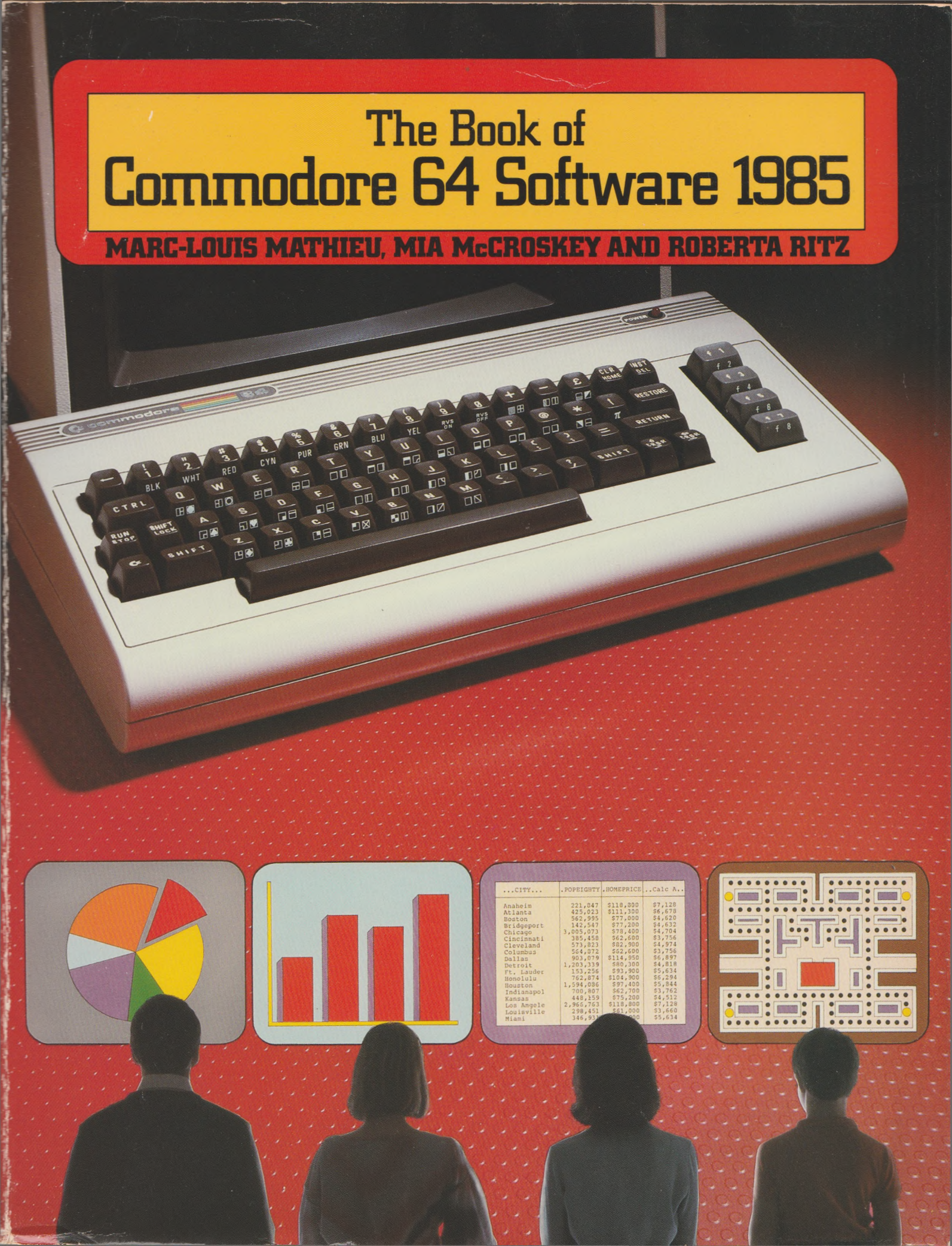
The Book of Commodore 64 Software 1985

MARC-LOUIS MATHIEU, MIA McCROSKEY AND ROBERTA RITZ



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Commodore 64 Software 1985

MATHIEU, McCROSKEY, RITZ

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Introduction

The Present

Welcome to the world of Commodore Software! As a consumer who owns or who is about to purchase a Commodore computer, you need a source of timely and reliable information about the software products available for your computer. *The Book of Commodore Software 1985* is the source of this much-needed information. Now that The Book is available, making the right choice has never been easier!

When you bought your Commodore 64 computer, it is very likely that it was your first full-featured computer hardware purchase. Many of you had previously owned Commodore's VIC 20, the little computer that started a revolution in the home computer market. With the introduction of the popularly-priced VIC, Commodore brought personal and family computing and computer education within the reach of millions of Americans for the first time.

Phase two of this computer price/performance revolution occurred when Commodore announced the C-64 computer with its expanded memory capacity and its extended list of features. By the end of 1984, several million individuals own Commodore 64s, making it the highest selling computer in history. Commodore didn't win the sales battle of 1983-84 without a challenge. Established contenders, such as Texas Instruments, Radio Shack, Atari, and heavy-weight marketing specialists like Timex and Coleco, with its Adam system, engaged in a price war that redefined the home computer industry. When the dust had settled, some of these companies had survived with their products selling reasonably well, but Commodore had emerged as the dominant force in the affordable-computer marketplace.

By now, you've started to explore the exciting world of personal computing. You've had rewarding experiences and, perhaps, a few frustrating ones. You may have tried your hand at programming your Commodore computer. You certainly have enjoyed hours of fun and recreation through the computer games and other entertainment programs you have purchased. The majority of you have acquired floppy disk drives, printers, and other equipment adding power and flexibility to your Commodore computer system. These add-ons are providing even more potential for your enjoyment of personal computing.

But, what next? Well, get ready for another challenge. Phase three of the small computer revolution has already occurred. The Commodore Software Revolution! Through 1983 and 1984, what started out as a small trickle of computer games and home/personal software products has turned into a gushing torrent of business, education, entertainment and personal productivity programs flooding the marketplace and offering a seemingly infinite choice to you, the consumer. But how to find out what products are available? How to decide which products meet your special needs or offer the best price versus performance standards? We trust that we've provided the right answers to these questions for you by publishing this book.

You made the right choice when you bought your Commodore computer. And, once again, you've made the right choice by purchasing *The Book of Commodore Software 1985*. The Book will enable you to survey what's on the market and to compare the

programs using valid and easily understandable criteria. *The Book of Commodore Software 1985* will open up new worlds of challenging, entertaining, educational, and, yes, even money-saving opportunity to you, the Commodore owner.

The Book of Commodore Software 1985 is a collection of critical reviews, not a directory of available products and suppliers. If you just want a listing of program titles with a few lines of glowing description tacked on (generally written by the public relations department of the vendor), you probably need a different kind of publication. The Book covers a majority of the most significant programs on the market in a number of key areas. Each program we review is analyzed in depth. In each review we summarize basic data and grade the product in the important performance categories. Furthermore, we provide descriptive information on the program's ease of use and its strengths and weaknesses compared to similar packages.

Any computer is only as good as the software that runs on it. As a Commodore computer owner, you face a dazzling selection of programs for a variety of applications. Programs offering similar functions have advantages and disadvantages as well as different prices. It is good to have many programs from which to choose, but it can be difficult to find the right program to meet your needs among the many competing for your software dollars. The right choice can be critical when a mistake can cost you many times the original purchase price of the program in frustration and lost time and business opportunities.

The Book of Commodore Sofware 1985 evaluates hundreds of the most popular software programs available for the most popular Commodore computers. While the emphasis is on the Commodore 64 computer, the informative and educational introductory essays offer a wealth of information about the world of Commodore computers. This information will help you learn more about the world of Commodore computing and help prepare you to choose software for whatever Commodore you now own or decide to purchase in the future. More than just a consumer guide, *The Book of Commodore Software 1985* is a learning experience! The Book offers an inexpensive way to look for the exact program or programs to suit your needs. In the following pages, you will find graded reviews describing some of the most popular, as well as specialized, software programs presently available. We hope that you will use it as a reference guide, as many software dealers do, to assist you in making informed and intelligent decisions when investing in software.

The reviews and evaluations published here were produced by experts in their various fields. Accountants evaluated accounting packages, office managers and professional writers tested word processing programs, teachers judged educational programs, and so on. These programs were field tested in the office, in schools, or whatever environment was appropriate. The reviewers evaluated each package according to carefully formulated criteria. In addition to subjecting each program to rigorous field testing, we compared each to others of its type. Our reviewers are consumers, just like our readers. The only difference is that they spend a lot more time working with a lot more different programs. They have no particular ax to grind, except the ax of consumer protection. They call the shots as they see them. For this reason, we do not publish the name of the reviewer with each review, but give instead our collective thanks.

Our reviewers do not review "demonstration" packages, such as those provided by software publishers to retail dealers for floor displays. The programs they test are the real thing, just as you would get them off the shelf. If they have a problem with the package, they call up the vendors for customer support without identifying themselves as reviewers, to find out exactly the kind of help ordinary customers receive. Reviews will always contain a subjective element, but everything has been done to ensure as fair and honest an evaluation as possible.

The Future

Commodore International has been associated with the leading edge of computer miniaturization technology since the early 1970s. Starting with some of the first low-priced hand held electronic calculators, Commodore has always been a leader in the trend to ever smaller, ever less expensive consumer-oriented computer products. In the late 70s, Commodore introduced the PET series of computers, a range of machines with their associated software that is still selling well all over the world in 1985. With the advent of the VIC 20 and the C-64 computers in the 1980s, Commodore has grown into a computer marketing giant, generating sales in excess of a billion dollars a year.

Where is Commodore going in 1985? What startling innovations will Commodore come up with next? More importantly, what does the future hold for the Commodore computer fan? We've tried to answer these questions for you.

We previously called the Commodore Software Revolution a "third phase" in the development of the trend toward low-priced computer power for the masses. With the terrific success of the Commodore 64 home computer, the development of a mass market for software and accessories for the C-64 system, and the vast resources that have been poured into meeting the demands of the Commodore market, the revolution will undoubtably slow down.

It is a fact of economic life that, no matter what is technologically possible for companies like Commodore to do, they will move toward and with new technologies at a speed that suits their own economic goals and plans. This simply means that, while new "start-up" companies offer what appears to be revolutionary products to the public, Commodore (like IBM, Apple, and other established producers of top selling computer products) will continue to support and promote their best-sellers, like the C-64. This does not mean that Commodore will fail to offer innovative products (as we shall soon see, they already do sell new computer designs), but rather, that new products will be introduced only when the timing is right. Commodore showed two new computer products to their dealers in January 1984. They choose not to put them into distribution until the Christmas selling season of that year (and even then in a somewhat modified form). Commodore is showing us that they apparently will not compete with, nor make obsolete, the best-selling products—like the Commodore 64—they are currently distributing and promoting. At the very least, there will be no apparent obsolesence at the time new products are introduced.

Commodore has great experience in tracking the selling cycle of their products. Furthermore, the marketing wizards at Commodore know how to get the most out of their investment in research and development. For example, many computer market analysts predicted that the advent of the C-64 computer would immediately make the VIC 20 obsolete and that there would be little or no support for the large numbers of VIC owners. Indeed, many of us hurried to buy the "latest" Commodore design and ceased to invest further in our VIC 20 systems. Our desire for a new, improved Commodore was fulfilled. Our fears that the VIC 20 might not have the support we depended upon were groundless. There were probably two main reasons that the VIC survived. First, the established VIC market was large enough for Commodore and many other software vendors to support. Second, Commodore continued to produce large numbers of the profitable and proven VIC 20 and to emphasize sales in Europe and other markets that were relatively undeveloped.

Over two million VIC 20s were sold by the time production ceased in 1984. Commodore has announced that they have "hundreds of thousands" of VICs available to take care of special marketing and service/exchange contingencies. As with many other computer products (like the legendary Apple II), Commodore PET, VIC 20, and C-64 computers,

software, and various systems "add-ons" are going to be around for a long, long time. Your investment in Commodore was a wise one, an investment that will be paying dividends for years to come.

So what's new at Commodore? Lots! With more to come! First of all, the Commodore 16. The C-16, Commodore's new low-priced entry into the home computer sales sweepstakes, gets its name from its 16K RAM memory capacity. For around $100 Commodore has produced an entry-level computer with the work space for programming and data entry that many of us had added to our VICs at that very price! The C-16 looks very much like the VIC 20, but the many internal improvements should make this product a winner in the low-priced computer market. Its emphasis on introductory computer education and home productivity sets the C-16 apart from the VIC. This is not a game-oriented general purpose machine. The C-16 does not have all the capabilities of the VIC 20 for entertainment and, indeed, will not run VIC software at all. One long overdue feature is the inclusion of an "Introduction To The C-16" program right in the package. This tutorial, along with Commodore's traditionally excellent owner's manual, should make getting started easier than ever for the first time Commodore computer user.

Commodore's new Plus 4 is even more different from the less-expensive C-64. Its newly designed (and very attractive) case features separate arrow-shaped cursor movement keys located to the right of the expanded keyboard. Following the industry trend toward "bundling" software along with the hardware, Commodore includes an extensive array of programs in ROM (Read-Only Memory) built into the Plus 4. The built-in programs include word processing, database management, spreadsheet analysis, a graphics package, and a new Commodore BASIC programming language. While offering a full 64K RAM of usable work space for the built-in software or for programming, the Plus 4 does not offer the fabulous Commodore SID (Sound Interface Device) chip—the three voice synthesizer circuit that has made the C-64 computer one of the best home entertainment values on the market. The welcome addition of serious software and a more functional keyboard design is an indication of the Plus 4's role as a more serious word processing and financial applications computer.

Commodore has elected to utilize new technology as well as a different marketing emphasis in producing these new machines. The basis of the incompatibility of these offerings with the VIC 20 and the C-64 is in the choice of a different "brain" for them. These machines utilize the 75C01 microprocessor chip. This new low cost chip makes it impossible for the new machines to "talk to" Commodore's earlier generations of computers, or to use some of the peripheral hardware devices sold with them. So don't throw out those terrific VIC 20 and C-64 game machines yet! Also, don't expect to be able to buy and run all the programs the Commodore software revolution has made available to you in the past few years. Unless the software industry decides to make a massive effort to convert the thousands of VIC and C-64 programs now on the market, only time, and the sales results, will tell how many new and useful programs will be available for the newcomers to the Commodore computer family.

Finally, for the Commodore PET fan, there's great news for 1985. Commodore Business Machines of Canada (Scarbourough, Ontario) has announced the Commodore 8296. This newest PET features 128K RAM, new high-density dual disk drives, and a tilt and swivel, full eighty by twenty-five screen. All of these features are wrapped up in a package combining the most attractive features of the Super PETs and the B- and C-series computers. The Commodore PET-oriented business and education markets are being supported with an exciting new product with built-in software including word processing, database management, and spreadsheet analysis. This software, coupled with an extended array of system utilities, should make the Commodore 8296 a serious choice for the sometimes-neglected PET owners of North America and Europe.

Many Commodore owners have been introduced to the world of personal computing through the VIC and the C-64. Their loyalty to Commodore is somewhat strained, however, as they realize the success and the functionality of more expensive and powerful computer systems from competitors like Apple and IBM. Many of you are ready to make the investment in computers with more capabilities, or would simply like to have the choice

of powerful and popular software available on other more expensive machines. Will Commodore continue to ignore the IBM-compatible market? Will Commodore be content with their traditional marketing stance, selling huge amounts of low-priced products in a mass market they not only understand, but are largely responsible for developing in the first place? We don't think so.

There are three major possibilities that Commodore might entertain as it analyzes the computer market and makes its plans for the future. First, Commodore could come out with an IBM PC-compatible computer. There are thousands of good, solid, useful, and well-known programs available for PC-compatible computers and operating systems. Commodore could introduce such a machine and, indeed, has purchased the rights to market the technology of the Bytec Hyperion, a Canadian product in the PC marketplace. With the new found success of the IBM PC*jr.* and other new low-priced entries in this market, we don't believe that Commodore will choose this option.

Second, Commodore could avail itself of the new technology provided by the availability of the 65816 microprocessor. This new chip provides 16-bit power and greatly improved speed, and is absolutely compatible with the PET, VIC 20, and C-64 computers Commodore has been selling for almost ten years. A hypothetical "CBM 65816 PC" would offer millions of Commodore fans an upgraded product that would allow exciting new programming advantages and provide a "migration path" for the thousands of Commodore programs available in 1985. We think that Commodore will take a "wait and see" attitude toward this option. Don't expect to see this type of Commodore product until 1986, or until the C-64 selling cycle is winding down. The success or failure of the C-16 and the Plus 4 in 1985 will also be a determining factor.

The third possibility for the future of Commodore computing revolves around entirely new concepts of computer technology. Commodore, a traditionally evolutionary company, has made step-by-step improvements in their products' performance and made their prices more competitive. Each product has built on the success and technology of past products. Other companies attempting to bypass some of these evolutionary steps, have tried to introduce revolutionary new concepts in performance or price to that part of the computer market hungry for innovation or requiring much more performance than has been available. Companies like Grid, Mindset, and Gavilan come to mind. These firms have had varied success, but the writing is on the wall for Commodore to observe. Some company is going to introduce a radically new product that sells very well to individuals who are willing to invest in a computer system that breaks with past traditions.

Mindful of these possibilities, Commodore purchased the Amiga company in 1984. Amiga has been developing a product since 1984 that is radically different in price and performance from the products being sold by the major suppliers. The Amiga uses the Motorola 68000 microprocessor, a chip that, to date, has only been used in expensive professional computers and in the Apple Macintosh. Using this very expensive and powerful microprocessor along with custom-designed Very Large Scale Integrated Circuits gives the Amiga computer speed and graphics capabilities unavailable prior to 1985 at such a low price. The Amiga computer, code-named "Lorraine," will reportedly be sold for $1200-$1500! This powerful, capable, and blindingly-fast machine will be sold at a price comparable to current Apple II and PET computer prices. This is the product we expect to see available in June of 1985.

Commodore International is an aggressive company possessed of vast resources. They have wisely used these resources to buy into the technology of the future and to put themselves in a position from which they can move in any of the directions the home computer market is likely to take. Whether Commodore sees the need to produce PC-compatible computers, evolutionary machines based on their current range of product offerings, or revolutionary new systems pulling the leading edge of future computer technology closer to the present, they are ready for 1985. The prospects for the Commodore computer user have never been more exciting.

—Marc Mathieu

Criteria

Each review begins with the program's vital statistics and the grades assigned it by our reviewer. In addition to the program name, vendor, and price, review headers include crucial information about the program—"supports 80-column modification," for example—and indicates if the program is for VIC 20 (no indication means the program is for the Commodore 64). The icons following each review convey specific information about it. Each of these icons is explained below.

We employ the familiar A through F letter grading system, "A" indicating superior and "F" unacceptable, with certain exceptions. The specific rating of graphics and educational programs (Graphics Quality and Educational Value) appears in the form of icons just below the grades, with five equivalent to an A and one to an F. Entertainment programs receive a Challenge rating of Easy, Medium, or Hard. Adventure games include the number of saved game positions (Save/Restore) you can put on one disk. Throughout the book, a grade of N/A means the reviewer found that grade not applicable to the program.

Overall Rating—How the program stacks up against its competition, based on all of its features and other grades.

Ease of Use—A measurement of the program's "user-friendliness." Takes into consideration how long it takes to learn the program, whether the commands are logically arranged, whether functions that should be simple are overly complex.

Documentation—An overall grade for the program's supporting text. The grade is based on clarity, completeness, physical presentation, and so on.

Reliability—The program works as it should and doesn't hang inexplicably, destroy data unasked, or flash obscure error messages.

Error Handling—Whether the program deals well with your mistakes—it should tell you what you've done wrong, not dump you back into the operating system.

Value for Money—Based on its own features and the standards set by the marketplace, a judgment of whether the program is a bargain or overpriced.

Educational Value—How well the program fits into a curriculum or supplements a course of study. Whether it effectively covers the intended subject, and whether what it teaches is best taught by a computer.

Graphics—Whether they're clear, colorful, and well done, or boring, muddy, and poorly animated.

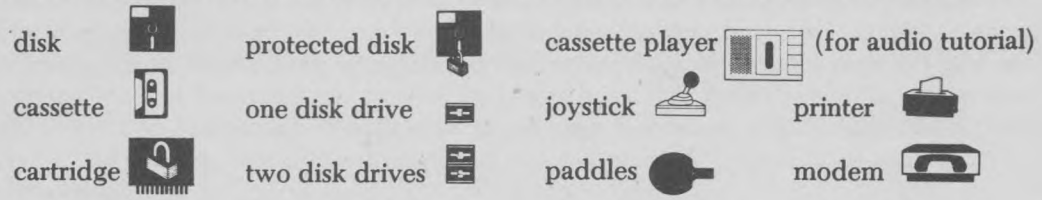
Creativity—The game is based a new, refreshing concept, and isn't a remake of something that's been done three hundred times.

Challenge—How much effort it takes the average player to win.

Vocabulary—Adventure games should understand a variety of synonyms and accept a wide range of verbs.

Holds Interest—Good games keep you playing for hours. You'll give up on bad ones in ten minutes, tops.

Game Depth—The game's level of detail and activity. You shooting at a single alien ship is one-dimensional. You flying a multi-function ship against dozens of aliens, all with different functions is deep. Multiple screens, and/or levels of play, add to game depth.



Disk, cassette, and cartridge refer to the format(s) of the program. A disk or cassette icon accompanying a cartridge may also indicate that the cartridge-based program can store data on these other media (read the review for specifics). Black icons are required to run the program. Outlined icons are recommended by the reviewer.

Business

Commodore computers (specifically, the PET series) have traditionally functioned in small business and scientific applications since they were introduced in the late 1970s. However, the success of the Apple II computers and CP/M-based computers resulted in a shift of emphasis by Commodore away from business applications. Indeed, the PET line-up of machines did not successfully garner a large share of this particular market. Business applications were chiefly programmed for the Z-80 microprocessor-based machines which used the CP/M operating system. Commodore even added CP/M compatibility to some of their computers, but to no avail. The small business and scientific applications market developed around competing systems from other manufacturers. With Commodore's development of the inexpensive home computer (the VIC 20), most computer enthusiasts felt that Commodore has abandoned the business market entirely.

The sales statistics concerning the VIC 20 and the C-64 computers started to change this. Where there are millions of computers of any make or model in usage, there is going to be an opportunity to sell large numbers of a variety of software programs. This opportunity was perceived by a number of software suppliers and a vast selection of business applications programs have become available for Commodore home computers, especially for the C-64.

Once upon a time in the world of American business, large companies decided to use huge electronic monsters called digital computers to speed up the handling of crucial, repetitive tasks. These activities had kept legions of paper shufflers and filing clerks busy from 9 to 5 and then some. Government agencies, insurance companies, and large corporations whose income statement or general ledger looked like the Manhattan phone directory (and took just about as much time to prepare and bind) turned to computers to enable them to handle their workloads a little faster and better. While employees initially resisted the introduction of computers into their work-a-day world, in the end an interesting phenomenon was observed. Not only were large numbers of workers not replaced by computers, but the majority of them were, of necessity, retrained as keypunch operators and as operations and support personnel. They found themselves possessing new job skills that demanded a higher rate of pay. More work was getting done and the businesses using computers were more competitive in their industries. Finally, the bottom line showed higher profits.

The business community learned two lessons. First, that computers did not necessarily put anyone out of a job. Second, that computers had proved to be cost-effective.

Small businesses kept plodding along doing things the direct, time-consuming, normal, safe way. When a small business decision-maker got interested in business automation and consulted a computer expert about using a computer in his or her business, the advice given was usually simple and to the point. Buy or lease a multi-hundred-thousand dollar machine, hire some programmers who don't understand your business, spend six months or a year preparing to use the machine, spend six months converting your business systems to the new requirements of the computer system, and then, good luck with the results, which were definitely not guaranteed. Needless to say, Tom's Hardware, Dick's Distributing, and Harry, the lawyer, found the prospect of using computers in their businesses less than attractive!

When Apple, Commodore, IBM, and others started to sell computer systems and software that was tested and reliable, in packages that cost three to ten thousand dollars, the usage of computers in small businesses increased and became a trend that shows no sign of slowing down. In 1985, there are about two million Commodore 64s distributed across America. Is it time for another quantum leap in the level of computer usage in the business

community? Is the world ready for the thousand dollar business computer system based on the affordable Commodore computer? Is the computer software available to enable businesses to use the Commodore computer effectively in their day to day activities at a cost that is almost negligible compared to the other expenses associated with doing business? The answer is yes, and no.

The "no" answer is based on the experiences many small businesses have had in the last few years as they have struggled to use moderately expensive personal computers. They have sought an aid to efficiency and profitability, a solution to the problems associated with rapid growth coupled with a lack of experienced or trained personnel, or, perhaps, an enhancement of status. The results have been mixed. Only recently has the situation stabilized to the point where the software is available to get the job done, and to the point where machine obsolesence does not threaten the initial investment made in business automation.

The "yes" answer to the question of developing a Commodore-based business computer system is as complex and difficult as the "no" answer. Business decisions are always difficult, and can be critical when money is being potentially wasted. The current generation of Commodore computers certainly offers the memory capacity and speed equivalent to many of the other computers used by small businesses today. But there is more to it than the evaluation of the actual computer itself. The speed, power, and price of the software programs used, and of the additional hardware needed (disk drives, printers, telecommunications devices, etc.) have much to do with the decision to develop your Commodore home/personal computer into a tool to be used efficiently and cost-effectively in your business. Certainly, your Commodore can be used as a word-processor, speeding up and improving the handling of letter-writing and report preparation in your business. The results may rival those obtained, a few years ago, only by ten thousand dollar dedicated professional word processors. Spreadsheet analysis and financial forecasting for your business can definitely be achieved using your Commodore and some of the software programs reviewed in this book. Certainly, mailing lists and other databases can be stored and manipulated to your business' advantage using a Commodore computer.

You will find, as you go through the following reviews of the business-oriented programs available for your Commodore, that almost any one function can be handled for your business. However, there is some reason for caution. First of all, you will need to invest a reasonable amount of money if you hope to make your Commodore computer a useful and dependable part of your business activities. More importantly, the time invested will be worth more than the cost of the equipment and programs. A major mistake in the selection of programs and hardware (compounded by the time lost in the attempt to automate your business and by the time lost in correcting these mistakes) could bring you to the point of suffering serious financial loss.

Now that we have cautioned you about using your Commodore as a business computer (and, we hope, haven't scared you to death...!), let's look at the up side. In the following section of this book, you will find reviews of dozens of useful computer programs that fulfill many necessary business functions. Generally, the quality of these offerings is high, reflecting the strong competition among software publishers.

But not all software is created equal. These programs offer widely differing features and functions. Programs that appear to be quite similar are offered at widely varying prices. This wide variety of business software selections and at times startling range of prices doesn't necessarily mean that one program is "better" than another. It simply means that they are different. Different in their intrinsic goal of functionality, no matter what their name implies that they are trying to do. "Randolph's Magic Accountant" could be a program that is most effective as an invoice preparation program. While it might not substitute for hard-working Doris who does your books, "R.M.A." might be just the ticket to enable you to get your actual billing done better and cheaper than ever before. Different in the speed at which they allow you to do your work. "Devastating Database IV" might have so much overhead associated with "booting up the system" (that is, turning on the computer and preparing to enter data into it) that it might be more trouble than it's worth to use it to store and manipulate a short list of customers. Different in the way they store information

and in the ease with which information can be looked up and used. "Super Mail" may be just a tad chauvinistic when it comes to accepting the files from "Devastating Database" and refuse to print out the labels you need to send out your new advertising literature or customer billings. Different in price for an equivalent amount of performance. "Rolls-Royce Business Supplies Inventory Manager" would appear to be the Cadillac of inventory control programs, priced at $199.95. However, "Incredible Inventory" at $39.95 might be the Chevrolet way to get the job done. Finally, business software can be different to the extent that individual programs interact with each other as part of an integrated accounting system. An integrated system is designed to accomplish a whole range of tasks in an orderly and efficient way. This type of software has now become available for the Commodore 64 and represents both a breakthrough in the state of the programming art, as well as an opportunity for Commodore owners to automate their businesses at a lower cost than was previously thought possible.

Picking up the right software and hardware add-on products for your Commodore is not an easy task. Business automation is serious business! Serious (and expensive!) mistakes can be avoided and there are financial rewards possible for the Commodore owner willing to do a little consumer research and make rational choices. Excellent business software is available for Commodore computers as never before and we're here to help guide you in your selection. *The Book of Commodore Software 1985* is part of Arrays, Inc.'s commitment to providing the kind of information you need to make the right choices.

—Marc Mathieu

Word Processing

When the first word processing program, *Electric Pencil*, appeared in 1977, the entire concept of applying the power and speed of the microcomputer to typing and writing seemed revolutionary and exciting. Suddenly, professional writers had at their disposal a powerful new tool offering the potential to immensely improve their productivity. The benefits of computerized word processing were so obvious that, practically overnight, they inspired a new industry.

Writers who had merely hoped to own an expensive professional electric typewriter someday, started to dream a different dream. They visualized an entirely different approach to composition, revision, and printing out their work. The concept of typing, correcting your work and retyping it repeatedly until the job was finished became instant history. The availability of word processing on relatively inexpensive microcomputers made it a whole new ball game.

In 1985, word processing is the standard mode of operation for thousands of writers. The speed, flexibility, and logical organization of word processing programs eliminate retyping, leaving more time and energy for composition. A word processor allows you to write at the keyboard, making changes to your work that you couldn't do on a typed manuscript without reams of erasable paper, scissors, and paste. When you are through, you store your work on a floppy disk—it only takes one to hold a medium-sized book—which you can recall later to edit and proofread. You can make as many revisions as you like, keeping previous versions or erasing them. Finally, you can produce a clean, corrected printout of your text without retyping it.

No single word processing program is the best. Some programs are designed to offer powerful features to professional writers who need them. Other word processors offer instant results for those who desire to perform simple tasks with minimal training and effort. No one program seems to offer the speed and simplicity required to justify using your computer for small jobs coupled with the powerful features needed for major writing projects. You should decide whether you want to "type" using a word processor, or whether you really want to "write," that is, to compose or create at the keyboard using the features offered by the most complex and powerful programs. There is a trade-off to be made. You usually gain speed and ease-of-use in a word processor at the expense of sophistication. In the more expensive programs, you generally find all the features you could ever want, but you must accept the time-consuming overhead of complex editing and file manipulation command sequences.

The key to choosing a word processing program is determining what you want from it first. The designer who wants stylized printouts, but expects to do little text entry or editing, does not want the same program as a newspaper columnist or bestselling novelist. Will your files be long or short? Will you be combining form letters with a mailing list? Do you want a program your kids can use? Do you have other software with which you want it to integrate? As you read the reviews of word processing programs, you should have a very clear idea of your needs—whether they be simply writing letters, magazine articles or compiling financial reports with graphs and tables. Once you have defined your needs and seriously looked at the reviews in this book, you'll be prepared to choose the word processing program that's right for you.

Word processing programs have three components: the editor, the file manager, and the print formatter. The editor is the part of the program that accepts what you type and helps you insert, delete, move, and otherwise manipulate text. The file manager performs some similar functions, but on a larger scale; with it you create, erase, copy, and otherwise manipulate files on cassettes or floppy disks. The print formatter organizes your work into an attractive whole and sends it to your printer.

Editing

Editors tend to fall into two categories: mode-oriented and non-mode-oriented. Mode-oriented editors allow you to enter text in one mode, delete it in another, search, replace, reformat, and move the cursor in one or more others. When you open a file, you usually are in either insert or cursor movement mode. You enter all your text, then switch modes from delete to search and replace or insert as you go back and revise it. If you tend to write in big blocks and edit all at once, this sort of editor will probably do for you.

Non-mode-oriented editors function much more like dedicated word processors. When you open a file you can insert, delete, search, reformat, and move the cursor all over the screen. All functions are available to you all the time. You can type a few sentences, hop back and change a word, and return to where you left off, all in the blink of a cursor. If you tend to rethink your work every few words, this kind of editor is a must.

No two word processing programs are exactly alike, but most of them share many virtually standardized functions. The most important of these appear on the chart in this section. They are the ones you shouldn't have to live without.

Cursor control: the more the better. You should be able to move the cursor backward and forward by character, word, line, page, and to the end or beginning of the file. If you can't, the program had better have some other real whiz bang features. The last thing you want is an editor that forces you to move the cursor character by character, or even line by line, through a file.

Search and Replace: one of the most useful things your word processor can do. If you discover you've misspelled your great aunt Sybil's name throughout your letter to Grandmother, you can tell the computer to find the misspelled word and replace it with the correct spelling. In the process, you should have the option of searching from the end of the file, having the program ask you whether to change each occurrence as it finds it, changing all occurrences without even showing them to you, and ignoring or paying attention to punctuation and upper- versus lowercase.

Move Copy Blocks: the computer's answer to scissors and paste. Every word processor worth its bytes can move or delete user-defined chunks of text. You tell it where the beginning and end of the "block" is, put the cursor where you want it to go, and tell the computer to move it. You can delete the block, or copy it into another file on the disk.

Wordwrap and Hyphenation: automatically returning, and splitting words at the ends of lines. Virtually all word processing programs have a wordwrap mode. The only time you hit the Return key is at the end of paragraphs. With automatic hyphenation, you can forget about breaking long words. The program applies basic rules of syllabification to long words that fall at the end of lines. It automatically breaks them with temporary hyphens. When you change margins and reformat, putting the long words in the middle of lines, these hyphens are automatically removed. Some programs let you insert your own "soft" hyphens, which is useful when the computer can't figure out where the word breaks. Many allow you to turn off the hyphenation feature. If you plan to transfer your text to some other program, such as a spreadsheet or database, the soft hyphens may gum-up the works.

Undo and Windowing: These two recent developments are destined to become standard features. Undoing is recalling the last text that you deleted. Because of its newness, there is little standardization: some programs undo character by character, others can recover huge blocks of copy. A few allow you to set the amount of text that can be recovered. If you've ever deleted a beautifully crafted sentence by accident, you understand the value of Undo.

Think of your monitor as a window on your word processing file—you see part of the text, and scrolling moves it so your view changes. Now imagine that your screen is two or more smaller windows. Through each one you see part of a different file. You can cut pieces from one and paste them in another. Some programs allow you to adjust the windows' sizes. Some can have an infinite number on screen at once, others only a couple. Don't be fooled, though; a few programs that say they have windows actually can present only two sections of the same file on screen at once.

Screen Format: how the program looks and what it tells you. Minimally, your word processor should tell you the name of the file you're editing, what mode you're in (if it has them), and where the cursor is (by row and column). Hopefully, the screen display includes margin and tab settings, amount of free disk space, and some command reminders or help functions. When you look at a demonstration of a particular program, see whether you can work with the display. If it is too cluttered, or doesn't offer enough information, you won't be comfortable with it.

Other Considerations: Look closely at how command sequences are arranged on the keyboard. They usually correspond to either logical mnemonics (Control-W to move forward one word, for example) or convenient locations (such as all cursor movement keys within reach of your left index finger). Can you easily and repeatedly hit whatever combination of keys moves the cursor back and forth? Can you easily delete, insert, and scroll the text? Having to reach across the keyboard or to use both hands for one command is generally not acceptable.

File Management

File managers duplicate some operating system functions and introduce a few more. With them, you can create, delete, copy, rename, and transfer files. If they're really good, you can combine and keep backups of your files, and find out how much space you have left on the disk where you have stored your files. A few word processing programs actually lack file managers—when you boot them up, you're in the editor. When you save your file, you return to the operating system. It is not necessary to accept this limitation.

Backups: some programs keep the previous version of your file on disk as a backup. When you make revisions, the backup is updated to reflect the most recently unrevised version. You should be able to delete backups, and even turn off the automatic backup function. While it is reassuring to know that you have an extra copy, it takes up a lot of space on your disk, and sometimes just isn't that important.

Using Operating System Commands: from the editor or the file manager. If your file manager can't erase files, can you access the operating system command to do so without actually exiting the program? If it doesn't offer you a list of the files on disk, can you call up a directory? Ideally, your word processing program should be so transparent, you can execute any operating system command from anywhere in the program. This isn't usually the case. However, if you're composing your version of the Great American Novel and you get a "Disk Full" error message, it's nice to be able to remove the full disk, insert a new one, format it, and save your file to it, all without leaving the editor. Short of that, you should be able to delete some unimportant files from the full disk while still in the editor (making room for your new prose).

Save and Return: to put your most recent work safely on disk without actually closing the file. Remember that if the lights go out or there's a power surge, you will lose everything stored in RAM. Saving and reopening your file every few minutes is time consuming, but preferable to losing several hours of work. Even better, however, is a file manager that will save the file you're editing and automatically reopen it, preferably putting the cursor right back where you left off. Some programs do this automatically at timed intervals. This is just fine—until you realize that you've been editing the wrong file. If your program makes automatic backups, you're okay; just scrap the edited version and rename the backup as the real thing. Otherwise, it's wise to make backup files, or keep backup disks.

Print Formatter

First off, you have to have a printer. Word processing programs exist to make printouts of your text. Consequently, their print formatting functions are quite complex.

Screen Oriented: what you see is what you get. In the best screen-oriented programs, type that you want bold appears bold onscreen and words to be underlined are. Margins, tabs, and paragraph indentations all look on the monitor much like they will on paper. If you're a visually-oriented person, you'll like screen-oriented word processors.

Character Oriented: what you get has little to do with what you see. As you type, you enter print formatting commands like "¹P" to start paragraphs, or "#I" for italics. When you print out the file, the computer translates these symbols into formatting commands and you see how it looks. Some character-oriented programs can display the page as it will appear just prior to printing, but you can't edit it.

Pages: breaks should be indicated onscreen. You should be able to force them with a command in the text. Really smart print formatters will avoid widows—a single line of a paragraph alone at the bottom or top of a page. You should have the option of starting and stopping printing at any page in the document. If you only need a printout of pages 12 and 13, you should be able to get it.

Headers and Footers: like the running heads in a book, lines of text at the top or bottom of each page. Some programs will alternate two different header or footer lines on odd and even numbered pages. Normally, if a program can handle headers and footers it can also number your pages. You may even have the option of starting the page numbering with something other than 1. Footnotes are a special case; a few programs can actually place them on the bottom of the appropriate page—a real advantage to academic writers.

Spooling and Chaining: editing while you're printing, and printing several files one after another. Obviously, waiting for a long document to print out wastes your writing time. A few programs let you reenter the editor while a file is printing out, so you don't have to stop working. If you have several files that follow one another, you can chain them together and only execute the print routine once. Their page numbers can be continuous (rather than starting over at 1 with each one).

Justification and Proportional Spacing: text with even margins on both sides is justified. To justify your type, the print formatter puts extra space between words to space out each line. If your printer supports it, many word processors use proportional spacing—varied space between letters—to make the gaps between words smaller and the text more attractive. Text can also be flush left (or left justified), flush right (or right justified), or centered.

Special Effects: the more you have, the closer to typeset your printout looks. Unless your needs are few and you're very tolerant, you shouldn't settle for a word processing program that doesn't print boldface and underlined type. Beyond that, you might want subscript and superscript. If you expect to use accents a lot, an overstrike function prints a letter, backs the printer up a space, prints the accent, then goes on. It can also be used for emphasis if you overstrike with the same letter (but that's virtually the same as boldface). If you elect to use a non-Commodore printer, or some special features available on printers commonly sold with Commodore systems, you will have to pay particular attention to the characteristics of the printer interface you must purchase to get it to work with your Commodore computer. Expect the salesperson to take the time to confirm that a particular printer interface will let you take advantage of all the features of the printer that he is recommending to you.

Don't expect your Commodore and word processing program to perform like a $10,000 dedicated word processor. The best of the programs reviewed in this book may come close—and so do their price tags. Most are considerably less flamboyant, cost less, and can handle relatively straightforward word processing. All but the worst of the currently-available word processors are faster, quieter, and more efficient than a typewriter.

—Mia McCroskey and Marc Mathieu

Explanation of Word Processing Chart

● = performs this function or has this feature
/ = partially performs this function or has similar feature
* = sold separately (often applies to spelling checkers and mailing list managers)

Minimum Memory Required—The minimum amount of memory required by the program (in kilobytes).
Format—Commodore programs come on floppy disk, cassette, or cartridge.
Copy-Protected—The user cannot electronically copy the program.
Tutorial—Includes step-by-step instructions on a disk or cassette, or in the documentation.
On-line Help—As you work with it, the program can display helpful information. Help may appear on a small portion of the screen, leaving your work visible, or it may replace your work until you are through with it.
Overall Rating—How the program stacks up against its competition, based on all of its features and other grades.
Ease of Use—A measurement of the program's "user-friendliness." Takes into consideration how long it takes to learn the program, whether the commands are logically arranged, whether functions that should be simple are overly complex.
Documentation—An overall grade for the program's supporting text. The grade is based on clarity, completeness, physical presentation, and so on.
Reliability—The program works as it should and doesn't hang inexplicably, destroy data unasked, or flash obscure error messages.
Error Handling—Whether the program deals well with your mistakes—it should tell you what you've done, not dump you back into the operating system.
Value for Money—Based on its own features and the standards set by the marketplace, a judgment of whether the program is a bargain or overpriced.
Mode Oriented—The program has special modes for inserting, deleting, and even moving the cursor.
Move Cursor By... *Character* = C; *Word* = W; *Line* = L; *Page* = P; *File* = F; ● = All.
Delete By... *Character* = C; *Word* = W; *Line* = L; *Page* = P; *File* = F; ● = All.
Undo—Restores the text you most recently deleted. Some programs can undo only a few characters, others can bring back large passages.
Block Manipulation—Sections of text can be specified and moved, copied, or deleted within a file.
Search/Replace—The program can search a file for a given string, and replace it with some other string.
Automatic Hyphenation—While in a wordwrap mode, the program automatically hyphenates words. These hyphens are automatically dropped when text is reformatted and they no longer fall at the end of the line. You should be able to turn off this option.
Upper- /Lowercase Changer—Using a one or two key command sequence, you can change the case of the letters the cursor passes over, converting all capitals to lowercase and vice versa.
Column/Line/Page Indicator—Displays the location of the cursor by column, line, and page.
Boldface/Underline—Printed output can include bold and underlined characters. You insert special commands in the text while editing.
Superscript/Subscript—Placing alphanumeric characters just above or below the line of type. Used for scientific notation and footnote references.
Tab/Indent/Margin Control—You can set multiple tabs, a special paragraph indent, and right and left margins.
Justification—*Full Justification* = FJ; *A flush left margin* = LJ; *A flush right margin* = RJ; *Centered text* = CJ.
Variable Line Spacing—As on a typewriter, setting the text at single, double, triple, or some other spacing.
Variable Page Length—You can adjust the number of lines or inches per page.
Page Numbers/Headers/Footers—Automatically numbering and placing user-specified headers and/or footers on the pages of a document as it is printed. Some programs do only one or the other, or some limited combination.
Embedded Print Commands—Including commands for format changes such as bold, italic, tabs, margins, page breaks, and footnotes in the text without having to use any special format, such as isolating the item to be underlined on its own line.
Print Preview—While it is not displayed in a formatted form as you edit, the program can display the text in a non-editing mode on the screen as it will appear printed.
Maximum File Size—The largest text file the program can work with, in kilobytes.
Multiple Drives—The program saves to and loads from a disk drive (or cassette) other than the one where it resides.
Display Directory—Displays a list of the files stored on any currently available disk or cassette.
Merge—Files stored on disk or cassette can be merged with the file currently being edited.
Telecommunications Format—Many word processing programs use proprietary formats for storing files, making it next to impossible to transfer them via modem to any other programs. A few communications-oriented programs store files in a more universally acceptable format, or offer a special format for telecommunications.
Initialize New Disk—While editing, can you initialize an as yet unformatted disk.
Automatic Backup—Automatically storing a copy of the file's previous version on disk.
File Chaining—Can link several files to print out one after another, usually with continuous page numbering and/or headers or footers.
Print Partial Document—You can specify which pages of a file you want printed, beginning and ending anywhere within the file.
Proportional Spacing—If the printer supports it, the space between letters in fully justified text can be adjusted to avoid ugly gaps between words.
Index—An alphabetical list with page references to help you find information in the manual quickly.
Reference Card/Keyboard Template—Some form of card, folder, or poster with brief explanations of the program's commands that you can keep by your computer.

Word Processing Chart

	General			Grades						Editor			
	Copy-Protected	Tutorial	On-Line Help	Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Mode Oriented	Move Cursor By ...	Delete By ...	Undo
Bank Street Writer $69.95	●	●	●	B+	B+	A-	A-	A	B+	●	C	C	●
Bliztext $49.95		●		C-	D	D	D	D	B		C,W P,F	C,W L,P	
CircaScript $39.95			●	C	D	B-	C	D	C		F	C,W	
CO_2 Write Now $49.95		●	●	B+	B+	B	B	C-	A	●	F	C,W	●
Cut and Paste $50.00	●			A	A	C	A	A	B	●	●	●	●
Easyscript $45.00	●			B	B+	B	B	C+	B	●	C, W,L	C, W,L	
Homeword $70.00	●	●	/	B+	A+	A	A	B	B+	●	●	●	●
Letter Wizard $49.95		●		B	C	A	A	A	B-	●	●	C,L	●
Micro Wordcraft $34.95	●		●	C	C	D	B	B-	B	/	●	●	
Omniwriter & Omnispell $59.95		●	●	A	A-	B	A	A-	A	●	C,W P,F	C,W L,P	
Paper Clip $69.95	●	●		A	A-	A	A	A	A	●	C	C	
Script 64/Scratch Pad $139.95/$69.95	●	●	●	B	C	B	B+	A	B	●	●	●	●
Totl. Text v. 2.5 $34.95 (tape), $38.95 (disk)/v. 2.6 $39.95 (tape), $43.95 (disk)		●		F	D+	B	B	C	D		C,F	C	
Typro $58.00			●	D+	B	D	C	C	D+	●	C, L,P	C, L,P	
Wordcraft 40 $124.95		●		D	C	C	B	C	D	●	C,F	C	/
Word Machine & New Machine $19.95				C	C-	B	C	B	B	●	C, W,P	C	
The Word Processor $49.95	●	●		A	B	C	B	A	A	●	C,W, L,P	C, W,L	●
Word Processor-Personal Version $39.95	●	●	●	B	B	A	A	A	B	●	C, W,F	C, W,F	●

					Formatter									File Manager							Printing			Doc	
Block Manipulation	Search and Replace	Aut. Hyph.	Up- /Low. Case	Col./Ln./Pg. Ind.	Bold/Underline	Super-/Subscript	Tab/Ind/Marg. Control	Justification	Var. Line Space	Var. Pg. Length	Pg. #s/Head/Foot	Embed. Print Com.	Print Preview	Max. File Size	Multiple Drives	Display Directory	Merge	Telecom. Format	Init. New Disk	Auto. File Backup	File Chaining	Print Part. Doc.	Prop. Space	Index	Ref. Card/Key. Temp.
●	●		●				/		●		/			3000 words		●		●	●	●				●	
●	●		●	●	●		●	FJ	●	●	●	●		24K		●		●	●		●	●		●	●
●	●				●	●	●	FJ,LJ CJ	●	●	●	●		39166 bytes		●	●		●			/		●	
●	●			●	●	●	●	●	●	●	●	●	●	30		●	●		●		●	●	●	●	●
●	●				●		●	LJ	●	●	●	●	●	29		●			●			●	●		●
●	●		●		●	/	/		●	●	●	●		20 pp.	●	●	●			●	●	●		●	/
●	●			●	●		●	●	●	●	●	●	●	V		●	●		●	●	●			●	●
●	●		●		●	●		LJ, RJ		●	●	●		33K		●	●		●		●	●	●	●	●
●	●	/		●	●		●	●	●	●	●	/	/	268K Kb		●	●		●			●		●	
●	●			●		●	●	RJ	●	●	●	●	●	34,000 ch.		●	●		●		●	●			●
●	●		●		●	●	●	●	●	●	●	●	●	19K		●	●	●	●		●	●		●	
●	●	●	●	●	●	●	●	●	●	●	●	●	●	999 screens	●	●	●		●	●	●	●		●	●
					●		●	RJ	●		●	●		20K			●			●	●				●
●	●				●		●	LJ,RJ	●	●	/	●		V		●			/		●			●	
●	●			●	/		●	FJ,CJ				●	/	256K		●	●		●			●		●	●
●	●				●		●	●	●	●			●	28		●			●						
●	●			●	●	●	●	●	●	●	●	●	●	386 lines	●	●	●		●		●		●		●
●				●	●		●	LJ,RJ	●	●		●		20K		●	●		●		●	●	●	●	●

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Word Processing

BANK STREET WRITER

Broderbund Software, Inc.
$69.95

Overall Rating	B+	A-	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A-	B+	*Value for Money*

Bank Street Writer is a bare bones, inexpensive word processing program that is ideal for novice computer owners and students who need to write correspondence or class papers. Its most attractive aspect is the ease with which it allows you to enter and edit text. The authors have designed this uncomplicated package so that novices can have the word processing system up and running in less than ten minutes. You do not have to hassle with a complicated series of editing commands, and complex formatting codes. Best of all, a benign Help menu always shines down on you from the top of the screen, above the eighteen-line block of text you are entering or editing.

The program deals with text in two distinct and separate modes on a hi-res screen that displays both upper- and lowercase letters. Normally, you are in the Write or Correct mode. The cursor cannot be moved without damaging the text. The right or left cursor keys erase text in front of or behind the cursor. When you find you must move the cursor before making corrections or insertions, the back arrow key puts you in the Edit mode (where you move the cursor about using the cursor movement keys). The Edit mode also allows you to erase or move blocks of text. You can activate any of these functions by moving the highlighted menu prompt to the appropriate one, then pressing Return. While these blocks are limited to fifteen line segments, you can shift larger blocks of text in multiple passes. The blocks are clearly highlighted in inverse video, and if you make a mistake, while moving or erasing you can replace the last segment by using the menu cursor at the top of the screen to select the opposite function (i.e., Unerase or Moveback). Since only the last block of text you have operated on is available in the safety buffer, you must be careful when doing a series of block moves or deletes. In addition, the Edit mode has the capacity to do global Search and Replace.

A Transfer mode menu handles all I/O operations. You can load or save text files to disk, and disks can even be formatted from this menu. The prompts are adequate, and built-in safety features prevent you from losing data files. Even if you attempt to clear the screen from memory, the program asks you if you've saved your text. Printouts of your text are also performed from this menu. You're given the choice of printing the file as final copy or as a preliminary draft. The draft is printed as it appears on the screen, thirty-eight characters wide. This option is especially useful for editing.

Although you have fairly good control over the printed format of your document (including the ability to preview the page breaks and the setting of line widths and spacing), the final printed documents leave something to be desired. First, text cannot be fully justified. Purists will argue that this feature is useless without the facility for proportional spacing, in that there's often bad spacing between long words on a short line; still, it looks cleaner than a badly ragged edge. Remember, because this word processor does not have automatic hyphenation, the ragged edge look is quite pronounced. The program provides a rather lengthy, eight-character paragraph indentation feature. If you need a blank line between paragraphs, simply put in an extra carriage return. The program drives any printer; adjustments are made through the utility section.

Bank Street Writer can only fit about 2000 words in the Commodore 64's memory. Longer files must be saved in chunks on the disk. During printing, these segments may be chained together so there is no break in the text.

The documentation is just as easy to read as the program is to use. It is clear, concise, and logically arranged. A glossary in the back explains the appropriate terms. A backup disk is included.

Bank Street Writer was developed by the Bank Street College of Education and has been extensively field tested among students of all ages. I think it is a good choice for students, some older children, and adults who need a "minimalist" word processing system that is not complicated to learn or to use. The program is very forgiving if a user makes a mistake. On the nega-

tive side, it doesn't have a very good print formatter and I particularly dislike the design structure. It would be more natural to be able to move the cursor around the text screen when correcting or inserting text. Separate Write and Edit modes, which are designed to eliminate the need for control character sequences, make moving the cursor to change simple misspellings an unwieldy process because you often have to toggle excessively between the two modes. *Bank Street Writer* is user-friendly and inexpensive, but rather a nuisance for anything other than small and simple tasks.

BLIZTEXT

Elcomp Publishing, Inc.
$49.95

Overall Rating	C	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	D	C	*Value for Money*

Bliztext illustrates the difficulties that arise in developing software for word processing applications. If the system has few commands, it is easy to learn, but lacks necessary editing and file handling features. At the other end of the spectrum, very sophisticated word processing programs (like this one) risk intimidating or confusing you with a large number of options.

With over seventy commands, *Bliztext* is one of the most powerful programs in its price range. It offers more than thirty editing commands, including global Search and Search and Replace. Another handy feature, the 4K copy buffer, allows you to move blocks of text during revision or store a frequently used phrase for insertion wherever you want it in the text. An additional set of commands allows you to format printed output, giving you control over spacing, margins, tabs, and justification. You can also trigger special features of the printer to underline, emphasize, or change fonts while printing. A third set of commands handles disk and tape files, enabling the program to format disks, read directories, and save, read, and scratch files without exiting the program. In addition, *Bliztext* even offers a terminal mode to facilitate electronic data transmission through a modem. A section of the manual describes connecting the Commodore to RS 232 devices through the user port.

In fact, there exist few tasks that *Bliztext* cannot accomplish. However, you pay a price for all this power and sophistication. First, you must learn more than seventy commands (or look them up repeatedly). While the package comes with quick reference cards, many commands are arbitrarily assigned to keyboard letters when mnemonic codes could have been used for the more frequently used commands. It seems to me just as easy to assign at least the most frequently used functions mnemonically. Second, some of the commands take a complicated form. For example, putting a blank line between the salutation and body of a letter takes four keystrokes instead of a single carriage return or down cursor command.

A variety of other problems plague the program and its manual. The editing mode is permanently locked into what I would call an insert mode, making simple corrections (such as overstriking a misspelling, for example) a more difficult procedure than necessary. Another minor irritation results from the input format, which requires carriage returns after every four or five words to prevent the text from scrolling off the screen to the left. The manual, although complete, is sometimes awkwardly written and hard to follow. The tutorial covers writing, saving, and printing a single business letter and therefore doesn't take you through all the options this program offers.

Certainly *Bliztext* offers a great number of desirable features at a very reasonable price, but it also presents some serious difficulties for the user.

CIRCASCRIPT

Circadian Software
$39.95

Overall Rating	C	C	*Reliability*
Ease of Use	D	D	*Error Handling*
Documentation	B-	C	*Value for Money*

CircaScript is a disk-based word processing program for the Commodore 64, written in machine language. It creates a workspace of 39,165 bytes, or about eighteen pages of text.

My first reaction to this program was not positive. When I placed the disk in my Commodore drive and attempted to load it, the disk drive began to chatter and the red LED flashed. The disk was evidently stuck inside the jacket. To use it, I had to slice open the jacket, remove the disk and place it into another jacket, load the program, and save it on yet another disk (a procedure encouraged in the manual). Extreme measures, surely!

When you boot up the program, you first see the main menu, which uses black and white on a gray background (as does the entire program). It contains commands such as Save and Load, Print (which leads to a further Print Menu), Edit (which brings up the text area where you create and manipulate copy), and others that allow you to view the disk directory and return to BASIC. The last command is the same as typing "SYS 64738" and wipes out *CircaScript* plus any files not saved to disk. The Format command prepares a

new disk. Unfortunately, it offers you no opportunity to enter a unique disk name and ID, with the result that all disks created by this method receive the name "Data Disk" and an ID of 00. Note that formatting a disk and viewing the directory are the *only* two DOS functions possible with *CircaScript*. You cannot rename, copy, or scratch files, nor can you validate (V0) or initialize (I0). You must return to BASIC to perform any of these functions. Note also that the directory viewed under normal circumstances features file names in reversed capital letters, which causes unusual things to happen onscreen ("T" deletes the previous letter, "S" causes text to go to the Home position) and makes it very difficult to perform any DOS commands.

I didn't find *CircaScript* particularly user-friendly when entering information. Sometimes you press a key, other times you press a key and Return. The method by which you move from location to location was inconsistent as well. Pressing "X" to get to the Edit mode after viewing the program's four Help screens returned me to the text area. On the other hand, pressing "E" for "Edit" in the Print Menu produced the Main Menu, which required a further "E" to take me to the text area. Also in the main menu, the "I" for "Initialize," which clears all copy in memory, takes you to the text area whether you want to go there or not. To load another program, you must return to the main menu with the left arrow key.

You create text in the Edit mode, which has two major problems. First, you don't see a character when you press Return, which makes it difficult to tell where a paragraph ends. Second, the cursor behaves in a peculiar manner while you edit. The cursor is the same color as the text, but it does not move over the characters and flash in reverse. Instead, it moves between characters. The text moves around the cursor to accommodate it.

Horizontal movement of the cursor on a line creates no great problem, but vertical scrolling is erratic. As you scroll up or down a page, the cursor jumps to the right (usually the margin) whenever it encounters a new paragraph. This makes editing cumbersome. Unfortunately, that's not all. When you place the cursor in the middle of previously typed text, anything new entered from the keyboard will be inserted in the copy at that point. Watch out, because using Shift-Inst/Del to create spaces in the text may instead dump previously deleted characters from a buffer. Moreover, you cannot type over old text to change words (such as "four" to "five" by typing "ive" over "our"). You must delete the copy you don't want, then type in the new material with the cursor's "eternal insert" feature.

Other editing commands employing two of the function keys allow you to delete sentences and paragraphs. The Search (called Global Search) and Search and Replace options work very well. You can also manipulate blocks of copy, but this involves saving these blocks to and retrieving them from the disk under separate file names.

Choosing the Print option from the main menu calls up a Print Menu saved on disk as a separate file. This file includes values for margins, spacing, and so forth, which you can change and save if your values don't match the established ones. After printing a file, the program recalls the Print Menu. If you changed but did not save the values, the old values will reappear.

I had considerable difficulty in making *CircaScript* print out correctly using a Gemini 10 printer and a Cardco "A" interface—hardly an unusual combination. Using the secondary address of 7 in the Print Menu (the third number of the command Open4,4,7 directed to the printer) produced all lowercase letters, while the only other possible addresses with the Cardco interface resulted in lowercase letters becoming uppercase and vice versa. A call to the manufacturer cleared this up: make the device number in the Print Menu $0C, and the secondary address 0 or 4. After overcoming these problems, printing proceeded at a fast pace. One exception: the underlining, during which the printer paused for a moment. You can control all four margins of the printed page, up to 132 columns wide on the Gemini 10. You can make copy flush left, centered, or justified. The built-in tabbing worked very well.

CircaScript allows the insertion of special printer commands directly into the text in two different ways. I found that this worked well after a bit of experimentation. The manual doesn't discuss this feature in any depth, especially the use of the Escape Code—CHR$(27)—which triggers numerous printing tricks like super- and subscripts, emphasized printing, italics, and so forth. I discovered that my printer/interface combination would not handle Escape sequences in the range of 64 to 90, so I couldn't produce emphasized printing. I had to add 32 to the second value to get this, changing CHR$(27)CHR$(69) to CHR$(27)CHR$(101).

I found the thirty-six page manual adequate, although one of the examples (on Search and Replace) didn't work with the sample file included on the program disk. Despite some misspellings, the chatty style makes it easy to understand.

On the whole, I can't recommend *CircaScript* because of its editing peculiarities and the lack of logic behind some of the commands. It might prove adequate if you have no preconceived notions of word processing and only want to use the program for home use. You can get other simple-to-use word processing programs with more versatility for around the same amount of money.

C02 WRITE NOW!

Cardco, Inc.
$49.95
Save data to disk or cassette

Overall Rating	B+	B	*Reliability*
Ease of Use	B+	C-	*Error Handling*
Documentation	B	A	*Value for Money*

C02 Write Now! is an easy to use, professional quality word processor with most of the features a serious writer is looking for. In addition, it offers you a choice of screen colors, allowing you to choose the color combination least stressful to your eyes.

Formatting text takes only a few "dot commands." For example, to change the left margin from the default value of eight, you simply type ".lm #" with # the number of the column you want your left margin to begin with. Similar dot commands control the top and bottom margins, page length, and most other format changes. You can left justify type or center it. To double space, you enter ".ls 2" or replace the "2" with whatever spacing you want. The program complies without a whimper. You can also set page numbering, headers, footers, and a pause feature.

Of course, you don't need to know how to use all these features to begin using *Write Now*. Simply plug the cartridge in the game port of your Commodore 64, flip on the computer, and start pounding out your novel. If (or when) you find yourself in unexplored territory, just press the F7 key to call up five Help screens. I found them a pleasant surprise. The manual included with the program is easy to understand, but lacks an index or appendix. Cardco packs the cartridge with a "temporary" manual. They ship each owner a complete, updated manual when they receive the warranty card, which is a nuisance because it takes a minimum of two weeks for the card to reach them and the manual to reach you. Most owners will have dogeared the temporary manual long before the new one arrives.

Editing is easy. You can delete or insert single words merely by moving the cursor to the desired spot and typing in the correction. You can duplicate, transfer, or delete blocks of type just as quickly and easily. The cursor never moves from the center line of the screen, which means that you never find yourself staring at the bottom line on the screen, not knowing what lies just out of sight. People who use word processors with cursor scroll instead of text scroll will appreciate this feature.

Other high quality word processors for the Commodore 64 include most of the features I've discussed. However, *Write Now* includes four additions that give it an edge over many others. First, it has 80-column display. No, you won't see eighty columns of text, but you can preview your document on the screen before printing. This saves time, paper, and wear on your printer, and the screen display helps you spot formatting errors. My other word processor wastes an incredible amount of time and paper as I try to get the correct format. This feature is a delight. Second, the program comes on a cartridge, which means you just plug it in to start. Simple and time-saving, compared to loading from disk. Third, you get sound. When you type, you hear clicks for each keystroke to tell you that the program accepted that letter. This feature will delight people who prefer touch-typing from hard copy, rather than constantly referring to the screen to verify successful input. If you prefer the quiet, simply turn down the volume. Be careful, though, because if you turn the volume down you also turn off the audio alarms that alert you when you're doing something wrong. Fourth, you can print out selected pages rather than the whole document. This is a real plus.

Alas, all is not perfect in *Write Now*. Specifically, the disk version includes what I would describe as a "suicide switch." This is the F3/F4 key, which you use to either save or load a file. Unfortunately when you save a file, the program doesn't check for already existing files with the same name; it simply copies over the existing file. Because this feature, unlike the others, has no built-in double check, when you press Return the deed is done. If you meant to load instead of save, you have probably written over a file. I experienced this suicide firsthand. The manual suggests that you save every file twice, for obvious reasons. At least cassette users are less subject to incorrect use of this switch.

Another problem is the initialize command for disk users. This command is used in the normal course of a work session as you switch from disk to disk. Unfortunately, *Write Now* uses this command to perform what Commodore describes as making a disk "New": erasing information from a new or no longer needed disk. This command writes over the entire disk, which means that an innocent (or ignorant) user could destroy an entire library of files with this second suicide switch.

Finally, the program includes no direct command to read the error channel of the disk drive. Since it also lacks a true Initialize feature, the only way to turn off the error light with the disk version is to call up the directory. Therefore, you can't directly discover whether the disk is full or what other problem caused the disk to give you the warning signal.

These problems suggest that the program was written with the cassette user in mind and that disk commands were second thoughts. However, despite these dangerous problems, *C02 Write Now!* is a good buy. If aware of the problems, you can avoid them. Certainly the lifetime warranty that comes with the program indicates Cardco's confidence in their product.

CUT & PASTE

Electronic Arts
$50.00

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	B	*Value for Money*

"Easy to use" describes *Cut & Paste*. Electronic Arts put a lot of hard work into this word processing program to take all the hard work out of using it. It's a good word processing program for people who normally hate them—powerful, yet easy to use. The designers claim that you can use *Cut & Paste* within thirty minutes of inserting the program disk into the disk drive. With most other word processing programs, you wouldn't have gotten any further than the second chapter in the manual after only half an hour. In fact, Electronic Arts made no empty boast about the ease of use—you need know little more than how to turn on your computer.

The program comes with two disks, a Command Summary sheet, and a fourteen page manual. One breeze through the manual and you should need little more than the Command Summary for reference. This sheet contains most of the commands and sequences that you'll use. One of the disks contains the program, the other holds documents that you save. *Cut & Paste* differs from other word processing programs in that it will only read or write to disks formatted with *Cut & Paste* and no others.

Here's how Electronic Arts kept *Cut & Paste* friendly: they subtracted. They designed the program for the home market; apparently, they figured that most people would use it only occasionally and that users would want a program that allowed them to write, edit, and print without hassles. They judged complexity to equal hassle and subtracted complexity. That meant leaving out rarely used options—the same options that other word processing producers pride themselves on including. For instance, every other word processing program that I've seen includes Search plus Search and Replace commands. With these commands you can quickly locate specific words or sentences and either examine them or replace them with something else. Don't look for this option in *Cut & Paste*; simplicity won out. However, all this subtraction left room for two friendly options: the top screen lines always display the different documents available on the Document Disk, while the bottom lines display the various options available.

Let me give an example. To save a document, you need only press the Control key and the left arrow key. This activates the lower screen options. You use the right and left cursor keys to highlight the word "Save" and then press Return. The program prompts you for a file name. Then, as quickly as your disk can spin, the program safely saves your document. Loading existing files follows a similar process. Moving text around and duplicating passages are just as simple. So the trade-off in fewer options makes the remaining options much easier to use.

The casual user will find *Cut & Paste* the answer to a prayer. Different formatted forms (envelope, business letter, resume, memo, etc.) await the few keystrokes needed to activate them. These preset forms eliminate a lot of the pain and wasted time (not to mention paper) so often needed to get a letter correctly formatted and ready to print.

This is a sleek, bug free, and very friendly program. It detects and reads disk or printer problems automatically. After an error, the program informs you with clear and friendly screen messages and returns you safely to your document where you can make needed changes and either print or save your document again. But beware. If you need a powerful, full-featured word processing program to write a novel or for extensive business use, give *Cut & Paste* a trial test before you buy it. You may find that it lacks many of the advanced editing options that you want. To be fair, *Cut & Paste* does not target business users or professional writers. It proves itself a very good word processing program for the occasional business or home user. For the same money, you can obtain more complex professional word processing programs. However, none that I have seen are as easy to use as *Cut & Paste*, nor as quickly learned.

Originally written for the Apple computers, *Cut & Paste* comes with a ninety-day warranty. After that time, Electronic Arts will replace a defective disk for $7.50.

EASYSCRIPT

Commodore Business Machines
$79.00-$99.00

Overall Rating	B	B	*Reliability*
Ease of Use	B+	C+	*Error Handling*
Documentation	B	B	*Value for Money*

This powerful word processing program comes equipped with many desirable features, but it has obvious problems with the Search and Print commands which lower the ratings. However, in general *Easyscript* functions well. The professional manual contains many examples showing you how to use all available functions. A novice would feel comfortable using this manual, while the experienced user won't feel offended. Many warnings tell you which operations will destroy data in the working file.

Easyscript allows the following general functions: left and right margin set; flush left, flush right, and fully

justified margins; block move and copy line editing; headers; footers; inserting text files from the disk into the current text; printer format commands; search and replace; and others. You can also get a directory of the disk or format a new data disk without losing data in the work area.

The package has a few limitations, such as files no longer than 191 lines of text with eighty characters per line (2.9 pages single-spaced or 5.8 pages double-spaced). However, you can store longer text as smaller files and connect them with the Link File command when printing. Although there is no limit on the number of files linked, the disk only holds about fifteen files (forty-two or eighty-four pages per disk). You may use multiple disks to increase the number of files available. Another major limitation involves the Search and Replace function. First, you can only search from the current cursor location to the end of the file (not from the beginning of the file). Second, you have no way to replace selected occurences of the specified word(s)—the program replaces all of them. For selective replacement, you must use the hunt function, which takes a long time and becomes annoying during serious word processing.

The program supports a number of different printers, or you can select a standard ASCII printer. If you have a printer other than the Commodore CBM, Epson MX-80, Qume/Diablo, or Spinwriter, you cannot use the printer commands supported in *Easyscript*. However, you can use special printer commands of your own at the beginning of any line, using the *SA xx,n,n2....nx command. Another command allows you to embed printer commands in the middle of a line, permitting you to underline a single word, for example. However, the program counts the command as printable characters, which pushes the right margin out of position. This annoying quirk also hampers serious word processing.

Editing, although simple, differs from the commands commonly used in other word processors. With most word processors, entering a carriage return in the middle of a line during editing places the remaining text on the next line in the file. *Easyscript* erases text to the right of the carriage return; you just have to get used to this when editing.

Commodore has kept the program simple by using only three keys as major command keys. The F1 key switches between the Edit and Command modes. In the Command mode you use normal keys to select commands (L for Load, I for Insert, D for Delete, etc). The F3 key enters a format command such as full justification. The F4 key handles disk commands such as format a new disk.

In general, *Easyscript* suits most word processing applications, but don't expect the same features and ease of use that you get with more expensive word processing programs. It best suits small businesses, school work, or general typing tasks.

HOMEWORD

Sierra On-Line
$70.00

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A-	A	*Value for Money*

Homeword is one of the new breed of personal word processors. This program is menu-driven and uses "icons," or pictures, to represent the available choices. This eliminates the need to memorize complex control commands used to format, file, and print your documents. If, however, you want faster access to the program's features, you can also use the special built-in control commands that function the same as the icons.

The program is packaged in a thick plastic book that offers excellent protection for its contents. The book contains the program disk, a fifty-six page instruction manual, a quick reference card, various labels, write protection tabs, and an audio cassette tutorial with a written transcript of the tape. This tutorial offers an extremely easy way to learn how to begin working with *Homeword*—in a matter of minutes. The well written documentation targets the novice computer user and leaves nothing to chance in leading him through the basic operations.

Homeword employs a full screen text editor with automatic wordwrap. You can enter text in either of two modes: "normal" typing mode or "change" typing mode. The normal mode allows you to insert characters or words using the built-in cursor keys and the Insert/Delete key. The program automatically adjusts text following the cursor. The change mode allows you to type over or change text that you don't want. This mode does not insert or delete spaces.

Homeword's main menu contains six distinct sections. The Edit section lets you erase text by changing it with the cursor. You can also reinsert the most recently erased text somewhere else in the document, move text, copy text, find terms, and find and replace character strings. The Layout section lets you format your printed text. You can set the spacing of the top and bottom margins, left and right margins, or line spacing. You can start a new page or set the alignment of the text, choosing flush or left margins, centered or fully justified text. To set indentations, you can use numbers, letters, or special symbols of your own design. You can also choose different print styles if your printer supports them: boldface, normal text, or underlining. The VIC 1525 printer does not support them, but many

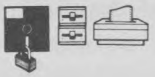
other, more expensive printers do. Finally, the layout section offers the important feature of headers and footers. You can also turn on or off or change the location of page numbers.

The Filing section offers a choice of four icons. Insert Document lets you combine two separate documents. Get Document lets you retrieve another document from the storage disk. Use the cursor keys to move around in the disk directory, and press Return to choose a file. To Save a document, you type the name and press Return the first time. If you Save the document again, *Homeword* saves it under the old name and appends .BAK (standing for "backup") to the old name. This gives you two copies of the document, saved under easily recognizable names—the original and the updated version. Include Document lets you insert a different document within, preceding, or following the document you are creating. The document to be included won't show on the screen, but will be positioned properly when you print the document.

The fourth section, Disk Utilities, lets you prepare a document disk, erase a document from the disk, see a catalog of the disk, or exit to BASIC. When preparing a new document disk, you exit to BASIC after formatting and must load *Homeword* again to continue. The fifth section, Print, lets you choose the type of paper, see the final document, change the starting page number, or print the document. The most impressive feature of this section is the see final document icon. This feature simulates a page of paper on your screen showing the exact layout of the document in the full 80-column print format. The custom characters in this mode are almost as readable as the larger 40-column character size used in the standard screen format. The sixth section, Customize, lets you back up documents, change preset margins, configure points used in indenting, change the parameters of the printer, choose either one or two disk drives, and save your customized choices on the program disk. When you save your customized choices, you rewrite the *Homeword* disk to make your changes a permanent part of the program.

Now let's look at what you see when entering text in the typing area. First, you notice the division of the screen into three parts. The largest part, your typing area, allows you to enter forty columns by fifteen lines of scrolling text into memory. The second part, a gauge in the lower left corner of the typing area, shows the remaining free memory and free disk space. You use this to judge when to save a document and when to change to another disk. The smallest area, the lower right corner, simulates the page as it will appear in the final document. You can't read the text (made up of dots, not characters), but you can get a good idea of the layout. This feature allows you to preview the final format of the page on the screen without wasting time and paper by printing out the entire document.

Homeword has the look of a top-notch program with strong support from the manufacturer. You can purchase a backup copy of the program disk after registering your ownership. In addition, a customer hotline service gives you the chance to ask questions and get help on using the program. As it stands, the program meets the needs of most people in the home market, but the inclusion of some features found in professional dedicated word processors (such as a spelling checkker . . . oops, I mean "checker") would really guarantee *Homeword*'s success.



LETTER WIZARD

Datasoft
$49.95

Overall Rating	B	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	B-	*Value for Money*

Letter Wizard would perhaps better be called "Word Wizard" or "Document Wizard" or something else that better implies its power. The "Wizard" part fits, however, because it might take a wizard to use the power effectively and efficiently.

First the positive aspects. *Letter Wizard* is written in machine language and loads very quickly (in less than one minute), unlike some word processing programs that give you time to have breakfast while they load. The main menu has three options: Edit, Print, and Disk Management. Disk Management allows you to view the disk directory, format a disk, validate a disk, delete files, copy files, or rename files—just about anything you want to do from inside the program. As a bonus, you can also view the directory from the Edit mode.

Choosing the Print mode calls up a menu with four choices of printer: Epson MX-80, Okidata, VIC 1525E, and NEC 8023. If you have a Star Gemini, Epson FX-80, or C. Itoh printer, the documentation tells you which menu option to pick. If you don't have one of the printers listed but one that's control-code compatible with one of them, choose the compatible option. If your printer is not compatible with any of those listed (or you don't know), you can experiment with the various options to see which works best for you. While having one of the listed printers makes it much easier to specify underlining, script type and size, super- and subscripts, etc., you can implement these manually by embedding the correct control characters in the text. The program doesn't offer a preview (or screen print) mode, so the documentation suggests that you write your document, preview it on the edit screen, then embed the formatting commands in the text just before printing.

Letter Wizard offers a full range of formatting commands. You can set all four margins. In addition, you can change the left and right margins relative to one another (plus or minus) to set off parts of the text. You can define headers and footers and have them printed automatically on every page, or only on the odd or even numbered pages, placed on the left or the right side of the page, or centered. To prevent the splitting of tables or lists between pages, at the beginning of the table or list you indicate the number of lines needed. If not enough lines remain on that particular page, the program skips to the next page. You can also chain files should your document spread over more than one file. You can also access a database and use only those fields in the database that you select. You can construct the database itself in the Edit mode.

The Edit mode is both the strongest feature and the weakest link in the program. A full-screen editor, it offers cursor movement in all four directions, to the beginning or end of the current line, to the top or bottom of the current screen, to the next page or the previous page, to the next tab position, and to the beginning or end of the file. You can modify or remove onscreen tabs. You can select from two typing modes: type-over, which prints over the text as you type; or insert, which pushes text to the right as you type. You can delete letters either to the right or to the left of the cursor, as well as lines, blocks, and all or part of a file. Should you make a mistake in deleting a line or a block, another command will correct your mistake. A Find and Replace command will replace any, some, or all occurrences of the given phrase at your command. You can define blocks and move, copy, or delete them. Besides the normal load and save operations, you can call up a disk directory, append a file on disk to the one in memory, or save part of the file in memory as a separate disk file should you want to use it somewhere else.

As you can see, this editor possesses a great deal of power. Unfortunately, getting the most out of it can become frustrating. You implement most of the edit commands by pressing two keys simultaneously. This is not unusual in itself, since many word processing programs work the same way. Most pick one key as the Control key with the second key a variable for each command. *Letter Wizard* uses seven different control keys! It uses F1, F3, F6, F8, Shift, Control, and Run/Stop, each at least once, either alone or in combination with a second key. If you use the program frequently, you *might* become skillful with the editor commands.

Overall, I would rate *Letter Wizard* as very promising. If you have the patience to learn the editor's operating system, you will have obtained a very good word processing program for a relatively low price.

MICRO WORDCRAFT

Audiogenic, Ltd.
$34.95

Overall Rating	C	B	*Reliability*
Ease of Use	C	B-	*Error Handling*
Documentation	D	B	*Value for Money*

Micro Wordcraft is a capable, disk-based word processor for the Commodore 64. A British import, it is a direct descendant of the popular *Wordcraft* series of word processors for the various Commodore PETs and VIC 20 computers. It is virtually identical in function to *Wordcraft 40*, the plug-in ROM cartridge version, that is priced at $74.95. (Please see the review of *Wordcraft 40* in this section of the book.)

With *Micro Wordcraft*, you can produce various kinds of reports, letters, and other documents simply and easily. A glance at the promotional literature and program documentation reveals this to be a competent word processor, suitable for the more complex small business, home, or club applications. The package includes a fifty-page (or so) user's manual in a ring binder, and the program disk itself.

Micro Wordcraft is screen-based. Thus, what you see on the screen is very close to what you get from the printer. This type of display is unlike that of word processors that imbed special characters into the text which appear on screen but do not appear on the printed page. Instead, *Micro Wordcraft* only uses a few imbedded commands on the screen to prevent distorting your view of what the final product will look like. The display is pre-set to use a sideways scrolling, seventy-five-characters-wide window with word-wrap; but the screen width may be changed to anything from three to ninety-nine columns. The default fifty-five-line page length (geared to British A4 paper) may also be changed.

Micro Wordcraft uses three operating modes: (1) the Typing mode, which is used for entering text; (2) the Control mode, used in conjunction with the Typing mode to enter necessary printer controls affecting localized portions of the text; and (3) the Command mode, which you employ to enter commands relating to the overall printed format, document viewing, disk handling, and the like. You access any of these modes by a simple keystroke command. Except for a start-up screen (used to adjust the software to your hardware configuration), menus are not used. Thus, for example, it's unnecessary to exit to a menu to call up a version of your document as it will look when printed, then go back—via a menu—to the Typing mode to input changes.

Since menus are not used, all of the commands must be memorized. Fortunately, the commands are simple, and they use reasonable mnemonics. For example, "P" is used to print a document, the Width command is

entered by pressing "W," and "S" means Save. In addition, you may use the Commodore's function keys to provide simplified access to the most-often used functions. Since there are no menus, *Micro Wordcraft* makes use of the top two lines of your display to keep you abreast of where you are in the document, what the word processor is doing, and how many bytes (characters) of memory remain available (26,864 characters are available upon start-up). The program also makes use of color in the command display to visually "flag" what is going on. The beeper is a nice little extra. It produces an audio signal for each keystroke, a much welcomed feature for the less-proficient typist.

Micro Wordcraft has two sets of built-in Help screens. In the Command mode, you can quickly display a list of all the available commands on screen. In the Control mode, a Help screen is available, too. Activating this screen displays a list of all of the *Micro Wordcraft* controls (used primarily by the printer). The Help screens are exited by hitting the space bar (which is also used as a kind of Escape key when an error locks up the keyboard). Any text on which you were previously working returns intact.

Micro Wordcraft performs all basic word processing tasks, and offers a lengthy list of features that go well beyond the fundamentals. The package allows you to do practically any kind of editing, including moving paragraphs, inserting and deleting text, and searching for and replacing words and phrases. You can also adjust a document's final printed appearance, define and use tabs, justify, merge text files, "fill" form letters with variable data, and produce headers and footers.

Document files may be saved to, and recalled from, tape or disk. The system allows document file encryption, so that unauthorized persons cannot read your text. Access to the usual disk support functions (formatting, validating, scratching, directory display, etc.) is provided by a Command mode entry.

Unfortunately, the user's manual is seriously deficient in several ways, and it does not adequately convey or describe the full capabilities of the package. The manual that came in my package was for the ROM cartridge version, *Wordcraft 40*. A single addenda sheet points out the few differences between the ROM and disk versions.

The manual is divided into three major chapters: they describe the system's features and operation in terms of your first contact with it, a second run-through, and finally, advanced word processing operations. This awkward approach resulted in my having to do an inordinate amount of page thumbing to find information. For instance, I found information on "how to get your disk drive to do what you want" in each of the three major chapters. Most of the specific information necessary in order to take advantage of *Micro Wordcraft's* more powerful features is packed into the chapter on advanced operations—but even there, the presentation is far too cryptic, and lacks sufficient details.

While the manual contains an index, it is incomplete and difficult to read. The commands and control codes are inconveniently listed on the index pages themselves, rather than on separate sheets in an appendix, or as quick-reference summaries. I could find no specification summary in the manual which showed the system's overall capabilities and limits. A printout of a short BASIC program is included that will convert your document files to *Wordcraft 80* files, if you like; however, I didn't find a copy of this program on the program disk. No comprehensive tutorial is supplied, either in the user's manual or on the program disk, nor could I locate a sample document on the disk. Including these items would improve the package.

As a result of these omissions, I had trouble determining exactly how to use some features (such as pagination, and creating headers and footers). No information regarding the capacity of *Micro Wordcraft* to produce linked-file printouts of long documents is supplied. The advertising literature also mentions a to-be-announced compatibility with files created by Audiogenic's *Magpie* database, but the manual contained nothing regarding this point.

Also, while the user's manual emphasizes proper equipment setup and interconnection, few details are provided concerning interfacing with non-Commodore printers. The manual is unclear as to exactly which Commodore printers the program supports. The start-up screen allows for the setting of parameters for non-Commodore RS-232 or Centronics parallel printers connected to the user port. But the manual provides limited guidance on how to send the proper commands and control codes to the printer in order to harness various advanced printer capabilities, such as boldface or condensed printing, underlining, and so on. I never did manage to get my Star Micronics Gemini-10X printer, interfaced through the serial I/O port, to work up to its capabilities with *Micro Wordcraft*. These annoyances comprise a frustrating group of flaws.

If you can put up with the deficient user's manual and printer interfacing limitations, *Micro Wordcraft* may be of interest to you. At only $34.95, it does offer a reasonably-priced, competent, and fairly reliable screen-based word processor for your home, small business or club needs.

OMNIWRITER & OMNISPELL

HesWare
$59.95

Overall Rating	A	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	A	*Value for Money*

OmniWriter & OmniSpell is a full featured word processing program that can be either as complicated or as simple to use as you wish. If your current needs are simple, you can use the beginning part in the manual to teach yourself how to type in, edit, and print your material. After reading Section 4 of the manual, you should know enough to do all this. As your word processing needs expand, the program offers features to match your growth.

The excellent documentation comes in a clearly written manual that fully explains all functions. The package also includes an overlay for the function keys and a quick reference card showing the various command keystroke sequences plus a referral to the appropriate section in the manual for an explanation of the command.

You'll find a number of features available in this program. For example, you can move text around in the document, delete and insert text, search for a specific word or phrase and then replace or delete it once or throughout the document, center text, utilize super- or subscripts, use headers and footers, check the spelling of your document, employ regular or expanded typeface on dot matrix printers, and merge information (such as names and addresses) into a boilerplate document to send personalized form letters. This doesn't complete the list, either. I regularly use word processing systems that cost many thousands of dollars, yet even compared to them the power available in this package is exceptional. You get a lot for the price. One of the added features is *OmniSpell*, a spelling checker with 40,000 words in its dictionary. You can also add special words that you use regularly.

The program is compatible with a number of different printers, both Commodore models and those that use the Centronics parallel interface protocols.

As you can probably tell, I found this program impressive. I use it regularly at home and it has proved extremely useful for a variety of tasks. If you want a word processing package and don't know how much power you need, try this program. It's easy to get started, and you can continue to grow into the program's complexities as you need them. I highly recommend it.

PAPER CLIP

Batteries Included
$125.00
Supports 80-column modification

Overall Rating	A-	A-	*Reliability*
Ease of Use	B-	A-	*Error Handling*
Documentation	C+	B-	*Value for Money*

Paper Clip is a very powerful, character-oriented word processor for the Commodore 64. By character-oriented, I mean that what you see on the screen is not what you get on the printed page. Formatting commands are embedded in the text on separate lines with a multi-letter alphanumeric command preceded by a check mark character (the British pound symbol). While *Paper Clip* has the capacity to create underlining, subscripts, superscripts, page headers, and footnotes within your text, it takes a considerable amount of time and memorization to learn to use this program.

The Edit mode has two text entry sub-modes—insert and regular—which you toggle between using the Commodore key (C=). The regular mode types characters as the cursor advances, and the insert mode inserts text just before the cursor position. Characters following the cursor are shifted down the page. One disconcerting omission is the lack of a wordwrap feature. The program splits words at the fortieth column (the eightieth, if you are using an 80-column modification) without any attempt to move them intact to the next line. It is the only recently-marketed word processor for the Commodore I know of that does this. The cursor keys allow you to position the cursor anywhere on screen, but there is no quick way to reach the beginning or end of a line.

You activiate most of *Paper Clip's* editing and file manipulation functions via control characters. You can delete, move, or copy lines within your text. While this is useful for whole paragraphs, groups of sentences belonging to different paragraphs are difficult to move, since they rarely break cleanly on their own lines. You may also transfer blocks of text from one document to another. Essentially, you delete everything except what you want to transfer, save the desired text to disk, then append it to the destination file.

Paper Clip can rearrange and sort columns destined for use in charts and tables. In addition, it features arithmentic commands that you can use for summing up columns.

The program prints to virtually any printer by means of a custom printer file. (You save this to disk for future use.) Output can be previewed on your screen in the final printer width. Since this is too wide to view on your display, you may scroll across it horizontally with the cursor keys. Apparently, you cannot edit in this

mode, although many users who dislike typing in the hard-to-read Edit mode would prefer this.

The overly long manual has three parts. It is somewhat hard to read because it refers to several different versions of Commodore computers. A tutorial is included, but it's easier just to read the reference section. Several very long appendices are supplied for advanced users. The vendor does not provide a reference card, but all the commands are summarized on three pages in Appendix A.

The disk is not conventionally copy-protected, however you must insert special key in joystick port #1 in order to use or copy the program. *Paper Clip* supports multiple disk drives, and you can chain files for long printouts.

In summary, *Paper Clip* is an excellent full-featured word processor. It certainly isn't meant for the casual user, since it requires learning far too many commands. It is quite powerful, though, and will print any style of document you desire (including form letters), as long as your printer is capable of producing it.

SCRIPT 64 DICTIONARY

Richvale Telecommunications
$20.00

Overall Rating	C-	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	B	C-	*Value for Money*

The *Script 64 Dictionary* provides a ready to go dictionary disk for users of *Script 64*. The dictionary includes 8,744 words—not very many when compared to others on the market. Among the words it does *not* know are "spelling" and "dictionary."

The spelling checker function of *Script 64* works very slowly, averaging about one word per second. As it checks the document, the program highlights each word in reverse video as it looks the word up in the dictionary. Unfortunately, as it is checked you must verify each word not found in the dictionary. Other spelling checker programs allow you to leave and do something else while they work—not this one.

One of the dictionary functions counts the words in your dictionary, a number that I thought meaningful for this review. After waiting an hour for it to finish counting, I left it running and went to bed. I got the final count the next day. However, the only actual bug that I encountered involved the add function. I had write-protected the dictionary disk, and when I tried to add a new word to the dictionary, the program locked up completely. I had to turn off the computer and start over.

Since you can build your own dictionary disk by reviewing your own documents and adding unrecognized words, it seems unnecessary to buy a prebuilt dictionary disk with so few words.

SCRIPT 64/ SCRATCH PAD

Richvale Telecommunications
$105.00

Overall Rating	B	B+	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	B	B	*Value for Money*

Script 64 is a complete word processing package that includes a mailing list program and spelling checker. It provides most of the features generally present in an advanced word processing system. These functions include full-screen editing with selective or continuous insert, Help displays, column math functions (addition and subtraction), global search and replace features, tabs, decimal tabs, caps lock, flush right output, and final document previewing onscreen.

Two versions of *Script 64* are provided: one for 40-column displays and one for 80-column displays. The 80-column display results from making the displayed characters only half as wide as usual. Unfortunately, the 80-column display is extremely difficult to read if you use a TV or color monitor. Unless you have a monochrome monitor, you probably can't take full advantage of this feature.

The dictionary function supplied by *Script 64* allows you to build a "dictionary disk" for checking spelling throughout your document. No dictionary or words are provided; the list of words for the dictionary comes from your documents. Subsequently, the more documents you check, the larger and more comprehensive your dictionary becomes.

For those who want to type in French, *Script 64* is bilingual, both on the screen and on hard copy (the program was written in Canada). The delete function allows you to restore deleted portions of text if the screen has been stored in memory—a feature that comes in quite handy when you goof. Three Help screen displays are available at all times to assist you. *Script 64* permits you to change print sizes and styles, underline, and utilize suband superscript features, if your brand of printer supports any or all of these.

The page numbering function allows you to place the page numbers at the top or bottom of the page in several formats: flush left, flush right, fully justified, or alternating. This last option lets you print the page numbers flush right on the front page of your document and flush left on the back side—a nice touch if you're doing two-sided printing.

While *Script 64* lacks true headers and footers, a page title can be printed at the top of each page (with the same alignment options as page numbering). Several other functions are also offered, but in an unusual form. For example, automatic hyphenation is provided, but it simply breaks words over six letters long at the end of the line. Not very useful without a lot of advance editing on your part.

I found this program's screen/page orientation editing its least attractive aspect. Rather than a continuous vertical scrolling when entering text, all text is typed on a screen page. When you print your document, you specify which screens you want outputted and their printing order. This approach allows *Script 64* to dispense with embedded print formatting commands by using a print format menu attached to each screen/page. A default format is provided for overall formatting, and a local screen format allows each screen/page to have its own separate format. The overall effect is one of typing one or more paragraphs per screen/page and then connecting them together when printing time comes around. You cannot change print formats except at the screen/page level, which I found very cumbersome. For instance, if you want to center a single line of text, that line must appear on a screen/page all its own.

Script 64 comes on cassette or disk, though the spelling dictionary will not work on tape. The disk program will run on any of the current Commodore drives, including dual drive systems. The program is copy-protected by means of a hardware "key" that you must plug into the joystick port in order to run the program. You can then make as many backup copies of the program as you wish. Be sure to put the "key" in a safe place, however, since you won't be able to run your program without it.

I found the approach of using 999 numbered screen pages on a disk instead of individual files for each document a pain. An index function lets you identify the screen/pages, but it seems a great deal easier to name individual documents than to identify a collection of screens as an entire document. Overall, I think the screen/page method very confusing. This is rather a shame, because *Script 64* otherwise provides many usable, advanced functions.

The disk for *Script 64* also includes *Scratch Pad*, a program for creating mailing lists usable by *Script 64*. *Scratch Pad* is actually a limited database system, allowing you to store up to 625 records, each of which can consist of up to twenty lines with thirty characters each. You may designate one of these lines as the "sort" line, allowing rapid access to a specific record. In addition, you may select records by any of the information contained within them. When printing, you can combine fields to properly print the city, state, and ZIP code on a single line.

In summary, *Script 64* offers good value for the money. It includes not only the finest aspects of a sophisticated word processing package, but a spelling checker and database/mailing list program. Documentation is thorough and complete. Its only major drawback is its screen/page oriented editor which, in my opinion, is both awkward and confusing.

SPELLPRO 64

Pro-Line Software, Ltd.
$49.95

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	C	B	*Value for Money*

Spellpro 64 is the spelling checker designed to accompany *The WordProcessor* from the same vendor. Spelling checkers are best judged by two criteria: the size and versatility of the dictionary, and the ease and accuracy of the program's ability to correct errors. *Spellpro 64* scores high on the first and less impressively on the second. Jim Butterfield, well-known Commodore programmer, is the author of *Spellpro 64*. He has created a program that is attractive and easy to use. His onscreen instructions are very good, and almost compensate for the inadequate support documentation included in the package. While *Spellpro 64* can check any word processing document saved as a program file, you can only make necessary corrections with *The WordProcessor*.

Spellpro 64 is copy-protected. The disk includes a program for copying the dictionary to another disk so you can add words to it. The alternative—buying a $20 backup and notching your working disk so that you can write to the file—is not acceptable.

The computer flags the words in the documents it checks that are not in the dictionary. The original dictionary is short, but adding words is easy, as is printing out or editing the word list.

Capitalization, hyphens, and apostrophes are ignored. All words are stored with optional s's. That is, if you tell the computer to add the word "come," it also adds "come(s)." *Spellpro 64* will then accept both "come" and "comes" for the price of one entry in a dictionary which may grow to about 25,000 words. You are limited by the storage space on the disk. You can have several dictionary disks, each with a specialized vocabulary. Automatically adding s's effectively increases the size of the dictionary by a large margin as compared to other spelling checkers. You still have to add both singular and plural for words like "ox" or "go," which don't simply take on the extra "s." Unfortunately, this means the program will accept misspell-

ings, such as "gos" for "goes," or "simplifys" for "simplifies." Always keep in mind that *Spellpro 64* doesn't replace proofreading; its main function is to quickly find obvious typos.

Spellpro 64's main menu lets you check a file, edit the dictionary, print the dictionary, or change all the screen colors. All the normal Commodore cursor control and insert/delete functions operate as usual. Butterfield has turned F1 into an Escape key. This key aborts the current operation if you change your mind. It worked fine most of the time, but didn't return me to a menu when the program misbehaved.

Checking a document is easy and relatively fast. If you use *Spellpro 64* to look at your disk directory before you name the document to be checked, the program displays file names with key numbers that can then be used to access the file. The computer reads the file under *Spellpro 64's* guidance and creates a data file of all the words. This file is checked against the dictionary. A dual drive system would make this process easier, but the program prompts you to switch disks. Flagged words that aren't in the dictionary are sorted into alphabetical order; you may look at them one at a time. You pass judgment as to which words are okay and which aren't and type in the correct spelling for errors. You may print out the misspelled words and add the correct words to the dictionary. Finally, *Spellpro 64* creates a file on your word processing data disk for both the misspelled word and its correct spelling.

I couldn't correct the misspellings, as I mentioned earlier, because this function only works with *The Word Processor*, which I do not have. The instructions and the program to replace the misspelled words reside in the word processing system. (I have a preliminary copy of *The Word Processor* with no documentation save a reference card. When I used the command that calls *Spellpro 64* corrections, no internal prompts were provided to guide me through the process.)

Spellpro 64 is a competent program, but the omission of instructions for carrying out its most important function, is a serious flaw. I also feel the program that makes the corrections should reside on the *Spellpro* disk, even if this duplicates programming for the two-disk system. For instance, I have a simple word processing program with which I write articles and letters. *Spellpro 64* can read the files and tell me what is misspelled. Without the automatic correction function, I had to correct my text manually. The list of misspellings is in alphabetical order, with no indication of where each error occurs in the document. I had to use the Search function or Search and Replace, one word at a time. This is not bad for a short error list, but is a real pain if there are a lot of typos.

The Quit function in *Spellpro 64* does not work. I couldn't get any other program to load and run after I exited the program—including *Spellpro* itself—without turning off the computer. However, it's hardly worth it to me to interrupt my work, turn off the computer,and boot a full-featured word processing program in order to make corrrections.

Error handling is pretty good. When I first started to play with the program, I tried to read an *Easyscript* file, because I assumed *The Processor* created sequential files. The documentation for *Spellpro 64* didn't mention that it reads only program files. I got a "Fatal Disk Error" which is not documented in the user manual. I had no earthly idea how to recover or what to do. Again, the program is fine; it's the User's Manual that doesn't tell us everything we need to know.

As spelling checkers go, *Spellpro 64* is fairly good. It's reliable, easy to use, and comes with a skeleton dictionary that you can build to meet your own needs. Technical writers can develop dictionaries for each specialized area if they wish. You can add up to 50(words at one time, directly or from a file created on the word processor. Whether the program is worth $50 is a matter of personal taste. Compare your rate of typing errors against the time it takes to correct your document by means of *Spellpro 64*. If you are uncertain about your spelling, make sure your dictionary is correct; the program will improve your confidence in the correctness of your text. Personally, I love spelling checkers, despite their limitations, because they are visible computer magic.

TOTL. TEXT

TOTL Software, Inc.
See below for prices

Overall Rating	F	C+	*Reliabil*
Ease of Use	D+	C+	*Error Handli*
Documentation	C+	D	*Value for Mon*

TOTL.TEXT comes in several versions. Version 2 runs on the VIC 20 with 8K expansion and costs $24. for tape and $28.95 for disk. Version 2.5 runs on t VIC 20 with 16K expansion and costs $34.95 for ta and $38.95 for disk. Version 2.6 runs on the Comm dore 64 and costs $39.95 for tape and $43.95 for dis

TOTL.TEXT has several really valuable featur but is the unhandiest word processing program th have ever used to enter text. It does not suit busin use, nor can I recommend it for home use. Nonethel I found it easy to learn, with the major functions cal up from menus. The documentation, although skim for beginners, was better than average. I had no pr lem making the program work with a non-Commod printer. Spiffy routines help you save documents; b the tape and disk routines are designed to prev disasters. The tape routine skips past a specified dc

ment before saving, while the disk save automatically keeps the current and previous versions of documents under the same name.

The Commodore 64 version supports dual drives and has a disk utility for disk housekeeping. All of the versions can merge documents created with *TOTL.-LABEL*. Versions 2.5 and 2.6 permit you to link documents so that the small memory left after loading the program won't limit your document size. The program is copyable, and the documentation explains how and where to change program functions. The company answers questions for a $2 fee.

Now for the bad news. Entering documents is awkward. This system will destroy any typing speed that you may have attained. You cannot use a carriage return. Changing to a new line or paragraph requires format markers which, although available in shorthand form, still consist of a space, two dollar signs, a two-character command, and another space. On the 2.0 version especially, these markers take up memory—and you need them frequently. They also make the onscreen document hard to read and proofread because the text runs together. Moreover, the program handles text in 255 character blocks. Onscreen, the block in process appears in reverse video. I found this splitscreen effect unattractive and hard to look at. The blocks break off in the middle of words and add to the difficulty of editing onscreen. You can move through the document easily, but moving by blocks takes getting used to.

When I tried to format a letter to begin on print line 12, I found only one way to do so: adding twelve new line format markers. Another annoyance: the computer automatically puts two spaces after a period. You must disable this function to print "Mr. Jones" correctly. I had trouble adjusting to this.

Of course, the package includes a "cheat sheet" of format commands, but I couldn't find a list of format defaults anywhere in the manual. The explanations for setting margins and indents lacked clarity, and I discovered how to set the top margin by trial and error. Finally, the program is written in BASIC and runs very slowly.

TOTL.TEXT has a number of advanced features that would make it an attractive word processing program if only text entry were easier and more natural. Since you use a word processing program mostly to enter and edit text onscreen, the disadvantages of this program far outweigh its good qualities.

TYPRO

Input Systems, Inc.
$58.00

Overall Rating	D+	C	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	D-	D+	*Value for Money*

Typro combines a word processing program and a database program on one disk. Using a menu-driven system, you can move from the database to the word processing program and back again with ease. This makes the creation of form letters and mass mailings very simple. The authors used Petspeed to compile the program, making *Typro* fast and smooth.

Unfortunately, after my initial positive reaction which resulted from actually possessing my first truly integrated package for the Commodore 64, I became very disappointed. These simple programs work as an integrated system, but they don't deliver many of the things that I feel the average computer user needs. This prevents *Typro* from attaining its potential. An average computer user needs a program that works well and comes with a thorough manual that includes a step-by-step tutorial or many examples of how to handle the individual program options. *Typro* does work well, but it doesn't deliver either a tutorial or a thorough manual. The manual explains, in twenty-one pages, how to utilize both the word processing program and the database. Users with previous experience in these kinds of programs will find the skimpy manual acceptable because they need only a short explanation of the available options. Users without a background in such programs won't find enough information to feel comfortable with the techniques and terminology. (For example, the term "pattern match" isn't explained at all.) *Typro* attempts to overcome this drawback by showing you all the available options at the top of your screen, or by prompting you with questions as you work. This is an excellent approach once you understand what you have to do, but it just isn't good enough for a first-time user.

One of my strongest negative reactions occurred when I found that the manual itself had typographical errors. This is totally unacceptable for a word processing program's manual—even sacrilegious!

To put this system into perspective: the word processing program cannot challenge the power of *PaperClip* or *WordPro 3+/64*, nor can the database challenge the power of *SuperBase 64* or *The Consultant*. This simple system lacks the depth and the "bells and whistles" of these other packages. It is so simple that it doesn't contain some of the options now commonplace in other word processing and database programs. Let me list a few of the problems. (1) It can only search one field deep rather than the two to ten fields deep handled by other systems. (2) During printing you must

go through a full series of questions every time; *Typro* offers no printer default option. (3) You must go to a separate editing mode to edit a line other than the one you are presently typing. Moreover, the program lacks a full-screen editing capability available at all times. (4) If your document has more than forty characters per line, the screen looks garbled, with every line split into segments. It lacks wordwrap or 80-column display, nor does it offer full-screen display of straight text. However, *Typro* does have one thing that the previously mentioned programs don't. The combination of a word processing and database program on one disk, controlled by simple menu selections, provides the simplest method I have found for form letters and mass mailings.

Typro is a simple system. If you can overcome the poor quality manual and get comfortable with its limitations, you will find that the program does work well and will allow you to do simple form letters, simple database work, and simple memos. If you need these capabilities and little else, this package may be right for you.

WORDCRAFT 40

Audiogenic, Ltd.
$124.95
Save data to disk or cassette

Overall Rating	D	C+	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	C-	D	*Value for Money*

Wordcraft 40 is a cartridge-based word processor designed for the Commodore 64, which claims to work with RS-232, parallel, or Commodore printers. The system has a broad range of printing capabilities and can do just about anything that your printer setup can handle. One particularly interesting feature is the beeper, which generates an audio signal for each keystroke; I find this most useful, being a fumble-fingered typist. Documents can be saved to tape or disk and verified. There is also a merge function, though I haven't been able to get it to work quite right as yet. One other unusual feature: the program's ability to embed user commands within the text. A typical command would suspend printing to allow you to change to a special print wheel.

Unfortunately, the majority of these nifty goodies don't work on my setup, nor on the Commodore printers. I have a *Gemini 10X* printer that can do just about anything but sing, and a *Card? G+* interface, adequate for nearly every printing task. To get output in standard upper/lowercase format, I had to modify the DIP switch setting to true ASCII instead of the Commodore emulation mode. Even when I did this, the program ignored commands, including the direct address mode. As close as I can determine, the only way to send output to or through the interface is to select the CBM output option instead of parallel or RS-232. This became very frustrating when I tried to implement the special functions that my printer is capable of, such as bold or condensed printing.

Furthermore, the package's documentation is seriously lacking, and the manual writer has a marked preference for disk drive users, as well as Commodore printer owners. I am neither. As a result, I had to search through footnote after footnote, then the index, the command summary, and the text to locate simple commands for underlining and Get functions. In one line (on page 25 in the section entitled, "Filenames") I found instructions for the procedure to recover cursor control in the event an error locks up the keyboard. I discovered this long *after* I discovered that the only key that accomplishes anything during a lockup is the space bar (which is what the "hidden" instruction advises). Quite annoying.

Since there is a plethora of word processing systems available for this machine, at prices ranging from the cost of a public domain disk to $125 for a fully-documented program with a spelling checker and mail merge, I think the cost of *Wordcraft 40* is outrageous. I must, however, admit that for plain vanilla typing—such as this review—I will continue to use this program. It is simple to load, and you only have to learn a couple of format and output commands to get rolling.

WORD MACHINE AND NAME MACHINE

Commodore Business Machines
$19.95

Overall Rating	C	C	*Reliability*
Ease of Use	C-	B	*Error Handling*
Documentation	B	B	*Value for Money*

Most Commodore 64 owners will buy *Word Machine and Name Machine* for word processing. Actually, they'll get three programs on one disk: a mini-word processor, a phone/address list, and a disk directory aid. Each interacts with the other.

Word Machine is Commodore's low cost mini-word processor, with the emphasis on mini. Commodore describes it as "an electronic typewriter with the features of a word processor." That's pretty accurate. The program is menu-driven. You create a new document by selecting an option from the menu and then typing. Once you complete the document, you can store it on either disk or cassette. The program includes sufficient double checks to help new users avoid writing over

existing files with another of the same name. However, because it's written in BASIC, word processing is sometimes painfully slow, most obviously in the Edit mode. To edit your document, you return to the Main Menu and choose another option. Once in Edit, any accomplished typist can quickly outpace the cursor. Furthermore, unless you've memorized the manual, you may become confused as to how to accomplish your editing. For one thing, cursor control is limited. You must tell the program what percentage of the document you wish to edit, which I found confusing, but it seemed more natural with use. The bottom line is that you *can* edit your document, albeit slowly.

The program also includes a global Search and Replace. You choose a word, sentence, or pattern of words to search for and then have them replaced with a new series of characters. Unfortunately, this handy feature also runs slowly. You also get pre-formatted letters that help you turn out a proper form letter quickly and with little fuss. You can preview your letter or document on the monitor before printing it out, although only in the 40-column limits of the monitor and not the actual 80-column output of the printer. However, the preview helps you spot misspelled words or gross format errors.

Despite the speed limitations caused by programming *Word Machine* in BASIC, the choice of this language offers some interesting possibilities. The manual suggests ways of personalizing the mother program to fit your needs. For example, you can alter the program to automatically print your letterhead or duplicate several different ones. You can also customize the format of a form letter.

Name Machine creates a mailing and telephone list that merges with *Word Machine*, a real plus. The program is well documented and works as advertised. I suspect that Commodore included the program to give more appeal to a word processor with limitations. It was a wise decision. *Name Machine* alone probably covers the price of the package. It holds around 150 files, which should serve most personal needs and many small businesses, and you can get around this limitation by creating several different files. Although written in BASIC, the program isn't objectionably slow. Besides, you can alter it to fit your needs. The manual outlines how.

Directory Assistance helps you organize disk files and load them almost effortlessly.

If you're looking for a full featured word processor, leave this one in the store and get a better (and more expensive) program. If you only need to turn out occasional letters, *Word Machine* will serve you well. It sure beats a typewriter, with the added plus of *Name Machine*. One last note. The only mention of a warranty was a disclaimer. I couldn't even find the standard ninety-day warranty. Luckily, the copy I have works just as advertised and since it's not copy-protected, you can easily make copies and keep the original in a safe place.

THE WORDPROCESSOR

Pro-Line Software
$49.95

Overall Rating	A-	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	A	*Value for Money*

The WordProcessor is a full-function word processor with all the features you'd expect from a business-quality program. In addition, it has many other features that give it nearly the power of a dedicated word processing system. It also has a few surprising omissions. For instance, the documentation is barely adequate for describing standard word processing operations—and nothing more. For the price, though, I doubt that you can find a comparable program that's superior to this one.

I divide the use of a word processor into three categories: entering text, editing text, and printing. Entering text with *The WordProcessor* is as easy as typing. It has an attractive, easy-to-read screen and wordwrap. You have to cut a write-protect notch in the disk and run the Install program to change the screen colors. My favorite feature is a separate text section (called "extra text"), in which you can store words and phrases to be inserted as you type. For example, as I am typing this review, whenever I want to type *The WordProcessor*, I use a certain control command, type a "W" (the title of my phrase), and a carriage return; my "variable string" then rolls onto the screen.

The amount of space for extra text is defined when you load the program. *The WordProcessor* permits only 409 lines of text, of which 386 are the maximum for the main document. The main text area is shorter than many programs, but you can link files in order to print documents of any length you choose. The extra text section can also be used to hold addresses for a mail-merge letter, or to store boilerplates for other documents.

Editing is a snap. You have Commodore's native full-screen editing, and you need not switch to a special Edit mode. You may define blocks of text by word, sentence, or paragraph. You may delete, transfer, or copy these blocks to another part of the document. You can recall (undo) deleted text, until you decide to use this function again. You may insert text from the disk. Imbedded formatting commands allow you to vary line spacing and set up indented text; they also permit

you to boldface, underline, and create super- and subscripts, if your printer permits. The program includes a Search and Replace function, which you can use manually or through the *Spellpro 64* spelling checker.

You may check your formatting via the video or map output options. The video output shows line spacing, margins, indents, and pagination. It also highlights any words which are marked for underlining or boldfacing. The map function displays the entire text—up to 160 columns—in 2 by 2 pixel blocks. You can't read any of the text, but you can see the whole format, including centering and justification.

Because *The WordProcessor* has so many functions, you might easily become confused and hit the wrong series of commands. Fortunately, the F1 key acts as an Escape key, and will abort almost anything you do in the program without losing your text. *The WordProcessor* lets you use all disk commands. A double-column directory display lets you see more file names at one time. The program can address up to four drives, if necessary.

Printing text is a crucial function of a word processor. This program has both good and bad qualities with regard to its printing capabilities. On the good side, it offers printer modules for most popular printers used in conjunction with Commodore 64s. Several models also have versions offering proportional spacing. While this feature slows the printer down, it produces very attractive text. On my Gemini-10X, proportional spacing employs a special print font, and adds about five to eight characters per line. Fully justified text with proportional spacing does not have the large, unsightly gaps between words that one normally associates with full justification. *The WordProcessor* does not justify partial lines at the ends of paragraphs.

Other attractive printing options include double-sided printing and double-column printing. You can set format markers to shift the margins and headers or footers on alternate pages. Then you print all the odd-numbered pages. Remove the paper and turn it over to print the even-numbered pages.

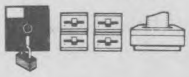
The double-column function is wonderful for newsletter editors. All you need is one imbedded command. The program creates a file called "leftside." This prints the first line of the first column, then the first line of the left column, alternating until it gets to the bottom of the page. It creates a new "leftside" for the next page.

I couldn't make the double-column function work, try as I might. *The WordProcessor* created a leftside file only once. It didn't print, although it moved the printer head in columns. I blamed this on my not having the printer matched to the software. However, the next time I tried, the program did not create a leftside file, and aborted during printing because it couldn't find the file.

The documentation didn't give me a clue on trouble shooting. In general, the documentation is well-written, but offers no advice when a function does not work. The information provided is good, but it doesn't answer a lot of questions, especially if you get in trouble. Perhaps the separate tutorial, which costs twenty dollars extra, provides the missing pieces.

For example, I encountered trouble with the printer: it added a line-feed I didn't want. I was using the correct printer module, and changing the DIP switches on my printer only made things worse. Finally, I realized that the problem was my *Card/? +G* interface. The documentation does not address how different interfaces change the characteristics of the printer. To make my printer work right, I had to set the printer with a software command before I loaded *The WordProcessor*. I found my answer, but had to fend for myself and face this problem alone; the documentation provided me with no help at all.

The WordProcessor is a good choice for business use or for the experienced home user, but it may very well frustrate the novice. It is copy-protected, so you should buy a backup for twenty dollars. This is a complex program with many more special features than I have room to discuss. I wish the documentation would address possible problems more and include an index, but on the other hand, I appreciate its manageable size. The lack of information on how popular printer interfaces interact with the program is a problem. However, for standard, everyday word processing operations, *The WordProcessor* is an easy to understand and use as any other program approaching its power and sophistication.



WORD PROCESSOR—PERSONAL VERSION

Mirage Concepts
$39.95

Overall Rating	B	A	*Reliability*
Ease of Use	B-	B	*Error Handling*
Documentation	A	B-	*Value for Money*

Word Processor, Personal Version is a low-priced, stripped-down version of Mirage Concepts' *Word Processor, Professional Version*. It retains the very powerful editor (the heart of both programs) while leaving out most of the formatting frills that Mirage Concepts evidently feels are less desirable for home use or the occasional letter writer.

They've also left out the 30,000-word dictionary and spelling checker, 80-column display (with sideways scrolling for a 40-column screen), global search-and-replace, and many of the other goodies for which most software consumers buy word processing programs.

In essence, it will turn your $300 printer into a $600 electronic typewriter, which would have made it a good buy for only $39.95—if there weren't a host of other $39.95 word processing systems available. You can, though, upgrade to the *Professional Version* if you send Mirage Concepts your program disk and $39.95. In return, you'll receive the *Professional Version* plus all the accompanying documentation—a total investment of $79.90 against a retail price of $89.95 for the *Professional Version* alone. You may purchase a back-up copy of the program for seven dollars.

This product could be more accurately described as a "letter writer," rather than a full blown word processing package. The program is easy to use, and the strong editor greatly simplifies the whole rigmarole of churning out letters and memos. People who want to do reports, charts, or research papers will encounter some difficulties, so be forewarned.

The documentation is outstanding: 150 text pages in an attractive, 5 by 9 inch loose-leaf binder with two handy pockets that hold the program disk and quick reference card. The introduction assumes no knowledge on your part of word processors or computers, yet it's written in a way that will not put off those who are familiar with them. There is none of the "Gee whiz! Look at what a computer can do!" type of commentary one frequently sees peppered throughout the documentation of low-priced, non-entertainment software. This section explains the use of unfamiliar (to typists) keys, discusses the care-and-feeding of disks and disk drives, and gives a brief overview of the rest of the documentation. The overview covers the nine-chapter tutorial (discussed below), a reference section (concisely summarizing all of the program's functions), a glossary, an index, and two appendices on printer command files, with suggestions for the most popular printers.

The nine-chapter tutorial is divided into two sections: a five-chapter beginning tutorial and a four-chapter advanced one. The beginning tutorial gives you all you need to know to use the system, while the advanced section is best used as a review after you feel comfortable with the program. The beginning tutorial leads you slowly and deliberately through loading the program, entering and editing a document, and printing it. The pace is excellent. Unfortunately, the only error I found in the documentation (on page two for Lesson One) turned out to be a serious one. The directions advise you to "Turn on your computer. With this completed, turn on the disk drive..." As most Commodore users know, this is a recipe for disaster, because your system may become hopelessly confused unless you turn on the disk drive *before* you turn on the computer.

The editor is a hybrid. It's basically a line editor, since all editing takes place on one highlighted line on the screen. It's not necessary (as in some word processing programs with line editors) to go to the document, pull out a line, edit it, and replace it, since your document can be scrolled through the edit line quickly and easily. Various keys that are used in combination with the Control (CTRL) or Commodore (C=) keys move you around the document by character, word, line, screen, or the entire file. This can be done in either a "destructive" or "non-destructive" mode; that is, by deleting text or skipping over it. In this price range, this is the most powerful editor I've seen to date.

To use any of the special features of your particular printer, you must set up a Printer Command File—a disk file in which you equate various alphabetic characters with the Control codes that must be sent to your printer. You then place these characters within your text, preceded by C=P/M (pressing down the Commodore key and "P" at the same time). In this fashion, you tell the program to send those Control codes that are necessary to make your printer perform as you want it to. Since each printer uses different Control codes to accomplish the same thing, you must write the Printer Command File. However, to help you there is a program on disk that does this, as well as a tutorial chapter with full explanations. In addition, a list of Control codes for ten of the more popular printers is supplied, as well as an appendix describing the structure and use of Printer Command Files.

The program offers a merge function which permits you to print out a form letter with different names and addresses. If you don't have a label maker program, Mirage has included a chapter in the documentation on creating a simple sequential database using the word processing program—something few, if any suppliers of low-priced word processing software provide (they would *much* rather sell you a separate database management program).

One irritating aspect of *Word Processor, Personal Version* is the lack of a screen preview feature. If you want to see your document as it will look after printing, you must write it, preview it through the editor, and then insert your Control codes into the document.

I missed having screen preview, tabbing, headers, numbered pages, footnotes, etc. But if you're simply interested in writing letters or memos, or if you want to try out a word processing program while having the option to upgrade to a more full-featured system, *Word Processor, Personal Version* is a fine piece of software.

WORD WRITER

Timeworks, Inc.
$49.95

Overall Rating	B-	B-	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	C	B-	*Value for Money*

Word Writer, a word processor, comes from Timeworks, a software publisher that boasts a wide assortment of programs—games, home management, business, and educational software—in its lineup. Like other Timeworks programs that I've used, *Word Writer* apparently reaches for a goal that has eluded the grasp of its programmer.

On the positive side, *Word Writer* is a "what you see is what you get" word processor. Using sideways scrolling, the display is adjustable from the first ten columns out to column 250. There are no embedded print commands, so you can see the layout of your document before you actually print it. There is also an onscreen line and page counter; consequently, you can always tell where you are in your document and where the page break will split your text. If you've never used a word processor that allows you to see on your screen exactly how your document will look when it's printed, I can only say that the savings in paper, printer ribbons, and frustrationcan be tremendous.

On the downside, no embedded commands means no formatting changes within the document. Either the whole document is double-spaced, or it is all single-spaced; you can use either italics, or boldface, or underlining, but not two of them. The software allows you to assign two printer codes to a control key. You can then toggle between them, turning on and off the printer function; thus you may use only one function in any single document.

Word Writer has a powerful global Search and Replace that does not offer enough options. If you ask it to find the word "it," and to replace it with the word "them," the word "exit" suddenly becomes "exthem." Unfortunately, I found no way whatsoever to overcome this problem (by using leading spaces, etc.).

The program documentation consists of a 130-page book. This may sound impressive, but eighty-three of those pages are instructions for interfacing *Word Writer* with *Data Manager*, Timeworks' database management system. The other forty-seven pages contain several puff pieces touting *Word Writer's* merits, a glossary of thirty-two terms (half of which refer to the database interface), loading instructions, when to use the word processor or the database management system interface, and so forth. (The publisher did not bother to include an index.) Thus, a mere thirty-one pages out of 130 actually describe the operation of the word processing program.

On the back cover of the documentation, a declaration from Timeworks states, in part, that they "have pooled creativity, technical knowledge, manufacturing expertise and conscientious quality control to bring you the versatility and reliability demanded by the computer generation. If superior design, maximum capability . . . and dependable performance are important to you," then programs from Timeworks are what you need. Buyer beware, however. If you read the warranty, quite a different picture emerges. The program you have purchased is sold to you "as is" without any warranty provisions of any kind. You shoulder the entire risk concerning quality and performance of the software. Should the program prove defective, you must assume the cost of all necessary servicing and repairs. You receive no guarantee that the operation of the program "will be uninterrupted or error free." If the distributor of a program does not guarantee that his program will work in the way he claims it should, he won't receive one cent of my hard earned cash. In my estimation, you should probably add *Word Writer* to your software library if you already own *Data Manager* or are planning to purchase it. Otherwise, investigate other word processors.

Mailing List Managers

DELUXE ADDRESSER

Briley Software
$29.95

Overall Rating	C-	B	*Reliability*
Ease of Use	C-	C-	*Error Handling*
Documentation	D+	C	*Value for Money*

Deluxe Addresser, a mailing list program, handles files of up to 250 addresses. You can create lists of addresses, search through a list and update individual addresses, perform three different sorts, list to screen, print out on paper or mailing labels, and save data for future use. The program allows addresses of four lines plus a telephone number and a set of eight flags that you define. Sorting options include ZIP code, alphabetical, and by flag. Printer options include Commodore, Epson, Anadex/ASCII, or none. You can print mailing labels either one or two across, and multiple sets in one session. A tone sounds with each keystroke. The program is written in BASIC and available on cassette, but it supports disk files as well.

This program looked like just the thing for my user group mailing list, but I had some problems. First I loaded the program from tape and immediately saved it to disk. (This worked fine, so backups should offer no problems.) Then I started to enter addresses. The first prompt asks you for a company name. I used an abbreviation (the same one for each name). When I tried to edit an address using the Update/Search function, I couldn't get past the first address! You can only search by company name, and no options exist to continue the search after it finds the name. The documentation suggested using a code for the company name when you want three-line addresses, so I tried that. The Search function worked fine. But when I printed the labels, the code appeared along with the name and address. Not very elegant. However, I finally figured out a way to produce three-line addresses. First I saved my initial file with the codes, then re-ran the program to load the file back in with a new name. After double-checking the accuracy of all the addresses, I used the Update/Search function to remove all of the company name codes, replacing them with a period. I then sorted the list alphabetically, which worked fine. (When company names are "the same," it sorts by last name.) Finally, I saved the second file and printed the labels. In future, if I have to change an address, I'll have to go back to the source file to make the change, then recreate the second file.

Program documentation comes in a fourteen-page, half size booklet bound with one staple. It started coming apart within a couple of hours. Some of the information seemed sketchy and I found it hard to understand. For example, the explanation of the sort function took only nine lines. The small print doesn't help, either.

Despite these drawbacks, *Deluxe Addresser* seemed pretty reliable. As long as I followed the directions, everything worked. But a novice could easily encounter problems. All he or she would have to do is hit Stop and then enter Run and the data would be gone. The documentation explains what to do (enter GOTO 47), but is that enough?

Error handling could pose similar problems for a novice. The program detects and reports disk errors, but provides little guidance beyond that. For example, disk file names include both a date and a title that you select. If you work on the file twice on the same date, you'll get a "File Exists" error when you try to save it the second time. Then you must exit the program, scratch the old file (the program itself has no disk editing commands), and reenter the program with GOTO 47. The documentation doesn't explain this explicity. Likewise, if you get a File Not Found error, you must stop the program and run it again. The program didn't notice that no file was loaded even though it reported the disk error. *Deluxe Addresser* doesn't trap BASIC errors, which could terrorize a novice. I did not run into any BASIC errors while testing the program, however.

Overall, this powerful program has a lot of features, yet I found it disappointing: it just doesn't have the flexibility to meet my specific needs. *Deluxe Addresser* seems best suited for a sales representative, for example, but I can't recommend it as a general purpose mailing list system.

EASY MAIL

Commodore Business Machines
$19.95

Overall Rating	C+	C	*Reliability*
Ease of Use	A-	B+	*Error Handling*
Documentation	B	B-	*Value for Money*

Easy Mail provides an excellent name and address database for small mailing lists, but ir proves far less useful for printing mailing labels for business use. On the positive side,I found the program easy to use, with better than average documentation.

Easy Mail offers pre-formed records that include name, four address lines, state or province, postal code, phone number, and reference. Each data disk holds 700 records, and you can select records that match any field, and sort them in ascending order on any field. You can use the match provided and sort functions together or separately. I thought the number of fields generous. Four address lines should cover the most complicated address, while the postal code has room for nine-digit codes and a hyphen. The "category" field, which permits you to separate friends from business acquaintances, for example, allows eight characters.

The program has good error trapping and editing is easy. You can recall records for display either by record number or by matching any of the fields. Adding new addresses will write over deleted records. You can enter data easily. First you format a data disk, which actually writes all the blank records that the disk will contain. Initializing a data disk takes a long time. The manual and the screen display say ten minutes, but I timed it at closer to thirteen or fourteen. The system defaults to the display mode. You must specify "new" for each added record and can change or delete records only by their number (easy to find in the display mode).

Easy Mail has three important disadvantages. First, it does not provide backup instructions, nor does Commodore offer a disk exchange for damaged disks. Since the program only costs $20, this may not constitute a serious problem. Presumably you can copy the data disk with standard disk backup programs. Second, the name field is a single field. If you want to sort by last name, you must enter the last name first. This won't cause problems for most companies, but it significantly reduces the value of *Easy Mail* for home use or for client-oriented businesses. Third, the program prints labels exactly as you entered the fields. This means that if you use only two of the four address lines, the program prints out two blank lines. You could probably live with this, except that most labels won't use the six print lines provided. I also dislike labels with personal names printed last name first.

The label printing procedure does have some nice features, however. You can choose between one up and two up label paper, and you can align the labels after the first label line has printed.

The match and sort functions of *Easy Mail* make it a powerful special application database within its size limits. In general,I think it's well designed, and if you can live with the problems that result when you print out your labels, you'll find this program a bargain for the price.

F.C.M.

Arrays Inc./Continental Software
$49.95

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

F.C.M. does everything that a "filing, cataloging, and mailing" program should do, and a good deal more. It is a personal or business mail list/mini-database program.

Unlike a number of mail list programs, *F.C.M.* allows you to create screen formats other than straight mailing lists, using as many as nine lines. This kind of flexibility gives it mini-database capabilities, like an electronic file box. You can also customize and print labels and envelopes (including a return address), and put a special message on any of the nine lines when printing in either mode. Because of its format flexibility, *F.C.M.* can handle most foreign addresses, and a ten-digit zip code.

The program prints out full master lists or selected lists, of your entries, as well as specially sorted lists for label or envelope printing. In addition to handling special message lines, *F.C.M.* can handle enhanced printer commands, such as a compressed print mode; if your printer has a fourteen inch carriage, you can print as many as nine labels across, nine lines per label. Standard labels only accept from six to eight lines per label, so the program makes allowances for oversized labels.

Each disk stores up to 650 separate entries, and the program allows you to extend on file to multiple disk. As many as 25,000 entries comprise one *F.C.M.* system. You enter records at random (i.e., during as many sessions and in any order you want). The program lets you search for, edit, delete, or sort entries according to special needs (such as alphabetical order, company names, memors, or specific ZIP codes) by any of twelve different categories or combinations of categories. The sorting routine is extremely fast, a nice bonus.

F.C.M.'s documentation is very good; but the program is so well organized and completely menu-driven that you rarely need to consult the manual. This flexible program is surprisingly simple to operate.

Considering its price, *F.C.M.* offers powerful mailing list features. Yet, perhaps its greatest attribute is its flexibility. Because you can custom format the screen labels, *F.C.M.* may also function as a mini-database or cataloging system. You can create catalogs listing your record collection, coins, stamps, recipes, or whatever, or make lists for inventory or insurance purposes. All of these lists, or parts of them, can, of course, be printed out. This versatility makes it considerably more useful than a simple mail list program.

MAIL NOW

Cardco, Inc.
$39.95

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	D	C	*Value for Money*

Although designed to merge with Cardco's word processing program *Write Now*, *Mail Now* functions quite well as a stand-alone mailing list program.

If you need a mailing list package that can do multiple labels as well as merge with your word processing system to generate customized form letters, *Mail Now* is for you. This is an easy loading, easy-to-use, easy-to-change mailing list generator. You can store a maximum of 600 different entries per disk, which does not mean that *Mail Now* limits you to 600 different addresses. By using as many disks as you need, the possibilities are limitless. However, one disk, or at most two, will probably meet the needs of most small businesses and organizations.

Each entry can contain seven separate pieces of information: Last Name, First Name, City, State, ZIP code, Category, and Remark. A handy menu of options is always present at the top of the screen. After you enter your list, you may easily change any of the information, delete an old file, and/or augment your list. You are able to review each file on the monitor or print it as a label. If you have a word processor that can merge with *Mail Now*, you can use your mailing list to generate customized form letters.

With a few strokes on the keyboard, you can sort through your listing according to any field you desire. For example, if you want to inspect or print every address in your list that's in the state of Texas, simply select Search from the main menu. Position the cursor in the field for State, input "TX" (for Texas), and press F7. It's as simple as that. If you have a large mailing to get out, you can save postage by pre-sorting your mail by ZIP code. This requires the same few keystrokes you used to search for a state.

The program can format a label to suit your needs using a special formatting formula. Your labels may contain all the information in each file, or the selected information of your choice. You can print several labels across a page, making it easy to use successive sheets of peel-off labels. Once you format a label exactly as you want it, the formula is stored with your file that contains the address list.

Mail Now's one major shortcoming is its manual. Most of the options the program offers you are self-explanatory; however I didn't find this the case with the label formatting screen. It works fine if you are using a Commodore printer, but with others you'll have to input a special ASCII code. The program supplies an easy way to input this code, but Cardco doesn't mention this anywhere in the manual. You'll have to figure it out on your own by trial and error.

The manual proves inadequate once again if and when you decide to merge your mailing list with your word processing program. If you own *Write Now*, you'll encounter no problems. The merge function is explained in the word processing program's manual, although it's not explained in *Mail Now's* manual.

Since Cardco's word processing system stores data using the same type of files as other popular word processors (such as *WordPro*), I suspect you could employ *Mail Now* in conjunction with most of the other popular systems. But the lack of precise information in the mailing list's documentation concerning this issue complicates the matter of merging with any word processing program of your choosing.

Mail Now is copy-protected, so you cannot make a duplicate and store the original disk in a safe place. Cardco does, though, include an exceptionally good life-time guarantee with each disk—so you're covered against future disk damage or failure.

Hopefully, Cardco, the vendor of *Mail Now*, will supply owners of this package with an updated and complete manual some time in the near future. They have done just that with their other products, so they're likely to come through with this one. Except for the disappointing manual, *Mail Now* is a very good product. It does everything it seemingly was designed to do, both quickly and well.

MAILPRO 64

Pro-Line Software, Ltd.
$49.95

Overall Rating	A-	B	*Reliability*
Ease of Use	B+	B-	*Error Handling*
Documentation	B+	A-	*Value for Money*

Mailpro 64 is much more than a mailing list program, as it provides a flexible database manager for any database that consists primarily of a list. Its powerful print utilities make it attractive for both business and home

use, as do its command-driven structure and easy use (once you have learned its features). The documentation is adequate, although I would prefer an index, a command summary, and more specific examples. However, the program comes with sample files on disk to use with a short tutorial in the manual.

The power of a database depends upon size of records, size of fields, the number of data types available for field definition, and the flexibility of sorting routines. *Mailpro 64* limits you to a 254-character record. Moreover, it sorts by ASCII value and offers no numerical manipulations. Its major drawbacks are its mediocre error handling and slow update time for complex records. The program's record size adequately handles address lists, or lists such as collection catalogs. Fields can extend up to ninety-nine characters, although if you choose to use long fields, you obviously limit the number of fields that so short a record can hold (although the program imposes no limitations otherwise). Of course, complex records take hours to update, so the number of fields has a functional if not an absolute upper limit. Files may include up to 4,080 records.

Data types include literal (all characters), shifted literal (capital letters), numeric, and yes or no. This last field automatically fills with whichever word you choose when you define the field. You can override this default, which then acts like a switch in sorting records. To call up records for onscreen viewing, you must specify one or more fields as criteria. The program then displays those records which have identical values in the specified fields. The important sorting in *Mailpro 64* takes place in the print program. You can specify one or two data sets for comparison with one or more specified fields. You then tell the computer to print only records that match, only records that don't match, records within a stated range, or records outside of a stated range. You will probably need to experiment a bit before you can take full advantage of this complex matching.

The Function menu, the only menu in the program, includes: create a file, edit field names, add records, enable data entry from the *WordPro* word processor (via two methods), search for a record, load a file, format a print program, print, get a list of *Mailpro 64* files from disk, disk output, and exit the program. I couldn't find an explanation of disk output. Within each function, commands enable other operations. For example, in the Search mode, the Commodore key and the F key move you forward to the next record. I found the commands mnemonic and easy to remember. (The user's manual has no summaries of commands.) *Mailpro 64* is easy to use, but one of the costs of a program this powerful and flexible is that it takes time to master.

Creating records is easy. Specify the name of the file, the number of fields, and the estimated number of records, and *Mailpro 64* shows you a screen with all of the fields ready for definitions of size and data type. Watch out, though, because if you create a file with the same name as one already on disk, the program destroys the first file without telling you. The documentation warns you about this problem with error handling, but your only remedy is to back up the original file as soon as you complete it.

In addition to specifying field name, length, and data type, you specify whether it will be a key field (for sorting) or not. The more key fields in a record, the longer it takes to update your files. You need at least one key field in every record. You cannot change your mind after you have created the file. As you design the record, you can use Commodore's built-in full-screen editor to make changes in record format. Because you use the Return key to move from field to field, you cannot inadvertently write to the disk before you're ready. *Mailpro 64* uses the back arrow key to accept almost all formats or record changes. To speed data entry, *Mailpro 64* uses batch processing to write to the disk. That is, it places each record in memory up to a limit of 127. A command writes them all to disk at once. This process takes a long time, even for short files. I do have one serious reservation: I got a blinking disk error light every time I wrote to a file. The files worked all right, but I couldn't figure out what was wrong. The program gave me no error message, either. I tried using different drives to make sure my hardware hadn't caused the problem. This flaw in the program worries me because any disk error makes me nervous.

You can use the setup editor to devise a print program with a header for each page and a format for each record of up to 160 columns and twenty-three lines. This format allows you to intersperse information for a field in your file with text that you enter via the editor. Besides the format, you define output specifications such as paper width, the number of print lines for each record, the number of records per line, vertical spacing for page breaks, and how many decimal places to use for numeric fields. You can then save the information to your file and reuse it. You can also save up to ten different print programs with each file, editing them as necessary. Since *Mailpro 64* has a screen dump utility as well, you can print out a given format and copy it for another file.

Mailpro 64 has more useful functions than I can cover here, but I'll mention a few salient points. For one thing, you can create a file with *WordPro* to fill empty files in *Mailpro 64*. You can write the whole file, or combine your manually entered fields with some entered automatically by the program. You can also create a file from *Mailpro 64* records and merge it with *Wordpro* documents to get a mail merge for a form letter. If you don't like the default configuration for the printer or screen color, you can run a configuration

program. If you have an RS-232 device or a Commodore printer, you'll find the reconfigured program convenient. My copy of *Mailpro 64* had no write-protect notch, so I had to cut one to run the configuration program, which writes a whole new *Mailpro 64* program.

Mailpro 64 is a sound business program. Its print routines let you print mailing labels across the full width of your printer carriage, while the print formats let you print a wide variety of reports drawing upon your database information. However, as a database it proves more valuable for home use than for a business because of its limitations. In particular, error handling is slap-dash. I spent an hour worrying about the combination of the disk error light and my inability to get the program to search a field defined as a non-key field (thus, not open to sorting). An error message to inform me that I can't search such a field would have saved me a lot of grief. Nevertheless, *Mailpro 64* is a successful compromise between a full-featured database manager and a dedicated address list manager. For the price, you won't find a more flexible program.

TOTL.LABEL 2.1

TOTL Software, Inc.
$19.95
VIC 20 (with 16K expansion)

Overall Rating	A-	A-	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A-	A	*Value for Money*

TOTL.LABEL 2.1 is a versatile and easy-to-use mailing list and label preparation program. It is designed to be compatible with the *TOTL.TEXT* word processing program for the preparation of form letters. The program allows churches, clubs, and small businesses to prepare mailing lists economically.

TOTL.LABEL 2.1 offers many of the features of more costly programs while remaining easy to use. The program first loads the "Chickspeed" module which subsequently calls the mailing list program. Both components are written in BASIC and completely unprotected, so you may readily prepare backup copies. Moreover, the company says that it will replace the original at no charge should it fail. This, combined with the fact that *TOTL.LABEL* works well, makes the program worth the investment.

This fully menu-driven program employs color coding for your entries. The opening screen offers a number of options: create a new file; load or save an existing file; add, change, or delete an entry from memory; print labels; browse; or quit. When a new file is prepared, you respond to questions about the physical size of the label, the number of typed lines, and the number of characters per line. All responses have default values, or you can modify them. To create a new file, you must select the option to modify a file. The load and save options are fairly conventional, although the Save command allows you to skip over all files on a tape system and begin recording just after the last file. This saves tape users a lot of time and helps avoid the destruction of old data by preventing you from accidentally erasing files you want to keep.

Data entry is also menu-driven and hence very simple. From the main menu, you can add any number of entries up to the capacity of the computer. The program prompts you line by line for each label. You can also change any line or an existing label or delete any unwanted entries. The VIC 20 editor (cursor control keys, Home/Clear key, and Insert/Delete key) functions in its normal manner during data entry. Additionally, the four function keys also have editing abilities in this program. They move the cursor back one line or forward one line, tell the program to accept an entry, and return you to the main menu. The browse option from the main menu allows you to examine the first line of each entry in groups of ten entries at one time. From this level, you can print labels in order to inspect one label, or print a selected group of labels.

The print option offers yet another menu. You may print all labels, print only those added in the current session, print only those changed, restart, or call up another menu with the final print option. This print option produces several questions as well as yet another menu. The program asks you for the number of horizontal labels (one or two), the number of copies needed, and the number of lines you wish suppressed during printing. After you enter the answers to these questions, the menu allows you to print a test label to check printer alignment and continuous printing.

The package performs unusually well for a BASIC program. Machine language subroutines enhance the speed of the search and browse functions. They also reduces the time needed for loading and saving data. Sorting, although limited to the first line, occurs rapidly; proper placement of data elements allows you to sort upon multiple items. The program also allows you to store and retrieve data from a cassette tape, a floppy disk, or both. This proves useful when you upgrade to a disk drive system. *TOTL.LABEL* supports the VIC 20 printer; however, using the modifications provided, you can adapt the program to nearly any printer. Likewise, if you own an 80-column expansion, you can adapt the mailing list program to work with these video formats. The documentation provides exact directions on making the needed modifications, but you'll find it helpful to have an understanding of BASIC prior to making these changes.

The documentation is clear and concise. The twenty-three-page paper bound booklet lacks examples and illustrations, but the table of contents is well organized and highly detailed. The manual provides precise directions for the initial startup, the implementation of each task, and the modifications needed for 80-column expansion and non-Commodore printers.

A few minor problems affect this program. For one thing, pressing the Run/Stop key sometimes halts the program. Entering "CONT" should restart it. Depending on when this occurs, you could lose data. You may also encounter a problem when saving data. You should edit, print, and save data, in that order. If you change the procedure, the computer may hang during the save and lose your data. The documentation addresses these problems thoroughly and suggests remedies.

TOTL.LABEL represents a real bargain for the VIC 20. It performs even better than the magazine ads claim it will. They don't even mention that the program can also serve as a small database, or prepare 3 by 5 file cards. Its ease of use, low cost, and support for a wide range of hardware offer you a product with a great deal of versatility. Any business or agency that needs a mailing list program should find *TOTL.LABEL 2.1* a real time saver.

Database/File Management

Earlier in this book, we presented reviews of mailing list managers. These programs can be used (especially in conjunction with word processors) to effectively control, utilize and manipulate a list of addresses. As a substitute for an index card file, this type of software is an prime example of the efficient application of personal computers to real-world problems. As you read these reviews and considered the benefits of these programs, you didn't know it, but you were learning about databases and the management of files of information.

In the broadest sense, a database is simply a collection of information systematically organized for one or more purposes. One common database we all use is a telephone book. It contains names and phone numbers arranged alphabetically to facilitate looking up someone's phone number. Dictionaries, catalogs, and library file cards are also examples of databases we use regularly.

A computerized file management or database program accepts, organizes, stores, and manipulates data in various user-specified ways, and reports the results. The database management program that's right for you should be the one that best suits your needs and handles data closest to the way you'd like it to.

There are obvious reasons for organizing data within a business environment. First and foremost is control. Many advantages (increased productivity, for example) result from putting all the information that's crucial to the operation of your business enterprise in one place. Database programs offer you flexibility in maintaining records, plus infinitely greater ease in reorganizing information for a variety of purposes. In fact, many consumers are attracted to database programs precisely because of their sophisticated reporting capabilities. The quality of report generating features differs greatly among the various file management and database systems. Nonetheless, this business software helps you reduce costs and improve efficiency.

The exact meaning of "database management" varies according to several criteria: the level of sophistication you're seeking, what kind of database you want to create, and how you want to use the information you store. There are three basic levels of sophistication among current database programs, ranging from the simple to the highly complex. Their functions and prices vary accordingly.

A file manager or database consists of files. Each file is made up of different records, and each record is made up of "fields"—individual units of related information. In a file (or table), the records are equivalent to rows, and the files to columns. The fields may be classified as alphanumeric, numeric, logical, dollar, date, and so on. Let's say, for instance, that you were creating an address book, a file limited to business clients. Each unit of information—name, street address, city, state, ZIP code, telephone number—is a separate field of data. These fields, linking together information on each individual, form one record in the file. Within the database, you could create several files: one for business addresses, one for friends, one for relatives, and so forth.

The simplest database is a fast, electronic version of a basic index file card system. If your projects could best be handled with this type of arrangement, then a relatively inexpensive and simple file management program (of limited flexibility) will adequately serve you. At the middle level of price and complexity you'll find programs that offer you a fair amount of power and considerable flexibility, yet are still easy to use. With them, you can format data storage and manipulation in various ways to meet different needs; they should be able to store, sort, edit, retrieve, and calculate data, as well as produce reports in different fashions (various types of graphs, charts, alphanumeric reports, etc.).

The first two levels are basically file managers; file managers can access and manipulate only selected items from a pre-defined file, *one file at a time*. If you have a simple

application, one table may suffice. When you want to add, change, or retrieve data, you are limited to using only a single table. In other words, if information concerning your department managers is stored in the Manager table rather than on the Employee table, a file management program would have no way to list each employee with his corresponding department manager.

The more complex database management programs can access more than one file at a time. The most powerful and flexible systems are generally called "relational" databases because with them, you can relate data from two or more files. These packages have the ability to link together elements from a number of different files in the same database, so they are very powerful in coping with a host of informational needs. No one, however, claims they are easy to use. In some cases, they are virtually programming languages for creating customized databases.

So what should you be looking for in a database? It depends very much on what you want to do, but obvious features include ease of use, ease in designing file formats, reporting capabilities (default and custom), and other user-oriented operating characteristics. You'll simply have to try out a few (or look at demonstration versions) at your local computer emporium.

Another consideration is the reliability and size of the programs's data storage capabilities. Does it provide backup procedures? Are there checkpoints for system failures? How many files of a given size can the program handle at one time? Keep in mind that a database program may have an upper limit on both the number of records (rows) and the number of fields (columns) it can handle. There is usually a limit to the maximum number of characters in each type of field. A limit may also exist on the total number of characters in a record.

Flexibility is a vitally important factor when selecting your database software. It is crucial that the program be able to reformat data in various ways—both the ways in which you add or delete information and those by which you obtain printed reports. You'll also want flexible "default options." Programs often come from the publishers with preset data entry formats and other features that appear automatically, that is, "by default." You should be able to change the default values—the standard setup of the program—to meet your individual requirements.

Also be sure to check the program's arithmetic cpabilities. For example, along with adding, subtracting, multiplying, and dividing, can your database perform exponential calculations? The ability to edit and sort data also merits your scrutiny. What can you change? What are the decimal specifications and monetary formats available? How is the sequencing of records performed? Can you sort files in ascending and descending order? And when you're sorting, can you use more than one field at a time as search criteria? Can you specify multiple fields, string values, or a range of record numbers when conducting searches? What kinds of data retrieval are supported (*ad hoc* queries, sorts)?

Finally, there are some other features to look for in databases and file managers, depending upon your needs:

- tutorial
- file expansion (that allows for virtually unlimited file storage capacity and sorting ranges spread out over multiple disks)
- modification and maintenance capabilities (updating individual records, redefining database tables)
- the ability to match, merge, or simultaneously update two or more files
- indexing capability
- master file extraction for building other files with shared data
- the capacity to interface with other kinds of programs
- data security (passwords, encryption).

Another salient point: Change is inevitable. The modification of a database structure is usually far more difficult than the updating of individual database records. Capabilities for redefining the database structure vary considerably among the various systems. In the most sophisticated packages, fields can be added or deleted, field lengths changed, and field names redefined by entering a single command. In other packages, by contrast, redefining a database table destroys all of the data in that table. Frequently, however, redefinition can

be accomplished through a series of easily mastered, straightforward steps which create a temporary table.

Therefore, unless you know exactly what your database structure should look like, either purchase a package that allows you to redefine the database structure without losing all the existing data, or plan to test the database with a small sample of data, making any changes *before* you courageously embark on your main data entry campaign. Whatever type of database management software you end up choosing, be it high end or low, be mindful that the accuracy of the output will not exceed the accuracy of the information you input into the program.

—Roberta Ritz and Marc Mathieu

Explanation of Database Chart

● = performs this function or has this feature
/ = partially performs this function or has similar feature

Minimum Memory Required—The minimum amount of memory required by the program (in kilobytes).

Format—Commodore programs come on floppy disk, cassette, or cartridge.

Copy-Protected—The user cannot electronically copy the program.

Tutorial—Includes step-by-step instructions on a disk or cassette, or in the documentation.

On-line Help—As you work with it, the program can display helpful information. Help may appear on a small portion of the screen, leaving your work visible, or it may replace your work until you are through with it.

Overall Rating—How the program stacks up against its competition, based on all of its features and other grades.

Ease of Use—A measurement of the program's "user-friendliness." Takes into consideration how long it takes to learn the program, whether the commands are logically arranged, whether functions that should be simple are overly complex.

Documentation—An overall grade for the program's supporting text. The grade is based on clarity, completeness, physical presentation, and so on.

Reliability—The program works as it should and doesn't hang inexplicably, destroy data unasked, or flash obscure error messages.

Error Handling—Whether the program deals well with your mistakes—it should tell you what you've done, not dump you back into the operating system.

Value for Money—Based on its own features and the standards set by the marketplace, a judgment of whether the program is a bargain or overpriced.

Number of Records—The greatest number of individual records that fit in one file.

Characters per Record—The maximum length of each record.

Number of Fields—The greatest number of separately defined portions of each record.

Field Length—The maximum length of each separately defined portion of a record.

Sorting by any Field—You can rearrange a file according to the information contained in any user-defined field.

Sorting Level—The number of levels on which you can simultaneously sort.

Multiple Key Searches—The program is able to locate information according to several criteria at once.

Record Number Displayed—Displays the location of the information with which you are working, according to its own bookkeeping.

Sample Data File—The package includes an electronically stored sample database file for your instruction.

Print Options—You can specify the format of printed reports.

Number of Indices—The number of diverse ways in which you can simultaneously organize your information.

Math Capability with Update—The program permits you to perform mathematical operations while changing stored information.

Logical Capability in Update—You can make decisions according to true or false values while changing stored information.

Maximum File Size—The largest database file the program can work with, in kilobytes.

Multiple Drives—The program saves files to and loads files from a disk drive (or cassette) other than the one where it resides.

Display Directory—Displays a list of the file stored on any currently available disk or cassette.

Telecommunications Format—Many database programs use proprietary formats for storing files, making it next to impossible to transfer them to any other programs. A few communications-oriented programs store files in a more universally acceptable format, or offer a special format for telecommunications.

Index—An alphabetical list with page references to help you find information in the manual quickly.

Reference Card/Keyboard Templates—Some form of card, folder, or poster with brief explanations of the program's commands that you can keep by your computer.

Database/File Management Chart

	General			Grades							
	Copy-Protected	Tutorial	On-Line Help	Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Number of Records	Characters per Record
CodeWriter $59.95	•	•	•	B	B+	B+	B	B	B	2000	1000
Commodore 64 File $9.95		•		B	A	A-	A	A	A	30,000÷ rec. length	∞ (30K)
Data Manager $24.95	•	/		C	B	B-	B	B-	B	5200/ 650*	240
Filewriter $59.95	•	•		B	B+	B+	B	B	B	Variable	840
Magpie $74.95	•	•	•	B+	C	B	B+	B	A-	32,000	6100
Mini Jini Record Keeper $89.95	/		•	B	B	C+	C+	C+	C+	800	250
Sunday School Master Writer $99.95	•	•		B	A-	C	B	B	A-	800	350
Superbase 64 $99.50	•	•	•	A+	A	B+	A	A	A+	∞	1108
TOTL. Infomaster 3.6 $50.00	•	•		C	B	B	B	B	C	∞	2500
Typro $59.95			•	D+	B	D	C	C	D+	2000	1350

* 5200 (1 field) / 650 (8 fields)
† Key=30 / Text=255
‡ Limited by 255 characters

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Formatting, Use, and Execution											File Manager				Doc	
Number of Fields	Field Length	Sorting by Any Field	Sorting Level	Multiple Key Searches	Record Number Displayed	Sample Data File	Print Options	Number of Indices	Math Capability with Update	Logical Capability with Update	Max. File Size	Multiple Drives	Display Directory	Telecommunications Format	Index	Ref. Card/Keyboard Temp.
100	39	●	1		●		●	1	●	●	100K	●	●		●	
∞	39	●	1		●			1			30K					
8	30	●	1		●			1			156K					
49	40		1		●	●	●	1	●		164K	●	●		●	
3050	127	●	1	●	●	/	●	1	●	●	32,000 records	●	●			
10	25	●	1		●	●	●	0	/		120K				●	
12	208	●	1		●		●	1	●		170K		●			
127	30/ 255†	●	∞‡	●	●	●	●	∞	●	●	∞	●	●		●	
100	245		5	●	●	●	●	1			170K	●	●		●	
50	27	●	1		●	●	●	∞			150K	/	●		●	

Database Managers

CODEWRITER

CodeWriter Corporation
$59.95

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	B	*Value for Money*

CodeWriter is an easy-to-use, menu-driven program generator that's capable of writing customized BASIC database-type programs. It is a two-disk package; you use the first disk to produce a program that creates the database, and the second to create a program that generates reports.

CodeWriter results are quite similar to many small database programs available for the Commodore 64. Nearly all of them allow you to customize a small database by designing a data entry screen, entering and updating records, and doing searches on various fields within those records. Quite a few let you perform calculations on numeric fields, and some can even design an 80-column customized report. So, you wonder, what are the advantages in using this program over a standard database?

First, you end up with a database program that is completely independent of the *CodeWriter* program. This program is generated in BASIC and can be listed and modified. Second, it allows for more customizing than most databases permit, particularly in the area of error trapping. You don't have just alphanumeric or numeric fields, but can set more strict requirements (for example, making sure the user enters all ten digits for a social security number). You can even define your own error messages.

Program design begins with the single screen layout. You use the cursor keys to type and input a label, then put a row of periods to define the length of the field. A "#" sign or "$" sign to the right defines the type of data field. Once all the fields have been layed out, the program reads the screen to make sure everything is correct. It then highlights each field and asks if the data input will be keyboard or calculated. Finally, the screen is saved to the data disk.

The second part of the program produces the basic code for the program you design. The screen layout is called up and you have to define the formulas for each calculated field. Calculated field formulas are algebraic and are based on either previous calculated fields or keyboard entered fields. You just type "List" and it displays a complete list. For instance, if Total (pc1) = Quantity (ke7) x Price (ke9), where ke7 and ke9 are keyboard entries for the record, then the formula would be pc1 = ke7*ke9. It also allows self-referencing formulas of the type pc1 = pc1+1, which could be used as a counter.

You may also do grand totals from a single field on all of the individual records. This comes in handy if you are trying to determine total sales from individual invoices. You assign a key field used for searches, and the number of records you need to form a calculated total that will fit on one data disk. Setting up error checking is done just before it writes its program to your data disk.

Writing the program can take anywhere from ten to thirty minutes. Length obviously depends on the number of fields, amount of error checking, and complexity of formulas. A simple example with nine fields, three of them calculated, and limited error checking, was ninety-five disk sectors in length. Runtime speed was reasonable for a BASIC program. Searches are quick with few files. The vendor claims that you can print records on Commodore and Epson MX-80 printers. Using a Cardco interface with an Epson printer, I got graphics symbols for uppercase letters, and uppercase instead of lowercase. Rather discouraging.

A second disk contains the Report Creation System. It lets you access specific information in your database, perform calculations on specific fields, then turn it into an 80-column report on paper or screen. The 80-column screen format is viewed by paging two 40-column screen halves from left to right.

One of the nice things about the program's report producing capacity is its ability to customize information retrieval to a greater extent than many large databases permit. For example, you can choose to search through a portion of the records and dig out field information on males over the age of twenty-five. Numeric operations, such as total, average, minimum and maximum can be performed on any field. The

number of fields are limited to the amount of information that can be printed in 80-column format. Reports can be longer than fifty-six lines per page (long lists do wrap to a second or third piece of paper), but you are still limited to the single-page report style.

The sixty-page instruction manual shows how to set up a sample screen and generate a complete program. Instructions are clear and to the point. Beginners shouldn't have any trouble following the examples.

Having heard so much hype about program generators, I was reluctant to believe that a program like *CodeWriter* could produce a useable database. Rest assured, it can. It is a powerful program, especially for customizing simple applications that involve a limited number of fields on a single screen.

COMMODORE 64 FILE

Rak Electronics
$9.95

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B-	A	*Value for Money*

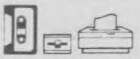
Commodore 64 File is neither powerful nor flexible, nor can it handle a large file. However, before writing it off, consider its amazingly low retail price: only $9.95! It approaches the abilities of some database programs in the thirty to forty dollar range, and may just be powerful enough for your needs.

The program is written in BASIC which makes it slow but easy to modify. It is available on cassette, but can be saved to disk and does support disk, as well as tape, files. A decent programmer could probably write a similar program in twenty to thirty hours, but if you consider your time worth more more than fifty cents per hour, buy the program and customize it to your own particular specifications.

Upon loading, you are presented with a menu consisting of two choices: load an old file, or create a new one. If you choose to load an old file, the program calls up a disk directory that lists very slowly. (I changed one line and added one line, and now the directory is optional.) If you choose to create a new file, you are asked "How many headings? In other words, how many fields do you desire? You then must name each field, and declare the maximum field length (from five to thirty-nine characters). This is annoying because a five character ZIP code and a twenty character name field are both allocated twenty spaces, so if you specify three fields of up to fifteen characters each, the program allows a possible forty-five characters per record. Based on available memory, it permits 666 records to the file, since all file handling and manipulation is carried on in memory.

When manipulating data, seven commands are supported: Dump file (save to tape or disk), Print file (VIC 1525 or similar), Add record, Change record, Delete record, Sort file, Load file. You can perform sorts on any field but on only one level. Printing is selective; you have the choice of printing the entire file, or part of it. If you choose to print only part of the file, you are asked which field to search and which data to look for in that field, with the option of printing records whose seach field is the same, less than, or greater than the input data.

That's about all that *Commodore 64 File* does. However, it's enough to maintain an address and/or phone number file, a home library index, a home inventory, and just about any home database setup that you would occasionally use. With a little work, you—or one of the neighborhood kids—could customize the program to fit your specific needs. And remember that low, low price tag.



DATA MANAGER

Timeworks, Inc.
$24.95

Overall Rating	C	B	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	B-	B	*Value for Money*

Data Manager is one of the least expensive database management systems (DBMS) you can purchase that uses relative files. Relative files (or "random files," as they are more commonly called) allow you to access any record in the file without having to read through all of them, as you would with a system using sequential files. This, coupled with the fact that the program is in compiled BASIC, keeps access and search time to a minimum.

What do you give up for this convenience? First of all, you are restricted to a maximum of eight fields per record and thirty characters per field. This is rather constraining, although you could spread your information over two or more records. The tougher restriction limits you to one file per disk—and nothing else. If your Christmas card list has two hundred names, it's a good candidate for a DBMS, but it would use less than a fifth of the disk's capacity; the remainder of the disk (over 500 sectors) would be unavailable. The reason you are confined to one file per disk is that *Data Manager* uses the same file name for all data files! Although you can title your file for internal use, it still goes on the disk directory as "data." This is so very restrictive—and so

unnecessary—that you should take into account the price of all the extra disks you'll use when considering the low ($24.95) price of this software.

Data Manager has a capacity of from 650 to 5,200 records per file, depending on the number of fields per record. A standard, four-line address file will hold up to 1,300 records. The documentation confusingly refers to a record as both "record" and "item." Sometimes it uses "item" to refer to a field, which it usually calls a "line." (Confused? I was for some time.) Since this software is intended for the novice user, it would have been better to introduce the standard terms, with appropriate explanations of their meanings.

What can you do with *Data Manager*? You can search your file for specific information. If your search criterion is numeric, you can specify a range of numbers to select, but alphabetical information will only be selected if it matches your specification exactly. You can only search one level deep, that is, one match at a time. The result of a search is held in memory, though, and you may do further searches on this data, as many times as you wish. The entire file, or the result of any particular search, can be dumped to your printer (Commodore or work-alike only), but reports and labels are beyond the scope of this program. You need *Word Writer* (Timeworks' companion word processor) for these. (For a complete review of *Word Writer*, see the Word Processing section of this book.)

Numeric information is stored through the use of "pointers," which are codes (such as A.) that are similar to assigned variables. You must identify all numeric instances of the same thing (i.e., dates, phone numbers, ZIP codes, etc.) with the same pointer if you think you may wish to search the file at a later time using that information. You may also "point" to alphabetical information with what are called "index codes." Index codes are letters or numbers that you include in the record for use in selecting a group of otherwise unrelated records (subfiles within your files). Consider the following example: You have created a database of the names, addresses, and telephone numbers of everyone you know. Using index codes, you can identify some as relatives, acquaintances, close friends, job associates, neighbors, PTA members, church members, and so on. You may use more than one index code per record, making it very easy to select a particular subgroup quickly. If you want to search the file for all references to a particular pointer or index code, they all must be within the same field in each record.

You are supplied with a small data analysis option within the program. It shows you a sum, average, and standard deviation of the selected data, as well as a graphics frequency chart. This option is of little use for mailing lists (unless you enjoy adding up everybody's ZIP codes).

The documentation is indeed intended for the novice—the dim-witted one, at that. I have no argument with documentation that explains things in detail (would that there were more of this kind!), but documentation that sounds like it's intended for a backward six-year-old really has no place on retail store shelves. A sample: "Sit back. It will take 4 or 5 minutes for your Disk Drive to set up the Data Base. As your Disk Drive grinds and turns, it is setting up the internal road map and sign posts . . . " What the program is actually doing is formatting the relative file so that information can be stored quickly once it is entered. (The author evidently liked this paragraph so much, he included it in the section discussing a cassette-based system.)

If you already own *Word Writer* from Timeworks, you should consider *Data Manager* since it interfaces directly with the word processor to print labels, reports, and so forth. Otherwise, database management programs just as good as *Data Manager* are being sold for less, and some much better programs cost only a little bit more.

FILEWRITER

CodeWriter Corporation

$59.95

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	B	*Value for Money*

Filewriter is part of the Codewriter Series from CodeWriter Corporation. It offers you the same data entry system contained in the more expensive *CodeWriter* package, but does not include the report generator. You can upgrade to the full system at any time by purchasing the latter program disk for $40.00.

Since the data entry program is identical to that used in *CodeWriter*, read the review of that package elsewhere in this book for a complete description of this program. There are several reasons why some consumers might choose this package over its larger, more costly brother. It is a less expensive way to store data in a "file cabinet" fashion without paying for report capabilities. Also, it may appeal to buyers who want to spend a little money on a small database now, before making the choice of a larger, more full-featured (and more expensive) database sometime in the future.

MAGIC DESK I— TYPE AND FILE

Commodore Business Machines, Inc.
$49.95
Save data to disk

The title of this program is misleading, since it implies that this is an integrated package with a word processor and a file management system. *Magic Disk I* actually simulates a typewriter that stores your finished text pages in ten "folders" within three "file cabinet drawers." The cartridge-based program has the same limitations as a real typewriter—it can neither delete nor insert material. Therefore, it's not a true word processor. You may save your work to disk; the program will manage your files by placing ten text pages into individual file folders within each drawer of the "filing cabinet." You may subsequently label them for convenience. (For a complete description of this program, please refer to the Word Processing portion of the Business section.)

MAGPIE

Audiogenic, Ltd.
$74.95 (cartridge) $54.95 (disk)

Overall Rating	B+	B+	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	A-	*Value for Money*

Magpie, a product of Britain's Audiogenic, Ltd., is a powerful and sophisticated database. It is available as either a plug-in ROM cartridge or a disk (the disk version is called *Micro Magpie*). A quick glance at the documentation gives you the impression that this is one of the most powerful databases ever created for the Commodore 64, and one that is particularly well-suited for small business database management.

Magpie is designed around the concept of "forms." A form, in *Magpie* terminology, may be of any size between twenty-five and 127 characters wide, and between one and 255 lines long. Your only constraint is that only 6,100 characters are available for a form. This is enough to produce a form eighty characters wide by seventy-six lines long. Since the Commodore's screen can display only forty characters by twenty-four lines, *Magpie* uses this as a window on the form. The window scrolls automatically when the cursor approaches the screen's edge. The database may make use of up to twenty-six numeric or alphanumeric fields. Other features include user-defined passwords, multiple-field searching with wild cards, and disk management utilities. *Magpie* is compatible with other Audiogenic programs, such as *Wordcraft*. While this review was based primarily on the ROM cartridge version of the program; the disk version has very similar capabilities.

The package can manage practically any data-handling task you could possibly dream up for your Commodore 64, and you may manipulate and retrieve data in various ways. *Magpie* lets you design and store to disk your own specific forms for the task at hand. The program is capable of holding many forms in memory, any two of which may be active at the same time; information can be swapped between them. It is possible, for example, to use information from and for invoicing form to update the data on a form used for stock control.

The heart of *Magpie* is a high-level programming language integral to the program. In order to get the program to do anything, first and foremost, you must write a program using the language. But with the *Magpie* language, you don't have to learn a complex syntax and type in lines of program statements, as you must do in BASIC. Instead, you select, or "pull down," commands from various menus and put these commands together in the order in which they are to be carried out. Since the language was specifically designed for data handling, and each command is capable of doing a great deal, *Magpie* programs are quite short. Program instructions written in the database's language are called "procedures." Once you have written the procedures for an application, they can be saved to disk (where the application is known as a "system"), along with the "forms" that were designed for that particular application.

The database is capable of carrying out highly sophisticated data search and retrieval routines. *Magpie* can use any field as its search criterion, and you can use more than one field at the same time. Other complex search capabilities are available, including pattern matching techniques, creation of an index on any field (for faster access), and logic-based decision making.

Another capability is that of turning data from numerical fields into scatter graphs or bar charts organized on X and Y axes. This can be very useful where graphic representations of comparisons or trends are required. You can view the chart or graph on your screen or output it to your printer.

Magpie is operated primarily via an innovative hierarchy of "pop-up" menus. These menus come into view on screen whenever a selection has to be made, and they disappear when they are not needed (leaving intact whatever was displayed behind them). You operate each one of these menus by moving a cursor line up and down until it is positioned over the desired option; you then press the Go key (F5) to make your selection. A "chain" of menus follows; in other words, most selections that you make from a menu lead to another menu, which in turn requires still another selection. Interestingly enough, when this occurs, the new

menu "pops up" slightly to the side of the old one, and the option you've picked is highlighted. Each menu has its title displayed at the top; this title corresponds to the name of the option which you've chosen from the previous menu.

Audiogenic's designer/programmer, Dave Middleton, obviously put a good deal of thought into the menu design, and it shows. The menu system is excellent: all twenty-three menus operate in the same manner and make use of the same function keys. You use the menus for almost everything, including programming a procedure, as opposed to employing keyboard entries. With just a few exceptions, the keyboard is necessary only for typing information onto your forms, or when using the calculator. *Magpie* performs mathematical operations (with up to twelve-digit accuracy) using the following operators: +, -, *, and /. Decisions based on mathematical results are made using the functions >, >=, =, ><, =<, and <.

The *Magpie* package includes a comprehensive user's manual in a ring binder, the program cartridge or disk, and a Help disk. The Help disk contains Help screens with information on each menu command to explain every program option the manual describes. You can call up these screens at any time, using the F6 key; calling for help will not effect anything you may be doing at the time. The Help display pops up and disappears once you've read it. The Help disk also contains a preprogrammed mailing list application and a graph plotting demo.

I realized very quickly that *Magpie* is indeed a powerful and versatile database management system—maybe too powerful for the typical home user. Few such users would care to go to the considerable trouble of programming the "system" required to track recipes, the family Christmas card list, or a household inventory. On the other hand, a small businessman with a bit of computer savvy could construct an excellent, password-protected data manager with many bells and whistles. Possible applications include custom inventory and stock control, invoicing, selective mailings, client follow-ups, etc., which involve handling moderate quantities of data. For a user who wants to take advantage of *Magpie's* sophistication but doesn't care for programming, prepackaged applications disks for various data management tasks are available through Audiogenic's U. S. representative, Regenics. These cost $19.95 and up.

Documentation for *Magpie* is fairly good, and includes a lengthy discussion of the basics of databases. I did, though, find that I had to skip around a good deal to find various information, and to follow the tutorials. Nevertheless, the manual is clearly written, despite the usage of some thoroughly British terminology and programming examples. It adequately conveys the program's features and operations. Please note that I reviewed an early version of the user's manual. A newer version is forthcoming which may be better.

Though *Magpie* is designed primarily to work with Commodore's line of printers (models 1515, 1525, or 1526), information concerning non-Commodore printers (Centronics or IEEE-compatible) is supplied. (Trying to work with a printer that is not properly interfaced to your computer may "hang" the system, resulting in loss of data.)

In the final analysis, *Magpie* is an impressive program, whose power is limited more by the slowness and limited capacity of the notorious Commodore disk drives than by the program itself. If you require a highly sophisticated database manager that is also moderately priced and is not overly complex, then *Magpie* is the perfect program for you.

MINI JINI RECORD KEEPER

Jini Micro Systems, Inc.
$89.95
Save data to disk or cassette
VIC 20

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	C+	*Error Handling*
Documentation	B	B+	*Value for Money*

If there is one thing that the Commodore 64 system does not lack, it's the availability of database software. You can get software to do everything from keeping simple lists of phone numbers to maintaining an updated inventory for a huge corporation. Most of the more powerful data management programs require you to memorize a zillion commands and be able to hold down six keys at the same time. Not so with *Mini Jini Record Keeper* from Jini Micro Systems. *Mini Jini* made cataloging my mountain of computer magazines a joy instead of a task.

I knew that *Mini Jini* was going to be user-friendly when I first opened the package. The program comes in a cartridge format, which eliminates any loading time. I plugged the cartridge in, turned on the computer, and my record keeper was activated immediately. This is a blessing when compared to disk-based programs that take from two to three minutes to load.

After the opening title screen, you are presented with the main menu; from this point, you can branch to all the different *Mini Jini* functions. You can access this menu from any place in the program.

First of all, you must create a file. You tell *Mini Jini* how many fields you want in each record (a field is a category of data within a record). The program allows up to ten fields per record; I used five. My records were

the magazine articles I wanted to catalog. You then input a description for each field. Mine were (1) title, (2) computer type, (3) magazine, (4) subject, and (5) date. I now had the chance to change any of these fields or enter data. I chose to enter data. I turned to the first article in each magazine, then entered information about each article into the different fields that I had created. I didn't have to worry about the order in which I picked up the magazines because I planned to sort the records later according to the date fields. *Mini Jini* permits up to 800 entries.

After I had entered all the information concerning my magazine pieces (I ran out of magazines before I ran out of computer space), I then had the option to look through the data, fix it, print it, or order it alphabetically. I first wanted to sort the data according to the date of each article. I had entered the dates in the format of year, followed by month (in this fashion, the program would sort the dates in the proper ascending order). After this sort, my articles were now in order by year and month. I made a printed copy of this listing and then saved the whole file to my disk. (If you are using a cassette system you can tell *Mini Jini* to save your file to the cassette.)

This, of course, was a simple exercise with *Mini Jini*. Many other functions are offered by this software. Using the 64's function keys, you can adjust the border color, turn printer line feeds on, adjust your screen, and stop the printing. A very attractive feature is the ability to set special printer codes with F2. This allows many different printers to work with the program. Disk users can also "New" a disk, scratch files, initialize a disk, and get a disk directory. *Mini Jini* can also search for anything, anywhere in a file. Moreover, you can perform math functions within fields that contain numeric data. Math features include addition, subtraction, multiplication, division, and averages. You can use a constant as a value set by you to affect a field. These math features almost make *Mini Jini* a mini-spreadsheet program.

Another advanced feature is a label maker which produces labels of up to six lines in length. You select whichever fields you wish to use as the lines of your label.

Mini Jini comes with a very complete forty-page instruction booklet. There is even a section called "Hints and Kinks" that details certain functions. The program can be used with all Commodore equipment and printers, such as Diablo, Epson, and Prowriter. The program works in conjunction with disk or cassette systems; it also comes in a version for VIC 20 users. Unless you're planning to use your Commodore 64 to manage a multi-million dollar business, *Mini Jini* will fill your needs for a database management system, and deserves first place in your software library.

PROGRAMMING KIT 3

Timeworks, Inc.
$24.95

Overall Rating	B	A-	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	B	*Value for Money*

Programming Kit 3 consists of two program versions (for disk or tape), listings of the two programs, and documentation. It purports to be a do-it-yourself approach to database design. The programs are virtually identical to Timeworks' *Data Manager* software package. (For a complete discussion of that program, please see the review of *Data Manager* in the Database section of this book.) The major differences between the two programs that are included in the *Kit* and *Data Manager* are: (1) the *Kit* programs are not compiled; and (2) the *Kit* programs use sequential files for storage, which makes them very slow. If you want to buy a conventional database management system, stop reading this review. If instead, you'd like a custom-designed database management system for a low price, consider *Programming Kit 3*.

Personally, I would prefer spending my $24.95 on this package. Any intermediate-level programmer should be able to take this program (with the listing and program explanations that are included) and in just a few hours, fine tune it so that it does exactly what you want it to—no more, no less. A compiler would be helpful to speed up execution of the program; but even considering BASIC's slow pace, the benefits of "custom-building" a database management system are probably worth a try.

Documentation consists of a fifty-two page booklet and a sixteen-page program listing (actually, four listings: two versions of each program, for tape and disk). The booklet has ten pages of instructions on using the programs; the rest comprise general discussions of programming, databases, and the design of this particular program. It is a good, if pedestrian, attempt to present top-down programming, with explanations of all subroutines and suggestions for enhancements you can make. If you have an extended BASIC (Blue Sky's *Super BASIC*, for example) with relative file handling commands, consider changing the sequential files to random files. You'll end up with a package that would cost you $50 to $80 retail.

Programming Kit 3 is a good product if you take the time to modify it; otherwise, spend your money somewhere else. The expressed purpose of the package is to get you up and programming. To that end, it succeeds.

SUNDAY SCHOOL MASTER WRITER

UHL Research Associates, Inc.
$99.95

Overall Rating	B	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	C	A-	*Value for Money*

There is little doubt that the microcomputer has come of age with regard to applications for church usage. Even churches (normally strongholds of tradition) are awakening to the value of silicon technology in their programs for religious education. *Sunday School Master Writer* by UHL Research Asssociates is evidence that the information industry realizes that religious leaders, too, want to reap the benefits of the small computer revolution.

SSMW is a comprehensive record keeping system for Sunday school teachers and administrators. The program is on disk and requires a disk drive plus any 80-column printer. In order to use the program, you must format at least two disks creating a Master Disk and an Attender/Visitor Disk. This process takes about eighty minutes per pair of disks and affords more than ample time to study the very basic and inadequate instructions that accompany the program. Once the program and file disks are ready to go, though, you have a powerful tool at your disposal.

The full potential of *SSMW* becomes apparent only with hands-on experience. It keeps all the requisite data associated with a program of this type (names, addresses, phone numbers, birthdays, etc.), but in addition, it makes data available with regard to several important categories. For instance, *SSMW* will list to screen or printer all students by birthdate, by class or department, or even by bus number. Upon the appropriate command, it will print out all students who have been absent over a period of time and will inform the teacher/administrator as to the date(s) of the most recent in-home visits to the student by members of the staff. Add to this mailing labels, quarterly reports, and a feature that allows data to be organized by class or department, and you have a complete record keeping system which will run on an affordable computer system that can also serve as a useful classroom tool.

While the features of *SSMW* are many, the cost of the program is relatively high when compared to other Commodore software. Given the price of this program, I expected a bit more user-friendliness and a more thorough manual. The manual included is a mere eight pages of sketchy instructions that more than once left me out in the kilobyte cold. With a bit of study and patience, however, *SSMW* will perform well.

For religious administrators seeking to add a solid record keeping dimension to the organizational system of their church, this program is certainly worth their perusal. Although the price of *Sunday School Master Writer* is somewhat high, it remains far below the cost of similar programs available for comparable computer systems.

SUPERBASE 64

Precision Software
$99.50

Overall Rating	A	A	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	A	A	*Value for Money*

This ambitious database designed specifically for Commodore combines the power required by software professionals with simpler, entry level applications for beginners. It serves well as your first database and probably the last you'll ever need. To get an idea of some of its impressive capabilities, let's check the specifications:

Number of databases: unlimited
Number of files per database: 15
Number of records per file: unlimited
Number of fields per record: 127
Simultaneous search: 127 fields
Record length: 1,108 characters
Characters per field: 30 for key, 255 for text
Word Processor Interface
Print columns: 255 Linking of files

While the power of *Superbase 64* is awesome, it need not be intimidating. You receive an excellent, comprehensive User's Manual (50,000 words) with a three-level tutorial to guide even the novice from the simpler applications through more complex uses as his or her needs and programming skills grow. A generous supply of Help screens demonstrate the program's friendliness. You can even create additional Help screens to prompt yourself or others using the program with important reminders. *Superbase 64* is both menu-driven (choices appear on the screen and you select one) and command driven (you enter your choice of command or chain of commands). You may find that the menus enable you to accomplish everything that you need, but the program offers the extra power in case you need it. Actually, the program seemed pleasantly familiar from the time I first loaded it and began working through the tutorials. Many conventions reminded me of my word processor, *Easy Script*, naturally enough since the same programmer, Simon Tranmer, teamed with Tom Cranstoun for this project. Good programmers write good programs.

The upper range of possibilities includes applications development using the "program" option. In addition to recognizing forty BASIC commands, Super-

base 64 includes fifty programming commands, such as BRKOFF to disable the STOP key, or ASK to allow keyboard input during program execution. You can even command the program to PROTECT to save it in a form that prevents listing or editing. This security feature will appeal to many business users. In fact, only the hardware limits of your system limit *Superbase 64*. Given the proper interface, the program can maintain a single file up to the full capacity of the CBM 9090 hard disk.

You will find all the features you expect from a fine database and even a few pleasant surprises. *Superbase 64* even eliminated a problem that I had with other databases: after I had defined the format for a record and filled part of my file with data, I would invariably require an additional piece of information in my records. This usually meant starting over and keying in everything again. Now I just add the required field to the existing format. Another nice point, rarely offered to C-64 users: *Superbase 64* accesses information from one file for use in another, a relational feature usually found only in programs costing much more. Also helpful, you can set different color combinations for each file to help you keep your records well organized.

I found no glaring errors in the program, just a few minor irritations. After loading the program (it autoruns), you must insert the data disk, then type in the name of the database. Suppose you don't remember the exact name? Well, you can list the directory of the data disk from within the program, but you won't learn this until you reach the advanced programming commands. The first sections of the manual should cover this point—it's quite important.

The User's Manual is well designed, both in content and physical makeup. The D-ring binder remains open, flat on the table, when you display the needed section. Five index tabs help you locate sections. I found the logic easy to follow and the text makes no assumptions about previous experience. A minor misprint referring to section 14.3.2 when it meant 1.3.2 caused some confusion, but otherwise I found the manual remarkably free from the misprints that typically plague software documentation.

Superbase 64 comes with a backup disk. Moreover, you can exchange a damaged disk for $5. Precision Software (USA), Inc. will send a newsletter to registered owners concerning any updates and they offer technical assistance when needed. When I telephoned them, I learned that they support the program in the United States rather than requiring you to exchange a damaged disk in England, as the User's Manual states.

Your software library may become cluttered with programs that become inadequate over time, but *Superbase 64* has a range of powerful capabilities for today and tomorrow.

TOTL. INFOMASTER

TOTL Software, Inc.
$50.00

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

TOTL.Infomaster, Version 3.6 is an excellent example of what a database management program should be. The vendor claims that it is powerful and flexible; it is both, and more. While many databases for the Commodore 64 are designed primarily for a single function, such as mailing lists, you can use *TOTL.Infomaster* for almost any application, including those requiring storage and retrieval of text (on a limited basis).

As with any database, your ability to conceptualize and then construct a system of records is critical to using the program successfully. Since most Commodore 64 users don't have a lot of previous computer and database expertise, easy-to-follow directions are a must. This program's documentation is well written and logically presented. You are led, step-by-step, through the use of the program. TOTL has also thoughtfully provided four sample databases on the program disk that allow the novice a chance to experiment with the various features of the program.

TOTL.Infomaster uses random files to store up to 2,500 characters per record in a file whose size is limited only by the capacity of your disk. As many as 100 fields per record, containing up to 245 characters each (up to a maximum of 2,500), may be utilized. The program allows rapid retrieval and changes to the individual records, as well as browsing through any predetermined selection of records. Search parameters can use the asterisk (*) wildcard or comparison to exact data. The critical parts of the program have been compiled for speed. *TOTL.Infomaster* also offers you the ability to limit access to files with a user-selected password.

The ability to provide printed reports on a variety of formats is one of the program's outstanding features. You can create up to twenty different reports and store them on disk. The ease with which you can construct these reports is remarkable. Margin settings, page numbers, and headings are all selected by responding to simple onscreen prompts. An actual layout of the report you are creating can be checked on the screen with a side scrolling feature that permits you to preview an 80-column printout. The sort function allows reports to be printed in any logical order, but *TOTL.Infomaster* also provides the convenience of printing files without sorting them first.

Every program has something that could stand some improvement. I was bothered by this program's requirement that I label previously created report formats by

number. Since I can't name reports, I have to keep written notes of which number represents which report. This is a nuisance. Also, while *TOTL.Infomaster* can do calculations between fields, the arithmetic is limited to single operations. You cannot directly enter complex formulas (such as those required to calculate compound interest and make comparisons).

As I've already mentioned, failure to anticipate your needs when first defining the fields can turn into a crisis when you suddenly discover that you left something out. With some database programs, you'd have to reenter your data in a newly created program. *TOTL.Infomaster*, to my grateful amazement, allows you not only to add new fields, but even increase the length of your key field.

TOTL.Infomaster also provides utility programs to back up data files using one or two drives, and to transfer files generated by other members of the TOTL. Software family. The author of this program has created a sophisticated system that Commodore owners will find easy to use. Even little details, like the capability to print titles, prompts, and data to the screen in different colors, were not overlooked. TOTL promises technical support for your software problems for a mere $2. While this isn't exactly the same as calling a toll-free number when the $700 program on your IBM PC crashes, it is probably a better value. *TOTL.Infomaster, Version 3.6* is a database that you will not quickly outgrow; in fact, it may be one of the best Commodore business software bargains around.

TYPRO

Input Systems, Inc.
$58.00

This combination database and word processor simplifies form letters and mass mailings. For a complete review of *Typro* see the word processing section of this book.

Spreadsheets

Computerized spreadsheets are the electronic equivalents of scratchpad, pencil, and calculator. Only, they're faster, neater, more sophisticated, and much, much more powerful. Most historians of the microcomputer industry agree that the development of *VisiCalc*, the first popular spreadsheet for microcomputers, provided a key boost to sales of the fledgeling Apple II. In fact, in some circles the old riddle "Which came first, the chicken or the egg?" has yielded to the equally puzzling "Which sold first, *VisiCalc* or the Apple II?"

A variety of spreadsheets are available to run on the Commodore. They range in price and complexity from HesWare's implementation of *Multiplan*, a popular modeling program on a number of other computers to Commodore's own *EasyCalc*.

Spreadsheets give you a visual display consisting of rows and columns. This display is generally a window into a much larger electronic worksheet. You enter your information and instructions into the worksheet at row/column intersections called "cells." Each cell may have text, data, or a formula which relates that cell to any other cell, or combination of cells, on the worksheet. Typically, when you enter something into a cell, the spreadsheet instantly takes the entry into account.

When you choose a spreadsheet program you should consider:how the program displays the worksheet, the ease of model entry, how data files are handled, the printed output from the program, and what financial functions are built in. The following reviews deal with spreadsheets on a comparative basis. We have examined the packages, compared their completeness and features offered, and subjected them to benchmark tests of performance and reliability. Nonetheless you should consider these programs in terms of their suitability to your own needs. The Spreadsheet Chart offers a quick summary of the comparative features of the programs. You will benefit the most from our evaluation if you conduct a similarly detailed examination of your own needs. If you are not familiar with the calculations that go into the type of model you want to create, find someone who can do it for you. Unlike game programs, these spreadsheet models demand that you know what you are doing from the outset. Computer spreadsheets can offer you a terrific increase in control and efficiency, or they can be a frustrating waste of time and money. Approach spreadsheets with the proper preparation, and you will certainly benefit from the computer's taking over a lot of boring but useful drudgery.

Based on *What If?...: A Guide to Computer Modeling*, by Tom Simondi (Copyright Arrays, Inc., 1982)

Explanation of Spreadsheet Chart

• = performs this function or has this feature
/ = partially performs this function or has similar feature
* = sold separately (may apply to graphics)

Minimum Memory Required—The minimum amount of memory required by the program (in kilobytes).
Format—Commodore programs come on floppy disk, cassette, or cartridge.
Copy-Protected—The user cannot electronically copy the program.
Tutorial—Includes step-by-step instructions on a disk or cassette, or in the documentation.
On-line Help—As you work with it, the program can display helpful information. Help may appear on a small portion of the screen, leaving your work visible, or it may replace your work until you are through with it.
Overall Rating—How the program stacks up against its competition, based on all of its features and other grades.
Ease of Use—A measurement of the program's "user-friendliness." Takes into consideration how long it takes to learn the program, whether the commands are logically arranged, whether functions that should be simple are overly complex.
Documentation—An overall grade for the program's supporting text. The grade is based on clarity, completeness, physical presentation, and so on.
Reliability—The program works as it should and doesn't hang inexplicably, destroy data unasked, or flash obscure error messages.
Error Handling—Whether the program deals well with your mistakes—it should tell you what you've done, not dump you back into the operating system.
Value for Money—Based on its own features and the standards set by the marketplace, a judgment of whether the program is a bargain or overpriced.
Matrix Size—The maximum number of rows multiplied by the maximum number of columns.
Cell Size—The length of an individual cell, in characters.
Format Individual Cells—Simple formatting of individual cells for display of numbers or text.
Global Formatting—You can specify margins, cell sizes, column widths, and matrix size.
Move Cells/Rows/Columns—You can move individual cells, or whole rows or columns within the spreadsheet.
Insert/Delete Rows/Columns—You can insert and delete rows and columns.
Replication—Sections of the spreadsheet (groups of rows and columns) can be copied.
Edit Formulae or Cells—Once entered, text, numerals, and formulae inside cells may be changed.
Clear Cells—A simple command clears the contents of a given cell.
Automatic Cursor Advance—When you've finished entering information in one cell, the cursor automatically jumps to the next.
Go to a Location—A "Go To" or "Jump" command allows you to move the cursor directly to a specified cell.
Escape Function—You can escape from whatever you're doing with a single, or double, keystroke.
Home Function—One or two keystrokes takes the cursor to the upper left corner of the screen.
Screen Shift or Scrolling—When the spreadsheet is larger than the screen, you can shift it to see the hidden sections.
Lock Titles on Screen—The names of rows and columns stay on the screen when you scroll away from the upper left of the spreadsheet.
Arithmetic Operators—Includes addition, subtraction, multiplication, and division.
Mathematical Operators—The program supports math functions such as exponent, average, sum, and count.
Logical Functions—The program includes less than through greater than, And, Or, Not, and If...Then...Else.
Calculates Individual Cells—The program can display the result of the formulae in one cell without calculating the entire spreadsheet.
Calculation Manual or Automatic—You have to order the program to perform calculations (M), the program automatically calculates when the spreadsheet is done (A), or it can do either.
Change Order of Recalculation—You can tell the program to calculate rows first or columns first.
Search and Sort Functions—The program can find specified items, much like a database, or sort rows or columns based upon entries in a particular row or column.
Available Memory Indicator—Displays the amount of free memory (or the amount used so far).
Color—The program uses color to good effect.
Multiple Drives—Files can be stored on a disk or cassette other than the holding program.
Telecommunications Format—Many spreadsheet programs use proprietary formats for storing files, making it next to impossible to transfer them to any other programs. A few communications-oriented programs store files in a more universally acceptable format, or offer a special format for telecommunications.
Format Printed Output—You may specify margins and include special fonts in printed reports.
Print Formulae—You can print the logic behind your model, as well as the model itself.
Graphics—The program can generate and print bar, line, or pie charts based on the information in the spreadsheet.
Index—An alphabetical list with page references to help you find information in the manual quickly.
Reference Card/Keyboard Templates—Some form of card, folder, or poster with brief explanations of the program's commands that you can keep by your computer.

Spreadsheet Chart

	General			Grades										
	Copy-Protected	Tutorial	On-Line Help	Overall Rating	Ease of Use	Documentation	Reliability	Error Handling	Value for Money	Matrix Size	Cell Size	Format Individual Cells	Global Formatting	Move Cells/Rows/Columns
Abracalc $53.95		•	•	C-	C-	D	B	B	D+	1040	9		•	
Busicalc 2 $69.00	•			B	B-	C	B+	C	A	999	9	•	•	•
Easycalc 64 $49.95		•		B+	B+	B-	A	A	B+	16,002	18	•	•	•
Multiplan $99.95	•	•	•	A	B	A	A	A	A	16,002		•	•	•
Practicalc 64 $54.95	•	•		B+	B	B-	B	B	B+	2000	38		•	•
P.S. Programmable Spreadsheet $79.95	/	•	•	B	C+	B-	B	B	B	25,000	9	•	•	•

The chart contains all programs reviewed in the following section unless they are inappropriate or information was unavailable from the manufacturer.

Formatting and Use																					File Mgt.		Printing			Doc	
Insert/Delete Rows/Columns	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Replication	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Edit Formulae or Cells	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Clear Cells	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Automatic Cursor Advance	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Go to a Location	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Escape Function	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Home Function	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Screen Shift or Scrolling	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Lock Titles on Screen	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Arithmetic Operators	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Mathematical Operators	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Logical Functions	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Calculate Individual Cells					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Calculate Manual or Automatic	Both	M	Both	Both	M	Both																					
Chance Order of Recalculation			•																								
Search and Sort Functions		/		/	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Available Memory Indicator	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Color	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•							
Multiple Drives		•																									
Telecommunications Format																											
Format Printed Output		•	/	•																							
Print Formulae		•	•	•																							
Graphics	•		•	•																							
Index	•		•	•																							
Ref. Card/Keyboard Temp.		•		•																							

Spreadsheets

ABRACALC

ABRASCO
(Distributed by 3R Import and Export Corp.)
$53.95

Overall Rating	C-	B	*Reliability*
Ease of Use	C-	B	*Error Handling*
Documentation	D	D+	*Value for Money*

Abracalc is a medium-priced spreadsheet program that would be perfectly adequate and easy for beginners to use if only it had a satisfactory manual. Its ease of use is primarily due to its lack of sophistication and its limited features. While this is sometimes a good trade-off in the wonderful world of business software, *Abracalc* is nowhere in the same league as similarly-priced programs such as *Practicalc*.

The spreadsheet contains 1,040 cells: forty rows by twenty-six columns. Four scrollable columns display at one time, each nine characters wide. The screen is divided into three areas: three command lines, eleven rows of the spreadsheet, and a Help screen below. You can remove the Help screen by enlarging the window to view more rows, or splitting the screen to see two separate portions of the worksheet. However, you can neither move around nor work in the lower window. The narrow and fixed nine-character columns present a problem with long lables, but these can extend to the next column if necessary.

As usual, the spreadsheet can do calculations with formulas based upon individual cell positions. Besides the usual arithmetic functions, sum, average, minimum, maximum, and the number of non-label entries in a list are offered. This is probably sufficient for simple uses. All entries can be replicated, but only one at a time. Range is not supported, but replicated entries can be relative to the new row or column to which they refer. Calculations are done across the row first, then down the sheet. You may set calculations to be automatic. One additional feature that you may find useful is *Abracalc's* ability to do bar charts with your input data. The charts are displayed on a separate screen. You can output your spreadsheets to your printer, but only nine lines by eighty columns at one time.

Most commands are implemented using the slash (/) followed by a letter. This is precisely the way *VisiCalc*, the microcomputer world's first spreadsheet, operates. Additional prompts appear afterward and the format is that which is shown in the reference section of the manual. There is definitely a lack of safety features regarding input. Since you can't take advantage of an escape key, you can inadvertently mess up a cell. However, there is a command that protects your formulas from accidental erasure.

The twenty-page manual is rather sparse. It's divided into several short lessons with no adequate or useful examples, and a reference section showing all of the commands. This manual may be suitable for users who have experience with other spreadsheet programs; however, it is totally inadequate for beginners.

To sum up, *Abracalc* is not nearly as powerful as many of its competitors, has weak documentation, and is somewhat overpriced. I'd suggest finding another spreadsheet package for your hard earned dollars.

BUSICALC 2

Skyles Electronic
$69.00

Overall Rating	B	B+	*Reliability*
Ease of Use	B-	C	*Error Handling*
Documentation	C	A	*Value for Money*

If words such as "profit margin," "depreciation," and "share of the market" get you excited, then *Busicalc 2* may be right for you. *Busicalc 2*, as you can guess from its name, is a *VisiCalc* clone that lets you perform complex spreadsheet calculations on your Commodore. Unlike many early electronic spreadsheets, this program allows for flexible data entry and editing, the use of built-in mathematical functions, saving and loading spreadsheets, as well as a large spreadsheet size (2,500 cells maximum). The creation of large spreadsheets by *Busicalc 2* is managed by the use of commands, such as View and Walk. These commands allow you to move an imaginary window over the entire spreadsheet. In addition, the inclusion of the "?Find" command greatly facilitates finding your area of interest within a large spreadsheet. *Busicalc 2* also

permits you to save or loadany portion of a spreadsheet from disk or tape, as well as providing the capacity to add, subtract, and overlay entire spreadsheets in a three-dimensional fashion. You can access 1541 disk commands (e.g., Initialize, Directory, Rename, Scratch, etc.) directly through the *Busicalc 2* program.

The built-in mathematical functions are extensive and include such things as standard deviation, summation, logarithms, trigonometric functions, as well as user-defined functions. Another nice feature is the display of a full list of commands at the top of the screen when the "/" key is hit. Printing of spreadsheets is easy and the documentation describes how to set up a number of popular printers (Epson, Gemini, NEC, Prowriter, etc.) with various interfaces. I have used a Gemini 10X printer with a Cardco G+ Graphics Interface and the system has worked flawlessly.

Although *Busicalc 2* is an easy program to use, it is not free from problems. Loading and saving spreadsheets from disk seem to take forever. And the lack of an on-line help facility or menu-driven guide for the user is a real drawback. *Busicalc 2* can also be very unforgiving of user errors in some cases. For example, supplying a non-letter value when the program was expecting a letter-abbreviated command leads to mysterious "lock-ups" of the keyboard, forcing the user to reset the machine by switching off the power, and causing the loss of any entered spreadsheet data. The documentation is adequate, although at times it becomes wordy and unclear. Numerous examples are provided to illustrate both the proper use and advantages of electronic spreadsheet data. The durable fifty-nine page spiral bound manual should hold up well, though a set of quick reference cards summarizing the many commands and options would greatly improve this package. The disks are copy-protected, but registered owners can buy backup copies at $10.00 each. Overall, *Busicalc 2* is a well-done software package that permits you to do complex spreadsheet calculations and forecasts at a reasonable price.

EASY CALC 64

Commodore Business Machines

$49.95

Overall Rating	B+	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	B	B+	*Value for Money*

Easy Calc 64 is a cartridge-based spreadsheet that's modeled closely after the granddaddy of all spreadsheets—VisiCalc. Although it isn't quite as powerful as its forerunner, it shares many of the same characteristics, including its easy-to-use letter command menu. This menu, activated by the F7 key, accesses various edit, format, and system commands.

As usual, the spreadsheet contains 255 rows and sixty-three columns. Memory limits the number of usable cells containing values, labels, or formulas to about 1,000. The scrollable spreadsheet window defaults to five columns of eight characters by twenty-one rows, but column width can be changed between five and eighteen to suit your needs. The screen is normally scrolled with the cursor keys, but the Goto function (activated by pressing the F3 key) allows you to choose your destination. Titles can be fixed in place, but the program lacks a windowing feature that normally would let you split the screen in order to view two separate sections simultaneously.

Values and formulas for individual cells are entered in the regular fashion, but a blank space is needed to distinguish a label. Entry is displayed on the second line on the screen where it can also be edited using the standard keys. The top line shows the position and formula. Formulas can use other cell locations in their calculations. You may save time and typing by using the cursor keys to go to the cell in the formula, then connecting them with +, -, /, or * operators. Functions include Sum, Mean, Min, Max, Abs, Rnd, Exp, etc. Logical functions include If-Then-Else, Or , And, Not, True and False. Formulas can be replicated to their cells in either absolute or relative notation. The program has no trouble replicating an entire column or row over a range of columns or rows. It is even possible to move a matrix or block of cells to another location on the spreadsheet.

You can color or format individual cells. Formats include integer, dollars and cents, flush left and right. You can globally format the entire screen as well, in one operation. In addition, the graphics function gives you a bar chart on a separate screen.

You can indicate whether calculation is to be manual or automatic. The program defaults to automatic, but this might slow you down if a large number of cells are on the spreadsheet. The order of calculation on the spreadsheet can be a problem in some cases. Default is down each column, from left to right across the sheet. You can, though, arrange to go column by column across the first row, progressing down the speadsheet to the next row.

Single screen outputs to the printer present no difficulties. However, if you request the entire spreadsheet, you do get wraparound. This means that the program isn't smart enough to print one section width completely, then the next, and so on. Instead, all of the columns in any one row are printed together. This can result in an output that's very difficult to read.

Easy Calc 64 is quite adequate for most purposes. It has the majority of features found in other popular packages, plus one very important asset: learning to use

the program is easy. The documentation consists of a short, seventy-six-page user's manual that is concise and to the point. Screen photos illustrate the helpful examples.

MULTIPLAN

HesWare
$99.95

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

Let's assume you are a corporate marketing manager and do financial modeling; or you're a businessman or accountant who needs quick accounting statements and cost analysis studies that consider the effects of variable interest rates. Or you may be an engineer who needs to do repetitive formula calculations. If so, then a second generation spreadsheet like *Multiplan* is one of the most useful business programs you can buy; it will supply you with a lot of power at a reasonable price.

Briefly stated, *Multiplan* is an electronic worksheet. It employs up to sixty-three columns and 255 rows of work space in a huge, imaginary page that you can scroll around your television screen. Anywhere on the grid of cells, you can enter text, values, or formulas based on values in another location or cell, and the program will automatically perform the required calculations. Thus, you can easily change a value somewhere on the spreadsheet and immediately see the results. Any problem that you can solve using a calculator or pen and paper can be done much faster and better using *Multiplan*.

Multiplan is one of the newer generation of spreadsheets that features word commands rather than confusing sequences of cryptic letters that you must memorize. It allows you to name areas of the spreadsheet so that they in turn can be used in your formulas. It also supports multiple windowing so that you can view different sections of the screen at once (a feature that has limited use on a 40-column screen), and has the ability to hold the titles of the rows and columns so they don't scroll. In addition, you can sort or insert rows or columns, change individual column widths, format groups or a single cell, lock formulas so they can't inadvertently be changed, and link named cells in two or more spreadsheets. It is possible to do a complex material cost analysis in one spreadsheet and ask for that one value when working with whatever current, larger worksheet you're using.*Multiplan* derives its name from this unique capacity.

The program is relatively easy to use, although it does take a considerable amount of time and practice to learn its capabilities. The command menu always appears at the bottom of the screen; you choose a function by pressing the first letter of the appropriate command, or by tabbing the highlighted cursor over to it and hitting Return. Most commands will then ask you for additional information that sometimes results in complex command sequences. You can abort at any time with the Run/Stop key. There is also an extensive on-line Help file available when you press the ? key. Since the Commodore function keys are used extensively in all operations, an overlay is supplied.

Like a word processing program, *Multiplan* can insert, delete, move, copy, and sort rows and columns. The Copy command shows its versatility in quickly creating repetitive types of worksheets. You can create formulas easily using mostly cursor movements. If your formula requires you to subtract the two values directly above it, you need only move your cursor to the top value, press Return, then the minus sign, move your cursor to the value you want to subtract, and press Return. Voila! You've created a formula with all values relative to the formula's position. Formulas also may contain any one of *Multiplan's* thirty-one funtions. You can easily add up or average a row or column just by placing the function in the format at the end.

Multiplan tends to run a little slowly during recalculations and while executing commands such as insert, copy, and move. The program isn't entirely RAM resident (it couldn't be or you wouldn't have nearly 10K of work space available) and it needs to go out to the disk often. Each operation takes about fifteen to twenty seconds. This is somewhat irksome if you have used other spreadsheets or *Multiplan* on another computer, but by now you must be familiar with the speed of Commodore drives (ugh!). Speaking of drives: your drive had better be in perfect alignment or you will get unreliable spreadsheet saves. Data is saved in Microsoft's SYLK format rather than the more popular DIF format used by *VisiCalc* and others. *Multiplan* can read DIF files for conversion, but since I haven't seen *VisiCalc* in operation on the computer, the whole issue is academic.

The program works well with the Commodore 1525 printer, or any printer properly interfaced to the serial port. Parallel printers can be used via a special printer interface such as Cardco's. The program doesn't support printers attached to the RS-232C user port. Obtaining hard copy is easy: *Multiplan* prints as many columns as will fit on one page, then continues onto the next. You can then paste together the results to form a complete spreadsheet.

The program's intimidating 422-page manual is divided into tutorial and reference sections. With regard to the 187-page tutorial, it will take you about three hours to work through the sample worksheet. You can read and reread it numerous times, but you can only learn it

properly if you type along while actually using the program. Fortunately, you can save your work at any time in order to learn the program in stages.

All in all, *Multiplan* is the most powerful spreadsheet package available to date for the Commodore 64. It is a serious business tool that will require a sizeable amount of time and practice to learn. I think beginners will find the program outright confusing and intimidating. Unless they need to do very complex spreadsheets, they may be happier with a less powerful spreadsheet program. Still, users who insist on using their Commodore 64s as serious business tools will definitely get their money's worth out of *Multiplan*.

PRACTICALC 64

Practicorp International
$54.95

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B-	B+	*Value for Money*

Practicalc 64 is a fast and powerful spreadsheet for the Commodore 64. It features a full set of mathematical functions and has the ability to produce low or high resolution bar graphs based on the spreadsheet. Like many similar programs, it allows you to insert or delete rows or columns, replicate cells, and even sort the information in a particular row or column. In addition, it has a "direction" function that enables one person to create the spreadsheet, and another to update it without needing explanations. The person who does the updating is prompted for the required input.

The program is written in a combination of BASIC and machine language. Since it never has to access the disk to perform functions other than Load or Save, it is particularly fast. However, it does lack many features of more powerful spreadsheets like *Multiplan*. It is, however, simple and rather easy to learn and use.

The spreadsheet is limited to the number of rows and columns that make a maximum of 2,000 cells. The program defaults to forty rows by twenty columns. This doesn't mean that you can fill all 2,000 cells, since memory is much more limited. You can enter labels or values in any cell, but must press the F1 key to enter a formula. These Formulas are based on position and aren't actually relative, so when you do a sort, they may no longer be correct. Calculations are not automatic but must be manually initiated with the exclamation point (!) key. Cells can be individually or globally formatted. While the titles may be fixed along the first column or row, the program can't do windowing to show separate parts of the scrollable spreadsheet. You can move the cursor anywhere using the arrow keys. This is the fastest cursor I've ever seen which is nice for traveling long distances. But you must just barely tap it to move one position—a minor annoyance.

The function keys are used to access some of the more powerful commands. The F7 key aborts any sequence. The F3 key operates most of the functions, such as Insert, Delete, Move, Format, etc., and the F5 key operates the Replicate function. It allows you to replicate individual cells or just their formats to any other row or column. Formulas may be fixed or relative. While you should be able to replicate one range of cells, like an entire row or column, to another, I found no mention of it in the manual. The best that I managed to do was replicate a single cell down an entire row. I can only assume that this important feature is missing.

You can print out any portion of the spreadsheet to any printer connected through the serial bus via a printer interface. However, you are limited to eighty columns. You have to print larger spreadsheets in several pieces. The program doesn't do this automatically.

The sixty-two-page instruction manual is more a tutorial than a reference book. It is relatively easy to follow, although it's confusing in places. In sum, *Practicalc 64* is a fairly powerful spreadsheet for simple applications. It is less intimidating and easier to learn to use than more powerful packages. It offers enough good features at a reasonable price to be considered a good buy.

P. S. PROGRAMMABLE SPREADSHEET

Practicorp International
$79.95

Overall Rating	B	B	*Reliability*
Ease of Use	C+	B	*Error Handling*
Documentation	B-	B	*Value for Money*

P.S. Programmable Spreadsheet is similar to, but more powerful than, version *Practicalc 64*. Both were written by the same programmer, and the difference between them is that *P.S.* can access disk-based BASIC subroutines located in any of the cells. Whereas nonprogrammers can create a spreadsheet, creating subroutines requires some knowledge of BASIC programming.

P.S.'s spreadsheet features are identical to *Practicalc 64's* (even the first part of the manual is the same). Therefore, to save time, I refer you to the descriptions of those elements in the review of *Practicalc 64* in this book.

The capacity to integrate customized BASIC program modules with data created within the spread-

sheet affords unlimited possibilities and expands the capabilities of the spreadsheet. However, you must be a skilled programmer to take full advantage of this feature. The second part of the 124-page manual carefully explains the file structure of the BASIC portion of the program and explains how to write programs.

Formulas within cells call the loaded module in a way that's akin to what's involved in passing variables to a subroutine. These formulas contain REF statements. For example, REF (STD,H2,V2) calls a standard deviation subroutine and asks it to calculate for the range H2 to V2 within the spreadsheet. The formulas for calculating this are buried in a BASIC subroutine within the loaded module.

I think this feature adds a considerable amount of power to the original *Practicalc 64* spreadsheet program. It takes a much more sophisticated user, though, to appreciate and/or employ this power. Needless to say, *P.S.* is not for the casual user. It requires a fair amount of expertise merely to understand how the BASIC interface operates. The manual provides only marginal help in unraveling the mystery. I believe Commodore owners purchase spreadsheet programs to avoid learning how to program. *P.S. Programmable Spreadsheet* may be a lost cause for this very reason.

Accounting

There is an incredibly high rate of attrition among new businesses. No matter what the nature of the business, whether it markets goods or services, whether it be large or small, the chance that it will cease to exist within a few short years is very high. Many things help explain this phenomenon. All of the flaws discovered in any business plan (usually identified by Monday morning q''arterbacks) seem to be very important and could be discussed at length by interested parties. Indeed, they should be. But there is one underlying factor that keeps coming up again and again when successes and failures of new businesses are discussed and analyzed: accounting information, or the lack of it.

Time and again, we hear the sad complaint: "I could see that we had a great-looking inventory. I knew that we were going to sell a ton. But I just didn't have a handle on the amount of money we owed our suppliers..."; or, "We did a million dollars worth of business in the first quarter, but I didn't know our number one salesman was giving away the store on all the big deals. We were actually losing money on most sales!"; or, "When I went to the bank to get some short term money to tide us over the Christmas selling season, they wanted income statements and the company's financial history for the last three years. They loved our development plan, but even though they'd been my personal bank for ten years, they wouldn't touch us without the 'hard' information..."

What is this "hard" information that seems to be lacking, just when so many business decision-makers need it the most? What are these Profit and Loss Statements, Financial Statements, General Ledgers, Income Projections, and Business Development Plans that are so crucial for success in the business world?

The process of taking an "accounting" of the current status of a business usually results in a financial statement showing what the company's assets are, as well as its liabilities. A "P and L" shows what the costs of doing business were for a given period of time, and how much money was taken in by the business. Subtracting the costs from the revenues gives an elementary definition of the profitability of the business. The General Ledger is the total record of a business' financial activities. This fundamental information, along with other reports and projections, provides the basis for dealing with other businesses and with the financial community. It is the final determination of the integrity and security of the business institution.

Bookkeepers and accountants endeavor to total up all the available information and put it into reports that can be used by decision-makers in their day-to-day activities. Invoicing sales leads to accounts receivable records and affects the amount of inventory on hand. Purchasing new inventory from vendors or manufacturing new inventory leads to accounts payable records and the recording of various expenses associated with doing business. At the end of the year, all of this information, along with payroll records, etc., is used by a business to pay its State and Federal taxes. Access to all this information is what keeps a business legal and what enables a business to turn a profit.

Thus far we have reviewed and evaluated computer programs that offer specific aids to conducting business in a timely and efficient manner. In the following section, we offer some serious analysis of basic accounting software that handles functions that are essential to proper operation of any business. Indeed, some business analysts would go so far as to claim that control of these business activities and records is the most important part of conducting business.

The programs you will find reviewed will handle one or more of the basic accounting functions. Some businesses will have little use for an accounts payable module if they have only a few suppliers to deal with. If you sell just a few products or only provide services, an inventory control program may not be needed. If your accounting takes a part-time

bookkeeper just two afternoons a week to accomplsih, your business may not be big enough to justify the expense of investing in accounting software at this time. Perhaps you should acquire organizational aids, modelling or spreadsheet analysis programs, instead.

But, whatever the size of your business, whether a one-man office offering just one service, or a chain of retail stores with hundreds of products in its inventory, there is an opportunity as never before to use relatively sophisticated business accounting software on your inexpensive Commodore computer to your considerable advantage.

There are other factors to consider. What if you were to lose that experienced and trusted employee who keeps your books and talks to your accountant at tax time? What if your "home-brew" accounting system doesn't impress the IRS authorities when that inevitable first tax audit comes around? What happens to your stable, self-financed business when opportunity or necessity sends you to the bank for short- or long-term financing?

Perhaps an investment in formal accounting software will put you in a position to handle the situations these questions identify. Perhaps you'll sleep a little better at night knowing that you're operating your business along more standard guidelines. With the availability of computer-generated business reports at the touch of a button, perhaps you'll identify a trend and act on it fast enough to get the edge on the competition. The bottom line may be that, through the acquisition, installation, and usage of serious business accounting programs, you will acquire knowledge and accounting skills, and using these skills with the aid of your Commodore computer could just be the easiest and least expensive "Real-world M.B.A." the business professional could acquire.

—Marc Mathieu

Accounting and Inventory

ACCOUNTS PAYABLE/ CHECKWRITING, Version 1.1

Commodore Business Machines
$49.95

Overall Rating	B+	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	C	A	*Value for Money*

Accounts Payable/Checkwriting belongs to the BAS (Business Accounting System) series of software developed for Commodore by Info Designs, Inc. The series also includes *Accounts Receivable, General Ledger, Payroll,* and *Inventory* modules. *Accounts Payable* operates either as a stand-alone program or interfaced with the other modules.

The *Accounts Payable* module allows you to enter billings from your suppliers, select which bills to pay, and print computerized checks (available only from Deluxe Computer Forms). The program also produces a vendor list, vendor activity report, check register, and various open or closed invoice reports. All printouts employ capital letters. If you have the *General Ledger* module, you can post directly to your *General Ledger* data file. Otherwise, you can enter the values from one of the printed reports. Up to fifty vendors and 150 invoices fit on one data disk, and you can use multiple disks. Note, however, that this sophisticated program requires at least a basic understanding of double-entry bookkeeping.

I found *Accounts Payable/Checkwriting* reasonably easy to use, especially considering its capabilities. It does take some effort on your part to set it up, but that makes day-to-day operation easier. When initializing the system, you must specify your hardware configuration. The program then writes this information to a file, so you needn't worry about it again unless you upgrade. You must also set up an information file containing your company name, password, account aging periods, and account numbers for cash and accounts payable. The program uses these account numbers to interface with the *General Ledger* module or to produce hard copy for manual posting. You must follow the program's account number format, which you will find in the error message listing in the documentation. Finally, you must create a vendor file before entering billings. In addition to the standard vendor information, you can enter the account number for the expense account to which you charge purchases (for example, office supplies), and the date/amount for payments you make every month. The program then enters this information automatically when you enter an invoice. You can override when necessary.

This preliminary work pays off when you enter the first bill. Just enter the vendor number you assigned that vendor; the program displays the name and address. Then key in the rest of the information from the bill. You can also delete or modify invoices and create credit and debit memos. Selection from the twelve items on the menu and responses to non-data prompts usually only require one or two keystrokes.

Program operation proceeds extremely quickly since the program is written in compiled BASIC (Petspeed), but it takes a lot of time to load the various subprograms. If you have only one disk drive, you'll have to switch the program and data disks constantly. Even with a dual drive you must turn the program disk over at times because all the modules don't fit onto one side of the disk. It's hard to fault the program for this, because it's more the result of a hardware limitation. However, it did seem at times as though things could have gone faster. For example, in the Calculate mode (used to create a check file before producing the check register and printing checks), you have the chance to start over if you make a data entry error. But, to do so you must go all the way back to the main menu. It takes several minutes before you can return to entering data. I also wish that the description of a purchase could exceed eight characters.

To write checks, you first create a check register to confirm your intentions. You can select from two payment modes: pay by vendor, in which you choose a range of vendor numbers and/or a range of invoice dates; and pay by invoice, in which you enter each vendor number and invoice number individually. The checks themselves include a registration mark to help with alignment. While I had no trouble getting the checks lined up, the stock was a bit heavy for my

printer (a 1525). Occasionally, I had to manually push the print head back to the left margin to keep the operation going.

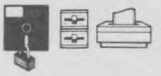
I thought the documentation pretty good for long term use, but it is poorly organized. It includes the important facts, but in a scattered fashion. For example, the start-up instructions lie buried in the middle of the sixty-eight-page booklet. It has a table of contents, but no index or tabs to help you locate information quickly. On the average, each menu item gets one page of explanation. A five-page section outlines the accounting procedures you should follow in using the program. The manual includes a sample of each printed report, along with a list of program error messages. It offers no information about the file structure (the program uses sequential and direct access files). The documentation states that tutorial videotapes are available, as well as a telephone consulting service. So, the information is there, but you'll have to dig for it.

In contrast, the program works with truly impressive reliability. I could not crash it except by feeding it nonexistent data, and I could not "inadvertently" destroy data. Only the section on data disk backup was weak. That section works, but extremely slowly (it copies every sector, full or empty). It also leaves untidy pointers at the end. If you reboot without a cold start (computer off, then on), the program will crash. You may wish to use another, faster method of backing up your data disks.

As for backing up the program disk, well, the documentation states that it is copy-protected. However, I made a backup copy without apparent problems. If your original disk is damaged, you can get a replacement from Commodore for $5, but you must send them the old disk.

Accounts Payable has excellent error handling. The program traps errors and produces its own error messages, complete with sound and flashing prompts suggesting the remedy. You also get the opportunity to verify menu selection, system date, password, and so on. You can cancel or revise most transactions before the program writes them to files.

In summary, I found *Accounts Payable/Checkwriting* powerful and flexible. I adapted it to meet all of the specific requirements of my own small business. Although I had some trouble running the checks through my printer, as mentioned, the salespeople at Deluxe were helpful. They do guarantee that their products will work with your system. The program's documentation could definitely use some improvement, but if you look hard enough, you'll find the information you seek. On the other hand, *Accounts Payable* comes through with flying colors on reliability. For the price, you get a powerful program. It especially suits businesses with basic Commodore systems that are planning to upgrade in the future.



ACCOUNTS RECEIVABLE/ BILLING

Version 1.1

Commodore Business Machines

$50.00

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	B	*Value for Money*

Accounts Receivable/Billing belongs to the BAS (Business Accounting System) series of software developed for Commodore by Info Designs, Inc. The series also includes *Accounts Payable, General Ledger, Payroll,* and *Inventory* modules.

The *Accounts Receivable* module allows you to print customer invoices and monthly statements (on forms available only from Deluxe Computer Forms). It also produces twelve other written reports to track customer lists, age of accounts, credit limits, and so forth, and to provide a hard copy audit trail. If you own the *General Ledger* module, you can post directly to your *General Ledger* data file. If not, you can post the information by hand from one of the printed reports. You can use multiple data disks, each holding up to seventy-five customers and 150 invoices. Printouts employ all capitals. Note that this sophisticated program requires at least a basic knowledge of accounting principles. It best suits a sales-oriented business, but I managed to make it work (for the most part) for my service-oriented business as well.

Despite its powerful features, I found *Accounts Receivable* reasonably easy to use—at least, after I finished the initialization process and became familiar with the various options on the twelve item menu. When initializing the system, you must initialize a data disk before you even boot up. Then you set up four different files, all selected from the menu, before entering your first invoice. In the configuration file you specify your hardware setup. If you upgrade in the future, just alter this file. You must also set up an Accounts Receivable Information file, which includes the name and address of your business, the password of your choice, and account numbers for interfacing with the *General Ledger*, if desired. You also set up a tax code file with the appropriate information on sales or other taxes that you must charge. Finally, you create your customer list.

While this seems like a lot of work to go through just to get started, it pays off later. For example, when you enter your first invoice you just type the customer number. The program reads the firm's name and address from your file and displays them on screen. Similarly, you type a tax code and the program computes and enters the taxes for you. Program operation proceeds quickly (it's written in compiled BASIC, or Petspeed) and menu selections require only one or two keystrokes. I found the display easy on the eyes. While the program has no Help screens, I thought the prompts were generally understandable.

Before you enter and print invoices, you must load and align the forms. You must call the alignment function twice before it will operate (the only bug that I found). The program prints a registration mark, but no corresponding mark appears on the form. Even so, I found the vertical adjustment pretty easy; not so the horizontal adjustment, however. The statement form also lacked a registration mark, but was easy to align. It has more horizontal latitude than the invoice form.

You pay a price for the program's capabilities, especially if you have only one disk drive. You'll spend a lot of time swapping the program and data disks and waiting for the main menu or the various subprograms to load. Even with two drives, you'll find yourself flipping the program disk over since the entire program doesn't fit on one side of the disk. You may become irritated with the waiting and disk flipping, but they demonstrate the program's power and sophistication.

Given the power of the program, I would have liked more flexibility in designating General Ledger line items. For example, the program allows only one "sales" account. Moreover, you can only enter a tax code that actually charges tax. Thus, I could not separately track taxable sales to tax-exempt organizations, which the sales tax people require me to do.

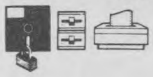
I found *Accounts Receivable* surprisingly well documented considering Commodore's reputation for poor documentation. It includes all the information you need—somewhere. (I finally found the instructions for initializing the system about halfway through the sixty page booklet. They were not in what I'd call tutorial form. I did find the documentation accurate. It includes a table of contents, but no index, tabs, illustrations, or sample screens. On the average, each menu item gets one page of explanation. A five-page section outlines the accounting procedures to follow while using the program. The documentation includes a sample of each printed report, along with a trouble-shooting guide. It does not include an explanation of the program's file structures (the program uses sequential and direct access files). The program refers to a "technical insert" with printer compatibility information, but it must have been written in invisible ink. On the bright side, you can obtain tutorial videotapes and consult a telephone support service. The documentation isn't inadequate, but it could be a lot better.

The program works with impressive reliability. I could not find a way to "inadvertently" destroy data. When you wish to delete a specific transaction, you must enter a delete code. Only the data disk backup showed weakness in this aspect. This segment, the only one written in BASIC, performs well enough, but when you exit this module you find yourself out of the program as well. If you reboot without turning the computer off and back on again, the program will crash. (In fact, this was the *only* way I got the program to crash.) At any rate, I'd recommend that you avoid this backup routine because of the sheer amount of time it takes. It took me thirty minutes, while another backup program took less than five. Just make sure that your backup program picks up the direct access files as well as the sequential ones.

The documentation states that the program disk is copy-protected. You can obtain a replacement for a damaged disk from Commodore for $5, but you must send them the old disk. I successfully backed up the program, and my copy seems to work well.

The program has excellent error handling. It traps disk errors and produces its own set of self-explanatory user error messages, complete with sound. The documentation provides complete explanations. The program also double checks your menu selections, password entry, and so forth to give you a chance to correct typos. When entering data, you can cancel a transaction before it's written to disk.

In summary, I found *Accounts Receivable/Billing* a powerful and sophisticated accounting program, capable of meeting the needs of many small businesses. The documentation needs improvement, but with patience you'll find the information you need. At any rate, the program's reliability makes up for the weaknesses. It's a lot of program for the money, and particularly suits a business with a basic computer system that plans to upgrade in the future.



BACK TO BASICS ACCOUNTING SYSTEM

Peachtree Software
$199.95

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B	*Value for Money*

Peachtree, a company known for its high quality business software for larger and more powerful microcomputers, has translated and scaled down its accounting system to fit the Commodore 64. This rather impressive *Back to Basics Accounting System* includes General Ledger, Accounts Receivable, and Accounts Payable modules that you can either run separately or link together.

The accounting package is obviously targeted to a very narrow yet specific end user: the small businessman who is required by his bankers to show his profit and loss statements regularly in standard accounting form using the double entry system of debits and credits. Since accountants are expensive these days, it is only natural that Commodore Business Machines, as well as the many firms that market software for Commodore computers, are hoping that small businesses will be enticed by the C-64's low retail price to purchase a complete computer system consisting of two disk drives and an 80-column printer to take care of their company books. Though it's a virtual certainty that this set-up will adequately handle the requirements of most small businesses, you, the consumer, ultimately have to decide for yourself (with the help, I hope, of the following review) whether using the *Back to Basics* package in conjunction with the Commodore 64's slow disk drives will turn the daily entry of accounting transactions into a full-time chore. The trade-off, of course, is the value you put on having a complete database covering your business' financial transactions plus a full set of financial reports available to you.

The *Back to Basics* system requires two disk drives: one for the program disk and the other for the data disk. These drives must be interfaced as device #8 and device #9. Dual drive set-ups, such as the MSD drives, will not work since both units are considered device #8 with two different drive numbers. An 80-column printer is also necessary, because reports as long as 200 pages for the combined three modules must be printed out at the end of each month.

Hopefully, any prospective user will have had at least one accounting class at the high school level. But for those who haven't, Peachtree thoughtfully has included a seventy-page tutorial covering the concept of debits and credits in a double entry bookkeeping system. It is a little tricky at times for the neophyte to follow; for instance, money deposited in a bank account is considered a debit, while you would normally think that of it as a credit to your account. Nonetheless, they set up a nice example of a small TV and appliance store to illustrate the appropriate concepts. You can use same fictional company to practice the operations of each module.

A lengthy start-up procedure requires some careful thought and planning on your part. You'll have to decide on the form of your Chart of Accounts, and whether or not to use certain options that the system offers you. Users may create their own Chart of Accounts or modify the one on the disk (which is listed in the appendix). You can configure for multiple cash accounts to handle separate checking and payroll accounts. Also, you can choose to classify income statements for subtotals, and the balance sheet for subtotals and account ranges for assets, liabilities, and equity. Finally, you may select the reports needed for posting.

The program defaults to daily processing on subsequent entries into the system. You input all daily entries in pairs, one account number for debits and another for credits. The accounts must balance or the program will not let you continue. What is particularly nice about the system is the semi-automatic entry feature. In other words, you type in the account number and the program displays the account name. Then you need only choose "C" or "D" for credit or debit and enter the amount. Subequently, these are automatically listed flush right as dollar-and-cents amounts. The computer assumes that the next account number is the opposite of the first, and displays the appropriate "C" or" D" and the balance value. You need only press Return to advance if these are, in fact, correct. The computer advances line to line, page to page, until all of the entries have been completed. Typing in the word "End" completes the task and after a second chance to back out, the data is saved to disk.

Both the Cash Receipts and Cash Disbursements journals work on individual transactions. For example, if a sales invoice for a $499.00 TV set were bought partially with cash and the remainder on credit, the payment would be debited to cash in the bank account, the amount owed would be debited to the accounts receivable account, while the actual sale would be credited to sales—TV and Stereo and Sales Tax Payable Accounts. Again, entries are semi-automatic and the program will not let you exit until the balance is zero. Each sales transaction is saved separately on the data disk. This is a lengthy procedure due to the slow serial data transfer to Commodore's disk drives. It takes forty-two seconds to save each transaction (about par for a C-64).

The Cash Disbursements journal records information about checks written for the month by your company. Entries can be entered manually from checks

that you've written, or if you prefer, it will print the checks on check forms. The entire package is menu-driven, with various submenus for maintenance, cash sales, automatic journal entries, void transactions, configuration, and reports. The program has excellent error checking that prevents inadvertent errors, such as deleting an account that doesn't have a zero balance. A void transaction option will correct mistakes that are made after data has been written to disk.

Disk capacity for any one month allows a maximum of 254 different accounts in its Chart of Accounts, a maximum number of 1,500 checks, and 1,760 entries (to two accounts, with thirty Cash Sales entries). Configuration of the second module, Accounts Reveivable, is simplified if it is linked to the General Ledger, since the Chart of Accounts is the same. Basically, Receivables keeps track of all incoming money, separates accounts into those that are taxable and those that are non-taxable, then invoices customers for the amount owed plus any applicable finance charges.

Everything, including the credit terms, is completely controlled by you. You enter each customer account specifying the appropriate options. You input "Y" or "N" answers to the following categories: taxable, finance charges, credit limit, terms, appropriate values for sales and finance charges Y.T.D., and current balances for various thirty-day periods.

Daily posting requires entering all sales invoices, then recording all payments, including finance charges made by customers. Again, while this tends to be a slow process with the Commodore 64 because of the slow I/O of the disk drive, the payoff comes when you want to access information about your customers or print periodic reports about the status of your business' finances as an aid to decision-making. For example, you can print customer statements at the end of the month. In addition, you can obtain a complete set of reports. These include: a listing of all customers with their balances due by aging periods, a listing of all invoices and debit memos, all customer payments, and all customer finance charges during the current month. The program can even print mailing labels for each of your customers.

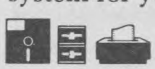
A separate data disk is required for each month. You can do a mid-month posting if the disk becomes full. Each disk can hold a maximum of 300 customers, 1,050 invoices (two distributions), and 875 payments.

The Accounts Payable module is used to pay all of your firm's bills. Like the others, you can link this module to your General Ledger. It's useful not only for writing checks to pay your bills, but for helping you decide if you can save money by paying bills early—assuming, of course, that some of your vendors give cash discounts or other favorable terms. You enter this type of data during vendor maintenance.

Daily posting includes recording all invoices due and posting all credit and debit memos. Fortunately, in most small businesses, less bills for purchased merchandise exist than invoices which result from sales. Therefore, entry should proceed much faster than with the Accounts Receivable module. A variety of reports are available with this module. One, the Cash Requirements Report, is very handy for determining if you have enough money to pay your current bills, for it can compare the company's checking account balance and the A/R Summary Report. Other journal reports are available: Open Invoice and A/P Check Registers, A/P Disbursements and Purchases Journals, and a Payables Detailed G/L report.

Disk capacity can accomodate 300 vendors, and a Chart of Accounts of sixty-five. Invoices numbering up to 710 can be distributed to one account, or 225 payments can be distributed to two accounts. Documentation is quite helpful; the 374-page spiral-bound user's manual is excellent. The first seventy pages serve as a lesson in accounting principles. The remainder is divided into sections covering the three accounting modules. Each part discusses a sample company's accounting problems and invites you to try out the system using the sample company's data. The rest of each section contains a reference guide that discusses each of the menu options in greater detail. Finally, at the end, the book contains a section on typical business situations and how they are handled in double entry bookkeeping. There is also a small hardware booklet specifically for the Commodore 64, and a fold-out map to all of the system's menu options for the three modules.

Back to Basics Accounting System is a superbly designed accounting package for the C-64 home computer system. Though it's a powerful and professional program, it really is best suited only for small businesses that deal with a minimal number of transactions per day. Grappling with a large number of entries could easily become a long, tiresome chore for any small businessman. In brief, for what it can handle, *Back to Basics* is a sound, competent, and dependable system for your Commodore 64.



GENERAL LEDGER

Commodore Business Machines
$49.95

Overall Rating	B+	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C+	A	*Value for Money*

General Ledger is a good accounting package for small business applications. On a single disk it stores

150 Chart-of-Account categories and 1,500 transactions. It is menu-driven and the operator's manual provides step-by-step procedures for carrying out each operation. Be forewarned that you need accounting experience (or the help of an accountant) to use this program.

General Ledger may be employed as a stand-alone package, but it offers even more power at the center of a system using other programs in Commodore's *Small Business* series. Accounts Payable, Accounts Receivable, and *Payroll* interface with *General Ledger*. You may take entries from these programs and add them to the *General Ledger* data disk, thereby supplementing and updating its files.

The documentation, although adequate for people with accounting experience, lacks an index. The program provides audit trails; cumulative figures for year, quarter, month, and previous year/previous quarter; and reports for Income Statement, Balance Sheet, and other accounting functions. The program supports dual disk drives and has a working password system. The manual gives the address of a vendor who will supply you with compatible check, invoice, and statement forms. Commodore offers customer support services—for a fee—including both consultation concerning particular problems and videotape training films. *General Ledger* is recorded on both sides of the disk; according to the documentation, it cannot be backed up without risking damage to the original. Damaged disks may be replaced for $5.

The central feature of this program is its Chart of Accounts. In addition to providing account numbers for debits and credits, the Chart of Accounts also includes headings and printing codes for the standard reports provided by the system. Installation of the system is complicated since you have to shift gears, so to speak, between entry accounts and codes in order to total entries and dummy codes for headings. If you make a mistake in the print program, your reports won't print correctly. While the print formats are standard in accounting practice, I would have preferred to see the print program handled by a separate mechanism that you could more readily edit. (Editing the Chart of Accounts itself is not recommended.

General Ledger is a solid, worthwhile program for small business use. Because is relies heavily on standard accounting practices and costs no more than most computer games, it would be an excellent choice for use by accounting students. Asking beginning students to "play" with *General Ledger* as part of their extracurricular lab work would provide them with an excellent true-to-life experience in accounting.

MASTER ACCOUNTING SYSTEM

Benson Greene Company
$70.00

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Master Accounting System is an easy to learn integrated accounting package including Accounts Receivable, Accounts Payable, and a General Ledger with a storage capacity of 100,000 accounts and no dollar limit. As if this weren't enough, you enter transactions into the system by issuing an invoice or voucher and the program updates all related files automatically, including statements and price lists. All files remain current. If an account does not exit in the file for the expense or income category you are currently working on, the program creates one for you. It always maintains statements ready to print at any time.

Two separate ledgers handle the cash flow of your business: Bankbook and Cashbook. Bankbook follows your check numbering system and automatically maintains your balance. *Cashbook*, on the other hand, totals all cash transactions and automatically updates them. *Master Accounting System* creates and automatically maintains price lists for your company from entries of invoices, vouchers, purchase orders, and acknowledgements. Income categories are designated taxfree or taxable. You further assign one of four pricing structures: retail, discount, wholesale, or factory cost. In keeping with the inherent philosophy of the program, you establish the pricing formula at your discretion.

Now, what about the system configuration? Can I accomplish all this on my Commodore 64? Yes! To get started you need only your Commodore 64, compatible CBM disk drive, and a printer.

The documentation, complete with binder, spans 112 pages with sample screens galore, all in order as you move through the program. All screens are numbered, so if you need to refer to a previous screen, simply find it in the instruction manual. I never found the documentation redundant, nor did I find extraneous material. Unlike some accounting programs, where you almost have to be an accountant to understand the manual, this program takes a straightforward, complete approach without becoming condescending. Even better, the program didn't intimidate me as I used it. It uses terms which I understood without reference to a dictionary or an accounting book and employs fully self-explanatory prompts. It was really fantastic to cover the entire program, manual in hand, and have it perform exactly as it should. No annoying crashes, no lock-ups, and no cryptic error messages—no matter how hard I pushed.

About the only complaint I have concerns the limitation on income and expense categories: three income and seven expense categories. Is this really a serious drawback? Well, I condensed fourteen expense categories required by a competitor's program into four, and five income categories into three. While this won't handle a large corporation, I suspect that it will adequately handle most small business situations.

The program disk comes with some beneficial utility programs that provide the proverbial icing on the cake. Although I won't go into detail on these support programs, I can summarize them. Copydisk allows you to make backup disks and prints out a directory listing designed to fit inside the protective disk jacket. Copy Sequential Files enables the person using a single drive to backup the disk (Copydisk is designed for use with two drives). Menu allows you to automatically load and execute any program on the disk. Change Disk Address provides a software method of changing drive device numbers when "daisy-chaining" disk drives. Disk Name Change changes the heading of a disk without destroying existing data. This utility becomes handy as your account files expand, helping you keep disk names consistent with the data they contain.

I believe that *Master Accounting System* is a perfect example of a user-friendly integrated program. Compared to other accounting packages, it's easy to use, but produces unsophisticated reports. If you need more complicated and indepth reports, look elsewhere. I look forward with great anticipation to further contributions by Benson Greene to the rapidly expanding field of Commodore 64 software.

TOTL. BUSINESS

TOTL Software, Inc.
$95.00

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

TOTL.Business, Version 3.6 is proof that the Commodore 64 is capable of much more than just word processing and games. It is a serious piece of software that will maintain the books for almost any small business. While *TOTL.Business* will not handle automatic payroll functions, it can operate a balance forward ledger system with accounts maintained on disk files.

TOTL.Business requires only one disk drive, though it can utilize up to three. The advantage of the additional drives is that you eliminate disk swapping. With Accounts Receivable on one drive and Accounts Payable on another, the system can also manage a much larger ledger. A third drive could be dedicated to the program disk. Naturally, making frequent backup copies of data disks is easier with multiple drives.

The Accounts Receivable portion of the program manages customer and product files, prints invoices and statements, provides reports on inventory and customer accounts, and writes a transaction-by-transaction "audit trail." Accounts Payable manages vendor and expense information, a checkbook, and purchase orders. It prints purchase orders and reports on expenses, transactions, and vendor activity. Customer and vendor mailing lists, as well as product identification labels, can be generated from the records.

Starting up the program requires setting up files for Accounts Payable and Receivable, and entering names of customers, vendors, products, and expense categories. Naturally, this is easier if you have already established a bookkeeping system. In this case, all that's necessary is to enter existing labels and data. Transaction numbers can begin with any number to allow continuity with existing records. Starting a record system from scratch requires some planning and a fundamental concept of how a balance forward ledger system operates.

The program is simple to use. The onscreen prompts are easy to follow, and data handling is fast, due to Chickspeed (the Machine language subroutines that are loaded into memory before any *TOTL.Business* programs are run). The more than 100 pages of documentation are written in plain English, and though some experience in operating computers is helpful, even a novice to the Commodore 64 could get things running right off the bat.

TOTL.Business will support an 80-column screen. The serious business user would be wise to invest in an 80-column board and monitor, thus doubling the amount of information on the screen at any one time.

All in all, *TOTL.Business* is a comprehensive system that allows for a great deal of flexibility and economy. It's possible, for example, to print statements, invoices, and purchase orders on regular 8 ½ by 11 inch fanfold paper instead of special forms. It is also possible to configure the system to operate on a single drive and then increase your hardware later. You can use the file backup utilities to move data to separate disks, and the system is easily informed when more than one drive is being used. Any small business manager who wishes to expand the financial applications of his Commodore 64 beyond simple checkbook and expense record accounting systems should give *TOTL.Business, Verson 3.6* serious consideration. Don't be fooled by the low cost; this program is a terrific bargain.

64-ACCOUNTING

Software Design
$69.95

Overall Rating	A-	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	A	A	*Value for Money*

64-Accounting is a complete, professional, accounting tool for small businesses. The first question you should answer before purchasing this program is, "Do I really need all its power to balance the books and help run my business?" If you operate a large business or retain an accountant to handle your finances, you probably can use the power. However, if your financial dealings are adequately budgeted on fifty-cent note pad and the desk calendar on which you scribble notes, then *64-Accounting* probably has more than you need.

Without exception, this is the most powerful, professional, complex, yet affordable business-related software for the Commodore 64 to date. If you own a business and use the Commodore 64 to help manage it, you owe it to yourself to try *64-Accounting*.

Be forewarned that along with the power of *64-Accounting* comes complexity. When I bought my 64, colleagues argued that it couldn't be as good as its higher priced competitors because it was underpriced, and professional quality business software was not available. *64Accounting* puts a big dent in that argument. The price, compared to similarly sophisticated programs in that competitive price range is almost a steal. And the professional calibre of the program plus its support features are first rate.

If you are the owner or manager of a small business, *64-Accounting* will help you keep track of your funds, coming and going. It assists you in establishing and maintaining a realistic budget, as well as producing a balance sheet detailing your own or your firm's net worth. You may be able to pinpoint wasteful spending—and eliminate it.

64-Accounting helps you keep track of up to ten checking accounts, 300 general accounts, and 200 different business or individual accounts with which your company does business. In fact, you can generate monthly invoices, statements, or automatically print checks to pay your bills or the payroll. And, of course, *64-Accounting* keeps track of all the checks you've written and balances your checking accounts.

There is a cost for all this, beyond the software's $69.95 price tag. If you're an accountant or are familiar with bookkeeping procedures, you'll feel comfortable using these series of programs. But if you don't know a profit center from the general journal, be prepared to study. Fortunately, the 160-page manual is complete and very friendly. It is well written and sprinkled with examples and explanations. Another plus is the sample file included on one of the two program disks; it allows you to put *64-Accounting* through its paces with predictable results. The five-chapter appendix section of the documentation includes instructions on how to get started, writing and correcting checks, examples of reports, and a glossary of accounting words and phrases.

Appendix D is the "help" portion of the manual. I suggest you get acquainted with the information contained therein before you begin using the program. The step-by-step instructions in the manual are very complete, but I always like to try things a little differently to see what will happen. If you take the same approach, without studying Appendix D, you may find yourself locked into certain menu options which I am sure you'd prefer to avoid. The step-by-step manual assumes you are going to follow along exactly as it directs you to. If you get lost on a little experimental side trip, you'll have to refer to the "help" section to get back in sync with your manual/guide.

Software Design, Inc. also includes telephone support for registered customers. There is a catch, though: to become a "registered customer," you must return the warranty card and pay a $20.00 customer support fee.

The files created by *64-Accounting* are of the REL (relative) type. The use of this type of file allows the different programs on the program disk to employ the same base of information. This does slow the operation of *64-Accounting* down a bit. Conceivably, the 38,911 bytes of memory the Commodore 64 has free for use, when it is first powered up, could quickly be exhausted by the needs of business accounts. To avoid this problem, *64-Accounting* is constantly dumping and loading programs and information. This activity will give your single disk drive a real workout. Perhaps for this reason, the designer of *64-Accounting* includes options for using two 1541 disk drives or the CBM4040 dual disk drive system.

The bottom line is, if you need (or think you need) a human accontant to help you with your books, you might well be able to use this worthwhile software package as a substitute. But be prepared for some serious homework. Along with the two disk programs and the User's Manual, the package includes a price list and examples of forms and checks that Software Design, Inc. sells for use with *64-Accounting*. (The company provides an 800 toll-free number for placing orders.)

General

BEC

Lawco, Ltd.
$69.00

Overall Rating	A	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

BEC helps you or your company make a profit. To successfully operate a business, you must produce and sell above your break even level. But finding the true break even point is not as simple as selling your product, subtracting what you paid to produce it, and banking what's left. You must know your product's true cost. At some point, production cost and sale's revenue cross. This point represents the minimum price that you can charge for your product and still pay all the bills. *BEC* helps you find that break even point and stay above it ("BEC" stands for "Break Even Computations").

Pretend you are a shoemaker. You have fixed expenses such as rent, utilities, taxes, insurance, and so forth that you can't easily change. You also have expenses that vary depending on the volume you purchase, which supplier you buy from, and the demand by other shoemakers for the same supplies. Variable expenses might include shoe tacks, polish, dye, shoe boxes, paper bags, thread, and so forth. How many pairs of shoes must you make and sell just to break even? Every shoe sold after that point will make a profit. That may sound simple, but other variables come into play. What if you cut your price in half in hopes of selling more shoes? Would your variable expenses per unit fall if you ordered in larger quantities? If they did, how would that affect the number of shoes that you would need to sell to make a profit? Similarly, what if the building down the street becomes available for twenty percent less rent, but with a heating bill five percent higher? Should you move? How many shoes would you have to sell and at what price to continue making a profit? If you plan to release a new product, you can use *BEC* to analyze the wisdom of doing so and the profit you're likely to realize from adding a new line. If you need to borrow money to expand, you can use the computer printout *BEC* generates to sell the idea to your bank.

The program allows you to process up to ninety-nine separate cost items to determine a break even point. You can either enter the price at which you intend to sell your product and have the program supply the number you must sell to break even, or you can tell the program how many units you think you can sell and have it supply the minimum price you must charge.

The program's power arises from its ability to shift data in order to answer "what if" questions. Although it targets business users, *BEC* could aid any project which causes money to change hands, including a rummage sale or baked goods sale for your church or a club. To use the program, you must know your product and the expenses that production entails (all of them, with complete and accurate figures). Knowing this, you can change and shift data to arrive at a price that will attract buyers at the same time that it generates a profit. The program will not think for you, but it helps you focus your thoughts logically.

You'll appreciate the user-friendliness of *BEC*. It comes with an easily understood manual that includes a sample file. You could probably load and use the program effectively within an hour, aided by the obvious and forgiving error prompts. One thing should be pointed out, however. You cannot just quit. The program stops itself if you answer "no" to all the prompts. The first time I used it, I answered "no" once too often, and, instead of returning to the main menu as I intended, I found myself saying "goodbye." *BEC* thought I was finished. I am more careful with my answers now and have had no further unpleasant surprises. At any rate, the program usually double checks your responses so that you needn't proceed with printing or deletion of a file if you pressed a key accidentally. *BEC* is copy-protected and evidently has only the standard ninety day warranty.

Lawco offers two other programs in the same series (reviewed elsewhere in this book): *MP+*, which fosters logical and productive management planning; and *PM+*, a project management program.

BUSINESS RESEARCHER

Briley Software
$65.00

Overall Rating	F	C	*Reliability*
Ease of Use	F	C	*Error Handling*
Documentation	F	F	*Value for Money*

Let's face it. What harried businessman wouldn't like a program that "helps eliminate the guesswork from managerial decisions"? This is the stated purpose of *Business Researcher* from Briley Software.

The documentation describes the program further: "Most decisions require a problem, then a decision is not needed. Such a problem that this program can solve is one that concerns distribution of limited resources for use by goal-producing items." What on earth!! When I read all this gibberish, I knew I did indeed have a problem—a problem with this program.

Unfortunately, the aforementioned passage is quite representative of the double talk and muddled explanations that comprise this package's documentation. After I read the manual cover to cover, I felt like I finally understood the purpose of the *Business Researcher*. However, I was still totally baffled as to how to make it work. After a few sessions with the computer, it's becoming clearer—but it's been an uphill struggle all the way. To top it off, bewildered users such as myself are referred to a couple of business college textbooks for further explanations. Thanks a lot.

I can summarize what I've thus far learned about the *Business Researcher*. If something, or some things, needed by several of your employees (or assembly plants, or whatever) are running short, this program will tell you how much of the "thing" to give to each employee in order to be most efficient and make the most money. Got it? The *Business Researcher* uses two analytical tools called the Revised Simplex Method and Decomposition. You input information in response to onscreen prompts, then stand back while the Commodore grinds out the answer to your problem. Quoting from the documentation once again, "Most MBA graduates are aware that these tools exist but usually defer to a person trained in Operations Research to use them. . . . With this new program, those automated tools are now available to any microcomputer owner."

The *Business Researcher* appears to this microcomputer owner to be a relic from the olden days. I think it is old PET software adapted for the C-64. My suspicions are not unfounded. The program is sold on cassette (though a disk copy may be made). The documentation is the type of ungrammatical mish-mash that, years ago, gave computer programmers the reputation of being illiterates.

I imagine that only those users with MBAs would really know how to use this software, and they're more likely just to put the company's Operations Researcher on the case when this kind of problem crops up.

Well, enough said. Why kick a dead horse, or a lousy program, any further? Especially when it's so badly in need of a total overhaul, like the *Business Researcher*.

BUSINESS WRITER/SUMMARY

UHL Research Associates, Inc.
$39.95

Overall Rating	D-	C	*Reliability*
Ease of Use	D	C	*Error Handling*
Documentation	F	F	*Value for Money*

Business Writer/Summary claims to be a check printing and accounting program for small businesses. It can indeed print checks, even on your existing checks, if you spend another $8.00 on a "tractor check form" available from the vendor. But it's a program I can't recommend. The documentation is atrocious, some of the prompts are incomprehensible, you must enter many items more than once, and you have to total numerous transactions manually. In short, it's a real dog.

The copy-protected program disk is easy to load—but that's the first and last thing that's easy. The prompts are confusing and the documentation supplied little or no help. In fact, I never have figured out what some of the prompts mean. The only way I could produce any results at all with this program was by trial and error. Furthermore, I had to manually keep track of various items (the last record written to the file, for example). A good program easily takes care of these things on its own.

The documentation (all five pages worth) is pretty worthless. Several program functions and prompts are not even mentioned. In other cases, I found the explanations inadequate. A beginner would be absolutely overwhelmed by *Business Writer/Summary*, and probably would never succeed in getting it to run properly. In fact, I'm not really sure I've ever had it up and running perfectly! At the very least, a sampling of the outputs, or a tutorial, would have been helpful (although I'm not sure anything could save the horrific documentation).

Once I had the program running (after a fashion), it seemed fairly reliable. However, if you choose to format a data disk or create a new file, you don't have the chance to change your mind. One missed keystroke is all it takes to destroy your data. Inclusion of an "Are you sure?" prompt would save the hapless consumer from unintentionally zapping a file or two.

I encountered some problems with error handling, as well. Errors were infrequent, but when they did occur,

I was kicked out of the program and found myself back in BASIC. The program appears to run in CBM BASIC. After a disk error, the program often halted with its files still open. I mean, really!

In short, do not buy *Business Writer/Summary*. For one thing, you'll never figure out precisely how to use it. Take my advice and shop for a better and more dependable accounting and check writing package for your Commodore.

CCI BOTTOM LINER

Clockwork Computers, Inc.
$44.95

Overall Rating	C	B-	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	C	B	*Value for Money*

Maybe my first mistake was to expect too much of the *Bottom Liner*. No matter, I was disappointed. Billed as a business system that "provides on a single disk a personal and small business accounting system with all necessary accounting functions," the claims made on the program's packaging overstate things a bit.

While the system appears to be an excellent project accounting package—whereby you can keep track of all the income and expenses associated with a specific project—it is not what I consider a full-fledged general purpose accounting system. Although you can produce an income statement, you'll have to wade through a printout and produce a balance sheet on your own. And while trial balance is discussed, again the software won't do it for you. What this means is that, inevitably, you'll wind up using some other General Ledger program to keep your books, and have to re-key all the figures to take advantage of the project tracking capabilities of this program. All this adds up to something less than the integrated accounting system I had hoped for.

On the other hand, the *Bottom Liner* does have many capabilities. It is well-suited to home accounting or small business needs. Within its limitations, the program is friendly and easy to use. The main menu includes eight functions. You can create and maintain client, project, and inventory files, and a chart of accounts. You may also enter accounting transactions, print invoices, and produce reports. A utilities section is also available. The data entry structure is pretty consistent from one module to the next, so things seem fairly straightforward after a short, get acquainted session. Each module includes its own submenu, although there are no on-line Help screens available. The modules are loaded from disk when called, and they load quickly. All of the modules are written in PetSpeed. One nice feature: the device number of your disk drive is software-selectable.

In the file maintenance modules, you can add, change, delete, and save records. You can also get a hardcopy listing of the file. You are allowed up to 500 clients, 100 projects, 700 accounts, and 500 inventory items. The inventory module serves only as an equipment or personal inventory. It's not set up to do a retailer's inventory, for example, and is not integrated with other modules. Entering accounting transactions is not complicated, and an automatic transaction number is supplied. When entering large batches of data, I had to cope with some annoying repetitive keystrokes: you must enter the accounting month and year for each and every transaction. You can include comments of up to eighty characters, but if you exceed the limit, you lose data. If you have an account (such as Cash), you have to keep track of the pluses and minuses (checks versus deposits) yourself. And if you work with a double-entry bookkeeping system, you must make sure that each set of entries actually balances.

The program prints decent looking invoices, either on plain paper or your letterhead, but this module is not integrated; you must re-key the figures to post them to your books. Charging sales tax is an all-or-nothing proposition on a given invoice—which became a problem for my particular application. The reports are okay as far as they go. You can get a dump of the ledger file, with various selection options, three different project reports, and two account summary reports (basically income statements).

The documentation is a bit scattered (it's comprised of a sixty-eight-page manual and an eight-page supplement). There's neither a table of contents nor an index, and the page numbering system is confusing. I also discovered some minor inaccuracies. On the other hand, printed menu listings are included, along with a sample of each report, and sample client, project, and account entries. An applications section at the back of the book attempts to show how to transfer figures from your printouts to your tax forms, but the information is rather sketchy. Copy protection is by Dongle (a hardware apparatus that comes with the program and must be plugged into your computer to run the program), so you can make unlimited copies. A PetSpeed version of the Schaff copying program is included in the utilities section. The compiled BASIC sped things up considerably (ten minutes for a copy). Program and data files are on the same disk, so expect to use that program regularly.

Unfortunately, I encountered reliability problems with the *Bottom Liner*; however, they weren't serious and there were some compensating advantages. The utilities section includes programs that calculate loan and balloon payments, and print an amortization schedule.

Although the documentation claims the software will work with my printer (a 1525), these routines printed a bunch of graphics instead of headings. At one point, the program also left a disk file open. I did not lose any data, but it was quite annoying. I never was able to determine exactly what happened because I couldn't duplicate the feat a second time.

On the positive side, the utilities section includes a data recovery program for the ledger, or accounting transaction, file. That will come in handy on one of those days when nothing goes right. Other utilities include routines to change screen colors, summarize transaction information, free up file space, and initialize the various files after making up a new disk.

In terms of error-handling, everything seems to be pretty well controlled, but errors are not trapped. I had no trouble crashing with a BASIC error message by not following directions. I could not force any disk errors, though. You do get a chance to verify your data after entering it. The Stop key is not disabled, and you can destroy files inadvertently by hitting it at the wrong time.

In summary, *CCI Bottom Liner* is a good package as far as it goes, but my expectations for the program were not met. I think the software's capabilities are overstated and hyped up by the vendor on the packaging. Before you buy this program, be sure that it is going to do what you want it to. On the other hand, the *Bottom Liner* does have some impressive features and is a good buy at $44.95—that is, if it meets your needs.

EASY FINANCE I

Commodore Business Machines
$20.00

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B-	A	*Value for Money*

Commodore Business Machines and Eagle Software together have produced a package of loan and mortgage programs that are hard to surpass. *Easy Finance I* contains twelve different programs to handle financial calculations, including: calculation of the maximum that you can borrow when you have a set payment schedule; calculation of your payments when you know the amount that you will borrow and the interest rate; a mortgage amortization table; adjusted rate mortgage payments; property investment cost analysis; mortgage comparison analysis; and a forecasting program that employs bar graphs.

You can easily print out all figures, calculations, and graphs. A master menu allows you to select any of the programs, or a tutorial. You can also call up Help screens at any time. The Help screen called up by pressing the T key will give you all the information you need to solve your problem, then returns you to the point at which you stopped. Pressing the D key displays all of your variables to that point. The S key scratches all data. The N key tells the program that you need no modifications. The P key prints the contents of the screen. Pressing the up arrow key returns you to the master menu. Using the R key, you can enter the results of a previous calculation from one program into the calculations of another. The calculations have a maximum precision of nine places, meaning that the programs can handle no amounts larger than $9,999,999.99.

The program catches and notes errors on screen; it also prevents you from making incorrect entries. Simple calculations take place on screen if you wish, and you can rerun the program after changing a single item of data. This helps you compare payments on a loan given different interest rates, for example.

The thirty-two-page manual contains a glossary of terms, screen and report options, and examples of applications for each program. While I thought the documentation fairly complete, the built-in tutorials really add special value to the package. If you need help to do your own financial calculations, I highly recommend *Easy Finance I*. It relieves some of the agony of dealing with loans and mortgages.

EASY FINANCE III

Commodore Business Machines
$20.00

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B-	A	*Value for Money*

Easy Finance III continues the financial series from Commodore Business Machines and Eagle Software. This group of sixteen programs comes complete with tutorials. The average individual will find most of the package easy to understand and suitable for common use, but many of the topics target people with higher incomes and are more business-oriented than the preceding programs. (See the review of *Easy Finance I*).

The first program calculates Future Investment Value to help you determine, for example, the future value of your savings account which, if typical, consists of unequal deposits and withdrawals over a period of years.

Present Value of a Tax Deduction allows you to evaluate any tax savings resulting from the deduction of interest payments on loans or debts with a maximum term of forty-five years.

For those who invest in T-bills, Current Value of Treasury Bill calculates your profits (the difference between the original discounted price that you paid and the face value of the bill at maturity). The Discount Commercial Paper program carries out a similar calculation for a fixed income or a commercial note.

Accrued Bond Interest simply calculates the interest a bond yields from the date of purchase to the present.

Net Present Value helps you analyze various investments, such as real estate. It calculates the amount of money that you would have to invest now to obtain projected cash values in future years, given an assumed inflation rate. By changing either the projected cash flow or the time involved, you can calculate what these various investments are worth today.

Financial Management Rate of Return (known as FMRR to professionals) calculates investment strategy after financing. This helps you decide on the optimum timing to obtain the chosen rate of return. Syndicated Investment Analysis provides annual and running cash flows for investors. Financial Statement Ratio Analysis allows you to analyze a business.

Maximum Purchase Price for Acquisition/Merger helps you pinpoint the top price that you can afford to pay for an acquisition or merger without losing money. Financial Leverage & Earnings per Share yields a percentage change in earnings per share for a given change in earnings before interest and taxes (EBIT).

Combined Leverage & Earnings per Share calculates a percentage change in earnings per share for a given percentage change in the amount of sales. The Weighted Cost of Capital tells you the overall rate of return necessary to recover any capital costs. EBIT-EPS Financial Indifference Point translates as earnings before interest and taxes on the earnings per share. The program calculates the EBIT-EPS point at which the cost of financing makes no difference.

All of the above programs have built-in tutorials which, along with the manual, enable you to carry out your own investment analysis. You can use results from one program as data in another. You can also dump screens of results to the printer.

EASY FINANCE IV

Commodore Business Machines
$20.00

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B-	A-	*Value for Money*

Easy Finance IV, part of a series from Commodore Business Machines and Eagle Software, contains twenty-one business management functions of value to managers or owners of small corporations. These subprograms have little appeal for the average software buyer, but if you do want them, you'll find the price reasonable.

Lease/Purchase Analysis permits you to compare your personal financial advantage from securing goods or property using either method. Depreciation Switch calculates the point at which switching from straight-line depreciation to accelerated declining balance depreciation allows a greater total depreciation. Salvage Value calculates the actual remaining value of an asset after a period of time.

Tax Depreciation Schedule helps you construct precisely that, using accelerated declining balance, the sum of digits, and the accelerated cost revenue schedule (ACRS). Optimal Order Quantity permits you to minimize the cost of an item for each price break per quantity. Optimal Production Quantity minimizes any setup and holding costs to balance production and inventory.

Breakeven Analysis uses a nonlinear method to incorporate both cost and price. You can also calculate maximum gross profit, revenue costs, and maximum net profit. Linear Cost/Revenue Schedule helps you determine the breakeven point for various levels of production.

These represent merely a few of the concepts concerning production, payments, and inventory control included in *Easy Finance IV*. As with the preceding *Easy Finance* packages, built-in tutorials offer help in all of the subprograms. Simply typing "T" calls up all the help you need when combined with the information in the well-written manual. The tutorial returns you to the point at which you encountered difficulty, allowing you to complete your calculations. You can call up the results of a previous calculation by typing "R," while "P" give you a printout of the screen.

If you can use the highly specialized calculations that this package offers, you'll find *Easy Finance IV* well worth the cost.

EASY FINANCE V

Commodore Business Machines
$20.00

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	B-	A-	*Value for Money*

Easy Finance V marks the last of the series of home and business financial software from Commodore Business Machines and Eagle Software. It includes nine functions that target the business person's needs. A highly documented manual contains step-by-step expla-

nations of how to use these functions. At the initial setup, you can select background, border, and character colors (as you can for the entire series). The same commands used in the other programs print the screen and supply previous data.

Risk Adjusted Net Present Value calculates the net present value of a project. It makes adjustments for probability distributions of cash flows and variable rates of return based on the expected value variation coefficients (which can affect the net present value decision criteria).

Payoff Matrix Analysis helps you find the best of a number of alternatives geared to achieve your company's objectives. The results of the analysis, based upon maximax, maximin, expected value, or minimax, guide you to your optimal results.

Bayesian Decision Analysis offers a technique to revise previously determined probabilities (called "prior probabilities") to a set of new probabilities (called "posterior probabilities").

Recession Analysis Forecasting forecasts the level of a variable based upon the level of an independent variable. This subprogram works with your choice of linear, geometric, or exponential equations.

Moving Average Forecasting calculates averages over various periods of time.

Exponential Smoothing Forecasting relies upon previously collected data.

Expected Value Computations select the alternative with the highest return.

Average Growth Rate/Future Projections yields the geometric growth based on previous data.

Apportionment by Ratios calculates both the percentage and amount of a future cash distribution.

Appendix B in the manual includes the formulas used to make the calculations listed above. Only an accountant could verify the accuracy of these complex formulas; I assume that they are correct. All of the subprograms work smoothly and are nicely formatted. As with the other packages in the series, the value shines through. While not suited for the average computer user, a small business will find it a good deal.

FINANCE CALC 64

Entech
$49.95

Overall Rating	D	B	*Reliability*
Ease of Use	B	D	*Error Handling*
Documentation	D	D	*Value for Money*

The documentation for this program should have tipped me off right away. Most financial management programs require several chapters of instructions and explanations. This program comes with a twenty-four-page booklet that tells all (almost). *Finance Calc 64* claims to be one of the most powerful financial planning programs on the market today, capable of tracking junior's allowance or a million-dollar business. Unfortunately, the program is little more than a report generator. The financial planning still must be done by the user. Additionally, the program has room for only twelve income categories. I expect that most million-dollar companies require a few more categories than that.

To be fair, the program rapidly accepts data and calculates monthly, quarterly, and annual reports. It will also display a color graph comparing income to expenses. It is easy to use and allows twelve expense categories, each of which can be broken down into twelve itemized sub-categories.

Unfortunately, the program has a lot of drawbacks when compared with more sophisticated accounting programs that set up records for each entry. In *Finance Calc 64*, you enter data as monthly totals. The only provision for identifying expenses is by itemized sub-categories, but generated reports list only the twelve main categories. This means that multiple payments to the same individual or account during a month must be manually added before entry. Dates and other memos are not accepted. Bar graphs are composed of normal alpha-numeric characters and do not show negative cash flow, only the difference by which income exceeds expenses. The expense categories are shared by all of the income categories. This means that the purported 1,440 itemized categories are actually no more than 120 when it comes to actually naming them. I found that being allowed a maximum of ten sub-categories could be restrictive when I tried to enter a list of magazine subscriptions. At the same time, I never used more than one or two of the sub-categories in other budget items.

To sum up, I had very little use for *Finance Calc 64*. It's not quite a spreadsheet, and it certainly isn't a home financial program since it has no capability to record individual records or transactions. Its value as a report generator is limited to only a few formats since there are no means by which to change the report formats.

THE INVOICER

MiccaSoft
$39.95

Overall Rating	C-	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	C	*Value for Money*

The Invoicer can help small business owners prepare invoices and keep track of daily sales activity. The invoices can be made on pre-printed forms or the pro-

gram can make an invoice from regular 8½ by 11 continuous fold paper. All necessary computations are done automatically on the invoice, including taxable items and totals.

The first time you use this software, you must employ *The Installer,* a program that sets up *The Invoicer* to work with your particular computer system. Once this information is recorded on the disk, a write-protect tab should be used to guard against accidental erasure.

At the very outset, you will be prompted to type in the date, then you'll be asked if you are using preprinted forms. If you aren't, the program asks for the name of your company and the address. Next, you inform the program as to whether the invoice will be subject to sales tax. If so, you enter the tax rate. The actual invoice has lines for the name of the purchaser, his address, the salesperson, date of invoice, account number, shipping company, date shipped, shipped via which means, collect or prepaid payment, terms, order number, and FOB point. You may then enter quantity, description, and unit price. *The Invoicer* will calculate the total charge for the items. Enter the remaining items on the invoice, and hit F1 when you are finished. You'll be asked whether or not you want to do another invoice. A "Y" will automatically print the letterhead portion of the invoice and return you to the first entry. If you respond with "N," *The Invoicer* will print "Totals For This Run," showing the total sales, total tax, number of invoices, and beginning and ending invoice numbers.

The Invoicer is not the ideal invoicing program. It fails to report acitivity by individual salesmen, an important consideration for most retail and wholesale businesses. It also fails to print more than one copy of the invoice when you use ordinary continuous paper. If you need a copy of the invoice for your own records, you must key in the information a second time. About this time, you might begin to wonder whether your computer is really saving you time or not.

The biggest flaw in this program—and the one which prevents me from recommending it—is its failure to interface daily commercial activities with your permanent data programs. You cannot add the invoice totals to customer accounts; goods sold are not subtracted from inventory records; and most importantly, you cannot store to disk totals for the runs, for a running Year-To-Date report. In effect, *The Invoicer* serves merely as an invoice printing program which lacks the means for furnishing all the crucial computations related to your business's invoices.

MANAGEMENT SYSTEM 64

Entech
$69.95

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A-	B	*Value for Money*

Management System 64 targets the small-to medium-sized retail service business. It won't help every firm, particularly a business such as a dry cleaner or a beauty shop. I'll talk about its drawbacks later—first the good things. These include printing of invoices, labels, reports, and customer lists; entering the product received; deleting old invoices; changing information about any item; and backing up your company information.

You enter information about your company: name, address, phone number, and sales tax. Then you list all of your products, including such things as cost, quantity, product number, and so on. You can also list up to twenty different sales people and their sales numbers. As you enter information day to day, *Management System 64* automatically tracks your inventory, saving you time on inventory tallies.

Management System 64 would work especially well with a mail order business. You can print as many copies of each invoice as you like and ship the product to the person ordering or to another address. As it prints invoices, the program automatically calculates discounts and sales tax. It also lets you add shipping charges. The program even prints packing slips for you. You don't have to obtain special forms for printing; you can use regular paper and save money on printing costs.

Although *Management System 64* is menu-driven, I would suggest that you familiarize yourself with the instructions before trying to use it because some commands do not appear in the menu prompts. Moreover, some of the menus have submenus which, although not complicated, may confuse you if you have not already studied the program. For instance, when you have finished entering your item information (item number, name, price, and so on) and want to get back to the main menu, you must press F1. You can learn this only in the manual, which is fairly well written and simple to understand. Other parts of the program prompt you on how to get back to the menu.

One menu item allows you to format a disk to store your information; it also allows you to make a backup disk of the information (but not of the program itself). Entech will replace your program disk for $5 if you send in your old disk. This is standard policy, but I would like to have a backup disk on hand rather than having to wait for a replacement.

As I mentioned before, this program doesn't suit a service-oriented business. Although it accommodates twenty sales people, it doesn't handle labor charges, nor does it allow you to figure some items with sales tax and others without. This creates a problem sometimes, such as in the case of states that don't charge sales tax on certain items (like food).

A minor irritation concerns the frequency with which you must change disks when you are in the main menu and need to add items received, print invoices, or almost anything else. Printing labels is problematical in that you cannot align the labels in the printer. Moreover, the program only prints labels in a single column rather than two across.

In summary, *Management System 64* has a few drawbacks, but no major flaws. If you mainly sell and ship goods rather than charge for labor, this program may just fit the bill.

THE MONEY MANAGER

Timeworks, Inc.
$24.95

Overall Rating	B+	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	C	A	*Value for Money*

The Money Manager is a fast, versatile, menu-driven budgeting aid for small business or home use. This is quite an impressive financial aid program for several reasons. First, it's easy to understand and use, and obviously was designed to be user-friendly. Moreover, *The Money Manager* is loaded with options and is very, very fast. You can input, review, or manipulate data quickly and easily. The program is both visually informative and exciting. The bar graph option helps you visualize the relationship between expenses and income, and the bars help you spot budgeting problems quickly. Last, but by no means least, *The Money Manager* is a true software bargain. It retails for $24.95 and at that price, you almost feel like you're using pirated software. I'm well known as a penny pincher (I still complain about paying fifty cents for a ten-cent cup of cola), but in my opinion, *The Money Manager* would be a good buy at triple the retail price.

The program can stand alone as a budgeting helpmate. Everything you need in order to use *The Money Manager* to its fullest extent is included on the disk and in the manual (in spite of some of the manual's shortcomings). In addition, it will interface with another of Timeworks' programs, *The Electronic Checkbook* (see the review of this program elsewhere in this book). If you use both programs together, you'll save yourself a lot of time. *The Money Manager* uses the same budgeting data files employed by *The Electronic Checkbook*, which will save you much typing.

The menu-driven options of *The Money Manager* will speedily allow you to view, modify, analyze, and manage your money. You can display your budget data and compare it in a variety of ways. All choices are selected from the main menu. Once the data appears onscreen, you either return to the menu or send the screen display to your printer for a printout.

You may view information by a selected month. For example, you can look at May's budget by pressing #3 from the main menu. Then press the "5" key (for May, the fifth month). When the appropriate information is onscreen, you can change it with a few, simple keystrokes.

Item #4 from the main menu allows you to review your "actual" budget, while #3 displays what you intended your budget to be. Item #4 forces you to face the cold, hard truth—the "real world" of your expenses and income; this option displays what is actually happening to your money.

Item #5 lets you contrast the two, comparing your ideal budget with what's really happening to your money. This option includes a percentage display of each item so you can see where your expenses actually are in terms of percentages below or above your budgeting plans.

Main menu choice #6 allows you to analyze selected items within your budget, while selection #7 is the most impressive and visually informative option: you can see your yearly budget versus actual expenses printed on the screen via color bar graphics. At a glance, you are presented with a quick analysis of how your planned budget compares to the real demands that are presently being made on your income.

The Money Manager supports up to sixteen user-selected categories. If you plan to interface this program with Timeworks' *The Electronic Checkbook*, be sure the categories are the same for both. Typical categories might include wages, mortgage payments, telephone, office supplies, groceries, gas, insurance, and so forth.

The program comes with an eleven-page manual. Reading it on its own, I found some of its references confusing. The instructions became clearer, however, after I experimented with the program itself and the beginner's example file included on the program disk. All in all, if you are familiar with the Commodore 64 and other business programs, you probably could skip the manual altogether and start using *The Money Manager* at your very first sitting by simply responding to the screen prompts and commands. Still, the documentation could stand a smidgen of revision.

Timeworks' accompanying brochures mention a free telephone consulting service, and a phone number (not an 800 number, unfortunately) is listed in the man-

ual. But I found no mention of a warranty or replacement agreement, in case the original disk fails to perform properly or proves to be defective.

The version of *The Money Manager* that I have is on disk; to date, it has worked without a hitch. Commodore 64 owners who do not have either a single disk drive or a dual setup may be interested in the fact that the manual includes operating instructions for a cassette version of the program. I suppose it's logical to assume a cassette version of the program either is out now or will appear on the market in the near future. In any case, *The Money Manager* is a fast, dependable, useful, and reasonably-priced financial management tool.

MP+
Version 2.0

Lawco, Ltd.
$99.95

Overall Rating	B	B	*Reliability*
Ease of Use	C	D	*Error Handling*
Documentation	B	B	*Value for Money*

MP+ 2.0 belongs to a series of management planning aids offered by Lawco Ltd. If you are starting a new business or just trying to keep the one you have in the black, *MP+ 2.0* may be an answer to your prayers. Or, if you're "up and coming" in someone else's business and need a little edge against some of the other "up and comers," you may gain the advantage with this program. It forces you to get organized, and proper organization is vital to developing and controlling a business. However, don't confuse *MP+ 2.0* with a spreadsheet. It's a planning aid.

MP+ 2.0 contains no magic to turn the office dummy into the corporate star. You must think constructively. The program forces you to think a project through logically, identifying your (the company's) goal. Then you identify the activities required to accomplish that goal, along with the resources needed to support each activity. The program removes a lot of the tedious paperwork needed to write and revise a management plan. A new business will find it a mini-course in logical business planning.

An example file on disk and in the manual teaches you how to use the program. It presents a scenario of a fellow starting his own software business. First he identifies five objectives: (1) write the software program; (2) test the software; (3) user-test the software; (4) write the documentation for the software; (5) sell the final product. Then he identifies the activities required to successfully attain each objective. Finally, he identifies the resources needed to successfully complete each activity.

A nineteen-page manual explains each screen menu option, tells you how to manipulate your file, and explains error messages. (New users will probably see the error messages often.) The manual is thorough, but uses stilted language and reads much like a business textbook. It contains all the information you need, but the novice may have to read slowly and pay attention to decipher it. The example file helps a great deal.

After you practice with the sample file and understand how to begin, edit, update, and review a plan, you can start applying the lessons to your own business. The final product is an outline of your management plan.

After you develop your initial plan, you can switch activities around using the "Edit a Plan" option, which employs a method similar to that of word processing. Unfortunately, the Edit mode suffers from frequent delays and works very slowly. Lawco says that this results from "garbage collection" by the program. Nonetheless, the Edit mode includes several handy options, including global Search and Replace.

As business conditions change, you may need to change your planning. You can do so through the option called "Update a Plan." If you wish, you can review your plan before printing. If it looks logical and workable, you can print it and use the printout to sell your ideas to the guys in the big office. Note that *MP+ 2.0* targets business use. If you're thinking of quitting your job and going into business with your brother-in-law, you might save yourself a few headaches and perhaps your bank account with the help of this program. However, homeowners will find limited use for it.

The version I used contains two bugs. First, if you press the quote key (") while entering data, the program falls into an endless loop. You regain control by pressing Run/Stop. The first screen reappears, but the program has dumped all of the data you entered before pressing the quote key. Obviously, this can frustrate you tremendously, but once aware of the problem, you can avoid it. Second, the Clr/Home key is not disabled while you enter data. When stretching for the Inst/Del key, I sometimes fell short and landed on Clr/Home, sending the cursor to the upper left corner of the screen. If you use the cursor keys to return to the proper screen location, all those cursor codes enter your file. Of course, you can always edit them out later.

Because *MP+ 2.0* is protected, you cannot list and change the program yourself.

Lawco offers two versions of *MP+*, 1.0 and 2.0. The early version, 1.0, retails for $49.95. It lacks some of the advanced features, like Setting Priorities and Evaluating Alternatives.

If you want to fine tune your business or simply need help getting organized, you'll find *MP+* worth looking into. Lawco offers two other programs in this series

(reviewed elsewhere in this book): *PM+*, a project management program; and *BEC*, which helps you compute the break even point of a product.

PERSONAL ACCOUNTANT

Softsync, Inc.
$34.95

Overall Rating	C	B	*Reliability*
Ease of Use	B	C-	*Error Handling*
Documentation	B+	C	*Value for Money*

Personal Accountant is a set of three programs designed to manage financial information for home or business. The first program, Budget, is the heart of the system and is based on the principles of double-entry accounting. This program allows you to set up accounts for your financial transactions. These files are used to keep track of your purchases, loans, charge cards, and other personal expenditures. It will generate several reports to aid you in analyzing your financial situation.

The basic idea of double-entry bookkeeping is that all monies must come from somewhere—and must go somewhere. This method of accounting provides a balance between credit and debit accounts. Each transaction is recorded in two places. For instance, suppose you write a check to pay your rent. The transaction must be posted in the checking account file (as a debit), and the rent file (as a credit).

Initial use of the program is quite easy. After loading the program the first time, you must format a data disk. You choose this option from the menu, which also generates a set of default files. If you do not need one of these files, the menu supplies options to change or delete. Since new files are automatically opened as they are needed, you don't have to keep creating them through the menu option. You can maintain up to 144 accounts containing a total of 4,000 entries per disk. If you fill a disk or would like to put each year's data on a new one, you have a menu option that forwards all accounts and their balances to a new disk.

You can now begin making entries. First you are asked to enter the date of your transaction. You must do this for each and every entry. The next entry is Particulars. This is an eight-character field for a note (remark), which corresponds to the memo line on a check. You may not want to put anything here, but due to an oversight in programming, a null input will cause a previous entry to be carried over. This is no problem the first time you load the program, but it will become a problem later on after you have made several entries.

At this point, you must think carefully about your entries. The amount of your transaction must be entered as a positive number to increase a Deposit, Loan, or Income account, and as a negative number to increase an Expense account. This information is displayed on the screen for reference purposes and should be checked if any doubts about your entry exist.

Next, you must make two entries on one line, separated by a slash (/). You are prompted to "Post to 'Account #1/Account #2'." The program wants to know which two accounts are affected by the transaction. If you have used your charge card to purchase clothing, you would enter the amount as a positive in the account "charge card/clothes." Account names must be entered exactly as they appear in the directory, or else a new account is opened and the amount is posted to it instead of the correct account. If this happens, you must use Option #6 from the main menu to change your entry, then Option #5 to delete the incorrect file. I found it difficult to make several entries without making at least one error. To my dismay, correcting errors with the *Personal Accountant* is not an easy task.

For Softsync to call this segment of the package a budget program is misleading. You neither make budget plans nor compare your projections against the actual accounts, as is common in most budget programs. Budget is a financial program, first and foremost, whose strength lies in its reporting capability.

Budget gives you the choice of four reports. The first, Trial Balance, is a balance sheet. It gives you a total for each account, placing it in a column according to the type of account. If you have made your entries correctly, the total for each column will be the same. You can also list the balances of all your expense accounts, generate an Assets and Liabilities report, and create an Income and Expense Statement. For a more detailed report of an individual account, you may list the transactions in any account. The information contained in these reports will allow you to analyze your financial position.

The second program is called Amortization, and provides you with loan and investment information. When you supply this program with the proper information, it will give you payment and interest amounts for a loan or the future value of a single or annually increased investment. This program will be valuable to most users because it relates well to auto/home loans and savings accounts.

The third program, Name, is a simple database for names and addresses. You can access the file created by this program from the Budget program. Data entry and the search function are both weak. Entries are carried over to the next entry set, and again a null input causes that line's previous input to be entered. The Search function will only find a partial string if it is at the beginning of a line. For example, if you have entered "John Smith" and want to find "John," the program will

locate your record but a search for "Smith" will fail.

The manual is small, simple, and clear. Great effort obviously was taken to present double-entry accounting principles as straightforwardly as possible. Several examples are offered; referring to them will help you at the start.

I was disappointed to find that all entries are made with the Input statement. The problems connected with this statement comprise the most serious flaw in the programs. Relative files are used to hold information and this does speed up accessing data. All three programs are written in BASIC, allowing for modification. Budget uses a simple method of protection that impairs the Listing of the program after it is run.

The tape version of *Personal Accountant* will handle fewer records because they must be held in memory. The name file cannot be accessed from the tape version of Budget. Softsync offers a ninety-day limited warranty covering defects in manufacture. They provide repair or replacement if the original is returned to them, postage paid, with proof of purchase. After ninety days, service is available at $2.00 for cassette or $5.00 for disk. (For security's sake, you should back up these unprotected programs as soon as possible.)

Overall, the Name program is flawed; Budget and Amortization are better; but a little more time and care in programming them would have made them shine.

PM+
Lawco, Ltd.
$129.95

Overall Rating	B+	B	*Reliability*
Ease of Use	C+	C	*Error Handling*
Documentation	B	B	*Value for Money*

PM+ helps project managers handle their tasks. The "PM" in the title stands for "Project Management." This program helps you get just the right mix of manpower, material, and time to successfully complete a project. And of course the bottom line is to get the job done, on time, with a profit. *PM+* helps you return a profit. The size of your business doesn't matter. If used properly, it can help both the small independent as well as the seasoned project manager of a large corporation.

The program disk contains not one, but a series of interacting programs to help you develop, update, and manipulate a project plan. A sample project file accompanies the four program modules. The sample file guides you step-by-step through defining a project goal, setting up the interacting activities required to achieve the goal, and entering the manpower, material, and cost needed.

The program forces you to plan logically. For instance, let's pretend that you operate a bakery. You have three employees, each working forty hours per week. You can't logically assign them work that requires more than 120 hours. But by asking "what if" questions of *PM+*, you may spot some slack areas in your operation where the workers could use those 120 hours more effectively. Or, what if you were to buy flour in larger quantities? Would the money saved make up for the increased time required to break the package down into usable sizes? Would storage create problems?

On the other end of the scale, suppose your company is building the world's largest single span bridge when a steel factory goes on strike, leaving your 1,000 welders idle. Should you wait for your regular supplier to settle his dispute, or buy from the competition on the west coast? You'll have to pay more for the competitor's steel, plus shipping. Of course, a good project manager should have an alternate plan for such crises, with cost figures at his fingertips. *PM+* will help you answer these "what if" questions.

This program is designed for business use. The manual contains 104 pages, of which seventy are devoted to the sample file. Two pages contain a glossary of terms you'll need to understand to successfully use the program. The remaining thirty-two pages read like a text book. In fact, you could probably use the manual and sample file for an office training course in project management. The manual includes everything you need to know.

Don't expect *PM+* to do all the work for you, however. It allows you to locate data and manipulate it quickly, but you must logically plan your project and enter the data. The initial entry of data won't save you much time over more traditional methods, but you'll appreciate the program when you need to update or change your plans. Then you'll save time and avoid frustration.

You can locate start dates and projected end dates for up to seventy-eight different activities involved in a single project. You can locate slack time and move manpower to better use resources. The program helps you shift activities around to avoid bottlenecks in production or lessen slack time for more effective use of manpower.

The program provides a graph of your project's different activities and their projected start and completion dates by interpreting the critical path of the project. Using the graph you can identify activities which can wait and those which cannot, shifting your manpower between the two to best use your resources. *PM+* helps a project manager identify problems before they become critical, and devise alternatives to keep supplies, manpower, and the product moving smoothly. You can print out the data you need, or review it

onscreen. Of course, anything that you enter you can later edit, change, delete, or shift. Data is stored on a different disk than the program disk. Lawco, Ltd. designed *PM+* to use a separate disk for each file.

I had no real problems with *PM+* once I understood how the four modules interacted. All four use the same database, but they take up too much memory to reside in RAM at the same time. Thus, to move from one module to another, the computer dumps its memory and automatically loads the requested module. This causes some minor delays and some initial confusion.

The inclusion of the sample file helps a great deal. The time spent working with it will repay you many times over. The program is protected and written in machine language. The documentation mentions only the standard ninety-day warranty, with no hint of a replacement agreement for damaged disks (which I find hard to believe).

Lawco, Ltd. offers two other business aids that interact with *PM+*: *MP+* (Versions 1 and 2), which is a management planning aid, and *BEC*, which computes the break even point of a product. Both are reviewed elsewhere in this book.

TOTL TIME MANAGER 2.6

TOTL Software, Inc.
$39.00
Save data to disk

Overall Rating	B-	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	C	B	*Value for Money*

TOTL Time Manager 2.6 is a very simple but effective tool that's useful for planning and scheduling business or home activities. This program allows you to create checklists for activities, calendars of events, and personal or business schedules. *Time Manager's* ability to create lists and schedules is enhanced by its capacity for producing bar graph charts which illustrate your activities on a choice of six different time lines. These capabilities are tied together in a program that uses a simple series of menus to guide you through the necessary steps toward your goal.

Within the program, your first step is to define a specific "activity" that you wish to make part of your list. Next, if you'd like, you can add a comment about this activity. Then you are asked to name the person responsible for that activity. You then define this activity as part of a specific project. Lastly, you can define the starting and ending dates and (if needed) the starting and ending times. All of these steps are very simple to do; you are continually prompted for the necesssary information. The program allows you to review the information you have entered before it finally accepts it. Having completed this operation, you then repeat these steps for each of the activities you want to add to your list.

If you find that you want to change the information later on, it is very easy to make a change using a single "Change" function which is available as a menu option. Technically, the program allows enough space for you to include an adequate amount of information. Specifically, you are allowed up to twenty characters for the activity description, sixty characters for a comment about the activity, eighteen characters to name the person responsible, and eighteen characters for the project description. Also, it is important to note that *TOTL Time Manager 2.6* allows for up to 259 activities per file, and you can create separate files for your individual needs (i.e., school, work, home).

The report printout is very flexible. You may produce reports using six different time lines (i.e., four years, one year, six months, seven weeks, six days, and two days). You can also sort through your activities and get separate reports based on a specific project, a specifically responsible person, and/or a specific date or time period. In total, there are fifty-four separate report possibilities. Each report presents a neatly drawn bar graph associated with each activity and the page has a complete time line drawn at the top. The quality of the bar graphs is adequate. They are, however, not as detailed as those produced by much more expensive project managers (e.g., *Lisa Project*). Considering the cost of the program, however, these graphs are thoroughly acceptable. You don't always have to use the printout option in order to regard this program as valuable, you can sort through your activities directly on the monitor screen (this sorting gives you all of the text information without the graphs).

TOTL Time Manager 2.6 is very easy to use, and almost "idiot proof." This is important because I found the manual to be a little too technical. Basically, you don't really need the manual except for setting up your printer. If you have a Commodore 1525 printer, (or a parallel interface that emulates a 1525), you won't need special instructions. If you have another type of printer, you must go into the program itself and make some minor modifications which are explained in the manual. (I do believe that having to modify the program, even if it is a minor modification, is too technical for the average computer user.) You then must save this "new" backup copy of the program for your business use.

It is not difficult at all to make backup copies of this program, which is an excellent feature. It allows you to have the complete program on your data disks. You'll find this especially handy if you decide to create multiple data disks. I was impressed with a special option built into the program that automatically saves a backup copy of your original data whenever you

decide to make data changes or updates. If you make a mistake or inadvertently delete some valuable information, you'll realize what a great asset this extra item really is.

TOTL Time Manager 2.6 is an interesting and well written program for anyone who prefers to create organized lists for keeping track of his activities. Basically, it is a simple, time-related database program with a graphing capability added. You can easily keep track of various major projects in your busy life, such as (1) all of the required activities that must be completed for your child's—or your own—wedding; or (2) all the interviews you have scheduled for a new job; or (3) all the reports and exams that you have to complete for this semester's coursework. Not only can you keep track of activities such as these, but the bar graph report shows you exactly when your activities will overlap. To pinpoint these heavy workload conditions is the main reason why someone would normally use this kind of program in a business environment. However, this capability is also quite valuable for managing the average person's school and social agendas.

Utilities

Commodore computer owners are spoiled. When they unpack, hook up, and turn on their computer for the very first time, it actually works! At least it is capable of working, of playing a game, of accomplishing a task, of computing.

The first thing you see when you turn on your computer is a message saying something in English, apparently aimed at communicating with you, the operator. You may not understand, but, at least it's doing something! If you type on the keyboard, the computer talks back. It may say "SYNTAX ERROR," but you can tell it's trying to help you along. It appears to be ready to do whatever it is computers are supposed to do. If you are an experienced computist, you probably open the owner's manual to check out a few details before you try to get this particular computer to do what you know you want it to do. If you are a novice, you open the manual to page one and check out how to get started doing what it is that computers are supposed to do. Even if you just want to play *Commie Mutant Invasion From Planet Claire,* you still check out the owner's manual. You need to know how to hook up the datacassette, the disk drive, or the joystick, and how to load the program so you can get down to eliminating those politically-deviant 'droids before they destroy America and Mom, and eat all your apple pies.

The owner's manual tells you to finish hooking up the necessary equipment, to type in something like "LOAD,*" and all of a sudden you're computing! It's so easy to get started. But it wasn't always that way.

The first home computers were constructed from kits. You then bought some surplus electronic equipment, like a keyboard or paper tape reader. Maybe you even got somebody to show you how to hook up your TV or whatever to the thing. When you finally finished your design, materials acquisition and construction project, you were the proud owner of some kind of a computer system. But even though the different parts were connected to each other, they couldn't work together. Your computer system needed coordination and education. Like a new-born child, it had a heck of a lot of potential, but it hadn't learned how to do anything yet.

What your home computer system was lacking was an operating system and the availability of a programming language. The "operating system" is a collection of special computer programs, called "utilities," that enable the parts of a computer system to work together. Without these utility routines, the computer's brain cannot accept what you type on the keyboard or display your writing on the monitor screen. With a complete set of utilities, a computer can do these things, read and write to floppy disks or cassettes, and more. Like a child with elementary coordination, a computer with an operating system is ready to do all sorts of marvelous things. It can take in information from all its senses (enabling it to react and remember) and it can perform the fundamental actions which make it understandable and recognizable. The key ideas here are "take in information" and "perform fundamental actions." Not to take the comparison too far, a computer with an operating system and a programming "language," is like a coordinated child with the power of speech. It is a fascinating creature, ready to be educated, ready to grow up and learn to do fascinating things.

Commodore computers are sold with a Commodore Disk Operating System and with the BASIC programming language built right in. This collection of utility programs and this language, which gives you the ability to write programs of your own, have the advantage of being free, but there are some limitations. One limitation is the compatibility problem. The utilities in the operating system are expected to be able to handle the equipment that has been sold in the past that you might want to hook up to your new Commodore computer. The BASIC language should be able to interpret programs written in the past. This is as it should be. Compatibility is a good thing. Most of us select a computer largely for its ability

to run all the programs and play all the games that we already know about or have heard about. And most of us are satisfied with our computer for a time.

There comes a time, however, when we decide to make some improvements in our computer system, to try to eliminate some annoying characteristics, or to try something different for difference's sake.

So what can you do? If you're into programming your computer, you can buy a utility program that adds commands and extends the capabilities of Commodore BASIC. You can improve your game programs by converting all, or at least the critical parts of them to assembly language. You can gain speed by "compiling" your BASIC source program. You can develop large programs using a "higher-level" language. You can use utility programs to improve the sound and graphics of your programs. One of the most desirable things to do is to improve the speed and reliability of your disk drive in the loading, unloading, and cataloging of programs and information files. All of these things and more can be accomplished with utility programs.

An anonymous hacker once said: "One man's utility is another's futility..." But the rewards and satisfaction achieved through the use of utility programs are worth the effort to learn and implement them. If you want to improve your programming skills, if you want to upgrade the performance of your system, or if you decide it's time to explore the world of Commodore computing a little deeper, read on!

—Marc Mathieu

General

ARROW HIGH SPEED TAPE MODULE
Model AR64

Skyles Electric Works
$49.95
Save data to Datassette recorder

Overall Rating	B	B	*Reliability*
Ease of Use	B+	C-	*Error Handling*
Documentation	C+	B	*Value for Money*

Skyles' *Arrow High Speed Tape Module* is a novel plug-in ROM cartridge that allows the serious tape user to load and save programs at about eight times the normal speed, using a standard Commodore Datassette recorder. Besides sheer speed of tape operations, you can stuff a good deal more programs onto a single cassette (up to 200K on a C-20 cassette). No modification of the Datassette is necessary, as the tape continues to move at the regular speed; it's the *Arrow* that transfers data to the recorder at a much higher rate than usual.

The *Arrow* comes in two versions for the Commodore 64: Model AR64, the basic $49.95 version that I've reviewed here, and a similar but more expensive version that includes a machine language assembler. This is Model ARAS64, priced at $89.95. The two cartridges are virtually identical except for the assembler feature. Model AR64 comes with an eight-page instruction booklet that's quite adequate, though it could use more detailed explanations of the cartridge's workings and additional examples.

The ROM cartridge is installed in the 64's cartridge port, much like a game cartridge. It is automatically activated when the computer is turned on; this fact is confirmed when you see the usual power-up message of "38911 Bytes Free" reduced to "30719 Bytes Free." Although the cartridge is activated and available for use, the keyboard still controls the computer. The primary purpose of the *Arrow* is to provide high-speed tape capability, but four other, secondary functions are also provided: program text editing; a machine language monitor; a memory manipulation feature; and a hexadecimal-decimal calculator and converter.

The high-speed tape functions include the addition of four new "Arrow" commands: S, L, V, and A. These are used to Save, Load, Verify, and Append, respectively, at a high rate (3,600 baud). These four high-speed commands are preceded by the back arrow key (also known as the left arrow key), which is located on the upper left side of the keyboard.

For example, to high-speed "Arrow-Save" a program, you simply depress the back arrow key, followed by the S key, type in the program name enclosed in quotes (as usual), then hit Return. Machine language programs may also be loaded and saved using a similar procedure. The standard loading and saving commands are still available when the *Arrow* is in use. After each cassette I/O operation, the length of the program handled, in bytes, is displayed on the screen.

Actually, you may employ two or more tape handling commands. The first is a variation of the high-speed load, using the back arrow key and "T." This is like the "S" command, but is used when you want to save the *first* program on a tape, to allow for a long (ten second) leader necessary to get past the blank leader at the beginning of the tape. Subsequent saves are made using the "S" command.

Also, the "P" (or Positioning) command is used for fast tape positioning in conjunction with the cassette recorder's fast forward mode. The command divides the cassette into ten sections; each section can hold over 16K of an Arrow-Saved program. This eliminates a common user complaint about being unable to rapidly locate and access files that are not at the beginning of the tape.

The *Arrow* module also contains several text editing commands for BASIC program writing. These include automatic line numbering, character search and replace, and deletion of line numbers. In addition, a simple machine language (M/L) monitor is included that allows for such features as memory block display, jumping to a specified address, register display, memory search, and memory block save and load in the standard (slow, non-Arrow) format. (High-speed Arrow M/L loads, saves, and verifies are accomplished as I've described previously.)

The *Arrow* also contains several machine code memory block manipulation commands. These are specialized capabilities that allow for copying a block of memory to a new location, comparing two blocks of memory, and renumbering assembler source code. The assembler itself, known as EZASM, is optional, and is found only in the higher-priced ARAS64 module.

One of the more useful and novel features of the *Arrow* module is its built-in calculator/converter. This feature allows you to perform simple onscreen calculations in hex or decimal. Memory location may be converted from hex to decimal, or vice versa, using a simple command.

Switching between the various operating modes requires but two keystrokes: the back arrow key plus a single letter. The module may also be turned off in this manner, though re-engaging requires you to type in a system call. A minor irritant involves the lack of a way to completely shut off the device when it's not in use. As long as it is plugged in, it deprives the 64 of some 8K of BASIC working space. A disabling switch on the module would be handy. Also, I found that inadvertently attempting to access one of the non-existent EZASM features, executing an EZASM assembled program using the "B" command, causes the *Arrow* to crash the Commodore 64. I lost the program in memory, and had to turn the computer off and back on again to recover.

Skyles' *Arrow* does its job well, and it should be of interest to the serious tape user who has little interest in upgrading to disk later on. The module will easily pay for itself by saving you a lot of tape and time. If you are planning to purchase a disk drive, however, investing in the *Arrow* is less attractive; other ROM or disk-based systems perform this module's secondary functions better. Skyles' popular *Victree* programming module, for instance, with forty-two new commands, has much more powerful programmer's aid capabilities, though it does not possess a machine language monitor as the *Arrow* does.

One final note: The *Arrow* module is primarily intended for programs that you create yourself and for fast Arrow-Saves with the module. But the device can't automatically fast-load cassette programs that were originally saved in the normal (slow) way. You must load such programs into the computer with the regular load command, then Arrow-Save them back to tape in order to fast-access them. Also, *Arrow* only works its magic on program files; sequential (data) files are handled in the regular manner.

If you are a dedicated tape fan, and would like your tapes to zip along almost as fast as disks, then Skyles' *Arrow High Speed Tape Module* may be precisely what you've been searching for.

MR. TESTER

Micro-W Distributing
$29.95

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	B	*Value for Money*

What would you do if you thought your computer or one of its peripherals were not working correctly? Panic is often the first reaction, followed by nightmare visions of large repair bills. Did you merely make a mistake when you keyed in an instruction, or is there something seriously wrong with the machinery? What *really* is the matter? Now there's a program that allows you to test all of your equipment to pinpoint that elusive hardware defect. *Mr. Tester* is the name of this handy diagnostic program for the Commodore 64 and most of its accessories.

Mr. Tester is copy-protected and carries a ninety-day warranty. A backup disk is available for only $5.00, but Micro-W doesn't give you a phone number for customer support services. *Mr. Tester* presents a title screen with options for testing various peripherals; you may test each piece of hardware in turn.

The keyboard test supplies a visual image of the keyboard on screen. When a different key is pressed, it correspondingly changes on the screen. After you have tested all the keys, you can exit to the main menu. The program also determines whether your monitor can display all of the colors accurately, and without bleeding.

The audio test plays a musical scale through each of the Commodore's three voices. In this fashion, you can test the sound reproduction of your TV or monitor. You may run the joystick test using either port. Moving the joystick creates a matching movement on the screen. If the results of one test are bad, try the other port. If both test poorly, be suspicious of the joystick.

Judging by its title, the disk drive test checks just what you'd expect it to. The manual unfortunately does not indicate if you can test other drives using this program. *Mr. Tester* offers two options: test one block on each track of a disk, or every block on the disk.

The printer test in *Mr. Tester* sends one of each ASCII character to the printer. It should work with most all Commodore interfaces that understand graphics. The datasette test measures the ability of your cassette player to save and load a program into the Commodore 64.

In the memory test, *Mr. Tester* contains two function modes: test all memory, or test one selected page of memory. It is a one-pass test that might uncover an intermittent problem in RAM.

The program makes good use of onscreen graphics and is very easy to use. The manual, though, definitely

leaves something to be desired. Micro-W should have given more time and attention to the print quality and design of the documentation. This is really a minor matter, since you can readily use the program without referring to the instructions. *Mr. Tester* is a good buy if you're seeking a diagnostic software package for your Commodore.

THE OPERATING SYSTEM

Hacker's Hardware

$54.95 (standard model) $64.95 (custom model)

Overall Rating	B+	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	B+	*Value for Money*

The Operating System is a utility ROM cartridge that plugs into the Commodore 64's expansion port. This customized device effectively replaces and expands the C-64's operating system (KERNAL and BASIC interpreter). *The Operating System* includes all of the C-64 features normally available in the "barefoot" 64, plus an extensive list of new features and capabilities.

Some of the improvements this program adds to the Commodore operating system include: escape and quick load keys, default loading and saving to disk, automatic machine language loading with display of load addresses, and improved video displays. Most of the additional features are accessed by two keystrokes via various pop-up menus. More than eighteen built-in utility functions, including simplified DOS commands and programming aids, as well as directory function, are provided.

The package has two unique features: facilitated partitioning of the C-64's memory into two separate blocks (enabling you to access two BASIC programs at the same time) and automatic creation of disk loader programs that permit automatic loading and running (auto-booting) of both BASIC and machine language (ML) programs. The various features of *The Operating System* may best be described by breaking them down into (1) the resident features, and (2) the utility modes.

The resident features are always available when the cartridge is installed. These features include a preset default cursor, border, and screen color combination (black on light gray) which provides an improved display on most color or black and white monitors and TVs. Although the color default is preset by the cartridge, you may change the default settings for each computer session.

In addition, the computer is forced to look primarily for loads and saves from/to a disk drive rather than a cassette unit. This greatly simplifies the disk loading sequence, though cassette programs may still be accessed with the cartridge installed. Loading is further simplified by using the Shift and Run/Stop keys for disk program loading, similar to the way in which cassette loads are accomplished by the C-64.

A final, highly useful resident feature is the special way in which ML programs are booted up. If the program you are loading is written in ML, a message is displayed giving the load address of the file and the starting SYS call required. After loading is completed, you can "cursor up" to the indicated SYS call to execute the program. This, of course, means that you no longer must remember the load addresses of your ML programs.

While the resident features are very convenient, the real power of *The Operating System* lies in its four utility modes: Disk Operations, Programming Operations, Extended I/O (Input/Output) Operations, and the Directory Function. Each one of these four utility modes is accessed by tapping the Restore key, then depressing the appropriate function key; this sequence of keystrokes causes a pop-up menu to appear which displays the available functions for that mode.

The Disk Operations menu presents a collection of utilities necessary to work conveniently with the disk drive; these may be roughly considered the equivalents of the familiar Commodore Wedge (DOS 5.1, on the Test/Demo Disk that comes with each Commodore 1541 disk drive). Available functions include renaming and deleting files; disk initialization, validation, and error checking; and formatting—all accomplished by keystroke command via the menu.

The Programming Operations mode provides six handy utility routines. These encompass setting screen color display defaults (if you want to change the start up colors), deleting line numbers, renumbering program lines, and appending programs. Another function, renew/unnew, allows you to recover any BASIC program that you may have inadvertently "lost" (usually caused by your inputting "New" to erase the program from the computer's memory).

Of special interest to hackers is a unique memory partitioning feature that lets you divide up the computer's memory space so that two BASIC programs may coexist in memory at the same time. This allows you to load and run a second, small (up to 4K) program which is partitioned off from the main 32.2K memory area (normally provided by the cartridge). You may then work on either program without contaminating or losing any information from the other program held in memory.

The Extended I/O Operations screen features include changing the disk drive default number (which is usually set to #8); creation of an auto-boot program on disk to permit the automatic loading and running of programs; and copying of either program or sequential files from disk to disk. Through the menu, you can also initialize the computer, that is, you can deactivate most

of the cartridge's features and return the computer close to its normal state, as if the cartridge were not installed (the resident features, mentioned previously, remain active).

The final menu screen facilitates easy access of *The Operating System's* Directory Function, without actually loading the directory into memory. Thus, you can call up a directory at any time without destroying whatever program you have in memory.

The Operating System is a powerful utility package that endows the host computer with a number of sophisticated and convenient new features. A possible drawback, however, is that the package does interfere with the operation of some complex machine language programs, causing the computer to crash. This may sometimes occur even if the computer has been initialized (returned to the start-up configuration) but the cartridge has been left in its installed position. Of course the module must be removed if other cartridge programs are to be used. Serious programmers will also seek a wider range of programmer's aid routines: commands such as AUTO, FIND, HELP, and TRACE, etc., are not implemented. From a personal standpoint, I would also have liked to have seen included in the package a ML screen dump-to-printer routine.

The manufacturer will supply a copy of the documentation free upon request—a refreshing approach that indicates considerable pride in the competence of both the utility and its accompanying product literature.

The package is priced at $54.95 for the standard model. A custom model is also available for $64.95. The latter version of the utility is identical to the standard one, but permits you to display your own internal title messages on the initial and subsequent menu screens (a nice little perk for business users seeking that "professional touch").

The Operating System does have some limitations, but one cannot possibly expect it to contain all of the "bells and whistles" that each and every Commodore owner would like it to have. Nevertheless, it does represent a well-planned package for overcoming some of the most significant limitations, quirks, and frustrations associated with the C-64's operating system—precisely those nagging *bete noirs* with which the legions of long-time Commodore users are all too familiar!

PHONECALL

Arrays, Inc./Continental Software
$69.95

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A	*Value for Money*

PhoneCall is an easy-to-use, complete telecommunications package that includes many features found only on other software selling for several times its price. The program consists of two chief sections that share many common utilities. The main terminal program includes facilities for uploading and downloading text files, BASIC programs, and machine language programs. The mini-bulletin board allows for attended or unattended use of the Commodore 64 as the basis for a bulletin board.

Both modules make use of the same subroutines for setting parameters, setting screen colors, and specifying modem type. *PhoneCall* works with the VIC modem, the Commodore 1650 Autodial modem, the Westridge Auto Dial-Auto Answer Direct-Connect modem, and the HES Modem I and II.

PhoneCall allows a wider range of protocol and parameter specifications than any other communications software for the Commodore. This makes it possible to communicate not just with other Commodores, but with other personal computers and with mainframes. *PhoneCall* can communicate at baud rates ranging from 50 to 2400 baud. (A baud is a measure of data transfer speed and is basically equivalent to bits per second. Three hundred baud, the standard rate for most modems that work with the Commodore, is roughly equivalent to 35 characters per second.) It supports even, odd, mark, and space parity. (Parity is a simple bit-counting method for checking the accuracy of transmission.) One of *PhoneCall's* most unusual features is the ability to employ the xmodem protocol. Xmodem is an elaborate error-checking protocol first written by Ward Christensen and employed in a wide variety of commercial and public domain software, predominantly on the IBM PC.

You work with *PhoneCall* through a series of menus. Once the program is loaded, it prompts you to specify whether the modem you are using is autodial/auto-answer. At this point you can also change the colors on the various screens. Then, you choose either the mini-bulletin board or the main terminal program. You make all further choices through a series of menus. *PhoneCall* does not read or write directly to disk when you are on line. You must upload files into a 28K buffer in memory before you can send them. If you are receiving information, you must manually download the buffer to disk. The amount of information that you can save is limited to the size of the buffer, or 28K. To send, or receive and save, larger files you must divide the file

into smaller files of 28K or less and later recombine them. The authors chose to limit the size of the files in order to save time and wear and tear on the disk drives. The Commodore 1541 disk drives are relatively slow and inclined to fail when they are used continuously. Loading from a memory buffer also saves time and money when you are connected to a billing online database.

PhoneCall makes it easy to send executable code, whether BASIC or machine language. You simply tokenize the file and send it in seven-bit words. I used *PhoneCall* to transfer executable BASIC files between Commodores and also to send a BASIC file to an Apple in order to modify the code to run on an Apple IIe computer.

PhoneCall has a macro capability. This means that you can store telephone numbers, log on information and billing information so that with two keystrokes you can be online with other computers. You can also store sets of parameters for different needs.

The documentation is not the last word on telecommunications, but it is easy to follow and includes enough general information to guide even a total novice. In addition, *PhoneCall* has context sensitive Help screens, so that necessary information is never more than a few keystrokes away. At $69.95 *PhoneCall* is a bargain for anyone with telecommunications needs on the Commodore. I have used it to transfer files between Commodores, between an IBM PC and a Commodore, and between a Commodore and an Apple IIe. In addition, I have connected to a mainframe computer and to the Dow Jones News and Information retrieval system. I haven't seen any software at any price that is easier or more reliable, or that has more features.

SMART 64 TERMINAL +3

Microtechnic Solutions
$49.95

Overall Rating	C+	A	*Reliability*
Ease of Use	D+	N/A	*Error Handling*
Documentation	C-	B	*Value for Money*

For a long while, *Smart 64 Terminal* was the only full-featured terminal program available for the Commodore 64. As the software market began to explode, many new terminal programs appeared on the scene. Due to this proliferation of terminal software, I have to honestly say that I cannot now give the *Smart 64 Terminal* as high marks as I would have in the past.

But before my criticisms, let's look at the program's strong points. The *Smart 64 Terminal* was designed to work with a Commodore 64, a 1541 or 2031 disk drive, and a Commodore-compatible printer. The latest version, *Smart 64 Terminal +3*, accepts a comma as a delay when using a Commodore 1650 Automodem in the RS-232 port. Other additions to this updated version include: a real-time clock (with alarm); x-on/x-off procedures when dialing into systems that recognize the x-on/x-off protocol, and not having the disk drive hold a file open during your total on-line session (thus allowing you to change data disks. Also, the on-line screen print routine has been incorporated into a machine language routine to provide faster screen dumps. *Smart 64 Terminal +3* now works with third party disk drives, such as MSD.

This utility supports most of the standard features that you'd expect in a terminal program. It provides an on-line buffer to capture programs and data files. You can format the ends of your lines to keep words from breaking at the end of the screen. Data may be dumped to the screen for review, or to the printer for hard copy. And, of course, you can save the data to a floppy disk.

Before you run *Smart 64 Terminal +3*, you must prepare a working user's disk. This will contain system control files and your data files for up- and downloading. You initialize the disk with the program, Smart-64.Build, on the original disk.

The opening menu consists of three main categories: On-Line, Text Function, and Control. On-Line opens the communications channel so you can call up another computer system. The Text functions allow you to print and merge files, and do a host of other file management tasks. The Control category gives you access to the disk directory, function keys, screen color controls, modem parameters, and printer features.

When you select the On-Line feature, *Smart 64* asks you several questions. It needs to know your file name for the download, how much space to allocate for downloading, clear buffer option, user ID for the system you are calling, format end of line, send line feeds, send return, if you want the alarm, and whether it is A.M. or P.M.

At this point I began to wonder why, if *Smart 64* is so smart, it needs all this information before I can dial another system? I'm interested in a genuinely "smart" terminal program, one that will get me on-line with the minimum amount of menus, questions, and prompts. I don't want to have to endure the Spanish Inquisition to get on-line!

I think a good terminal program should go on-line with a standard configuration; then, if a situation arises requiring special parameters, allow the user to make the appropriate changes. One of the most annoying features of *Smart 64 Terminal +3* is that, to change anything while on-line, you first have to call up the menu. A simple combination of a special control key and a command key should be available to make

parameter changes.

One redeeming aspect of this program is the design of its download program handling features. *Smart 64* permits ASCII text to be converted to Commodore BASIC, and vice versa. It also handles the "image" file conventions for *Compuserve*. (An image file is one whose contents represent the binary code of a program file. This allows a more error-free download of programs.)

I don't find *Smart 64 Terminal +3* as easy to use as other terminal programs in the same price range. This is not to say that the program is worthless. Due to the numerous features that are packed into it, this terminal utility still ranks as one of the best in its field. In my estimation, though, it doesn't offer significant ease of handling. And if a program is not simple to use, I probably will never come to appreciate its features—no matter how exceptional they may be.

VIDTEX

Compuserve
$39.95

Overall Rating	A	A+	*Reliability*
Ease of Use	B-	N/A	*Error Handling*
Documentation	A-	A	*Value for Money*

The job of most terminal programs is to enable your computer to communicate with another computer even if the two machines are running on different operating systems. The *Vidtex* system for enhanced terminal communications will quickly turn your C-64 into an intelligent extension of the *Compuserve* mainframe. After putting *Vidtex* through a week of intensive testing, I'd say that *Compuserve* without *Vidtex* is analagous to a clown without make-up.

Vidtex comes packaged in a sturdy slipcase. The instructions are in a three-ring binder so the pages lay flat—a feature that is a blessing when you're flipping pages to locate some piece of information. The program can support a printer and an additional disk drive.

Vidtex enables your computer to be fully compatible with the *Compuserve Information Service*. A RAM buffer lets you capture information received from the host computer and then save it to disk or dump it to your printer. The *Vidtex* buffer can hold up to 32,000 characters of information. You can also define the function keys with any frequently typed commands; these definitions may be saved to disk and you can load new sets of definitions as you please.

An interesting feature of *Vidtex* is that it is machine specific. In other words, *Vidtex* understands the special Pet ASCII that is common to all Commodore computers. Consequently, the *Compuserve* host computer can send your computer special commands employing color graphics and cursor positioning for creating special video effects. And you have your choice of sixteen colors of regular screen displays.

In the past, I accessed *Compuserve* with a good 40-column terminal program for my VIC 20. Therefore, I was quite interested in seeing if *Vidtex* would allow me to make better use of my time on *Compuserve*. I loaded the program into my Commodore 64 and was ready to enter the inner recesses of the *Compuserve* network. I was using the Commodore 1650 *Automodem*, so I pressed the Commodore key along with the "at" key (@); this allowed me to input my local *Compuserve* phone number. When I reached the *Compuserve* carrier signal, the message "Carrier Present" appeared on my screen.

Hitting the Run/Stop key sent a Control-C command to *Compuserve*, indicating that I wanted access to the the *Compuserve Information Service*. After entering my ID number and password, I went to the default function. When using *Vidtex* for the first time to access *Compuserve*, you must let the host computer know that you're running the *Vidtex* program. While in default, you can also set your line length, terminal type, delays, and other parameters.

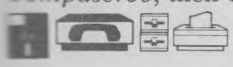
After informing *Compuserve* that you're running *Vidtex*, an amazing change comes over your computer. My C-64 was now under the control of the *Compuserve* mainframe. The C-64 was no longer just a dumb little terminal trying to make sense of data coming in from some super-brained mainframe. Instead, it was now grafted onto the *Compuserve* system. *Compuserve* could now send my computer commands to start my printer, open a file, and even clear my screen. This, in a nutshell, is the beauty of *Vidtex*.

A time and money saving feature of *Vidtex* is the Autolog file. An Autolog file is created to speed up your log on and navigation in the *Compuserve* system. I created a file that contained all the information necessary to dial *Compuserve*, log on to the system, and then take me directly to the Commodore section of *Compuserve*. You may create any number of different Autolog files which then can be used to access different services available on *Compuserve*.

I think almost every aspect of *Vidtex* is superb, but the icing on the cake definitely consists of the error free up- and downloading features of the utility. *Vidtex* supports "B" protocol. "B" protocol transfer ensures the accuracy of the transmitted file by detecting and correcting any errors that may occur. In this way, your downloaded program files are protected from any possible damage caused by telephone line noise and other types of data interference. Program files downloaded with *Vidtex* "B" protocol are machine ready right after the download. You needn't edit the file nor tokenize the

data to make it Commodore-compatible. I downloaded a number of public domain programs from *Compuserve* and found that they ran perfectly the first time I booted them up.

A backup copy of *Vidtex* is easy to make and *Compuserve* recommends that you do just that. The instruction manual goes into detail about each *Vidtex* command, and appropriate examples are given. The last chapter in the manual highlights the technical aspects of the program and provides a glossary of terms. I've been using various terminal programs for over a year now, and I can honestly say that if you want to access *Compuserve*, then do it with *Vidtex*.



64 DOCTOR

Computer Software Associates
$29.95

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

If you're worried that your computer equipment is not up to par, this reasonably priced software package will help you out. *64 Doctor* presents a title screen with options for testing your hardware and peripherals. You can easily check every piece of hardware that you own in turn. The individual tests comprise a comprehensive diagnostic series. The keyboard test is a visual representation of the keyboard which appears on the screen. When you hit a key, it changes on the display. After you have tested all the keys, you are permitted to exit to the main menu.

The video display test is a color test pattern. Your monitor is tested for its capacity to accurately display all of the colors without bleeding. The audio test plays a musical scale through each of the three voices of the Commodore, gauging the sound reproduction levels of your TV or display. You can run the joystick test using either port. When you move the joystick, a matching movement appears on screen. If one port tests badly, try the other one. If the results of both port tests are substandard, your joystick is probably at fault.

The disk drive test checks the Commodore 1541 drive. The manual, though, does not say whether you can test other drives using this program. *64 Doctor* also tests the DOS internal functions, as well as the Save command.

The printer test in this package does not test the Commodore graphics characters, but does test printers using the RS-232 port. The datasette test measures the ability of the cassette player to Save and Load a program into the computer. In the memory test, *64 Doctor* presents two modes, both of which test all of the memory. One is a one-pass test (testing all of the memory one time), while the other is a continuous test that can be left on for an overnight check to detect an intermittent problem in RAM.

64 Doctor makes good use of onscreen graphics and is a snap to use. The user's manual is very good; much to its credit, it adheres to a simple-to-follow format. You can actually begin using the program without even glancing at the instructions. *64 Doctor* is not copy-protected, and has a ninety-day warranty. Computer Software Associates supplies a phone number for customer support, but it is not an 800 number. A cassette version of the program is available. I can recommend *64 Doctor* to anyone who wants to purchase a reliable diagnostic package for his hardware and peripherals.

Languages

COMAL STARTERS KIT

COMAL User's Group, U.S.A., Ltd.
$29.95

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

The *COMAL Starters Kit* is an introduction to the COMAL programming language for the Commodore 64. The package consists of over eighty programs on three disks, and a sixty-four-page book explaining all of the available keywords, packaged in a nice plastic slipcase. Each disk includes disk-loaded COMAL, Version 0.14, plus Help files, demo programs, tutorials, and utilities.

COMAL (COMmon Alogrithmic Language) was created in Denmark in 1973, but is new to North America. It is very popular in Europe and is taught as a first computer language in the schools in several European countries. In a nutshell, COMAL combines the BASIC programming environment—keywords such as Print, Input, and Read—with the structural capabilities of Pascal: a complete If . . . Then structure, plus Case, Repeat, and While; and functions and procedures (subroutines) which are called by name instead of line number. In addition, a variety of sprite and graphics commands (including turtle graphics) are available, and programmers' utilities, such as renumbering, deleting a range of lines, program merging, and automatic line numbering are built-in. It is also much faster than BASIC.

I have been using COMAL for about a year, and I don't think much of BASIC any more. In fact, if I need a BASIC program, I usually write it in COMAL, then convert it. I've faced only one big disadvantage: because it is loaded via disk, I wind up with less than 10K of programming space. (The COMAL Users Group recently released a cartridge with many more features that leaves 30K free.)

Although I was already familiar with the language before I acquired this piece of software, I consider the *COMAL Starters Kit* a good package. It includes an impressive amount of material. The tutorial disk, for example, provides enough information to get most people (even beginners) started using COMAL. If you are a total novice, you may want to send away for one or all of several tutorial books put out by the COMAL Users Group.

As I mentioned before, I've found the COMAL language much easier to use than BASIC, and the *Starter Kit* follows up on that. Loading instructions are right on the disk. The sampler disk includes several Help files, a couple of simple games, some nice turtle graphics demos, a sprite editor, and a number of utilities and program extensions. It also includes a disk backup program.

The tutorial disk includes twenty lessons regarding the COMAL language, and covers most of its essential features. You may call up the lesson of your choice from a menu, or use the auto function to cycle through them in order. I thought the lessons on file handling and Boolean functions were excellent. Many sample programs and exercises are included. The disk also supplies tutorials on the graphics and turtle commands, with explanations of each command and a demonstration of what it does. All of the tutorials are clearly written and make good use of color and graphics to present the information in an appealing fashion.

The third disk, called the Auto Run Demo, includes twenty-six demo programs called from a menu. The package contains eighteen graphics demos, two games, one sprite demo, and two music demos. You also receive demonstration versions of two applications programs. A half dozen of the graphics programs are outstanding. In Auto mode, the Menu program cycles through each of the twenty-six demos in turn, without operator intervention.

The sixty-four-page booklet which serves as documentation was written by Borge Christensen, co-creator of COMAL. It begins with a preface and some general definitions, followed by sections outlining the graphics and sprite commands. The bulk of the book consists of descriptions of the COMAL keywords, in alphabetical order. Depending on the complexity of the command, the descriptions range from one sentence to three pages. Although a serious programmer might eventually find this documentation inadequate (the definitive documentation is *COMAL Handbook*

by Len Lindsay, available from the COMAL Users Group for about $20), it will certainly get you started—and then some. A written command summary consisting of four pages is also supplied, and the Help files on the sampler disk include brief descriptions of each keyword. Also, some rather technical information on how the three-pass interpreter works is included in a disk file.

The disks are not copy-protected. In fact, the boot-up messages encourage you to stop what you are doing immediately, and make a backup copy of your disk. The public domain 1541 Backup program comes on the sampler disk for this express purpose, along with a single file copying program. A very detailed sheet of instructions on using 1541 Backup is also supplied in the package.

In terms of reliability, I had no problems of any kind with the materials in the *Starters Kit*. As far as the COMAL language goes, I've experienced only two problems, both of which were the fault of the DOS, and not COMAL. One was the infamous @0: bug, which also comes up in BASIC from time to time. Since the keyword Delete is available to erase disk files, the bug can be easily avoided. The second problem was in writing Relatives files (known as Random files in COMAL). The problem was that COMAL is too fast and the disk drive couldn't empty its buffer fast enough. I have seen several routines that solve this problem, though none of these are included in the package.

COMAL's error handling truly shines. Every time you enter a program line, the interpreter immediately checks the syntax. You are not allowed to enter a line which the interpreter cannot understand. A verbal error message (read from the disk) is printed below the line, and the cursor flashes at the trouble spot. After you correct the mistake, the message disappears and whatever was on screen before is restored. If you don't have the error file on the disk in your drive, you issue a SETMSG—and get an error number instead. A program to write the error file to any disk is provided. The interpreter takes a second pass when you issue a Run command, checking for any structural errors. These are reported before the program execution begins (the pass takes about half a second). Commands are also available to disable the Stop key, and read the disk error channel.

I may be biased, but I think that COMAL is an outstanding language. Despite all the features I've outlined, I haven't even begun to detail the range of its capabilities. The *Starter Kit* is a good introduction to the language; when you consider the price tag, it looks even better. An incredible amount of material and information is supplied. I think some people dismiss COMAL merely because it is reasonably-priced. Maybe some of these skeptics would be more receptive to its value if this package were to cost two or three times more.

MASTER 64

Abacus Software
$84.95

Overall Rating	B	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	F	B	*Value for Money*

Master 64 is a wondrous mixed bag of enhancements for your Commodore 64. It enables you to write custom application programs that run much faster than if they were in BASIC. The foundation of the system is its new language, which adds about 100 commands to your programming vocabulary. They allow you to control the screen, disk drive, and printer with simple commands. In addition, *Master 64* makes twenty-two digit multiprecision arithmetic possible on your C-64. Programmers' aids are included, along with a machine language monitor.

I was first attracted to the package because it offers the possiblity of writing custom business applications on *Master 64*, then selling run-time versions of my programs without having to pay royalties to Abacus Software.

Without a doubt, this is a truly professional application development package. The capabilities are impressive. You can use BASIC 4.0 commands: Auto Number, Renumber, Delete Line, Print Using, Trace, Dump, and more. This program has everything you could possibly need to develop custom applications, except one item: it lacks acceptable documentation.

To me, learning to use *Master 64* was like playing *Zork*: each step forward was made after several steps sideways. While this is entertaining in a game, it is *very* frustrating when you are trying to develop a custom business application, as I was. The documentation reads as if it were poorly translated from Swahili. The package's most serious flaw is the contents of the manual.

The bulk of the manual simply consists of brief explanations of commands, showing syntax and appropriate examples. There isn't even the barest attempt at a tutorial. You have to figure out on your own how to link the commands into a program. The documentation's organization is downright atrocious. At one point, I was so exasperated with the manual that I tried to list the program itself in order to glean a hint from the REM statements. No such luck: most of them were not written in anything vaguely resembling English (as most of us know and love it).

Two demo programs on the disk were somewhat helpful, but their listings aren't in the manual either. I suspect most purchasers who actually learn to use the program will have to list the demo programs and try to learn from them.

Master 64 will be a blessing to some and a curse to others. Advanced programmers will likely understand what the sketchy and often misleading documentation is really trying to convey. Relatively new programmers will invariably get lost in the manual's mumbo jumbo. If a clearer, more complete documentation was available, I would not hesitate to recommend *Master 64*. Unfortunately, I know of no other package that similarly assists in software development. After all is said and done, bad documentation or not, this is about the only game in town. When Abacus Software bills *Master 64* as a "professional application program development package," maybe what they are actually saying is that you'd better leave it to the professionals.

PILOT FOR THE COMMODORE 64

Commodore Business Machines

$59.00

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B	*Value for Money*

Pilot is a CAI (computer aided instruction) language designed specifically to help teachers create educational software as effortlessly as possible. Specifically, *Pilot* offers the facility for constructing tests that do not have to rely on menu-oriented (multiple choice) answers. Also included are commands that facilitate custom characters and sprites similar to, and in my opinion superior to, those found in Simon's BASIC. The package claims to fully utilize the 64's sound capability, but this turns out to be a hollow boast. In my experience with the program, the only command that uses sound is a limited form of Poke.

With *Pilot*, all commands (called op codes) are single-letter, although a second letter called a modifier may be added to some. The op code is followed by a "field," that is, the thing to be operated upon. This field may contain further single-letter commands specific to that particular op code. Although this may sound confusing, the excellent documentation will have even the novice computer user quickly writing his own programs.

The towering strength of *Pilot* is the Match (M) command which takes your input (usually the answer to a question) and matches it to a list, setting a flag if there is a match. You may match for specific words, groups of words, parts of words, or alternative words. For example, if the question posed to you was"How do fish propel themselves?" and your match command was "M: swim," then any answer with swim as a part of it would be assigned a value of true. "They swim," "swimming," "they are swimmers," and so on would all match. The M command examines the answer to see if its field matches exactly with any consecutive string of characters in the input. If you were worried about spelling, you could use the conditioner "S" with the Match command (MS: + the answer field). This would signal "correct" if the student had one letter wrong, or two letters reversed in his answer. If the required answer is a long word or two or more words, using the ampersand (&)—the "and" qualifier—between parts of the Match field will trigger the program to look for each part of the answer and signal "correct" if all parts are found. You could include synonyms in the match with an exclamation point (!)—the "or" qualifier—so that "swim", "float", "flippers", "fins", etc., would trigger a "true" response if students were to use any of them.

The easy-to-use graphics, sprite, and character commands are coupled with a split-screen capability, so that graphics can be displayed on one part of the screen while text is scrolled on another. These windows come in assorted sizes to fit almost any need. The powerful commands for sprites and hi-res graphics make writing programs that hold the user's interest a breeze.

Pilot is structured in three modes: Edit, which is used to write programs; Immediate, which executes commands as they are entered; and Run which runs programs. It's possible to load only the Run mode which keeps inquisitive and mischievous minds from examining (or changing) the program.

There are two flaws in this implementation of *Pilot*. It only operates in integer numbers, which limits its use as a mathematical aid, and there is no way to read a disk catalog! To know what's on a disk or verify spelling for a Load command, you must exit *Pilot* to BASIC, read the directory, and then re-load *Pilot*. File handling commands are included to maintain a list of users' names, test scores, etc., on the disk with the program. Including a catalog option would have been a simple extension of this facility.

Pilot is an interpreted langauge, like BASIC, and therefore is slower than compiled languages (LOGO, Pascal, etc.); however it is certainly fast enough for the uses its creators had in mind when they designed it. *Pilot* permits a total of only twenty-six variables at any time, either string or numeric, and string variables must be dimensioned before use. Thereafter, however, the interpreter freely shifts your data between numeric and string forms depending on its use in the program. This facility is very useful when a question calls for a numeric response. For instance, suppose the screen

was displaying a 100 milliliter container, and the question "How much liquid must we add to make the container half full?" Suppose, too, that you would take the input and use it to graphically draw the liquid in the container. In most languages, if the student answered "You need 50 milliliters," the response would be treated as having a numeric value of zero since the first character is not a number. *Pilot*, when asked to assign a numeric value from this answer, searches it and finds the number 50, which it can then use for calculation.

You may label subroutines for ease in calling. Additionally, one subroutine can be included in any program (always labeled "SYSX"). You may call it up simply by typing "@" in place of an input, thus allowing the use of a Help menu (or a game reset, etc.). Labels may also be used throughout the program as targets for Jump instructions. Another powerful op code is "X," the eXecute command. As its field, X takes a string built up from an op code and a field (normally inputted by the user), which is then executed as part of the program. In effect, you can modify the program while it's running.

Commodore offers the consumer a good implementation of *Pilot* which, I'm pleased to report, is well-documented. However, aside from its intended use in classrooms or other educational interactive programming, it is limited. Games of the "choose your own adventure" type would program quite well, but I strongly feel that most other programming would be better off in a different language.

SUPER FORTH 64

Parsec Research
$96.00

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

If you are not a convert to FORTH (which many people regard as a way of life, rather than just using another language), read on. For the FORTH-lovers out there, by all means run to your nearest software boutique and *buy this package*!

Super FORTH 64 is a superset of MVP-FORTH, a full implementation of FORTH-79 (both the required and extension word sets) with extensions from FIG-FORTH, Brodie's "Starting FORTH," and special extensions to make full use of the Commodore 64's sound and graphics capabilities. If the previous sentence didn't make sense to you, consider this: *Super FORTH* is the most powerful language, with the greatest range of commands, currently available for the Commodore. If you like programming, it is definitely worth your time and energy to learn FORTH in order to use *Super FORTH*.

Super FORTH 64 is extremely flexible. It works with virtually any system configuration, tape or disk (using a single drive, dual drives, or a two drive set-up). You can also output a compiled application (or program) which will run on any Commodore 64, by simply loading and running from BASIC (and without paying for a license fee!). Many high-level "words" (as FORTH commands, operators, and so forth are called) are provided to make use of the unique capabilities of the C-64; in addition, all of the lower level words used to define the high-level ones are discussed, so you can modify or construct your own custom-built implementations for graphics, sound, and so forth.

It's probably a good idea to bring up the subject of the documentation for *Super FORTH 64* here. First of all, the index could be more extensive. That is its chief drawback. Otherwise, the 250-page, 8½ by 11 inch loose-leaf book is as complete as any documentation I have encountered. While it does not purport to teach the language, it does present a complete discussion of all FORTH words with examples of appropriate uses, demo programs on disk, and tutorial sections.

The one place where *Super FORTH 64* differs from other FORTH implementations is in the editor. Most FORTH editors are line editors, while *Super FORTH* takes full advantage of the C64's built-in, full-screen editor. This makes it easy, I believe, for the beginner, as well as the accomplished Forth programmer to be up and running in a short time. A tutorial is provided that demonstrates and fully documents all aspects of the editor.

If you are unfamiliar with FORTH, detailing the FORTH-79 standard here will only confuse you. If you are familiar with FORTH, you already know the standard. Let me concentrate on the extensions to the standard language which were added for the Commodore 64 version.

There are commands for manipulating bits of 16-bit words, 8-bit bytes, and 4-bit nibbles. A full set of words controls I/O operations, which facilitates the use of joysticks, paddles, printers, modems, RS-232 devices, etc. Words are provided to interface with the Commodore KERNAL, and the 1541 DOS (Disk Operating System). Included is an assembler and words to connect machine language routines to your application. The 16K RAM hidden under the KERNAL and BASIC ROMs can be switched in and out so that this space can be used for data storage. Words are available to modify the interrupt routine so that background processing can be performed (in effect, running two programs at the same time). Extensions are also provided for floating-point math with trigonometric functions, one and two dimensional arrays, and extensive string handling.

There are forty-nine graphics related words. These combine the best I've seen from PILOT, LOGO, Simon's BASIC, etc. Words to define the bit map area, text screen, and character definitions are provided. Also, you can use a split-screen capability. Words are included for plotting points, or drawing lines, arcs, ellipses, and circles. A "mirror mode" automatically divides the bit map into four quadrants and duplicates your graphics in each quadrant for a kaleidoscope effect. A built-in editor defines sprites, or information can be read from files built by other sprite editing programs. Sprites can be turned on or off, expanded or contracted, made hi-res or multi-color, have background priority set, and have collisions detected, all without reference to a memory location.

The sound and music capabilities of the Commodore 64 are far above those of any other personal computer. Unfortunately, using these capabilities effectively is beyond the powers of the average programmer. The authors of *Super FORTH* have included words so that any programmer, no matter what his level of expertise, can use sound in his programs. Also, a music editor enables anyone with a bit of musical knowledge to write music (using one, two, or three voices), and play it without memorizing long tables of strange numbers (Super Forth utilizes an approximation of normal musical notation).

You get all of this and system support, too! The vendor, Parsec Research, provides you with their address and phone number, and invites consumer queries regarding any discrepancies or problems you have encountered. They encourage you to recommend changes or improvements to the system, and promise to provide all registered owners with "bug fixes, enhancements to the system, and answers to commonly asked questions."

Super FORTH 64 is an excellent software package. If you are a FORTH programmer, or want to become one, you should add this package to your software library. It may not convert you to the FORTH philosophy of programming, but it will help the FORTH novice become more proficient, and assist the proficient user to become a sagacious master of this challenging and powerful programming language.

Extensions to BASIC

ADD-ON-BAS-IC

Blue Sky Software
$39.95

Overall Rating	B-	B-	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	C-	B	*Value for Money*

ADD-ON-BAS-IC from Blue Sky Software appears to be nearly identical to the *BASIC Aid* utility package, also from Blue Sky. The only differences I can find are: a new label which doesn't mention Richvale Telecommunications, the copyright holder; *ADD-ON-BAS-IC's* older and inferior version of the documentation; and one major bug that is not present in *BASIC Aid.*

The cover of the instruction booklet is the same as that of BASIC Aid, and most of the descriptions are identical. *ADD-ON's* booklet, though, is called a "provisional manual." Furthermore, it includes an eight-page errata section (labeled "BASIC Aid errata," to further confuse you).

The bug I mentioned above concerned the Flist command, which lists a program from disk to the screen without disturbing memory. *BASIC Aid's* Flist worked just fine whenever I tried it, but *ADD-ON* managed to insert an extra line of code in my program which consisted of parts of other lines. What a pain!

Calls to Blue Sky and Richvale did not help to clear up the discrepencies, since the two companies are apparently in the midst of a bitter feud. Before you buy *ADD-ON-BAS-IC*, by all means read the review in this book for *BASIC Aid.* If *BASIC Aid* sounds appealing, buy it. If *ADD-ON-BAS-IC* is all you can find in your local software emporium, make sure you check out the user's manual, and test the Flist command (if you can). If the manual is better than the provisional version, and Flist works correctly, then—and *only* then—would I recommend you buy *ADD-ON-BAS-IC*. Under those conditions, you can be reasonably sure you're getting a package that's comparable to *BASIC Aid.*

BASIC AID

Blue Sky Software
$39.95

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A	*Value for Money*

BASIC Aid from Blue Sky adds thirty-three additional commands to Commodore BASIC 2.0, which comes with the Commdore 64. At first glance, thirty-three commands for $39.95 seems to compare favorably to *Simon's BASIC* (114 commands for $59.95), but this is deceiving. *BASIC Aid* has no commands for graphics, sprites, music, or "structured programming," which form the bulk of *Simon's BASIC's* command set. What *BASIC Aid* does have are excellent new commands that help you to enter, debug, and list programs, as well as commands to ease your interaction with the disk operating system (DOS).

Where *BASIC Aid* and *Simon's BASIC* offer similar capabilities, *BASIC Aid's* commands invariably have more power and are easier to use. For example, consider the command for renumbering lines in a BASIC program: the command in *Simon's BASIC* is Renumber; in *BASIC Aid*, it's Num. With *BASIC Aid*, you can specify the range of lines to renumber as well as the new increment, and all Gotos and Gosubs are automatically changed to conform to the new numbering. With *Simon's BASIC*, you specify only the increment; the whole program is then renumbered and you must go back and manually change Goto and Gosub targets. If you want powerful help with programming and debugging, *BASIC Aid* is the far better choice.

What can you do with *BASIC Aid*? It puts four general groups of commands at your disposal: programming aids, debugging aids, disk operation aids, and printer aids. Let's look at each group in turn.

To help you write programs and use the screen editor, *BASIC Aid* offers automatic line numbering using any increment you set. This can be disabled by hitting Return when a line number appears. It is reactivated by entering a line with a valid number. Screen tabs can be set (or removed) and activated with function keys to assure, for example, that print statements are correctly

aligned. One command changes the border, screen, and text colors. The Hex command takes a number in hex, decimal, or binary and displays it all three ways. Hex also does addition and subtraction of mixed-base numbers. You can leave spaces between the line number and command so that sections look indented for easier reading. I previously mentioned the utility's ability to renumber a program, but there is also an option for moving a section of a program. If you're expanding a program and want to add twenty lines of code between program lines 90 and 100, you can move line 100 (and all or part of whatever follows) anywhere else in the program. Should you "New" a program (erase the program in memory) by accident, the Old command restores it in its entirety.

At any time, you can determine how much memory your program fills, as well as the starting and ending locations. (You can also check the size of any program on disk, without disturbing memory.) It is possible to scroll your program both forward and backward with the cursor keys. F7 becomes a second Home key, moving the cursor to the bottom left of the screen. And should you be hopelessly trapped in the Quote mode, with the color and cursor keys printing useless graphics, F8 cancels it and allows you to regain control. Dump is at your beck and call to help with debugging, displaying all variables and their values. Find searches for a given string, and Change searches for and replaces one string with another. If you have ever had to remove twenty or thirty lines from a program, you'll appreciate the Del command that deletes a range of program lines.

Finding the source of an error is assisted by Help (aptly named), which displays the line causing the last break. The Merge command reads a program from disk as if you were typing it in, and merges it with the program in memory. Should you want only part of a program from disk (a well-written subroutine, perhaps), you can specify a line range. Turning on the Trace function and running the program displays each line at the top of the screen as it is executed. You can vary the speed of execution by changing the argument to Trace. (The Trace function in *Simon's BASIC* displays only the line number, racing it past you at a speed that defies anyone's ability to read it.) To erase part of a line, place the cursor at the place where you want the correction and strike F3 to clear everything from the cursor to the end of the line. Hitting F4 clears everything from the beginning of the line to the cursor.

Five commands specifically facilitate interaction with the disk drive. Catalog displays a disk directory onscreen, while Get loads a BASIC program from disk. Drun loads and runs a BASIC program. Disk replaces the cumbersome "OPEN 15,8,15:PRINT#15". (To scratch a file, for example, you simply type in DISK "So:NAME.OF.PROGRAM" <Return>). This method can be used for all BASIC commands sent to the disk drive. Without disturbing the program in memory, Read lists to the screen a sequential or user file from disk.

Finally, there are also helpers for your Commodore printer (or other device #4). Ascii (the command) toggles the printer output between standard ASCII and Commodore ASCII characters (replacing, in my case, a fifty-line subroutine). Crt prints a hard copy of whatever is on the screen, but far more flexible is Key, with which you designate one key on the keyboard. Pushing that key—while a program is running—dumps whatever happens to be on screen at that time to the printer. The Plist command lists your program to the printer, replacing the five BASIC 2.0 commands that previously were necessary to accomplish this.

The documentation is adequate. A thirty-page booklet discusses each of the new commands, elucidating them with appropriate examples. Additional examples would make getting started a bit easier, but after a short run-through, I had no trouble using all of *BASIC Aid's* ample power.

Almost all of *BASIC Aid's* commands are used in the immediate mode. They won't speed up your program, nor will they make sound or graphics any easier. They will, however, considerably shorten the time necessary to write and debug your programs. If you write your own programs—especially if you write moderately long ones—*BASIC Aid* is well worth the investment.

HESKIT 64

HesWare
$30.95
Save data to disk

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

HesKit 64 is a general purpose programmer's aid for the Commodore 64. It's a cartridge-based, integrated programming tool that adds to Commodore BASIC powerful editing and formatting commands, reverse scrolling, auto numbering and renumbering, variable dumps, and a Trace mode for debugging.

HesKit 64 comes on a cartridge that plugs into the expansion slot on the back of your 64. It uses 8K of memory, which decreases the available memory for BASIC programming. It is covered by the standard HesWare 180-day warranty, and you can avail yourself of a technical assistance hot-line if you need help. You can use the programming aids on any program, but if you use the enhanced BASIC commands, you must use *HesKit 64* to run those programs.

The additions to BASIC that *HesKit 64* offers fall into the following categories: editing aids, programming aids, additions to BASIC, print enhancements, keyboard redefinition, machine language aids, and, last but not least, miscellaneous commands. Let's examine these one at a time.

The editing aids are additions to the screen editor. You use Copy, Move, Print, and Delete Text commands when moving blocks of text on screen. Insert, Delete, and Clear Line commands are used on single program lines. Auto Load and Run commands are available for disk drive users. There are several Listing format options for sending listings of your programs to the printer. There are also screen save and dump routines, text and screen color change commands, and cursor tab commands.

The programmer's aids are the most valuable additions that *Heskit 64* offers. Automatic line numbering is great, but the renumber options are astounding. You can renumber all or part of your program, move a subroutine and renumber it, copy a subroutine and renumber it. All your Gotos and Gosubs are automatically renumbered. A Find command is at your disposal, as well as global Search and Replace. Crunch removes all REM statements and extra spaces from your program to conserve memory. There is a true merge, a variable dump, an "un-New" for restoring the last program in memory, an error checking Help command, and a Trace function, sorely needed by all of us amateur programmers.

The additions to BASIC require you to plug in *HesKit 64* whenever you run a program. Beep makes precisely this sound; Color is a single command for setting the text, border, and background colors; Joy checks the joystick port and returns its value; and Screen Save, Dump, and Load commands are also available.

The print enhancements are extensions of the BASIC Print command. They fall into two categories: variations of Print Using and Print At commands, and Cursor Move and Screen Clear commands. Using various combinations of these commands, you can clear parts of the screen, print to any location of the screen without difficult calculations on cursor location, clear incorrect input from the screen, and change the text color.

The machine language aids are minimal, but useful for beginners in assembly language programming. Commands are offered for converting hex, decimal, and binary numbers back and forth, reading a specific address, and saving a section of memory without loading a machine language monitor. A routine is also provided for loading a machine language program from BASIC without automatically rerunning the BASIC program. (You can also do this with Sys and Hex.)

The miscellaneous commands are divided into three sections. The first group involves defining strings. Any string may be defined to load and run a specific program, or to print an oft-repeated line of code while writing a program. The second is a variation of the DOS Wedge. The third creates a numeric keypad on the keyboard.

HesKit 64 is not a graphically-oriented program. The use of screen graphics is minimal, limited to a change in screen color when certain functions are used. This is not a major problem, but it would be nicer if there were more graphics.

HesKit 64 has a lot to offer. It is not as difficult to learn as BASIC, but it takes some time to get the hang of it. The manual does not really help you learn the full range of functions. Although it gives an explanation of what each command does, some of the samples are too cryptic, and too short. A complete tutorial would be a welcome addition. A quick reference card is included, and it helps you remember the format of the commands. However, it leaves out the full format structure of the commands, and includes only the keystrokes necessary to access them, not the respective syntaxes. The manual has a section on advanced functions, and user notes that give some tantalizing hints on other possible ways to use *HesKit 64*. It is far too short, though, leaving many questions unanswered. I would like to see a section on how *HesKit 64* stores screens, and how to access them from BASIC.

I can think of several other additions which would be worthwhile for programmers. Still, the many commands that the utility includes are of great value. and I would recommend this package to any Commodore programmer who has become frustrated by the lack of many necessary commands. Once you learn its commands, you'll find *HesKit 64* a welcome help-mate in BASIC programming.

One final note to programmers: *HesKit 64* occupies $8000-$9FFF, and you cannot use this section of memory in any program.

SUPER BASIC 64

Blue Sky Software
$39.95

Overall Rating	A-	A-	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	C	A-	*Value for Money*

Super BASIC 64 comes close to turning your Commodore 64 into a more powerful computer like a Commodore SuperPet or B128, as well as supplying additional graphics commands to your BASIC vocabulary.

Loading the first program from the disk brings up a menu with the following choices: [F1] BASIC 4.0; [F3] BASIC 4.1; [F5] BASIC 4.2. Calling up BASIC 4.0

makes all of the BASIC 4.0 commands, as well as a machine language monitor, available to you. BASIC 4.2 gives you the monitor, BASIC 4.0, and the additional commands (called "Extended BASIC"), which are available on the "B Series" of Commodore computers. (You cannot have Extended BASIC and the graphics commands in memory at the same time.)

Why do you need BASIC 4.0? The Commodore's resident BASIC is version 2.0, which was adopted intact from the VIC 20. Since the VIC 20 was conceived as a cassette-based system, no disk input/output commands are included, and all magnetic storage commands default to the cassette player. When Commodore introduced the low-priced 1540 and 1541 disk drives, however, the great majority (approximately eighty percent) of Commodore 64 owners bought them and discovered the "joys" of deciphering the 1541 manual, and using the disk drive for anything but saving and loading programs. *Super BASIC 64* has now come to the rescue.

The additional 4.0 commands fall into three categories: disk maintenance, file maintenance, and data handling. For disk maintenance, the new commands include: Header, which formats a disk; Directory (or Catalog), which calls up a directory from the disk currently in the drive; Collect, which replaces the DOS Validate command and de-allocates disk blocks that are a part of unclosed files, or were allocated and not used, thus giving you more available space on the disk; and Backup, which works only with a dual disk drive, and makes an exact duplicate of one disk onto another. For file maintenance, you can use: Copy, which copies all or part of a disk either to a different drive, or to the same disk; Concat, which combines two disk files into one; Rename, which changes the name of a disk file; and Scratch, which removes a file from the disk. The added data handling commands are: Append, to reopen a sequential file and add data to the end of it; Dopen and Dclose, for opening and closing disk files of any type; Dload, to load a program from disk; and Record, used with relative files to access a particular record in the file. Record is the most powerful of the new commands and eliminates a lot of typing.

You can use all of these commands (except Backup) with one drive, two drives, or a dual drive system. In a dual drive system, the two drives are called device #8, drive 0 and device #8, drive 1; whereas in a two drive system, they are called device #8, drive 0 and device #9, drive 0. The BASIC 4.0 commands can be added alone or in combination with Graphics BASIC 4.1 or Extended BASIC 4.2.

BASIC 4.1 adds eight new commands for improved graphics capabilities. While other packages are clearly superior in the number and power of graphics commands, this is a nice little bonus in a piece of software you should buy primarily for its disk manipulation commands. The added commands are: Graphic, which sets either text, hi-res, or multi-color modes; Scnclr, which clears the current screen; Color, which sets screen, text, border, and multi-color colors; Draw, which draws either a point or a line; Box, which draws a rectangle, and allows rotation around a set point; and Scale, which changes the X,Y screen range values from 0-391,0-199 (hi-res) or 0-159,0-199 (multi-color), to 0-1023,0-1023. This also adjusts output for truer squares without making the programmer include screen-scaling factors in all calculations.

Another command is also at your disposal: Locate. This command "positions the [invisible] 'pixel cursor' on the screen at the coordinates specified by the numbers you enter after the command"—or so says the documentation. What it doesn't tell you is the precise use of this command. It isn't necessary before the other graphics commands (which take their own inputs) and, in fact, seems to have no purpose. This valuable memory space could have been given to a more useful command (perhaps Circle, or Arc). Apropos of this curious item, the documentation for *Super BASIC 64* is this package's biggest drawback. Although each of the three parts of the package make a memory monitor available to you, nowhere in the documentation are you told how to invoke the monitor, or what commands may be used with it!

For those of you who already own *Super BASIC 64*, or are planning to acquire it, please note: you invoke the monitor via the command Monitor. It appears to respond to four commands: X, which exits the monitor back to BASIC; M (followed by one or two hex addresses), which displays in hex the contents of the specified memory locations; R, which displays the contents of the registers, status byte, program counter, and address of the IRQ subroutine; and G, which begins execution of a machine language program at the address specified, or the address in the program counter, if none is specified. The contents of memory or the registers can be changed by overtyping and hitting Return.

The third package that you may load is BASIC 4.2. This makes all the commands that Commodore included with its new "B Series" of computers available to you. In fact, one command (Bank) is ignored by the 64, but is necessary if you wish your software to run on a B Series computer. Among the features of BASIC 4.2 are: the ability to assign keywords to the function keys; the ability to save or load machine language programs or other sequential memory locations (Bload and Bsave); the ability to load and run a machine language program (Brun), or a BASIC program (Drun). Three new commands can be used within programs: Else, which extends If . . . Then to If . . . Then. . . Else; Instr, which returns the start location of one string within another; and Print Using (as well as Print# Using), to

format the output of numbers. These commands are a mixed bag, very useful to some people, but not to others.

The utility is copy-protected. No backup disk is provided, nor is information supplied regarding an update policy. All in all, you can overlook the shortcomings and idiosyncracies of *Super BASIC 64* because the BASIC 4.0 commands are so very useful to the average programmer. We might dream of something better, but *Super BASIC 64* will do quite nicely until that "something better" comes along.

ULTRABASIC

Abacus Software
$42.95

Overall Rating	B	B+	*Reliability*
Ease of Use	B	B-	*Error Handling*
Documentation	B	B	*Value for Money*

ULTRABASIC simplifies the Commodore 64's complicated sound and graphics capabilities by adding fifty new commands to BASIC. This machine language program acts as a wedge, becoming completely transparent to the BASIC programmer. It does, however, occupy space in memory, trimming your BASIC program storage space from 38,911 bytes to 25,215 bytes—a reduction of about a third. But these new commands which deal with sound, game controllers, high resolution, sprite, and turtle graphics, save you a zillion separate Pokes into memory and the headaches that accompany them.

The program's graphics commands are probably its most useful. You can draw and plot in two different modes: hi-res and multi-color. Graphics commands allow you to plot points, lines, rectangles, and circles. You can also fill in any rectangular area on the screen, determine the color of a specific point, and save or load graphics screens to either tape or disk. The screen's axis may prove to be somewhat confusing to seasoned programmers since it is exactly like one that would be on graph paper (0,0 axis at the bottom left), rather than the way computers normally work (0,0 axis at the top left). *ULTRABASIC's* convention does allow you to shift your 0,0 point to let you use the standard computer graph plotting convention.

Sprite graphics commands have been simplified both for data storage and placement on the screen. They allow you to store the data as a group of twenty-one lines of Bit statements. Each line represents the 0 or 1 (off/on) pattern of pixel data, but you can also use either Hex or Data statements. A Copy command transfers the sprite data stored in these line numbers to actual sprite memory. Then it is only a matter of turning the sprite on and positioning it with two other commands. The Sprite statement saves the most time since its parameters allow you to control priority, size, color, and its multi-color mode. This is done with one nine-variable command statement. Additional commands are available for rotating sprites and determining collisions.

Turtle graphics commands are also supported. A small turtle is displayed on the screen which you can position anywhere, point in any direction, and move forward with its "pen" up or down. It leaves a trail in a specified color when its pen is down.

All of the 64's sound control features are supported by *ULTRABASIC*. With just two statements, you can adjust waveform, attack, decay, sustain, release, filter, and volume controls. You can define tune patterns to produce songs. This means that you may define the opening pitch value in hexadecimal, tell it how long to hold the note, then tell it how much to raise or lower the pitch of the next note, and how long to hold that one. To my mind, the program accomplishes all this the hard way. It would have been better to give a new pitch value for the next note, rather than the offset from the last note. The sound is interrupt-driven so that you can hear it while the computer is doing something else.

ULTRABASIC also includes commands for reading the control ports, joystick paddle, and light pen. In addition, you can employ ten user-programmable timers, five of which count down in jiffies, and five in seconds. Finally, since graphics dumps support Commodore, Epson, and Okidata printers, three different initialization programs come with the disk.

ULTRABASIC 64 is quite useful and powerful, especially for beginning programmers who are confused by Commodore's zillion and one Poke statements. Much of what has been included here should have been incorporated into the machine itself. While this package makes programming easier, users should be aware that their programs can rightfully be used only by others who own this package, too. Since no mention is made concerning licensing this language for commercial purposes, this limits the use of *ULTRABASIC* to the casual home user.

Assemblers and Compilers

BASM BASIC COMPILER AND ASSEMBLER

Computer Alliance
$99.95

Overall Rating	A	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

When I first opened the instructions, I received two surprises, one pleasing and the other disappointing. Despite the name and packaging, *BASM* is *not* a compiler of Commodore 64 BASIC. You cannot turn your favorite programs into fast, Machine coded programs, but you can learn a new language, a language that combines BASIC keywords with Assembly language and then compiles the complete code into a Machine language program. This compiler compiles BASM BASIC, a new language for your Commodore 64. A structured language that thinks like Assembly language, BASM BASIC combines the syntax of BASIC with Assembly language data types and addressing modes. It helps you advance from common BASIC to programming in Machine code.

BASM BASIC Compiler and Assembler requires a Commodore 64, one 1541 disk drive, and an optional printer. A second disk drive saves you the time spent in swapping disks. First thing, make a backup. That's right—this company tells you to make a backup and has included a small program on the original disk that makes the backup for you. Then you can load the program. Typing "Run" puts you into the *BASM* editor.

You always use an editor with any compilable computer language. It resembles a simple word processor, allowing you to enter code on separate lines and then edit it. This editor is easy to use. Line numbers help you locate code, but you cannot use them as labels because they disappear when you compile the program. The *BASM* editor supports the following commands: Compile, Delete, Bye, DOS, Find, Free, Insert, List, Load, New, Renumber, Run, Save, Dir, and CMD. Compile invokes the *BASM* compiler. Find, Delete, Insert, List, and Remember help you move through your code and locate, change, add, and remove lines. Free tells you how many bytes are available for programming. DOS and Bye return you to Commodore BASIC. Load and Save are the same as in the Commodore operating system. Dir lists the files on the disk. CMD allows you to send commands to the disk drive, such as Rename, Scratch, Copy, and New.

A compiled program has two parts. The program just as you wrote it is called the source code. After you have compiled the source code you have the object code, the actual compiled Machine language program. The process begins with your creation of a program in BASM BASIC. You save the program to disk, then invoke the compiler. The compiler asks you for the name of the source code, finds it, and compiles it into Machine language. You can then load the Machine language program and run it like any other.

BASM has many outstanding features, but the one I like the most is that it takes into account my knowledge of Commodore BASIC and shows me how to use that knowledge to learn BASM BASIC. For example, Chapter 3 of the instructions includes four sample programs that compare the workings of BASM BASIC with common BASIC, line for line. This makes learning a pleasure. Chapter 4 then goes into detail on each of the BASM BASIC commands and compares them to Commodore BASIC commands. Many will look familiar and function in similar ways, but a number of new commands work as go-betweens from BASM BASIC to Assembly. BASM BASIC also supports fifty-six mnemonic Assembly commands documented in the instructions and in the Commodore 64 Programmer's Reference Guide. The eighty-eight pages of documentation come in a three-ring binder that lies flat for easy reading.

The sample programs proved enlightening, combining BASIC keywords with Assembly language. At first this looked like a strange mishmash, but after I went over the line by line descriptions of the sample programs, Assembly code began to make sense to me. The syntax of BASM BASIC led me into the meaning of the Assembly language. Even though I have yet to become a whiz at Assembly language, now I can look at more than one line of Assembly without going into instant brain lock.

As you become comfortable with BASM BASIC, you encounter other surprises. The program has commands to support sound and sprite graphics, and, to top it all off, even contains a Machine language monitor for programmers who already know how to write directly in Assembly language.

Since I didn't have extensive prior knowledge of Machine language, I decided to find someone already proficient in it to take a look at *BASM BASIC Compiler and Assembler*. Within a few hours he was writing graphics programs that even I could understand. I could look at the language and see what was going on even though it contained some mysterious words. I consider this the most important benefit of the program. In addition, Computer Alliance doesn't charge a commission for programs that you write and compile with *BASM*, so you can use it to develop and market programs without splitting any of your possible profits with them. Of course, I do have a few complaints, especially about the packaging. Looking at it, I would conclude that it was a compiler for Commodore BASIC, which it isn't. Also, the program was originally written for the Atari computer and this version for Commodore is almost a direct translation. This is unfortunate because the Commodore 64 is a smarter system. I would like to see the Commodore version include new commands to make full use of the intelligence of the Commodore 1541 disk drive.

To use *BASM BASIC Compiler and Assembler* you must have an excellent working knowledge of BASIC and the concepts of program flow. It won't suit people looking for a first language. However, seasoned hackers who want to move from BASIC into Assembly language will find that it helps them do so with minimal pain. All in all, *BASM BASIC Compiler and Assembler* lives up to every claim made for it.

BLITZ!

Skyles Electronic Works
$99.00

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A-	A	*Value for Money*

Blitz! is a BASIC compiler. Programming languages come in various forms, but the two major types are interpreters and compilers. The BASIC built into your computer is an interpreter. Interpreters work by checking the syntax of your program and translating it into machine code, line by line as it is run. Interpreters have many advantages, especially in writing, debugging, or modifying programs. They have one large disadvantage: they are very slow. The primary purpose of a BASIC compiler is to speed up a program, with the secondary goal of reducing program size. A compiler translates your program into machine code only once. The compiled program then executes without the overhead associated with a program that must be interpreted.

The actual gain in speed varies tremendously depending on the program you're compiling. *Blitz!* makes no claims for speed, nor gives any approximations. Programs with many Gotos and Gosubs usually gain the most. There is little or no improvement with regard to loops, one of BASIC's slowest procedures.

The simple benchmark speed test that *Creative Computing* magazine has featured since 1983 lists 1:53 minutes for the Commodore 64. *Blitz!* improved this by less than ten seconds. A sieve program to compute and print all prime numbers from 1 to 1,000 improved from thirty seconds to nine—about three times faster than standard BASIC. *Blitz!* compares quite favorably with *Petspeed* and *Instaspeed*, the two other popular compilers for the C-64. I compiled about two dozen programs with *Blitz!* for this review, and found speed gains ranging from zero to about eight times faster. Most were about two to four times faster than standard BASIC.

Blitz! will not work magic. Your programs must still be written and debugged using the standard ROM BASIC. Compilation is the final step after you have a properly functioning program. Your compiled program and the standard BASIC program produce the same results; the compiled one is just faster.

Blitz! is easy to use. First, you copy the program(s) you wish to compile onto a formatted disk. With a single drive, the computer needs at least 300 free blocks (blocks left on the disk). You then load the compiler and a menu appears from which you select your disk drive arrangement: a single drive, dual drives, or a two drive system with different addresses. All of them work equally well. The two-drive arrangement is more convenient and allows for file chaining (although they do not offer any speed advantage with *Blitz!*.)

If you are using a single drive, you are prompted for the file name; *Blitz!* immediately starts the compilation process. If you're using two drives, *Blitz!* asks for the device numbers of your source and destination disks. With dual or two drives, another menu appears offering four more choices concerning which files on which disks are to be compiled. Then a prompt appears telling you to insert the disks. You press "Y " and the compilation process commences.

If the compiler finds an error during compilation, it stops and asks if you want to continue. (It is wise to stop and correct the error). Lines containing errors are not compiled. Error checking is minimal; your BASIC program should be complete and fully debugged before you attempt to use any compiler. Only a few types of errors are specifically detected: syntax, type mismatch,

bad subscript, overflow, and undefined statement. Extensions are not considered errors, but are detected and noted with their corresponding line number.

Blitz! makes two passes through your program. The first checks for errors. If none are found, or if you instruct the program to continue, the actual compilation is made. All variables and line references are replaced by their exact locations in memory. Undefined statement errors, if any, are again noted. Several files are created during compilation. The compiled program is saved onto disk with a "C" prefix. A second file (prefixed "Z") contains cross-references to the line numbers in the original program, which are used for debugging or modifications. Two other files are created in the process to hold the intermediate p-code and data, but are scratched by the second pass. (Due to all these files, if you use a single drive—as I mentioned before—Blitz needs at least 300 free blocks for *Blitz!*.)

Compilation is slow, but not unreasonably so. Files to be compiled must be loaded from the disk into the computer, which takes the usual amount of time. *Blitz*'s first pass seems to require the most time: at least seventy seconds even for a very short program. The second pass takes only a few seconds. The compiled program and error cross-reference file must be written back to the disk, as well as the two intermediate files used in the compilation process. This is where two drives save time, since all the files on the disk can be compiled with one run.

Blitz! is reliable and works extremely well. I could find no bugs and encountered no problems. Error correction of a compiled program is a bit complicated, but it should be a rare occurrence if your original programs are properly debugged.

Blitz requires no special hardware. The documentation is clear and consists of ten full-sized pages, including a table of contents. It is reasonably complete and has sufficient information to enable you to operate the program without difficulty. No mention is made of any warranty or backups (the utility is copy-protected). One point that's not mentioned in the documentation: to run *Blitz!* again after it's completed a compilation, you must place the original disk back in the drive, using either a single drive or double drives. The utility's copy protection requires this, and it turns out to be a minor nuisance.

Blitz is the only Commodore 64 compiler that can translate chained programs and even pass variables among them. The calling program may be longer or shorter than the called program, unlike standard BASIC. To save space, the run-time routines are added only to the starting program. Either dual or two drives are required in order to use the chaining procedure.

Blitz! differs somewhat from standard BASIC. It disables the Stop key after Run, Load, and Clr. A simple command enables or disables the Stop key during program execution. Multi-dimension arrays must be specifically defined. For . . . Next loops may use integer variables which run faster. *Blitz* reduces some memory overhead, allowing for more complex nesting which would cause Out of Memory errors in standard BASIC.

Blitz! recognizes some extensions to standard BASIC, mostly *Victree* commands. *Victree*, also produced by Skyles, adds fifteen commands to BASIC. You can force other extensions by preceding them with a double colon (::). The run-time routines pass the whole statement to the built-in interpreter.

Blitz! saves time in many ways. Rather than search memory for locations of variables, arrays, and line destinations, *Blitz!* directly stores their locations. Constants are converted to floating-point or integer during compilation. True integer arithmetic is used, as is Reversed Polish Notation (RPN).

In conclusion—and simply put—*Blitz!* is a compiler that works very well.

C64 MINI-MON

Interesting Software
$17.95

Overall Rating	C-	A	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	D	*Value for Money*

The *C64 Mini-Mon* is a general purpose monitor—a program that allows direct manipulation of the computer's memory using assembly (or machine) language. You must have some knowledge of machine language in order to use any monitor. The more proficient you are in machine language, the greater the value of the monitor.

While merely counting the number of commands is no proper way to judge any monitor (or any computer language), it is a crude measure of potential usefulness. *Mini-Mon* has twenty commands; *Supermon* and *Micromon*, two popular, widely distributed monitors, have fourteen and thirty-four, respectively.

All monitors have some commands in common, such as memory dumps, disassembly displays, fill memory (with specific byte), load and save, change memory, and a simple one-line mini-assembler. All three of the aforementioned monitors possess these functions. Surprisingly, *Mini-Mon* is the first monitor I've seen on any computer that does not have a register display command. This is a serious omission, both for beginners and experienced machine language programmers, as well.

Mini-Mon does have a few unique commands, some of questionable value. It can switch the KERNAL and

BASIC to RAM for modification just by pressing a single letter. Another single letter command does the Opposite, switching the ROM KERNAL and BASIC back in. These can turn out to be extremely convenient features if you have a need for them. Other monitors can do the same thing, but some thought (on your part) and several commands are required. *Mini-Mon* has a Reset command that's an unnecessarily limited duplication of the Go or Execute command. It has a Restart command that's also a pointless and limited duplication, since the Go/Jump command accomplishes the same thing. A Help command displays a one-page command summary. *Mini-Mon* can do hex-to-decimal and decimal-to-hex conversions, which are very handy.

Like *Supermon*, the Load command in *Mini-Mon* is limited in that the file always loads into the same memory location from which it was saved. *Micromon* has a much more versatile Load command which lets you specify the memory starting address. You can save any range of memory to disk or cassette.

Instructions are entered into *Mini-Mon*'s mini-assembler—one line at a time—in standard 6502 mnemonics after you specify the starting address. Again, *Micromon* is better; it calculates relative branches automatically and permits comments to be added to a line.

I think monitors are often superior to assemblers, both for beginners and those already familiar with machine language. While an editor/assembler can be much faster for experienced programmers, it usually results in longer programs containing more bugs. A monitor is an excellent approach to learning machine language. The documentation for *C64 Mini-Mon* does not teach machine language; it just describes the commands. A knowledge of machine language is not absolutely required to derive some use from a monitor, but at least a superficial familiarity is essential.

I detected no bugs in *Mini-Mon*. It is relatively easy to crash any monitor since you are dealing directly with memory, and *Mini-Mon* is no worse and no better than the others. It works—and works quite well at that. It is not copy-protected. One full page of the short eight-page booklet explains how to make backup copies, which is always a good policy.

Mini-Mon lacks some of *Micromon*'s better capabilities, like memory comparison, quick trace and slow walk instructions, and ASCII and binary conversion.

Mini-Mon's price is reasonable compared to other computer utility programs in general, but it is overpriced compared to other monitors. *Mini-Mon* is very comparable to *Supermon* in quality, and *Supermon* is included on Commodore's $20 Bonus Disk along with many other interesting programs. Many other monitors are available; most C-64 user's groups have a selection of public domain versions.

The distinctive features of *C-64 Mini-Mon* do not really justify its purchase over high quality monitors available at lower cost. *Mini-Mon* has neither salient drawbacks nor outstanding advantages. If you see it in a software store's discount bin for $5.99, buy it (if you need a new monitor). Otherwise, don't go out of your way to purchase this one.

HESMON

HesWare
$39.95

Overall Rating	C	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C+	C	*Value for Money*

HesMon is a cartridge-based machine language monitor for your Commodore 64. It purports to be an aid to machine language programmers who need to either create or debug short machine langauge routines. Because it is completely compatible with BASIC, you needn't worry about protecting zero page when working with the monitor.

The monitor offers programmers thirty different commands, including Assemble, Disassemble, Set Break Point, Compare, Fill or Move memory blocks, Execute Code, Alter registers or memory, Step through program, and Hunt for a sequence in memory. In short, it is a typical monitor with several added commands, such as External Relinker, Divert Output from screen to printer, Test Color RAM, and Perform hexadecimal arithmetic.

It's quite obvious that the utility has its roots in the public domain monitors from the old PET/CBM computer, rather than in other 6502-based computers, like the Apple and Atari. While I'm sure that some Commodore enthusiasts will be relieved, the core of successful and experienced programmers who elect to transfer their programs to the Commodore 64 will find the *HesMon's* protocol somewhat confusing.

HesMon is basically helpful for debugging short routines. It is excellent for patchwork or small fixes to a malfunctioning program or even for a quick disassemble of someone else's code. The assumption here is that somebody else's program will load while your *HesMon* is installed. It does have one important feature that I have never seen anywhere else: the external relinker. Essentially, this command facilitates the transport of machine language programs from one 6502-based computer to another (for example, a VIC 20 to a Commodore 64). Basically, you construct a table of pairs of ROM addresses used in both computers. *HesMon* changes the ROM subroutine calls from the source computer to those of the destination computer. Though this is the theory, it does not guarantee that the translated program will work, since there may be more differences than just a few ROM subroutine calls.

I think the *HesMon* is a very functional and useful monitor, but I also think that serious programmers should consider purchasing a really good assembler. Most assemblers do include a monitor with the majority of the commands that are included in *HesMon*.

MACRO ASSEMBLER-EDITOR

Eastern Software House
$99.95

Overall Rating	C+	B	*Reliability*
Ease of Use	C-	B-	*Error Handling*
Documentation	C	C	*Value for Money*

This very powerful co-resident macro assembler has a unique set of pseudo-op codes that make it incompatible with other assemblers. Yet its power and versatility are apparent in its macro capabilities, and in its ability to generate relocatable object files.

The full-screen text editor is quite powerful, and can do conditional search and replace, as well as copy and move lines. Since the lines are numbered, there is a renumber command. Normally, source code is automatically numbered as it's inputted. You enter source code in free form, with only a space between fields.

The assembler exhibits several good features. It is fast, supports chained source files, and has an option to continue assembling after encountering errors. However, it resides in memory at $5000, leaving, at most, 8K of text buffer at $3000. Code assembled to memory must be sandwiched between the 4K-long monitor at $1000 and the text buffer, assuming a portion of the label buffer is safe at $2000. Actually it is best to assemble to disk. The assembler allows conditional assembly for both source and macros. The macro features are extensive. Local labels are also supported, and, of course, the symbol table is sorted. This is the only assembler that can generate relocatable object files. This powerful feature is over-emphasized in the documentation, at the expense of good explanations of other features.

There is a standard debugger, or monitor. Surprisingly for a package with this power, the C-64 version does not include Step and Trace.

The documentation is fair, but has confusing references to many different Commodore models. It certainly wasn't written for beginners.

Macro Assembler-Editor is a powerful and advanced assembler for experts. Its non-standard pseudo-ops make it difficult for users to upgrade their libraries of routines build on other assemblers. Beginners will find *Macro Assembler-Editor* both intimidating and expensive.

Sound and Graphics

THE BANNER MACHINE

Virginia Micro Systems
$49.95

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	B	*Value for Money*

The Banner Machine prints signs or banners of up to 128 characters in various sized letters, ranging from just under one to up to six and a half inches high. You can print multiple lines in the smaller letter sizes, and the messages are printed sideways on the paper.

Two versions of the program are available, one for the Commodore 1525E and Gorilla Banana printers, and the other for Epson and Gemini printers. With proper interfacing, I would think that many other printers would also work, but you should read the documentation and run a test before you make your purchase. (I tested the program using a 1525.)

The Banner Machine is surprisingly easy to use. If you employ any type of word processor, you'll encounter no problems. The program begins in a text entry mode. You may select twelve additional program features with the function keys. A plastic template which fits over those keys is provided to help you keep them straight. You can choose any of eight letter sizes and control the spacing between the letters. You can also select among eight widths of borders—or no border at all. Screen colors can be changed according to your whim. A format function allows you to create text that's flush left or right, or centered; you can also split text into two segments with margins that are flush to each margin. You can use a different format command on each line. Other features include a screen dump to record the parameters for a given sign (signs cannot be saved to disk), a screen display to preview your sign, and the ability to exit to BASIC.

Two print functions are provided. The standard printing routine allows you to print from one to ten copies of the sign, prompts you to prepare the printer, and then prints the sign in as small a space as possible. The Special Print mode lets you select the width yourself in order to produce several messages, each surrounded by the same size border. Take a coffee break after the printer starts, as it is very slow. Use the Cancel mode to erase lines, temporarily halt printing, or escape to other modes, such as Display. Finally, a Font mode allows you to choose which style of type you want to use to print your sign. Unfortunately, only one type style is included with the program and additional fonts cost $19.95 each. Two more commands are available in the Epson/Gemini version: you may select standard or compressed print modes, and you can force extra line feeds if your printer requires them.

I know this all sounds like a bit much, but with the help of the template, I was successfully using the program very quickly. Entering text is fairly straightforward, and the program takes advantage of the Commodore's powerful screen editing system. Just a few characters require some getting used to. You should use the brackets to enter quotation marks—both to avoid the problems with the Quote mode and to allow for both opening and closing quotes. The "<" and ">" symbols produce left and right arrows, respectively. Striking the Back Arrow key produces an arrow that points down, while the Up Arrow key produces just what you'd expect it to. (Since the bulk of the program is so easy to use, I worked with the manual open to the relevant page containing the information for these specific items.) I was disappointed, though, to find out that the program only supports the first eight colors, not the Commodore's full range of sixteen.

The documentation is concise and thoroughly adequate. Half of the thirty-eight page spiral bound booklet consists of displays of the various type styles that are available. Easily comprehensible explanations of each of the program functions, some suggestions for special techniques, and a short tutorial are included. Loading instructions for first-time users are supplied on the packaging. The documentation also gives you specific instructions for the following printer interfaces: Microworld MW302, Cardco Card?, and Tymac. Only one prompt, which popped up once during program execution, is not explained in the documentation, and this did not cause any problems. Unfortunately, the typeface used in the manual is small and hard to read.

In terms of both reliability and error handling, *The Banner Machine* is nearly flawless. The program is

written in BASIC, but Stop, Restore, Clear/Home, and the quote marks are disabled, so it is difficult to do much damage. All errors I encountered were trapped, even when I forgot to turn on the printer. The documentation includes an explanation of how to restart if the program comes to a screeching halt.

The Banner Machine is not copy-protected. In fact, it comes with a program for copying the "font" to another disk. The documentation wisely encourages you to make a backup immediately.

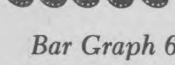
Overall, I found *The Banner Machine* to be a sound, well-documented utility program. It could be of great value in some business applications, such as retailing. However, if you want to make full use of this program, expect to spend more than your initial $49.95 since only one font is supplied. If you want reversed printing (white letters on a black background), you will have to purchase *Banner Machine II* for $49.95. And you may want to set your printer up for roll paper to get rid of perforations in your signs.

All in all, it's an impressive program even without those extras, and I consider it a reasonable value for the money. If Virginia Micro were to include one more type style in the basic program package, it would, in my eyes, be an absolutely terrific buy.

BAR GRAPH 64

Susie Software Business Systems Division
$31.95

Overall Rating	C-	B	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	B	D	*Value for Money*



Bar Graph 64, a graphics generation program, displays and prints bar graphs from the information that you enter into it. Bar graphs prove very useful in a variety of applications, since they allow you to see and display information in a format that's easily understood and quickly comprehended. Bar graphs make it simple to compare lists of similar data, and to spot trends quickly.

Bar Graph 64 comes on a single disk with six pages of documentation. It is written in compiled BASIC (for faster execution) and is not copy-protected. The documentation does not contain information on how to obtain backup copies, nor on product support. However, it supplies an address and phone number that, presumably, you may use for customer assistance.

When I first ran the program I was shown a menu that allowed me to choose the colors of the chart I wanted to make. I was shown five pairs of colors, and prompted to choose one pair. The colors are various greens and reds—not my favorites on the Commodore monitor that I use—but they show up as contrasting half-tones on a monochrome screen. This permits the program to be visible on all monitors. Next, I was asked if I wanted a grid overlay on the screen while the graph was displayed. If I wanted to have the grid on my printed output, I had to select the grid at this time. However, I found the grid to be very distracting, and I chose not to use it. Although the documentation tells you nothing about it, a way does exist to add the grid to the printout later by saving the file and calling it back up with the grid option. The next prompt was whether to create a new graph or load a previous graph. I wanted to create a new one. Then I was asked if I wanted to title my graph. The title appears when the graph is printed, but when I saved a graph to disk, I had to title it all over again.

Three kinds of graphs can be created. The first is "Days," which creates a graph with seven bars labeled for the days of the week. The second is "Months," which creates a graph with twelve bars labeled for the months of the year. The third is "Create," a free-form graph with up to thirty-six bars. With "Create," you can assign each bar its own two-digit label, and its own color outside of the restrictions placed earlier on color. However, I found that I had to specify the color for each and every bar, and if I went back to edit the data for any one bar, I had to reenter the data and color for them all. The one advantage to entering the color codes is that when a bar has the numeric value of zero, it still has some height on the graph. Furthermore, by assigning it the color black, it blends in with the background.

A menu at the bottom of the screen offers several options: Run, Average, Statistics, Labels, Edit, Input/Output, and Print. Run starts the program over and erases any information in memory at the time. Average displays the range of data and its average. Statistics displays a column of figures: the bar number, its value, and its label, if any. The information in Statistics sometimes does not justify correctly. Label allows for one-or two-character labels for each bar. Edit allows for changing the data, and it contains several bugs. When I returned from the Edit mode after creating a "Days" graph, I found the "Months" graph on the screen with a single bar in January. This same thing happened every time. Also, when I edited either the labels or the color codes, just hitting Return would cause me to lose the data I had previously entered.

Input/Output corresponds to Save and Load. No erase functions are allowed inside the program; however there is information (incorrect) in the documentation on how to erase a file. Don't follow those recommendations. There's also no way to read a disk directory from inside the program. This is definitely a serious flaw. I can't always remember what name I've given a data file. Also, I don't like having to exit the

program to call up a directory, then re-load the program again.

When I finished creating my first graph I wanted to print it. The print function allows you to print either the graph or the statistics. The program can work with either a letter-quality printer or a graphics capable (dot matrix) printer. However, the quality of the graph on my *Gemini 10X* leaves a lot to be desired. The graph is printed as a series of blocks, not as solid bars. The printer is capable of printing a solid bar—but the program isn't. Annoying, to say the least.

Bar Graph 64 is very fast due to the compiled BASIC coding, but this does not allow for any modification by the user. Although I found it fairly easy to use (aside from the bugs in the Edit mode), I have some very real complaints concerning this program. There is no way to load data from any database or spreadsheet, no sample files, and no information on how the program stores information. When a graph is created, you have no way to assign values to the vertical bar of the graph; it is locked into displaying everything as a percentage. This lack of flexibility is my main gripe. What if I wanted to design a graph showing total sales by day—the actual number of sales and not relative percents? *Bar Graph 64* gives you no way to accomplish this. The program has too many shortcomings and too little utility for me to honestly recommend it. Better chart and graph programs are on the Commodore software market these days. Keep shopping and pass this one by.

COLOR 80

Blue Sky Software
$49.95

Overall Rating	B	A-	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C	C-	*Value for Money*

Color 80 is a program that provides eighty-column expansion for your Commodore 64 *without* added hardware. It uses no BASIC memory and has eight character sets in full color. The disk includes five bonus public domain programs that use 80-column formats.

Color 80 converts your standard forty-column computer to eighty-columns. You need no hardware attachments of any kind (though I highly recommend a monochrome monitor with high enough resolution to properly display twice as much video information).

I use an almost new but low-quality thirteen inch color monitor with my Commodore 64. I live about ninety miles from the nearest TV station. I use a shielded cable and a power strip with an RFI suppressor. This arrangement gives me an excellent picture, surpassing most monitors I've seen demonstrated in computer stores. But even this set-up presents problems with some color combinations due to artifacting and color bleeding. The problems become much worse when I use *Color 80*. Only a few combinations remain clear—mostly black, white, and shades of gray.

I tried this program on the family TV, an older twenty-five inch set, using an ordinary switch box. Everything was illegible. I don't know anyone who owns a Commodore monitor, but I borrowed a TI color display which also produced a poor quality picture. Finally, I tried it on a nine inch black and white monitor and it worked just fine. Since color is not really a necessary element in most eighty-column applications, using a monochrome display doesn't represent a big drawback. Because the Commodore 64 provides only a composite signal, few people will achieve satisfactory color performance with this program.

Color 80 does not use any BASIC memory, but is loaded into RAM under the BASIC, I/O, and KERNAL ROMs. Screen memory starts at $E000 and color starts at $D800. It takes some programming skill to modify the program. I/O must be switched out to poke into color memory. *Color 80* remains continuously in the bit-mapped high resolution mode. This slightly reduces the scrolling speed, enough to be noticeable but not disabling.

Blue Sky Software emphasizes *Color 80*'s eight character sets. Well, there are indeed eight, but four of them are upside down, mirror-reversed versions of the other four. (*Color 80* calls them inverted.) I see no practical use for these since it is virtually impossible to read them from the screen. At least I cannot read them; if you frequently read upside down, mirror-reversed type, you'll have no difficulty. Theoretically, bit-mapped screen dumps could print them—but then you'd have upside down, mirror-reversed printouts! I'm sure there is some industry somewhere that has a need for such type styles, but not the average home user.

The four rectangular character sets are small, narrow and tall, wide and short, and wide and tall. They all are tiny. By a slight margin, the wide and tall set looks best on my system. The sets aren't totally different—such as italics or boldface would be—they are just different sizes. To change to an alternate character set, you must load and run another program on the disk. This means you can't switch sets while your own program is in the computer. The small set is the default, so if you prefer one of the others, you will have to run the second program. It has a menu, and making a selection is a simple process.

If you need eighty columns for spreadsheets, word processing, databases, terminal emulation, or other applications, this program does work well—provided your system can produce a legible display. There are no obvious bugs, no errors, lock ups, or endless loops, and it seems to be crash-proof. It does have an odd peculiarity when changing the screen color. The hi-res

screen mode requires that, after the normal Poke (53281), you clear the screen. Another barely noticeable peculiarity is a flash when you press Run/Stop and Restore. You can return to the standard forty-column display without losing your probram by means of a relatively simple set of commands provides in the manual (a SYS, four Pokes, Run/Stop, and Restore).

The documentation consists of two pages in a nicely produced booklet, along with fourteeen pages of advertisements for other products. The booklet I have is labeled a "provisional manual" and is probably not the one that ordinarily comes with this utility package. In all fairness, only a minimal amount of documentation is actually required, since *Color 80* is a trouble-free program you just load and forget, as you go about your other computing business.

Color 80 is copy-protected, perhaps excessively so, with errors on twenty-two of the thirty-five disk tracks, along with other forms of protection. This creates occasional problems. The solution, described in the documentation, is simple: you must initialize the program and try again. This does become a nuisance. No backup disk is offered and no warranty of any kind is mentioned. The public domain programs on the disk are unprotected and you are free to copy them.

The five bonus programs are typical public domain works; they do little more than demonstrate how a particular type of applications program looks with an eighty-column format before you go out and purchase an expensive program. They include a terminal program, a very simple spreadsheet, an address book database, and a slow and crude word processor. There's also a directory boot program which shows off the eighty-column capability best: it displays on one screen the catalog of any disk. You load a program by entering one number, and print the catalog (if a Commodore-compatible printer is interfaced) simply by pressing one letter.

This brings us to the all-important question of value for the money. Fifty dollars is a lot to the average Commodore owner. *Color 80* is a serious utility and you should have serious uses for it before buying it. I strongly suggest you have specific needs in mind, since some Commodore programs come with eighty-column provisions built-in. A recent computer magazine article stated that sixteen out of thirty-seven word processors they reviewed included eighty-column displays. These programs can be bought for prices as low as $34.95; you should definitely compare them to the cost of *Color 80*.

On the other hand, with *Color 80* you can add an eighty-column capability to almost any Commodore 64 program, unless they use the same memory area as *Color 80*, or define their own character sets. Some businesses would certainly find *Color 80* of considerable value. Obviously, displaying twice as much information can be a real time saver, and indeed, is standard practice on more expensive computers used in the business world for financial and word-processing applications. For the home user, though—unless you are deeply into word processing, elaborate spreadsheets, or complex databases—you may be disappointed with an eighty-column display. *Color 80* works well, given the limitations of the Commodore 64 computer, cheap color monitors, and run-of-the-mill TV sets.

COLOR CRAFT

Sim Computer Products, Inc.
$24.95

Overall Rating	B	A	*Reliability*
Ease of Use	C+	A	*Error Handling*
Documentation	A	B	*Value for Money*

Sim Computer Products touts *Color Craft* as an "entertainment and educational software package." But don't expect a traditional educational program; *Color Craft* is all about generating drawings, graphics, and animation—not English grammar or math.

The program allows you to draw on the screen by using the keyboard graphics symbols. You can then animate your drawings, or even your text. The entertainment element in *Color Craft* comes from watching your creation "come to life." The educational part involves learning how the computer takes part in this transformation.

What you do with your animated forms, once you've created them, depends upon your individual needs and unique imagination. A shop owner might use a short cartoon as an electronic bulletin board. A teacher could use animation to reinforce a lesson or some other learning experience.

If you write in BASIC, you'll want to turn to Chapter 8 of the user's manual, which tells you how to incorporate *Color Craft* animation into your programs. If you make home movies, you can use *Color Craft* to design very interesting and entertaining movie credits or title screens. I use the program to develop screen titles and cartoons which I transfer to my video cassette recorder. And, of course, there is always the simple fun of watching your creations move and dance on your computer monitor.

Color Craft is available on both cassette and disk. Saving the program to a disk allows for quicker loading. The cassette version, which I use, is copy-protected by dongle. In other words, you have to have a key-like apparatus (a dongle) in joystick port #1 or the program won't work. Without the dongle, which comes with the program, *Color Craft* locks up, forcing

you to turn your Commodore 64 off and back on to regain control.

Manipulating *Color Craft* is easy once you learn the commands. The manual is thorough, but some information is hard to find. A reference page of abbreviated commands and their functions would save a lot of search time.

Animation is achieved by quickly replacing one drawing with another—rather like flipping the pages of a book. The cassette version allows for a total of forty-six different pictures. The more pages you choose to draw, the smaller the screen display. The largest page is twenty-one rows long and forty columns wide; the smallest page is ten rows in length and ten columns wide.

Once you draw your first page, you can duplicate it and make small changes on the copies to achieve smooth animation. You won't have to redraw the parts of the picture that aren't animated.

Color Craft includes several editing aids. One allows you to automatically center your display. You select a drawing location with the cursor control keys. Another editing aid makes drawing somewhat easier by letting you pick the direction in which the cursor moves. Duplicating and erasing selected pages is probably the most work-saving editing aid. You can copy any screen to another page with just a few keystrokes.

After you finish all your pages, you set your creation in motion by picking Run from the command line. *Color Craft* displays each page for exactly the amount of time you specify. Short displays give the best illusion of animation. You will want pages with text on them to freeze long enough for the viewer to read them. Once you are happy with your work, you can save it to another tape or disk for future use.

Color Craft has two major drawbacks. First of all, you draw with the cursor control keys which print the characters and the standard Commodore 64 keyboard graphics symbols. You can create amazing drawings with them. But what isn't amazing is how difficult it is to achieve the design you want, at least at the outset. If you have ever tried to draw with the C-64's keyboard graphics symbols, you know just what I mean.

Color Craft includes a sample illustration that is a fine example of the graphics potential of the C-64. I'm certain the sample was included to encourage the faint of heart like me, but I had to devote several hours of hard work to create a drawing similar to the sample. This, in all probability was due to my own and the Commodore keyboard's limited abilities.

The second problem involves the warranty—or rather, the lack thereof. A few software companies guarantee their programs for life, while others stand behind their products for a year. However, the majority of software warranties are for ninety days. Sim Computer Products, which markets *Color Craft*, offers none of the above. Sim disowns *Color Craft* as soon as you purchase it. They give you "no warranties, either expressed or implied." The version I have has worked flawlessly. But each time I see that irritating disclaimer in the user's manual, I cringe a little.

At $24.95, *Color Craft* is reasonably priced. But what does seem overpriced to me is the charge for replacing the security dongle. If you lose this tiny plastic key (and if you have children who use your 64, you invariably will), a replacement will cost you an additional $18.50.

DOODLE!

City Software
$39.95

Overall Rating	A-	B+	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A	*Value for Money*

Let me begin by saying that *Doodle!* is hot. It's fun, easy to use, simple to learn, and quite useful as well. *Doodle!* turns your Commodore into an electronic sketch pad with an eraser that never wears out. If you can imagine something in your mind, you can reproduce it on your monitor using this utility.

Doodle! comes with one disk and a manual written in a down-home, folksy style that's not condescending. It's simple enough for a novice, starting off with instructions on how to load and run the program; it thoroughly covers all the functions of the program in a step-by-step fashion that even a beginner will have no trouble following. *Doodle!* is copy-protected, but you can purchase backup copies for a nominal charge.

When I loaded *Doodle!*, the main menu came on-screen first. I'll list the items it presents to give you some idea of the capabilities of *Doodle*!, then I'll go into specific details about the program's various features. The main menu offerings are: Sketch, Lines, Boxes, Circles, Color, Zoom, Copy, Stamp, Letter, and Disk & Print. Each listing has a submenu (Help screen) that you may call up without disturbing your sketch-in-progress.

I first chose Sketch. The screen was blank, except for the cross hairs that marked the location of my "pen." I pressed the fire button on my joystick and began to draw. By pressing different numeric keys on the keyboard, I changed the size of the line my "pen" drew; I could also change the speed at which it drew. Whoops . . . I made a small mistake. By pressing the Delete key, I changed my "pen" into an "eraser." I drew a box, then pressed the fill key; my empty box filled with the color of my choice. I drew a butterfly, then pressed the + key. The entire screen became a mirror image of my origi-

nal drawing. Then I pressed the - key and the screen became a negative image. Some of my other options were to draw a removable grid pattern on the screen to aid in aligning my sketches, to memorize my sketch at any point (in case I didn't like additions), to recall what I'd memorized, and to clear the screen.

Line does just what I expected it to: it draws lines. But I found I could draw a line in "temporary ink" to see if it went where I wanted it to, and could erase it if it didn't. The screen showed two cross hairs, each one moveable, and would draw a line between them at the press of a button.

Circle draws both circles and ovals. The cross hairs become two pairs of arrows, their points defining the circle. I found I could fill a circle with any color, erase it, or draw it in "temporary ink." Box resembles Circle, but it has some more powerful features. I used the Erase command to erase only what's inside the box, the Negative and Mirror commands to change the contents of the box, and a special command called "op-art" that creates an effect hard to describe, but it looks like a multi-dimensional line drawing from the sixties. I also found another great use for Box: to memorize just a portion of the screen and redraw it in another location. This works in conjunction with the next item on the main menu, Copy.

I absolutely *love* Copy. Not only could I make copies of any portion of the screen, but I could change the shape and size of what I had copied before I sent it back to the screen. I could change its horizontal and vertical size and do rotations in ninety-degree increments. I employed Letter to sign my sketch. It lets me print my name anywhere on the screen, right side up or upside down. I found I could even write on the side of the screen and change the size of the letters.

Zoom reminded me of "The Incredible Shrinking Man." It works like a magnifying glass, enlarging any part of the screen. I used it to do detail work on my sketch, fine tuning the outlines and fixing some mistakes that I had overlooked.

Stamp reminded me of the memorize function of Box, with a difference. There are nine different stamps. This is important because when I used the memorize function in Box, I cleared out whatever I had memorized earlier. This doesn't happen with Stamp. Stamp also uses the rotate, mirror, negative, and temporary functions, but you cannot change the size.

Color, obviously, is for coloring. Not only could I choose the color of my "ink," but also the color of my "paper". I won't tell you all there is to know about Color, but I think it's only fair to mention that it is the most difficult function to master in *Doodle!*. This results mostly from the way *Doodle!* handles color; it caused more than a little frustration on my part. Color works just fine, it just takes some getting used to. As for the entire program, Color has the only real drawbacks about which I would complain.

Disk & Print are what give *Doodle!* much of its utility. You can save your masterpieces to disk, load them back into *Doodle!* for more work or display, or erase them from the disk entirely. You can also print your creations. *Doodle!* supports a variety of printers: Commodore 1525, C. Itoh 8510, NEC 8023, most Epsons or Star/Geminis, and most Okidatas with graphics. A program called "Change Printer" reconfigures *Doodle!* to whatever printer setup you have. The manual also gave me information on merging my doodle into a program I had written. It made a great title screen.

I've found quite a few uses for the program since I started using it. I created a new letterhead for my business, drew a map with directions on how to get to the party I threw a few weeks ago, and I've begun to design my next darkroom floor plan.

Doodle! is simple to use, fast (100 percent Machine code), and uncomplicated. The Help screens for each function and the main menu can be called up onscreen without losing the sketch in progress. Most commands require only a single keystroke, and they are straightforward and easy to memorize. The documentation is laid out in a logical fashion, with each function fully and completely explained. I think *Doodle!* is without a doubt the best state of the art graphics design program available for the Commodore 64.

FLEXIDRAW LIGHT PEN SYSTEM

Version 4.0

Inkwell Systems

$150.00

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

Flexidraw is a very impressive light pen-based graphics package for the Commodore 64. With monochrome graphics capabilities that have incredible detail and a menu-driven input device that is easier to use than a mouse, the package produces drawings that rival those created by Apple's *wunderkind*, the Macintosh. This is only the beginning, for the system can take those monochrome drawings you've saved to disk and color fill them via another program, Pen Palette (included in the *Flexidraw* package). Additionally, there are programs for designing sprites, animating them, and even transferring pictures automatically by means of a modem. Best yet, you can design and program just

about anything that would benefit from the light pen as an input device using simple BASIC.

The light pen may be the most natural computer input device to date, especially when it comes to drawing. It acts just like a real pen; lines are drawn exactly where you point the pen. You don't have to refine your hand/eye coordination as with a joystick, mouse, or even a drawing tablet. Detractors say that drawing on a perpendicular screen becomes tiresome, but you can always mount your monitor at an angle or on a desk in order to rest your hand during long creative sessions.

The *Flexidraw* light pen plugs into joystick port #1. It is a high-quality device featuring a high degree of sensitivity and a resolution of one screen pixel. It is the size of a thick felt-tipped marker: five-eighths of an inch in diameter and six and a half inches long, and features a spring-activated switch at its tip. The *Flexidraw* light pen is so accurate that I've also used it in place of Atari's own light pen while using that computer.

The software accompanying the pen, especially the monochrome drawing program, is powerful, simple to use, and free of bugs. You create graphics in the hi-res mode (320 by 200 pixels). Unlike other home computers, this is not an artifact mode; the mode actually has 320 black and white pixels horizontally. The screen area is on the left, with a dynamic menu selector along the right edge. Two work areas (or screens) are useful for transferring items from templates to the actual work screen.

You select drawing modes and graphics commands by touching the pen to the appropriate menu selection. You may choose to draw in the sketch or spray modes, change the pen size in the grid mode, or work in the rubber band mode so that you can preview lines before finalizing your drawing. This last mode, and those that produce geometric shapes, like circles or rectangles, require setting the initial point with the back arrow key, then a second point with the pen, before choosing the function on the menu with the pen.

Due to the nature of the pen, you must draw on light areas only; you can invert the screen, though, if necessary. This is particularly valuable when adding or erasing individual pixels in the magnified zoom mode. Pixels are enlarged to character size for easy correction. The zoom screen can be scrolled horizontally or vertically. You can also fill in the enclosed areas on the screen with any of ten patterns, and add titles to your screens in Alpha mode. The Get and Put modes allow you to define a rectangle and overlay existing graphics elsewhere on the same screen or on the other one. You can Or, Abs, or Xor the images in order to produce a variety of effects. This latest version of *Flexidraw* adds the ability to split the screen either right/left or up/down, thus linking the two drawing pages for wider or taller printed outputs.

You may save pictures to disk, or even print them on a variety of printers at two different magnifications. The system supports Commodore, Epson, Okidata, and C. Itoh printers. There's a slight distortion on some printers, such as my Epson, which shrinks the vertical axis by about ten percent.

Pen Palette allows you to paint your *Flexidraw* pictures in color. Painting is not a matter of filling enclosed areas on the screen with color, but rather, coloring by choosing the foreground/background colors in character-sized areas of the screen. Remember, you are working in hi-res graphics. You can assign colors to twenty-three paint pots on the menu at the right side of the screen. Just select the pot that you wish to use, then touch the areas on the screen that you want to color. You may change your mind by selecting another paint pot. If you become confused, simply query any area to find out which paint pot you used to color it. It isn't that simple to color an entire picture without running into problems at boundary lines. Often, color will run into an adjacent area because two areas overlap in the same eight by eight character. When you save a picture, the color information is saved separately.

Four other programs are included on the disk. Some show you how to incorporate the pen into your own programs. There is a sprite editor for designing monocolor sprites on an enlarged grid. You may save the sprite data or send it to the line printer. Also, a crude sprite animator is available for stepping through a series of different sprites that you've created. In addition, you can take advantage of a light pen piano and a synthesizer program that adjusts slide controllers to change many of the parameters of the SID sound chip.

Inkwell Systems has produced a winning combination of hardware and software. I was so impressed with the product when I first saw it demonstrated at a local computer fair, I wanted to take one home right away. Once I did acquire one, I immediately found it delightful to use. *Flexidraw 4.0* is a well-planned, professional-quality drawing package that you can use almost without a single glance at the instructions. A short, two-page tutorial gets you started on version 3.0. Version 4.0 includes a superb sixty-eight-page illustrated manual outlining every function of the package with easy-to-follow steps for use. A template fits over the function keys for accessing extra commands. Inkwell Systems hinted in the program literature that I would have trouble using Pen Palette with my MSD drive. I haven't so far.

Flexidraw Light Pen System, Version 4.0 is certainly one of the most powerful and user-friendly graphics programs I've ever used. Much planning has gone into this package; it is obvious that Inkwell Systems is an organization that cares about the end user.

FLYING COLORS

The Computer Colorworks
$39.95

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	B	B+	*Value for Money*

Flying Colors enables you to be an artist and create medium resolution, multi-color drawings with either a switch-type joystick, graphics tablet, or one of the newer potentiometer-type (non-switch) joysticks. Its biggest advantage is that the program is completely menu-driven and thus easy to use.

The menu for *Flying Colors* overlays fifteen percent of the right portion of the screen. Functions include Draw, Line, Box, Circle, Color Fill, Brush Size, Clear, Disk Access, Alpha and Micro Modes. You select one of the options by positioning the cursor over the function with the joystick, and pressing the button. There are no keystrokes to memorize. The joystick button also activates the brush tip and is often used to indicate placement of one corner of a box or the center position of a circle. You can abort any Draw function, including Color Fill, with the F1 key. This key also toggles the menu on or off the screen; this comes in handy when you wish to draw over the entire screen area. A function key overlay is supplied since other function keys can change the border color and cursor speed, and place a temporary reference grid on the screen.

You may choose from a palette of sixteen colors. The color that you are currently working with shows at the top of the Brush Menu. This menu also allows you to change the size and shape of the brush by submenu selection via the joystick. You can fill any enclosed area with the color of your choice. A small "F" beneath the cursor reminds you that you are in color fill mode. An interesting Change Color feature changes the color of an area that you had previously drawn. You must be very careful in this mode, since all portions of the drawing that used the previous color will also be changed.

The Micro Mode (available only with potentiometer-type joysticks) allows more accurate drawings by limiting the cursor movement over a small, outlined portion of the screen. Unlike several other drawing packages on the market, *Flying Color's* Micro Mode doesn't magnify the pixels to allow you to easily correct minor flaws in your drawing.

The Alpha option lets you place keyboard characters anywhere on the screen. You just move the cursor to where you want to place text, press the button and start typing. You can even pick your choice of color.

Pictures can be saved and retrieved from disk. A separate Slide Projector mode will show a sequence of different, saved pictures. You can determine the order by giving the program a list of saved pictures on the disk. You set the time each picture is to remain on screen, then sit back and watch. Don't expect a speedy show; most 64 owners are well aware of the Commodore's slow disk loading rates.

A small, forty-two page booklet clearly documents the program. I don't even think it is necessary to read the instructions at the outset since the menu commands are self-explanatory. This is a definite plus for any software package. In sum, *Flying Colors* has sacrificed higher resoultion for additional color and ease of use. This program won't enable you to execute as fine a drawing as you could with some of its competitors, but by employing *Flying Colors,* you can use more color and will complete your drawing in one-fifth the time.

THE GRAPHIC DESIGNER

Blue Sky Software
$39.95

Overall Rating	D	C	*Reliability*
Ease of Use	D	C	*Error Handling*
Documentation	D	D	*Value for Money*

The Graphic Designer from Blue Sky Software is billed as a sophisticated, high resolution graphics editor. First of all, it is not sophisticated. This repackaged program was originally called *HED*. It has not been changed one iota (except for the new packaging), and does not meet the standards that I have come to expect for Commodore graphics programs.

The Graphic Designer offers you four modes: Master, Area, Paint, and Text. Each mode has various functions, such as expand, rotate, shift, fill, and duplicate. The program also has a line and circle generator. It will print a full 8½ by 11 page on a Commodore 1525 printer. There is a custom character set loader and a BASIC program for using images designed with *The Graphic Designer* in your own programs. All this sounds good—but, alas, it is only an empty promise.

The program is not copy-protected and no warranty information is included. I searched but found no information whatsoever regarding customer support.

Loading the program is easy, but the fun stops there. The manual lacks a tutorial, and merely contains a bare-bones listing of the commands—and only some of them, at that. You are not given guidance on how to get from one mode to the next. The program starts in the Master mode, and I was stuck there for some time. Finally, I began to experiment by hitting keys until *something* happened! (It turns out that the F1 key shifts from one mode to another, if you really need to know this information.) Master mode also allows you to save

or load a picture from disk, print a picture, and load a pre-defined character set into the program. That's all well and good, but there's no provision for creating a custom character set, no information on what one actually is, or even what software will create one that's compatible.

Area mode is an image constructing mode. You can't draw in it, but you can change some colors, duplicate sections of images, create circles, rotate images, expand and reverse, and fill in areas. Be forewarned that it will take some practice to understand how to use the commands.

Paint mode is really the Draw mode. You can draw in three different speeds and several different brush sizes. Automatic line function is supplied, as well as a fill function. Use the fourth mode, Text, to add text to the image you're creating.

All in all, I found *The Graphic Designer* difficult to work with. The manual definitely lacks useful hints for using the program and the commands are awkward to implement. A full-page printout was only 7 by 10 inches and took about fifteen minutes to produce. I have used several graphics design packages for the Commodore and *none* of them have been as unpleasant to work with as this one. I would not recommend this re-cycled, problematical program to anyone—friend or foe.

PAINT MAGIC

Datamost
$49.95

Overall Rating	B	A	*Reliability*
Ease of Use	B	A-	*Error Handling*
Documentation	B-	B-	*Value for Money*

Paint Magic is a graphics package that turns your monitor into an electronic canvas. Using the Commodore 64's high resolution color mode, it allows you to use your joystick to sketch or draw complex geometric shapes in any of three colors Although the program isn't menu-driven, it uses simple keyboard commands—simple enough to classify *Paint Magic* as easy-to-use.

You can create lines, rectangles, and circles by using a combination of keyboard and joystick commands. Place your cursor wherever you please, press "B" for box, move the cursor, and instantly you preview the geometric shape until you get its size exactly the way you want it. Press the button, and it is permanently set. It will stay in that mode until you press the Run/Stop key. You can color fill any enclosed shape in any one of five ways: pure color fill (from any of your three color choices), horizontal or vertical stripes, diagonal checks, or one of three pre-drawn patterns. You can even design patterns using the palette menu. Some of these commands are tricky to use, such as "13D" for diagonals using color registers 1 and 3. Conveniently, you can erase the wrong fill just by hitting the "R" key.

You can select the three drawing colors and the background/border colors via the Color Pattern Selection Menu activated by the F3 key. Just pick a color number and cycle through the sixteen available colors. While it's easy initially to select colors, if you plan to change things at a later time, it's best to watch the color changes from the picture mode. You'll suddenly realize that everything drawn using a particular color register changes. You can add additional color by "masking" or overpainting in the brush mode.

The program has numerous other features including a Magnify mode for repairing small sections of the picture. With the Grab mode you can pick up a small section of the drawing and then "stamp pad" the image anywhere you want—even onto a second drawing screen. In fact, you can draw something on the second page and then merge it with whatever is on the first. The merger takes place on the second screen so you do not run the risk of ruining your first drawing. Of course, you may save all screens to disk. It should be noted that *Paint Magic* will not work with the MSD Commodore-compatible disk drive.

The program is entirely in machine language, so all operations are nearly instantaneous. A Help screen showing the numerous commands is only a keystroke (F7) away. This is quite helpful if you only use the program occasionally. The instruction manual is fairly clear. It contains a short tutorial that walks you through most of the commands.

In sum, *Paint Magic* is a well-designed drawing package, considering it's not menu-driven. See for yourself: just load several drawings from the disk to get an idea of its capabilities.

SOUND SHAPER

Quality Computer
$14.95

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	B	*Value for Money*

Sound Shaper is a programmer's tool that makes it easier to put music into Commodore 64 software. It lets you try out different sounds, then prints the Poke statements needed to generate the sound. These statements can be printed to the screen or printer. They can also be saved as a file on disk which you may read into programs you write.

The program also generates the necessary Data statements to put the sound into BASIC programs, via Read statements. (You may also save these as separate files for later use.)

Before writing a sound into a program, you must experiment to find just the sound you want. *Sound Shaper*'s excellent organization simplifies all this. Pressing certain keys changes the values for the different parameters of voice #1. For instance: W = Waveform; Function 1 = Attack; Function 3 = Decay; Function 5 = Sustain; Function 7 = Release; Space Bar = Play the note; + = Raise the pitch; - = Lower the pitch.

To change the parameters for voice #2, use the same keys, while simultaneously pressing the shift key. Likewise, the Commodore key (C=) controls the third voice. There are a number of other ways that you can change the sound. Two, or all three, voices can be synchronized or modulated, and they can be filtered or tuned to achieve fine adjustments.

Although the program documentation clearly states that you can't use it for composing music, it does have a stilted keyboard mode which redefines the top row of keys for play as an octave of notes. This, at least, lets you hear how a section of music might sound if it were played using the current sound settings.

The programmer's instructions are excellent. They explain how to use the *Sound Shaper* to build music into your programs. The glossary at the end of the documentation defines any terms that you may find unfamiliar. Although the notes only occupy ten pages of a 5 by 7 inch pamphlet, they are adequate.

Sound Shaper is not geared for the computer novice. You must have good programming skills in order to integrate music into the software package of your choice. The author has created a useful package as long as you have some idea of what you are doing. If you are a less-than-average musician or programmer, pass this one up.

SPRITEMASTER

Access
$34.95

Overall Rating	B+	B	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	B	*Value for Money*

Spritemaster is a utility program for designing single- or multi-colored sprites. It allows you to edit as many as twenty different sprites, then animate them in any sequence you choose. It is particularly useful for beginning BASIC programmers who want to incorporate animation into games or other forms of computer entertainment. The best part of the program is that it is completely menu-driven and easy to use, even if you never look at the instructions.

You design your sprites on an enlarged 21 by 24 grid that takes up most of the screen. The actual sprite is displayed in regular size on the lower left portion of the grid, and the colors with which you are currently drawing are shown at the top left. Select the three colors in the multi-color mode using the F1, F3, and F5 keys (you pick these from a palette of colors during initialization). You can control the drawing cursor with either joystick or keyboard commands. The Shift key serves as a button in the keyboard mode. Rather than pressing the button each time you want to draw a pixel, you hold down the button and pixels appear wherever you move the cursor. This little routine is a bit different than usual, but is less prone to errors. You are able to correct mistakes easily by shifting to the background color and re-drawing. Pixels in the multi-color mode are two units wide, which, in effect, halves the sprite's resolution.

You reach the main command menu from the editor at any time by pressing the / key. It is here that you may copy sprites to other areas for slight modification in order to produce animated sequences. While the command structure on the main menu is completely based on one-letter commands, supplementary commands have so many safety features that doing a long sequence of operations becomes tedious. These safety features do, however, protect you from inadvertently erasing important data. One chart keeps track of which areas contain data. You have to erase a filled area before copying into it.

You can animate sequences of sprites by specifying the frame order. Nothing has to be in sequence and multiple frames may contain the same sprite. You control the speed, and set the animated sprite in horizontal and vertical motion via the arrow keys.

The disk can store ten sections, or groups, of sixteen sprites. The program can facilitate saving your creations to tape. *Spritemaster* can also transfer the sprite data, in the form of data statements, to another program. Normally, you append it to the end of your program by assigning it correspondingly large line numbers. You have to load the other program and type a SYS 32768 before the appending takes effect. The actual sprite data (sixty-four bytes) follows the mode and color information. If you follow the example in the manual, you can achieve the same animation effects that *Spritemaster* does.

The documentation, for the most part, is in the form of a tutorial. It's easy to understand, even for beginners. Advanced programmers will find the "Programmer's Reference Section" (on the last ten pages) very helpful.

I think *Spritemaster* is an important utility to purchase if you're doing an extensive amount of sprite programming. It greatly simplifies design and coding

of data. It isn't quite as powerful as some other competing graphics editors, since it lacks the ability to shift, rotate, and mirror shapes. However, *Spritemaster* is by far the easiest sprite editor to use. It may not be exactly what the seasoned professional requires, but you certainly won't become frustrated using it.

SPRYTE BYTER

Microtechnic Solutions, Inc.
$39.95

Overall Rating	C-	B	*Reliability*
Ease of Use	C-	B	*Error Handling*
Documentation	C	D+	*Value for Money*

This very powerful sprite editor helps you design single and multi-color sprites to use in your own programs. While *Spryte Byter* allows you to rotate, shift, flip, and copy sprites with ease, its command menu and numerous sub-command levels are so complicated that only a professional programmer would put up with them.

Spryte Byter's makers don't seem to realize that powerful programs don't have to be complicated to use. Nearly half the manual is devoted to explaining the Draw Menu and its six sub- and sub-submenus. And that's just for mono-color sprites. Multi-color sprites have a different set of menus accessed through the Color submenu command on the mono-color Draw menu. You press a key (A through J) to activate each command or submenu. There is no easy method, like hitting /, to return to the original Draw menu. You have to press either F, D, or H, depending on which submenu you're on. Another confusing thing is that you can convert mono-color sprites into multi-color sprites without creating new sprite data or points. The documentation I received is a bunch of goddledygook, but it is labeled "preliminary manual" so there is hope.

Perhaps I should point out some of the positive aspects of the program. You can design a sprite quite efficiently using a joystick controller. The mono-color mode uses a grid of plus signs that are replaced by dots when the points are drawn. Four true sized sprites are displayed at the upper right, some expanded or double sized in various axes. Designs can be shifted, flipped, mirrored, inverted, flopped on any axis, and rotated at any angle. The algorithm does take into account that pixels aren't square when shapes are rotated; however, the results need considerable touchup. If you rotate a shape 45 degrees and then back -45 degrees, the shape you end up with isn't what you started with. The copy command moves a sprite into a buffer for insertion somewhere else. Since you can alter these shapes so they are all different you can then step through them in the form of a mini-movie.

Shape data can be dumped to a line printer or saved on disk. You can use data saved on disk with the bonus program, The Game Maker, included on the disk. It actually modifies your sprite data so that you can program a BASIC game around it.

The utility does not look or feel professional, although it definitely has many professional features and can be used to design any sprite. The manual mentions that the vendor's first priority was to make *Spryte Byter* useful for professional programmers. Unfortunately they neglected to make it actually easy to use. For non-professional programmers, it certainly is not a pleasure to use.

Disk Utilities

AUTO 64 DIRECTORY

George Earl Software
$29.95

Overall Rating	C	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	D	*Value for Money*

Auto 64 Directory is a disk management program for the 1541 disk drive. It adds several commands to your computer's repetoire that simplify using the drive.

Auto 64 comes on a "partially" copy-protected disk. That is, you must first go through certain steps in order to make backup copies. These steps involve loading *Auto 64* into your computer, putting a blank disk into the drive, and using the F key to format and write a copy of the program onto the disk. Once you have done this, the copy is no longer protected. Strange, but that's just how my version worked. There's no other way to back up your program disk. If, however, your original disk doesn't work properly, return it to the vendor for another. I was unable to find any warranty information anywhere on the packaging or in the documentation. Furthermore, I saw no mention of a customer support number if you should run into any problems with the program. I did find a printed request at the end of the user's manual that asks you to write to George Earl Software if you encounter any bugs. Gee, thanks a bunch!

Almost all the commands that *Auto 64* adds to your Commodore (Save, Load, Verify, Rename, Run, Delete, Directory, Validate, and several others) are accessed by hitting one key. If the aforementioned commands sound familiar, you can find them on the DOS Wedge which is located on the Test/Demo disk that comes with your drive. You may also take advantage of commands that change the screen color, change the drive number, and run and delete programs from the directory.

The program's manual is the epitome of the "close but no cigar" genre of software documentation. The organization is fairly good, and nearly everything is included by way of instructions for using the program. The typestyle, though, is difficult to read and the wording tends to be unclear. The section concerning how to use the *Auto 64* with dual disk drives is a prime example. According to the instructions in the manual, the program doesn't really support two drives. However, the instructions advise you to tell the program to look at either drive, one at a time.

A Help screen is available that gives an abbreviated list of the commands and their respective syntax. I found it to be a great aid, since I had difficulty at first remembering the commands for certain functions. After a while, I got the hang of it, but I don't see the use of learning two sets of commands to do the same thing.

I already have used the DOS Wedge; it didn't cost me a thing and it works just fine. At the present time, purchasing *Auto 64* is essentially a waste of money since the Wedge does exactly what *Auto 64* does. Rumors have been circulating that Commodore may stop bundling the Test/Demo disk with its disk drives. If this does in fact occur, then *Auto 64 Directory* will prove to be quite valuable.

THE CLONE MACHINE

Micro-W Distributing, Inc.
$49.95

Overall Rating	A-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	A	*Value for Money*

The Clone Machine is a collection of menu-driven programs that helps you duplicate disk-stored software. Using the package, you can "clone" an individual file or program, or an entire floppy disk. *The Clone Machine* operates with a single disk drive, but it will work even faster if two disk drives are daisy chained together.

If you have expensive disk-based software, *The Clone Machine* could be the best investment you've made since purchasing your Commodore 64. The first question you may ask yourself is, "Why do I need backup copies of my software?" The simplest answer is, "Nothing in this world is permanent." Every floppy disk, sooner or later, will acquire a scratch, a fold, a

magnetic zap, or will just wear out. Without a backup disk safely stored away, you will either have to buy a replacement or do without that program.

Your next question might be, "Why do I need to use *The Clone Machine* to make my backups? Can't I just load and save what I want to duplicate?" The Save command works only with programs written in BASIC; it won't properly save a program that's written in machine language. Your disk drive can store several file types. PRG files are the most common. Others include SEQ (SEQuential), REL (RELative), and USR (machine language). To duplicate such files, you must open the file, read it into memory, and write it to the disk. The BASIC commands Load and Save do not recognize such files.

Much of the software on the market today is copy-protected. In other words, the manufacturers have designed their products so that they fail to load or run if they are loaded from any disk other than the manufacturer's original. This protection is intended to prevent unauthorized copies from competing with, and decreasing, sales of the original software.

A third question that you may be pondering is, "If I do indeed have a warranty assuring me of free replacement of my software for the first ninety days of ownership, and I can protect myself thereafter for only a fraction of the cost of *The Clone Machine*, why should I spend $49.95?"

If you want only one or two important programs or files, then your fifty bucks may be better spent elsewhere. But, if you have several hard-to-replace programs, or ones that you wouldn't want to be without during the days or weeks it might take to get a replacement from the vendor, then *The Clone Machine* may interest you.

One other consideration: what will you do if the software company that produced your favorite game or word processor changes ownership or goes out of business? Will you still be able to get a replacement disk?

And there is yet another consideration: free, public domain utility programs exist that do the same things as *The Clone Machine* and cost little or nothing. Why should you pay money for something you can get for free? I have a collection of such software; they work quite well on unprotected programs and files written in BASIC. But some cannot copy any file type other than PRG or SEQ, and all the ones I own fail if there are error sectors on the original disk. Additionally, most public domain utility copiers are slow. For example, I used one of my old favorite public domain file copy programs to duplicate an entire disk. It took forty-six minutes and a dozen switches of the disk (using a single 1541 drive). I duplicated the same disk using *The Clone Machine's* SuperClone program in only eighteen minutes, with only four disk changes.

The Clone Machine disk contains several programs, only one of which is actually called The Clone Machine. Its method is similar to and not much faster than its public domain cousins. It copies all of the things the public domain versions will, but is faster and easier to use. I use it to copy individual files from one disk to another, or to duplicate the same file on the same disk with a new name.

The second program on the disk is called Unguard. It allows you to "investigate" a floppy disk. Use it to see what a particular block in an individual sector of the disk contains. With it, you will learn a lot about how the 1541 disk drive stores information. But more importantly, the information it reveals, along with *The Clone Machine* manual, will enable you to detect and defeat software protection schemes or even repair damaged disk files. Serious programmers will find this program very informative and helpful.

The real muscle on *The Clone Machine* disk—and what makes the price worth paying—is a program called SuperClone. Its name tells all. It clones, i.e., it copies all the information on your original disk unchanged, onto a blank floppy disk. The new disk will be an exact duplicate of the original, complete with copy protection if the original itself was protected!

SuperClone is fast and simple to use. The manual that comes with *The Clone Machine* is one of the easiest to understand that I have ever seen. In fact, using SuperClone or its faster brother FastClone, you'll probably never need to open the manual. Simply respond to the screen prompts, and in eighteen minutes, your disk drive will spit out a duplicate disk (Fastclone performs the duplication in under fifteen minutes).

The Clone Machine really does work. It actually copies complex, copy-protected software such as word processors and arcade games—most of the time. SuperClone copied everything I asked it to, with one exception—The Clone Machine disk itself. Perhaps, in the final analysis, it is just too much to ask a burglar to burglarize his own home.

The Clone Machine comes with a ninety-day replacement warranty. No mention is made of any replacement agreement after that. Perhaps Micro-W, the distributor, figures you should be able to defeat *The Clone Machine's* own protection scheme using Unguard after three months time. Even if you don't, you will not regret the purchase of this handy software product.

DI-SECTOR

Starpoint Software
$39.95

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C+	A	*Value for Money*

Most people who purchase *Di-Sector* will only use it to make copies of their software. That's all well and good, but *Di-Sector* is much more valuable than that. Although it contains a variey of disk duplicating routines (the most powerful I've seen so far), it also has one of the best machine language monitors on the market.

One of the biggest problems with the Commodore 64 is the slow speed of the disk drive. Most of the copy programs available these days take about twenty minutes to copy a disk. *Di-Sector* can copy a disk in *three minutes*. It can format one in ten seconds, duplicate most protected disks, and create "errors" in any track/sector. It includes a true nibble copier that so far has worked on all the protected software on which I've tested it. It also has a monitor program that allows assembly/disassembly in the disk drive memory, as well as in the CPU. And there's more: a file copier, a disk sector editor, and a program designed solely to back up programs from Electronic Arts.

Let me take you through the various parts of the *Di-Sector* package, one section at a time. The program comes on a "master" disk that's used to create three "user" disks. Both the master and user disks are copy-protected. When my first copy of the program didn't work, I dialed a phone number provided for product support and servicing. The people on the other end were extrememly friendly and helpful. After I received my new master disk, I used it to make a user disk. The documentation is a bit vague about this process. It calls for a blank disk, but doesn't specify whether or not it should be formatted first. As it turns out, it doesn't have to be. Once I had made my user disk, I was ready to explore *Di-Sector*.

The first program I used was the Nibble Backup. It loaded just fine, but left me with a blank screen. I found I needed to press a key to get to the beginning of the program. Any key worked, but the documentation mentioned nothing regarding this. The rest of the program worked without a hitch. Screen graphics were informative and well presented. The onscreen prompts were easy to follow and the program included an audio prompt as well. This comes in handy when you don't want to be stuck watching a screen while waiting to swap disks.

The next program on the disk was the Three Minute Backup. This one program alone is worth the price of admission. I do a great deal of word processing, and I'm constantly making backups of data disks. It used to take me fifteen or twenty minutes to make a backup copy; now it takes me three. The Three Minute Backup is also menu-driven and uses onscreen prompts for disk-swaping.

Use the File Backup program to copy files from one disk to another. (The program supports one or two disk drives.) The screen is well laid out, with all commands displayed in an easy-to-read format. This is the first file copy program I've seen that also allows for file scratching to be performed as easily as file copying. The only feature that's missing is a rename function to employ when a file already exists on a disk. The file backup does allow for replacing an old file with a new file of the same name.

The Sector Editor program is similar to a public domain program called *Disk Doctor*. However, it is much more powerful, permitting you to edit in Hex, ASCII, Decimal, and Assembly language. The Sector Editor is used to examine or modify blocks on the floppy disk itself. This can be useful for repairing damaged files, unscratching files, modifying programs, and other uses as well. The Sector Editor also has a printer dump routine that lets you send the current displayed sector to the printer. There are also routines for changing the disk drive device number (if you are using more than one drive), displaying and printing a BAM (free space) map, and duplicating a block on the disk.

The next program on the disk is called the Format Editor. This is a collection of utilities that I found very helpful. A disk error checking routine is supplied that will investigate either a whole disk, or a specified track, for errors. There is a fast formatting utility (about fifteen seconds) and a write-protect utility that makes it impossible to write to a disk until you unlock it. This is very useful for keeping the kids from accidentally scratching your disk. The program also supplies an error writing utility that's necessary for copying protected software. There are some other useful items in this section, but I'll leave them for you to explore yourself.

The monitor I mentioned previously is called Drive/64 Mon. It's similar in function to other monitors, except that it allows monitoring of the disk drive RAM and ROM. All of the expected commands are available: Assemble, Disassemble, Fill, Hunt, Save, etc. Routines are supplied for transferring memory to and from the disk drive, and for printing disassemblies. Three versions for the monitor are supplied, each loading to a different memory address. This is very useful for debugging a program, as it allows the monitor to be loaded out of the way of the program you wish to examine.

The last program on the disk is the Arts Backup, used for making copies of Electronic Arts' disks. This is the first time I've seen a program designed specifically for

making copies of one software publisher's programs. It's a trend I'm not thrilled to see, but as long as software publishers continue to make obtaining backup copies of programs difficult, this will continue.

I have some general comments to make about *Di-Sector*. First, due to the way in which it works, you cannot plug any other other devices into the serial bus during the use of many of the routines. The modules using the printer and those using two drives are okay, but all others will not load correctly if you try to plug anything into the back of the disk drive. I don't like this. The use of graphics is excellent and most of the routines have full Help screens to assist you. I found the majority of the programs simple to use and well thought out.

I do have a bone to pick with Starpoint Software, and that concerns the documentation. As much as I found the program to be designed in a professional manner, the documentation left quite a lot to be desired. It had a "let's pat ourselves on the back" feeling to it that bothered me. Several small bugs in the instructions were annoying; additionally, some of the instructions were confusing and hard to follow. Although a novice can use the program without major hassles, I would have preferred to see a tutorial included, as well as some background information on software protection schemes. At the very least, a bibliography would help someone who's just starting out in this area.

All of my complaints aside, I believe *Di-Sector* is one of the finest buys on the market today. The combination of powerful disk duplicating programs and the Drive/64 Mon monitor is a one-two punch that's an absolute knockout. If you require either one of these software goodies, I highly recommend *Di-Sector*.

DISKPATCH

Blue Sky Software
$39.95

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	C	B	*Value for Money*

Diskpatch is a disk (or rather, sector) editor. With it, you can examine the contents of any block on a disk and modify it directly. Unless you are familiar with the uses of a disk editor, this utility is not for you. The documentation (if you can call it that) is a single, 4 by 11 inch sheet of paper that does not explain the possible uses for the program. It is poorly written and full of typos.

The program itself is easy to operate, and uses the function keys and another dozen single keystroke commands. You can display any track and sector you choose, step through the disk sequentially (either forward or backward), or follow a file logically through the disk (either forward or backward). Should you modify a block incorrectly, you may recall the initial contents from memory. Data is displayed in both hex and ASCII, and you can modify either one.

The program is apparently well-written, if not terribly exciting. As to its usefulness, my teenager was more enthusiastic about *Diskpatch* than about any other package I've given him for his evaluation. He has used it extensively to modify saved screens and/or positions from *Mr. Robot*, *Loderunner*, *Pinball Construction Set*, *Temple of Apshai*, and *Zork*. He has also mentioned "messing around" with friends' disks, to spice them up by adding a few little surprises when they run their programs. *Diskpatch* seems to be of limited use in your own programming applications.

If you understand sector editing, this is a good program to acquire, despite its poor documentation. If you do get a hold of *Diskpatch*, and have a kid at home, a word of warning: write protect all your important disks!

GRAFDOS

Interesting Software
$39.95

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B+	A	*Value for Money*

When Commodore gave computer users the 1541 disk drive, they gave us an intelligent drive that doesn't eat up memory and operates quite well. What Commodore didn't provide was a simple way to "talk" to it. If you want to scratch a file from the disk, you must type long cryptic messages that bear little resemblance to English. Also, if you try to load a directory from the drive, you lose the program in memory. Because of these shortcomings, I was very interested in *Grafdos*—a disk operating system for the 64 personal computer and Commodore's 1541 disk drive.

The package includes a mini machine language monitor, a mini machine language assembler, and, as the name suggests, it also adds some graphics commands to Commodore's BASIC. A command I've always wanted is one to list the disk directory without destroying the program in memory. With *Grafdos*, I simply type "Catalog" and the disk directory scrolls by. Two advantages over the 1541 DOS Wedge (special commands provided by Commodore for the 1541 drive) are that the *Grafdos* directory is formatted, and that the first part of the directory doesn't scroll off the screen if there is too much directory information to fit. Hitting the space bar allows the directory to continue listing.

With *Grafdos*, I can load programs without tagging the Load command with the number 8. If I ask *Grafdos* to intitialize a disk, it asks me, "Are you sure (Y/N)?" This prevents me from accidentally reformatting a disk with important programs on it. Renaming a program is easy. Just type in Rename, the old name, a comma (,), then the new name. I find this much easier than "OPEN 15,8,15, R0:PROGRAM=PROGRAMA", then "CLOSE 15". To scratch a file, enter the word "Delete." (You can access most of the *Grafdos* commands by merely inputting the first two letters of the command.)

The many other commands included with the disk operating system help make *Grafdos* an even more useful utility. The Stat Mem command performs a memory diagnostics to find bad RAM. The Stat Sys command diagnoses your whole system to make sure everything is all right. Sections of memory can be saved and loaded with Bload and Bsave. *Grafdos*'s new BASIC commands help you manipulate sound, cursor controls, error trapping, high and low resolution graphics, and the ability to move memory. *Grafdos* even gives you a bunch of the ever popular bells and whistles. For example, *Grafdos* responds to your hitting Control-G with a beep from the C-64's sound chip.

The *Grafdos* disk includes the aforementioned machine language monitor and assembler, as well as a number of demonstration programs that highlight its many uses. With *Grafdos*, I was even able to use the high resolution commands to plot graphics, as in LOGO. The only feature that disappointed me was the Update command. Update is the *Grafdos* version of Validate (or Collect, in BASIC 4.0). It is used to free up sectors on the disk. Use this command cautiously, because it will delete all Sequential files on your disk. Aside from this small flaw, *Grafdos* is packed with more utilities than most programs of this kind. As standard practice, Commodore recommends that you always turn on your computer first, then turn the disk drive on. I recommend that after you have done those two things, you boot up *Grafdos* and make your life as a programmer a bit easier.

KWIK-LOAD!

Datamost
$19.95

Overall Rating	A	A-	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Kwik-Load! is an impressive software package. It comes with two major programs: a quick loader and a quick copier (appropriately called Kwik-Copy). Datamost claims that this package loads and copies disk programs three times faster than standard disk operations. This is an understatement, if anything.

These programs work by using a wedge to change the normal disk drive DOS. Most Commodore owners have used the Commodore 64 wedge or DOS 5.1, which also modifies the DOS (in a much less dramatic fashion), to simplify commands.

The *Kwik-Load!* portion of the package loads in about five seconds into a small memory area at 52480. It remains there as long as the power is on—unless it is overwritten. (The Stop/Restore function may be used without destroying *Kwik-Load!*).

Using Kwik-Load! is extremely simple. After it is loaded, you load another program in the normal manner. The screen goes blank and your program boots up at least three times faster than usual. Its effect is most apparent when you use it in conjunction with lengthy programs. As the manual and packaging clearly state, *Kwik-Load!* is not intended for use with copy-protected software or disks that do not employ the standard Commodore DOS. *Kwik-Load!* almost never loads from disks protected by modified DOS loading techniques, and disks protected by error tracks won't load at all. The manual neglects to mention that *Kwik-Load!* does not work with many chained or linked programs either. The first program loads correctly, but the drive sometimes "hangs" when it tries to load the next program. This is the only unreliable feature I encountered in the package.

Kwik-Copy, a separate program on the disk, boots up considerably slower than *Kwik-Load!*, partly because it displays a colorful banner as it loads. Kwik-Copy is menu-driven; it offers six options on the main menu and several sub-options. Choosing Kwik-Copy brings up a secondary menu with three choices: full disk copy, active sector copy, or file copy. Full disk copy duplicates all 683 sectors on a disk. Copying only the active sectors is obviously faster if the disk is not full.

Selecting the full disk copy option brings up a third menu which lets you choose between using single or dual drives by specifying the device numbers. All these menus actually make for very easy and rapid operations.

This type of disk copier is most impressive. First of all, it's extremely fast. Only three disk swaps are needed to copy a full disk. If you're using a single disk drive, clearly stated prompts tell you when to switch disks. The manual suggests placing a write-protect tab on the original disk, which I think is an excellent idea.

Other similar copiers on the market include *German Fastback*, *4 Minute Copy*, *Quick Swap*, and *Fast Copy* by Thomas Templeton. All of them work in the same manner. They are all somewhat better than Kwik-Copy in that they can copy some types of protected software. They attempt to copy disks protected by error tracks—

Kwik-Copy aborts and returns to the main menu when it encounters an error track.

Since Datamost is a large and well-respected software publisher, this design decision is a sensible one, but it prevents consumers from making legal backups. The other copiers are really quite limited since most can only write Error #23 onto a copy, while a variety of other errors (and often entirely different methods of protection) are used on commercial programs. Kwik-Copy and its competitors have one other impressive function—they automatically format blank disks as they write the copy.

Kwik-Copy's file copy option is very fast, too, but it requires a previously formatted disk. It will copy files up to 192 blocks long. You can use the 1541 drive's asterisk (*) wildcard to copy several files in sequence. For example, "S*" will display the names of all files starting with "S," and ask you if you want to copy each one.

All of these copy procedures (full disk, active sectors, and file copy) also offer an automatic verify option that you select in advance from the main menu. You verify each byte after it is written. Naturally, this takes longer and really is unnecessary. Despite rumors to the contrary, the 1541 is a reliable drive.

The main menu also offers you a directory option, which displays the disk directory in alphabetical order. One screen appears at a time, so you do not have to hold down the Control key or continuously hit Stop in order to view the entire directory. After displaying a directory, you may write an alphabetized version of it back to the disk just by pressing Control-W.

The main menu also offers DOS Commands. It presents another submenu with four common DOS commands: Scratch, Rename, Validate, and Format. The menu, written in plain English, helps beginners use these commands effortlessly. Formatting only takes a few seconds.

The Edit Disk option—geared for advanced programmers—presents another menu for choosing the sector you want to edit (or simply display). First you name the track and sector. The data in that sector is shown in both hex and ASCII. The screen will not hold the entire sector at one time, so you must enter the Edit mode and use the cursor keys to scroll through it. You may edit any byte and write it back to the disk. You may also write the edited sector to a different disk. And though it's not specified in the manual, you can copy a sector from one disk to another by reading it from the first disk and writing it to the second.

The final function available with Kwik-Copy is both practical and just plain fun: it's a drive speed test. The 1541 should spin the disk at 300 revolutions per minute. To read and write correctly, the disk speed must be within a certain range of that speed. The manual says normal readings are 295 to 305 RPM. A graphic indicator needle is shown on the monitor under a scale that's marked from 290 to 310 RPM. The exact speed is also displayed down to one decimal point.

This was my first experience using a drive speed test for the 1541. My drive seemed to pass with flying colors, generally holding steady around 300.5 RPM. I also discovered that different brands of disks spin at slightly different speeds, implying some real variation in the quality of lubrication and friction. I did not, however, discover enormous variations.

The documentation is adequate. A small, fourteen-page, well-written booklet is included that contains detailed instructions and examples. The disk is copy-protected. A backup copy is available for $5 when you return the registration card to Datamost. I found no bugs or errors and experienced no crashes with *Kwik-Load.*

Even if you already have one of the other quick copier utilities, *Kwik-Load* is definitely worth buying. The load feature itself is, to some extent, a gimmick unless you work frequently with long, unprotected programs. With short programs, it will take you just as much time to load *Kwik-Load!* first as it would to merely load your program in the conventional manner. *Kwik-Load*'s combination of features, however, makes this package mighty attractive to almost everyone: disk editing for advanced programmers, easy DOS commands for novices, the speed test for sheer fun, diagnostic methods to pinpoint disk or disk drive problems, alphabetized directories (though these present drawbacks for more experienced users), and fast and easy disk formattting and copying for one and all. At the low price of $19.95, *Kwik-Load!* is a good deal.

SUPER COPY 64

Richvale Telecommunications, Ltd.
$29.95

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	D	*Value for Money*

Super Copy 64 is a disk maintenance package for the Commodore 64 and its 1541 disk drive. *Super Copy 64* provides a series of disk and file copy utilities that make using your disk drive much simpler. The program comes on a copy-protected disk with no backup. There's no mention of any backup policy in either the manual or warranty, and no customer support phone number is supplied (although the phone number for the Richvale company in Canada is listed in the manual).

When I loaded the program, the main menu appeared on the screen and offered me these options: Catalog Disk, Format Disk, Backup Disk, Copy Files,

Rename Files, Check Drive Speed, Change Drive Unit Number, Change Source/Destination, and Quit. The bottom two lines on the screen are status lines that show the number of blocks free on the source and destination disks, and the current disk status. The program resides entirely in memory, and once it is loaded, you may remove the program disk.

Most of the commands should be familiar to you: they are the same as the ones offered by the DOS Wedge on the Test/Demo disk that comes with your disk drive. Catalog, Format, Rename, Change Drive Number, and Scratch do just what they sound like they should, and offer no extra benefits over the Wedge. The backup disk program is of value. Although it will not back up any copy-protected disks, it will make copies in seven minutes with one disk drive, and in six with two drives. The Copy Files program prompts for a yes/no on each file on the source disk before it begins to copy files. This can be tedious if you only want to copy one or two files. The only unique portion of the program is the Check Drive Speed section. This gives you a test of the rotation speed of the drive, which may be useful if you know how to repair a disk drive.

The program makes good use of onscreen graphics and supports operations involving two drives. Owners of older 1541 drives (those in the light tan cases) should be aware that some users have encountered problems with the Disk Copy program. A difference exists in the serial bus between old and new drives. The manual is set in rather small type, and is perfect-bound (not a spiral or loose-leaf binder); it will not lay flat, which is a bit inconvenient. The program, however, is menu-driven and after using it once or twice, you'll see that the manual is not really essential. Frankly, better programs are on the market for expressly these purposes, and I cannot recommend *Super Copy 64* as a good value for the money.

1541 FLASH!

Skyles Electric Works
$89.95
1541 Disk Drive

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	A	*Value for Money*

My biggest complaint with new software for the Commodore 64 is the length of time it usually takes to load into memory, and how often it accesses the disk drive. The 1541 disk drive is one of the slowest drives in the computer world, and waiting two or three minutes for a program to load has been known to drive me buggy. Imagine not having to wait any more! Imagine all your programs loading in a fraction of the time they used to take! I'm not talking about buying an expensive parallel drive and IEEE interface, or about a software program that only works with a few commercial packages; I'm talking about *1541 Flash!*. *Flash* works with all software, copy-protected or not. It will speed up the loading of any program by a factor of three. That means that a game that usually takes two minutes to load will only take about forty seconds. But *Flash* is much more than just a fast-load solution; it also adds twenty-one extra commands to the Commodore.

1541 Flash! is a firmware addition to the Commodore 64 and 1541 disk drive. It is a combination of hardware and software (ROM chip) that is installed once and forgotten about. In most cases, all it takes is a screwdriver and a little patience. I found that although I was nervous about opening up my computer and drive, once I had read the instructions and begun the installation process, it was not as difficult or complicated as I had imagined. For those who do not wish to attempt it by themselves, Skyles offers a service to install *Flash* for $28.50. This normally takes about a week, plus shipping time. However, I suggest that if your system is still under warranty, you wait until the warranty expires, as installing *Flash* may void it. *Flash* has a four-month warranty and there is a customer hot line for help if you need it, or have questions.

Once *Flash* is installed, no work is required to use it. It is also possible to use a Commodore that has *Flash* installed with a drive that does not, but there will be no speed gain in loading programs. This preserves compatibility with other peoples' hardware if you need to swap equipment at some time.

It is also possible to turn off *Flash* if needed. For example, if you are writing a program that uses the disk access time for some constant, you might want to be running at the standard rate. This "off" can be done either through software or through a hardware switch.

Flash also adds quite a few conveniences besides the fast loading. Most commercial programs load by using a command that looks like this: LOAD"*",8,1. This can be simulated by hitting the Run/Stop and Shift keys at the same time. The default device number has been reset to 8 instead of 1. This means that when you want to load or save a program to disk, you no longer have to type ",8" after the program name. The default open has been changed from the screen to the printer. This makes listing a program much easier.

Most of us use the DOS Wedge that came on the Demo disk with our drives. That wedge is now in memory and does not need to be loaded. Just by typing a SYS command, it can be called up. This means that if you forget to load the wedge, and have a program in memory, you can still call the wedge without losing your program. Just type SYS65526 and there it is.

Flash also adds several editing commands to the Commodore: home the cursor to the bottom of the screen, clear the screen from cursor down, tab the cursor sixteen spaces from the left side of the screen, exit "quote mode" without moving the cursor, delete the line the cursor is on without scrolling the display, add CHR$(27) or (13) using a keystroke, and freeze the listing of a program using the Shift or Shiftlock keys.

There are also several advanced programming commands. These are used to transfer information between the disk drive and the computer. There is also an NMI debugger aid that will print what the processor is doing at any one moment.

The version of *1541 Flash!* that I am using is one that was designed to be used on the SX-64, Commodore's portable computer. Since this machine has no cassette port, there is a space in memory that is not used (a rather large space). This has been filled by *Flash* with two additional goodies. One is a minimonitor with the following features: memory list, go, gosub (used when a section of memory ends in an RTS instead of a BRK), load, save, verify, ASCII display, exit, and the wedge commands. There is also a scratch pad. This is a memory space "under BASIC" that can be used by *Flash* as a mini word processor. This scratch pad can be entered while you have another program running by hitting the Commodore key and the Restore key at the same time. You can write to the screen, save to disk, or dump to a printer, and transfer what was on the screen to the scratch pad before you entered it. When you are done, you can return to the program you had running at the point where you left off. This works with most software, and does not crash the program in memory.

It's difficult for me to hide my enthusiasm for *1541 Flash!* I think it is one of the most important new products for the Commodore. It elevates the 1541 drive to the level of a business quality (speed) disk drive at a reasonable cost. Once installed, it can be forgotten about, and works without problems. I have become spoiled, and would not give up my *Flash* for any offer. I recommend that you crack open your piggy bank, and purchase one today.

Entertainment

Sure, your Commodore is a powerful personal computer that handles some of your most important, practical tasks. But it likes to have fun, too. Its superb color graphics and sound capabilities make it an excellent game machine.

Since Commodore introduced the PET in 1977, home computer games have evolved from simplistic, low resolution games like *Pong* into complex, high-speed, high resolution extravaganzas like *Defender*. The days when animated sprites were a mystery to all but a few, and many thought *Pong's* one-dimensional, monochrome bouncing ball marvelous are long gone. Today's Commodore programmers are sophisticated and adept at using all of their machine's capabilities. Today's arcade-going public demands newer, better, and more challenging entertainment from their home computer. The worst of today's free, public domain software is just as good as, if not better than, those early VIC 20 alien invaders games. Many Commodore games are translations of Atari or Apple classics, or imitations of glitzy, quarter-eating arcade games. While some are mere shadows of their originals, many reincarnations benefit from the Commodore's three-voice sound and high resolution sixteen-color graphics.

Computer games can be likened to works of fiction. The hundreds of novels written each year have only a handful of plot types. Regardless of how well they sell initially (whether because they are different, the author is hot, or they are widely-promoted), few titles sell for longer than a few months. However, the handful that become classics continue to sell to newcomers year after year. The computer world has a similar elite, including *Zork, Dig Dug, Flight Simulator, Pac-Man,* and *Frogger*. They've inspired ranks of copy cat programs in their respective genres.

Each new generation of games is bigger, brighter, and faster than the previous one, as programmers strive to give the public more for their money. Prices tend to be high, so players want games that will be interesting and challenging for a long time. The novelty has worn off; people would rather spend five dollars for a couple hours in an arcade than pay twenty-five dollars for a Commodore game they'll tire of in a week. Protection schemes prevent them from copying games and trading them for others, so each one has become more valuable. And no one is going to buy a copy of a game he played on a friend's computer unless he found it quite compelling.

Commodore games—the good ones, anyway—are very graphics- and sound-oriented. Programmers who are on the ball make full use of the Commodore's color rainbow and superior sound; there's no reason to accept a Commodore game that doesn't. Arcade-style games are by far the most common—indeed, nearly half the games we reviewed are in this fast action, shoot-'em-up, gather the points fast genre. Unfortunately, only a small portion of them excell (by our standards) as arcade games. But you can afford to be picky.

Judging by sheer volume, Adventure games are the next most popular type. You assume a role—adventurer, detective, gladiator—and the game presents you with a series of problems. You decide whether to fight or run, take treasure, or talk with other characters in the game. Most accept your commands in English (go west, hit gargoyle...), and a few are joystick controlled. Some have graphics to help set the scene or offer clues not included in the text. Others are entirely text games; you read a description and type in your action. Text descriptions range from dry facts ("There is a lantern here. There is a troll here") to wonderfully detailed, sometimes frustrating responses ("A tiny lizard wearing a silver spacesuit stands by the path, leaning on a tinier crutch, and groans "Food. Food for the truth."). The third type of adventure game often lets you customize your character, his attributes and weapons. Usually these "role-playing" games stress defeating monsters and gaining experience over the puzzle-solving aspects emphasized by text adventures. Unfortunately, many adventure games are miserably slow to respond to your commands. Waiting for the program to find the appropriate response on the disk takes away the spontaneity. If the game is small enough to fit in memory (thus eliminating the need to read from the disk) it probably isn't very involved. Nevertheless, we've found some well executed adventure classics—*Zork* and *Ultima*, for example.

Home computers seem to inspire game designers' creativity. You'll discover all manner of sports simulations, including weightlifting and diving competitions that our reviewer found both interesting and fun. And the computer's speed and memory proves an excellent tool for tracking incredibly detailed war games. But even with all the creativity exhibited in this section, there's still some frivolous programming. You'll have to judge for yourself the usefulness of a computerized jigsaw puzzle or animated dancers.

Graphics are important in an arcade game, but those pretty pictures are pointless if the game has poor strategy. An adventure game that's especially challenging may have a terrible vocabulary. The harder the problem, the more versatility you need in telling it what you want to do. Don't assume a game you played at the arcade in the local shopping mall will be just as much fun on your Commodore, or that a bomb from the arcade will be just as bad at home.

The entertainment programs available today are a real *potpourri*. The sheer multitude of titles available suggests that many people use their computer largely for entertainment. We've divided the reviews into categories and subcategories to keep similar programs together. Within each section, the reviews are arranged alphabetically. Each section will give you a good idea of which programs are good and which are turkeys. As you read the reviews, keep in mind the aspects of each type of game that are significant to you, and look at all the grades. If you don't like a certain type of game, don't assume because we've given it straight A's that you'll have a change of heart. And remember, just because we downgrade a program doesn't mean you won't like it. Read the reviews to find out why we assigned the grades. Maybe the problem we cite won't bother you in the least. Consider whether you prefer joystick, paddles, or keyboard control. Do you want graphics in your adventure games, or are you an all-text purist? Just because a game uses low resolution graphics doesn't mean it's bad—perhaps the simpler graphics are perfectly adequate and high resolution would be unnecessary.

Shop carefully, look for games you'll play over and over, and don't forget, your Commodore wants to have fun.

—Mia McCroskey

General

BREAKDANCE

EPYX
$30.00

Overall Rating	B	Easy	*Challenge*
Creativity	B-	A	*Graphics*
Documentation	C	B-	*Value for Money*
Game Depth	C+	B	*Holds Interest*

Breakdancing is the latest dance craze to escape inner city obscurity and enter mainstream American culture thanks to the media of movies and television. Today, school kids of all ages are showing off their moves, a combination of deliberate puppet-like motions (known as "popping"), and gymnastic flips, spins, and rotations. They're breakdancing on sidewalks, in schoolyards, and in the playgrounds of America's big cities. Even where I live, ghetto Blacks and blonde beach kids earn a decent day's take by entertaining the tourists who flock to Ocean Front Walk in Venice, California.

Breakdance is an effective artistic simulation of this new dance fad. It consists of four games, but only the last one, in which you choreograph your own dance, was of much interest to the teen-aged breakers in my neighborhood. The others are very reminiscent of the old Simon Says game, where the dancer on the left performs one of five moves, and you must imitate him with the joystick-controlled dancer on the right. If you are successful, he adds a move. It is essentially a memory game, since you eventually have to reproduce a long series of breakdance steps, including spinning on your back.

The second game is a more interesting variation of the first. A gang of "B-boys" has invaded your turf and is challenging you to dance. You must outdance them by imitating their movements, or else they will push you down the street and off the edge of the pier. You move your dancer in front of a gang member, push the button, then begin imitating his steps in perfect order without making a mistake. Four or five correct moves later, the dancer vanishes with a pop, and you battle the next. Dancers appear first in pairs, then in threes and fours. You gain points as you progress, but the moves get harder.

The dance puzzle is the weakest and least interesting of the four games. The player has to match a four-, six-, or eight-move routine performed by a computer-controlled dancer. The dancer selects the poses and performs them in a certain order. Then the poses are shown on a selection screen, and you have to arrange them in their correct order. When you are done, both dancers are shown performing their routines. A radio appears in each of the school windows for each move that you have correctly matched. Boring!

Choreographing your dance moves in the last game is the highlight of the program and definitely the most fun. It can be played by one or two players. Each routine may consist of up to 255 dance steps which you can then save to disk for playback later in a dance competition. The disk contains enough room for sixteen different saves. Each competitor can choose his moves from fourteen different steps, including boogaloo (popping), up rocking, the moonwalk, heel spin, backflip, frontflip, suicide (flipping so that the dancer lands on his back), turtle, floor flip, hand spin, floor rocking, back spin, gyro (windmilling), and head spin.

Make your selections by moving the highlighted cursor up and down the list with the joystick. The animated frames for the move appear below when you press the button, and the number of the step is added to the growing sequence of moves. You can back up the current move position via the joystick at any time, and can correct any errors in your routine. Supposedly, you may erase your entire sequence by simultaneously pressing the Commodore and the Clr/Home keys; whenever I tried doing this, it never worked. This does not become a big problem, though, because you can just overwrite your old routine with a new one.

The animation in the playback is some of the best I've ever seen outside of *Movie Maker*. It is immediately obvious that a skilled animator who was familiar with breakdancing took part in this project. All of the moves look authentic. And when they are com-

bined creatively, the moves look very natural and realistic. It's always a lot of fun to perform a backflip that turns into a turtle, and work a series of gyros into a long head spin, followed by an obviously impossible front flip. Two players can compete simultaneously on the stage, and each player can slowly move his breaker around the stage. You will find this an effective feature when your dancer is moonwalking, or when you want the breaker to appear to be gyro-ing or turtle-ing slightly off-balance. Five types of music are available during the competition. All are computer-generated, but several sound harsh to your ears.

Breakdancing is a surprisingly fun program. I've tried it out on people who had little interest in the dance fad, and they got caught up in it and were thrilled. Try to get your local software dealer to give you a demonstration. Break on!

CRUSH, CRUMBLE AND CHOMP

EPYX
$40.00

Overall Rating	B+	Medium	*Challenge*
Creativity	A-	C+	*Graphics*
Documentation	B+	C+	*Value for Money*
Game Depth	B+	B+	*Holds Interest*

In *Crush, Crumble, and Chomp* you can play one of six featured monsters (or one of your own home-grown creatures) as you attack the city of your choice: San Francisco, Washington, D.C., New York City, or Tokyo Harbor. With your fiery breath you can burn entire cities or smash them underfoot. You can block roads with your webs and escape underground where tanks dare not tread. As a monster you can tear apart bridges with your tentacles, emit an ultrasonic scream as you grab members of the populace, and fly over a city of smoking ruin.

Of course, being a monster isn't easy. You're always hungry. A good rule for proper monster nutrition is: if it moves, it's edible. And the city, played by your friendly computer, has an arsenal of police cars, tanks, artillery, helicopters, National Guard, and an indomitable mad scientist to fight back with.

You control the monster with a variety of keyboard commands. All monsters have a basic command structure that controls general direction, head position, and movement. Some monsters can burrow, another can fly. All can crumble buildings or grab individuals fleeing in the crowds. Each has its specialty, like (A)tomize or (U)ltrasonic Scream, (B)reathe Fire, (W)eb (weave obstructive web), or (Z)ap flying units with ray gun. Control is only slightly sluggish in the Commodore translation. This is because you're taking turns with the computer and sometimes it's not ready for your next command. Be patient; the computer has to update the screen and attack before you can make the next move. Also, you can't change your mind once you type a command and must wait for your next turn to correct your error.

You can monitor the game on a map as you move around sections of the city. Your monster's health, his hunger status, head position, and general direction are all displayed on the right side of the screen. The head position is displayed in all its living facial monster horror. It keeps you aware of who or what you are.

Yes, this game is for real and it actually can be fun to play once you get used to the keyboard controls. It is certainly a way of releasing your aggressions and no different than those shoot-'em-up games where you play the good guy and kill the aliens.

The graphics are a little disappointing. The display map and animation are done with animated character set graphics. Crude oversized sprites are used for the monsters. As a translated Apple game, it does not take advantage of the Commodore's scrolling capabilities. Instead, this game laboriously draws a new map once the monster goes off the edge of the screen. Despite the game's rather slow play, and steep price, it offers a lot of creativity, is challenging, and is well-documented in a lengthy but humorous vein.

DANCING FEATS

Softsync, Inc.
$29.95 disk/$24.95 cassette

Overall Rating	B	N/A	*Challenge*
Creativity	B+	B-	*Graphics*
Documentation	C+	B	*Value for Money*
Game Depth	B	B	*Holds Interest*

Aspiring musicians who want to create pleasant-sounding compositions without first acquiring much formal musical knowledge will appreciate *Dancing Feats*. It controls the background beat, tempo, and chords while the performer, using a joystick, chooses harmonious notes. The notes are harmonious with each of the C, F, and G chords because all others are filtered out. Each of the eight positions produces a different note; these are displayed as colored bars on the screen. The note is predictable for any given chord, and pressing the button lowers the notes one octave. The chords themselves, which change randomly during the impromptu composition, add to the total quality of the piece.

The composer can change the tempo, beat, bass, style and finale of his composition. For example, one

can choose among jazz, rock, blues, and boogie-woogie beats. Compositions lasting up to one hour can be recorded to disk and played back later.

The program will appeal to the accomplished musician, as well as to someone who cannot read a note. *Dancing Feats* lends itself to experimentation with both the music and graphics. It is fun to use the joystick as a "musical instrument" and attempt to produce a pleasantly melodic creation with a colorful rainbow effect. With *Dancing Feats*, you now have the enjoyable opportunity to become a one-man band ... instantly!

DRAGONRIDERS OF PERN

EPYX
$39.95

Overall Rating	C	Medium	*Challenge*
Creativity	C	B+	*Graphics*
Documentation	C+	C-	*Value for Money*
Game Depth	B-	C-	*Holds Interest*

Dragonriders of Pern is a strategy/action game based on Anne McCaffrey's fantasy novels. Creating a game based on a book or film can be a tricky business; the designer must predict exactly what the potential audience will want. Most designers opt for either pure strategy, as in *War of the Worlds*, or arcade action, as in *Star Wars* or the James Bond series. *Dragonriders of Pern* unsuccessfully tries to meld the two.

In *Dragonriders*, you must protect the land of Pern against the dreaded "Threadfall"—when spores that destroy organic matter fall from the sky, killing all flora and fauna on the surface. Threadfall comes every 240 days, when the Red Star passes at the end of each turn (that's a Pernese year). Up to four players each command a "Weyr" (or dragon lair), sworn to protect the neighboring Holds (castles) and land from the Thread. To win, players create alliances with Lord Holders and Craftmasters to strengthen their Weyrs, then send out their dragons to destroy the thread when it falls. The game ends when players meet one of three conditions: twenty or more Holds become infested with Thread; a player receives twenty victory points for negotiated alliances; or time runs out.

If you think this sounds a little complicated (or tedious), you're right. Negotiations take up about three-quarters of the game. A series of screens shows names, numbers, descriptions, and events. The computer controls Weyrs without player-leaders, and everyone, computer included, jockies back and forth to gain the strongest allies. Try as I might, this seemingly endless procedure never excited me very much. Looking at names and numbers just isn't much fun for very long. Nor could I muster any interest in the thread-fighting sequences. You use the joystick and spacebar to control the dragon's ponderous movement. Despite varying skill levels, the action is depressingly static. Worse still, players must take turns using the same joystick and keyboard.

The lengthy, poorly organized documentation doesn't cover some major points. For instance, it never makes clear the exact relationship between forming alliances and threadfall—vital to the game. However, *Dragonriders of Pern* displays some splendid graphics. Unfortunately, graphics screens are few and far between. It has nice music, and you can adjust the game's difficulty, length and speed (the shorter and faster, the better, I say).

Dragonriders of Pern may appeal to McCaffrey's literary fans, but there are plenty of forty-dollar games out there with far better action and strategy for the rest of us.

DUCKS AHOY

CBS Software
$29.95

Overall Rating	B-	Easy	*Challenge*
Creativity	C+	B-	*Graphics*
Documentation	C+	C+	*Value for Money*
Game Depth	C	B	*Holds Interest*

Ducks Ahoy is an amusing little game for three-to six-year-olds. The premise involves a fictional "Ducks Ahoy Day" during which it is your job to transport the Venice ducks from their canal homes to the boardwalk where they can get together with their pals at the beach. (Though it's not specifically stated, the game's locale sounds like it's Venice, Italy rather than Venice, California.)

Using a joystick, you guide a boat through the canal grid. The ducks, accompanied by music, waddle around their houses as they make their way to the dock. You must dock the boat before the duck plops into the water. When you've collected one or two ducks, you sail to the boardwalk to let them off. The only real danger is the grinning pink hippo waiting in the canal to sink your boat. While there's no penalty if a duck jumps in the water before you arrive, your boat will sink if ten of the cute creatures plop into the water, if a duck jumps on the bow (which occurs when the vessel isn't properly positioned), or if you try to fit three ducks in one boat.

Young kids will find the game rather cute and entertaining. The graphics are colorful and the musical score is a delight. *Ducks Ahoy* is a game that gives children the chance to think logically, as they plan a successful

route for picking up ducks without running into the enemy hippo.

FAX

EPYX
$29.95

Overall Rating	C-	Medium	*Challenge*
Creativity	C-	N/A	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	C	C-	*Holds Interest*

This trivia test lets one or two people play, offering a chance for competition between two. You can choose among four categories: sports, history, entertainment, and a grab bag. The double-sided disk package contains a total of 3,700 questions in multiple choice format. You choose from among four answers, one player indicating his choice by pressing numbers 1-4, the other by pressing numbers 6-9. You have several seconds to read the question before four answers appear and you must make a choice. The point value awarded for the correct answer falls rapidly, forcing you to choose quickly. Since you can only make one choice and since the game doesn't penalize you for incorrect answers, *Fax* strongly favors guessing. A 5,000 point guess is worth more than a 2,000 point correct answer if it takes that long to read all the answers and enter the correct choice.

The questions vary according to the level of difficulty set at the beginning of the game. Most of the questions are straightforward, but some deliberately trick you. For example: In football, does the guard play offense or defense? Which white wine is made from red grapes? On the other hand, some questions are either humorous or riddles. For example: In cannibalism, what is the goal?

I found *Fax* somewhat entertaining, but the ability to win by guessing mars the challenge. Also, it could do without the riddles, which break your concentration. The answers aren't always correct, anyway; you need to figure out what the authors think the correct answer is. Despite its merit, other similar games offer more challenge.

FUN WITH MUSIC

EPYX
$30.00
VIC 20

Fun with Music, from EPYX, is a plug-in cartridge for the unexpanded VIC 20, which lets you create music and use that music in an arcade-style game. It is recommended for ages six and up. For a complete description of this program, please see the review in the Education section of this book.

GATES OF THE INCAS

Umbrella Software
$39.95

Overall Rating	C-	Medium	*Challenge*
Creativity	B-	C	*Graphics*
Documentation	B	D	*Value for Money*
Game Depth	C	B-	*Holds Interest*

If you enjoy visual puzzles, *Gates of the Incas* will be a sure challenge. In this game, you are a treasure hunter looking for loot hidden in the inner rooms of an Incan temple. Each room contains gold and treasures, but to get to the riches you must satisfy the spirits that guard the temple. The ancient builders of the holy place designed magic gates with secret locks secured by symbolic combinations to keep intruders out.

Each gate is covered with nine symbols arranged in three rows. But the crafty builders created intentional flaws in their work. To open each gate and gain access to the treasure beyond, you must first detect the flaw and shine a beam of light on it. The flashlight you carry with you will do the trick nicely.

If you are correct, the gate slides up, allowing you to enter the room and pocket the loot. If you are wrong, the spirits will suspect you're some sort of treasure-seeking Indiana Jones, out to plunder their holy shrine. If you can't quickly satisfy them by picking the correct flaw on the gate, the protective spirits will cause the earth to tremble and the temple to crash down upon your larcenous head. Once past the first gate, you're faced with another, then another, then . . .

The puzzle gets tougher when you reach the sixth gate and your flashlight's batteries begin to fail. You can see and study the entire puzzle on gates one through five. From gate six to gate ten, you can only see a small portion of the puzzle at once. To view all the symbols, you must move the flashlight around and try to remember what you've seen. However, the spirits are impatient; as time passes and you delay in solving the puzzle, they begin removing the treasure hidden behind the gate, concealing it elsewhere in the temple. Take too long to detect the flaw, and the room will be empty and all your mental efforts will have been for nought. Fail to solve the puzzle, and the spirits will realize that you are in truth only a thief, and both you and the temple will be destroyed!

To open the fifteen gates, you must have a quick and active mind. The hidden flaws are not easy to spot. Sometimes the error is a color. Sometimes a symbol is

wrong or out of place. Sometimes a single portion of the puzzle is tilted a bit differently from the rest.

I found the puzzles difficult to solve even when the clock ticked slowly and I could view them all at once. But when the flashlight began to dim, I realized I was no Indiana Jones. While attempting to open the gates of the Incas, I collected more rubble on my head than gold in my pockets. I found the spirits unreasonably suspicious and impatient.

The program literature suggests that the educational value of *Gates of the Incas* lies in its ability to test "recognition of shapes, numbers, colors, and rotation." Furthermore, it is "an exercise in logic perception that challenges your reaction and memory skills." Without question, *Gates of the Incas* does all that. And it may also be a good game for patient older children or adults with good memories, who are not easily frustrated.

Unfortunately, the program offers no selection of difficulty levels for beginners or young children. I suspect a few TV screens will catch a fist or two when some frustrated users get tired of watching the temple crash on top of their heads.

The timer in *Gates of the Incas* starts at a quick pace and gets faster. The puzzles begin with complicated symbols and get harder. Whenever a gate slid open for me, I felt a sense of relief rather than relaxed enjoyment. Then, before I could even catch my breath or count my loot, *Shazaaam!*—another gate with a new puzzle for me to solve appeared.

Umbrella Software guarantees *Gates of the Incas* to be free of defects for ninety days, and will replace any defective disk free of charge during this warranty period. No mention is made in the manual or on the packaging regarding a replacement agreement after the warranty expires.

If you enjoy puzzles, *Gates of the Incas* is a challenging test that you may want to give a whirl. At a steep $39.95, however, I think the program is overpriced. Because of the cost, I suggest you try it out before you whip out your felt-tip marker and checkbook.

I.Q. BASEBALL

Davka Corp.
$24.95

Overall Rating	D	Medium	*Challenge*
Creativity	D	D+	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	C	D+	*Holds Interest*

Somewhere, lying like a small, unexploded bomb in the ruins of *I.Q. Baseball*, is a half-way decent idea for a computer game. That idea combines a baseball trivia quiz with a graphics representation of a real baseball game. Unfortunately, I found the Davka Corporation's hybrid completely satisfactory, both as a trivia test, and as a baseball simulation.

I.Q. Baseball replaces the confrontation in the game of baseball—hitter versus pitcher—with question versus answer. The computer asks a multiple choice question concerning some aspect of major league baseball. If the player gives the wrong answer, he is out; if he gets it right, it's a hit. Depending on the difficulty level of the question, the hit may be a single, double, triple, or a home run. (That, at least, is what the Official Rules say; in many cases I could see no connection at all between the difficulty of the question and the number of bases awarded.) One or two persons may play. In the solitary version, when the computer is at bat, the player still answers questions, but a correct answer counts as an out against the computer, and a wrong answer as a hit. The computer keeps track of the number of hits and runs made by each side.

Upon loading the disk, the player is given a choice of "major league" or "minor league" questions. This is unfortunate terminology, since both sets of questions concern major league baseball, but the "minor league" questions are somewhat easier. And the questions are neither well praised nor necessarily accurate. For example, this is a major league question: "This pitcher was 24-12 in 1971 and 3-15 in 1972. Answer choices: a. Jim Merritt b. Bill Singer c. Ron Bryant d. Wilbur Wood."

You hit a single for answering this correctly, which is very hard to do since the correct answer should be "none of the above," according to the *Baseball Encyclopedia*. While this is the only verifiable error I've encountered, it does not inspire confidence in the rest of the game. Nor do the numerous misspellings (such as "Lem" Barker, or "Your Wrong," or the Cleveland "Indains") show an acceptable level of attention to detail. The minor league questions aren't much better: according to baseball rules, if a ball hits an umpire, it's dead. Answer choices: a. true b. false." The computer says the answer is "b. false," but the actual answer is "it depends" (ask any umpire).

Despite the above examples, I found the questions in *I.Q. Baseball's* major league section generally interesting and challenging. The minor league questions suit younger fans, or anyone with a less slavish devotion to the game than I have. Still—and this is a big still—there are only one hundred questions in each level on the main disk. This, to me, is quite inadequate. Furthermore, I got thrown some of the same questions in each of the first few games I played. *I.Q. Baseball* will not hold up to repeated use.

Certainly, the programmers did not have to design it this way, considering there are over four hundred free blocks on the game disk which could hold additional

questions. Need I add that supplementary question disks—twenty-seven in all—are available from the manufacturer at $14.95 each? There are disks for each of the twenty-six major league teams, and also a special World Series disk. (How could there even *be* two hundred questions on the Seattle Mariners? Or even one hundred, or fifty, or twenty-five? Oh, reason not the need!) I tried the World Series disk (412 blocks free). The questions are comparable in quality to the main disk.

I.Q. Baseball's graphics are a *major* disappointment. The designers included a plethora of cute little touches, but left out the heart of the matter. An American flag glides across the diamond; we hear the last bars of our National Anthem; the pitcher warms up; we hear "Take Me Out to the Ballgame"; when a pitcher is knocked out of the box, we hear that "Hey-hey, Good-bye" song; when there is a rain delay, little umbrellas pop up at each base; and so on. Very cute, but the action itself is excrutiatingly slow. The ball flies to the same general area over second base each and every time; there is only one fielder (who shows up at random, from nowhere, to catch some balls that should be hits); and the computer must access the disk drive for a question after every play, at which time the entire field momentarily disappears. The waiting becomes extremely tedious. Worst of all, you, as the ballplayer, make no real baseball decisions in this game. You just answer the questions and watch the little men run around the bases.

I cannot honestly recommend this program. The more you love baseball, the more annoying you'll find it. Five years ago, this would have been a book; it certainly cannot justify its current existence in computer program form.

MOONDUST

Creative Software
$34.95

Overall Rating	C-	Easy	*Challenge*
Creativity	B	C+	*Graphics*
Documentation	C+	C	*Value for Money*
Game Depth	D	D+	*Holds Interest*

Moondust is an entertainment program that truly defies categorization. Some people might call it a game, others a formless sound and light show. It is definitely the most spaced-out computer video game on the market! If anything, *Moondust* can be called a piece of interactive electronic art and music. Jason Lanier, the programmer, just marches to a different drummer. This game is pretty, but it's about as weird and unstructured as *Alien Garden*, his first Atari game.

You are in control of a Spacewalker, one of seven brightly-colored objects on the screen. The other six ships, all in constant motion automatically turning at the screen's edge, can be made to follow the joystick-controlled Spacewalker's motion, as in a ballet. Ships get out of phase, though, when they make their graceful turns at the boundary. The results are often mayhem, with ships going in all different directions. You have to watch all of them, for if you collide too often with a ship, you can be knocked out of the game.

Each of the seven objects leaves brightly sparkling trails of moondust in its wake. Every move you make with the joystick affects the background music. Pushing the joystick up or down raises or lowers the pitch; pushing right or left changes the note or chord structure. You can play with the ships and sound effects for as long as you want in the "freestyle" mode, but if you prefer, a game is provided.

The object of the game is to drop one of three seed squares far from the center, then guide the ships across the seed until it spreads out into a stream. If you can lead the stream across the bullseye center target, you gain additional points and a bonus seed. The hardest thing is to avoid crashing into another ship. Three hits and you are out. A couple of variations exist in the game. In the hardest one, the dropped seed quickly moves off the screen. You have to be fast and spread those seed squares before it vanishes.

Obviously, *Moondust* is not for everyone. If you are looking for a conventional game, forget it entirely. But, if you're looking for something relaxing and unusual, or you are into transcendental meditation, try it. It's hard to give *Moondust* precise ratings, so don't take the above grades too seriously.

PERPLEXITY

Daybreak Software
$29.95

Overall Rating	D	Medium	*Challenge*
Creativity	D	C+	*Graphics*
Documentation	C	D	*Value for Money*
Game Depth	C	D	*Holds Interest*

PerPlexity offers three classic puzzles adapted to the computer. Each puzzle can be worked in either Regular or Contest mode. You may select Electro-Connection, Tricky Trip, or William's Warehouse Worries. Tricky Trip is a single puzzle, but the other two are collections of puzzles of increasing difficulty.

Regular mode provides hints and feedback, or even the solution. You do not ask for help; the computer watches over you and offers help when it thinks you need it. In Contest mode you're on your own.

Electro-Connection requires you to connect four points to four matching points without crossing any lines. It presents three variations. Contest Mode times

your attempts, so you can compete with other players or your own past times.

Tricky Trip presents a map of twenty-three cities which you must visit by traveling over each road only once. It has one correct solution.

In William's Warehouse Worries you slide crates around to match a certain order. You have six levels to conquer.

The vendor claims that *PerPlexity* is for ages seven and up. But I warn you, don't expect your seven-year-old to do well with it. In fact, you may even have a hard time at first. Electro-Connection requires you to draw connections from one point to another using function keys, and if you hit a wrong key you have to start over. This is a major irritation. Why not use cursor keys or a joystick?

Even if you love these kinds of puzzles, *PerPlexity* will disappoint you. Once you have solved the three puzzles, the program becomes a bore. You could wait to spring it on someone new, but that isn't much fun for you. The only reason that I stayed with it and solved all the puzzles at all levels was because I had to write this review. The program's best part is the beautiful display of the Daybreak Software logo at the beginning of the program, but that's not worth my $29.95.

PUZZLE PANIC

EPYX
$32.00

Overall Rating	B-	Hard	*Challenge*
Creativity	B	C+	*Graphics*
Documentation	C+	B-	*Value for Money*
Game Depth	B	C+	*Holds Interest*

Ken Uston, the renowned blackjack expert, has devised a series of clever and diabolical puzzles to test your reasoning ability, coordination, powers of observation, and memory. Eleven series of puzzles are offered which have from two to six difficulty levels. Some of the puzzles have clearly stated rules or at least hints in the instructions, while others leave you in the cold to figure out what you're supposed to do. And when you solve all of the puzzles and you know what all of the symbols mean, you can face the big challenge: Metasequence.

The game begins with your joystick-controlled player, "Benny the Bulb," on a field of question marks. Two doors with symbols on them are present. Try one! Oops, wrong door. The tunnel wraps back to the same screen. Try the other one. The new screen has a few triangle shapes and several square ones. A message says "Triangles First." With a monster in pursuit, you have to change each of the triangles into other shapes without accidentally touching a square. The monster is faster than you, but you can wraparound from one edge to the other, while he cannot. You have to be careful not to collide with the wrong shape at the opposite edge. You can always escape a puzzle and get to the menu screen by pressing F2. You can cycle through the levels within any family of puzzles by pressing the F1 key.

An interesting puzzle called Color Climb will test your mettle. Five columns of randomly placed color blocks are presented. Each column has a different color on any one row. While you can easily move Benny between columns, you can only climb on that color when the doors at the top of the screen are the same color. Every few seconds, the colors change randomly. Normally, reaching the top would not be very hard, except that in this case, you are being timed. The second level is slightly more difficult, in that two colors are displayed on the doorways. It does not take long to discover that the odd-colored doorway is the right one, but on level three, each door is a different color. Now you begin to see why these puzzles can be so maddeningly diabolical.

Another puzzle is a memory test, where you have to figure out what you must remember. You have to pay close attention to both the colors and shapes as they are scrambled from screen to screen.

A Ken Uston game wouldn't be complete without a card puzzle. You will see four sequences of five cards each. The card moving across the top belongs to the end of one of the sequences. You must quickly reason this one through before the card vanishes off the right edge. You can then choose another video challenge, a puzzle called Computer Response. Here, you have to move Benny from the top left of the screen to the blinker at the opposite corner, through a grid of alternating colored shapes. Each time you move, the computer responds in a predictable pattern. It might move you left two squares (if you land on an orange shape) and up one (if you land on a green one). The trick is to outsmart it and reach your target with the fewest moves possible. The first few levels are easy, but the fourth just doesn't work out. (Or didn't for me, no matter what I tried.) Rather frustrating!

Have fun with the four racoons and the chaser. You must tag each of these unmarked creatures in the correct order. What order? Who knows! You have to keep an eye open for clues as they chase you. The wraparound escape is the only way to survive for more than a few seconds.

These puzzles, among others, will certainly test your reasoning, problem-solving, and coordination skills. It is a game that requires perseverance and much patience. *Puzzle Panic* will no doubt appeal to a select audience.

SAMURAI PAK

ComputerMat
$29.95

Overall Rating	C	Hard	*Challenge*
Creativity	D	F	*Vocabulary*
Documentation	D	C	*Value for Money*
Graphics	C	0	*Save/Restore*

Samurai Pak is a collection of five games, two of which, Shogun and Ninja, are war games with Japanese themes. Two others—Adventure and Caves of Silver—are extremely limited text adventures. The final game, Shuttle Voyage, has apparently been thrown in to make the package look like an unbeatable value (five games for only six dollars each). It is a rocket simulation, more or less of the *Jupiter Lander* type. If Shogun and Ninja sound like your cup of sake, the package is probably worth buying. The other three games are too undistinguished to add any significant value.

The *Samurai Pak* games come on three cassettes. One tape is devoted to the space game and the adventures. Shogun and Ninja each have their own tape, recorded on both sides. They are copy-protected, and may be hard to transfer to disk if you've got a disk drive system. When you finish a game and have a chance to play again, don't hit any key but "Y" if you want another round. (The program resets the computer with a cold start, and you will lose the program.) Reloading the game takes several minutes from the painfully slow cassette format.

Shogun, the best game of the lot, is a credible war strategy game. Your mission is to gather 600 men and the equipment needed to successfully storm Osaka Castle. Each keystroke consumes one of the 365 days that you are allotted to accomplish this task. On the way, you encounter groups of hostile samurai, ronin, and ninja. You check a list that gives the relative strength of each party, then decide whether to fight or run away. Either decision affects your manpower. If you fight and win, the surviving enemy forces will join up with you; if you run away, your men will desert their cowardly commander.

As you begin the game, you can locate only the mountain oracle and the Osaka fort. The oracle tells you where to find the equipment you need. Until you capture a map, you can't see your destinations on the screen. Even when you do see them, you can't get in without first visiting the oracle. Each trip uses up precious days. Shogun relies heavily on a strategy of balancing men, materials, distance, and risk. If you run out of time before you collect the men and equipment you need, you are asked to make the "happy dispatch" (suicide) required of an honorable failure.

Shogun effectively employs graphics and throws in sound effects for added texture. The movement screen and the fight screen both use redefined character graphics creatively. When you arrive at various settings (like the pagoda), you're treated to a spectacular hi-res interior scene. While these hi-res screens are not directly relevant to the action of the game, they do add a certain depth and an attractive visual aspect to the playing experience. (Each piece has its own scene.)

Ninja is a maze game in which five men must penetrate the Khoga stronghold and recover the Imperial Sword in time to save the Emperor's government. Each man in turn selects tools and moves into the maze which contains randomly placed (and invisible) threats, such as guards, trapdoors, and mines. When your man encounters a threat, you have two seconds to type the first letter of the correct tool needed to counter it. If you fumble, or hit the wrong key, you are doomed. As each man dies, another rushes into the fray. Any doors unlocked by his predecessor remain unlocked, but gains, such as keys, are lost in death.

Each time you enter a room, you see a hi-res interior scene which identifies the setting. Once again, the superior graphics add texture but are not strategically necessary. Ninja is difficult to play. Response time is critical, and the prompt that indicates what threatens you is hard to see if your display screen is at eye level or higher. I found this game rather frustrating, but I can understand why many players would enjoy its challenge.

Finding out what tool counters which threat is a trial and error proposition. Other than loading instructions, *Samurai Pak* supplies no printed instructions (boo!). The instructions which preface the series are inadequate and leave out a great many things I wanted to learn in order to play the games. (Remember that in Ninja, you cannot refer back to the instructions, so take notes when you begin the game.)

If you have played an adventure game more sophisticated than the average public domain text adventure, Adventure and Caves of Silver will seem hopelessly inferior. Adventure recognizes nine key words, of which two are "quit" and "score." After eighty-eight moves using every combination of words I could think of, I gave up without entering the cave. Caves of Silver recognizes only the initials of six directions. Without the wit of a *Zork* or even the strategy of an *Atlantis*, I got bored after only two dozen moves into the adventure.

Shuttle Voyage is a credible space voyage simulation. You balance speed (one of three routes), and profit margins (including perishability and weight of the cargo). If you stay within the speed limit and don't go too long without sleep, you may finish the run to Pluto, provided you don't get hit by a meteor shower. You have frequent opportunities to park at a space station to refuel and take a nap. However, if you do take a nap, someone (or something) apparently siphons off your fuel. One time, I filled up so much, that I spilled four excess units. After my nap, I was down over forty units! Since the instructions didn't mention a

word about thieves, I suspect the program still needs some finishing touches.

You can buy better adventure games than Adventure and Caves of Silver in many public domain collections at a fraction of the per-program cost of *Samurai Pak*. Shuttle Voyage is another type of program that's easy to find in the public domain. None of the three non-Japanese theme programs have graphics.

Samurai Pak may be worth its price to you if you really like war strategy games. Shogun is a good representative of the genre, and if you like Shogun, you'll probably enjoy Ninja, as well. However, I personally feel this collection of entertainment programs is not first-rate, by any means.

SPACEPORT

Umbrella Software
$39.95

Overall Rating	C	Medium	*Challenge*
Creativity	C	C+	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	C	C-	*Holds Interest*

Spaceport is a memory challenge that requires you to recall color sequences. The setting is a large space station where ships of various colors arrive for refueling. As Space Contoller, your job is to send the ships on their way in the proper order. As your skills increase, you advance through twelve skill levels, from Space Private to four-star Admiral.

The game bills itself as being suitable for toddlers, but challenging enough to captivate adults. In general, I agree. My three-year-old enjoyed *Spaceport*, and I found the upper levels sufficiently challenging. But even though the game allows for two players, we had trouble playing together. Each player has three lives; a player's turn continues until he loses that life. By the time I lost my first life, my daughter was no longer interested. It would be much better if alternate play among the players took place more frequently.

The concept behind *Spacepost* is not an earthshakingly innovative one, but it is well-executed. An interesting feature is that the single package includes versions for both the Commodore 64 and Atari computers, one on each side of the disk. The program is written in BASIC and uses sprites for all the graphics. Play is a bit slow at the lowest levels, but that seems to be according to intentional design and is not a result of BASIC. At the higher levels, the speed of play picks up.

Documentation for *Spaceport* consists of a four-page booklet. Detailed instructions for booting up the game are included. Beyond that, the information is sketchy, but adequate. Some educationally-oriented hints for parents would be useful additions. And, since the program does not disable the Stop key, I would have appreciated some information on how to cope with inevitably crashing the program with it. *Spaceport* has a ninety-day warranty, but offers no information about purchasing a backup/replacement copy. I had no trouble, however, making my own backup.

The game looks and sounds good, but not outstanding. The sound effects are okay, but seem all too familiar. The various colored spaceships are very nicely done, but the explosions (when you select the wrong color) are weak: you see nothing but changes in sprite sizes (a pretty obvious technique).

Spaceport is a fairly good game and a decent memory exercise, but at $39.95, I think it is overpriced. If it were to retail for $10 less, I would consider it a good buy. It surely is not in the same league as the $40 games, and the fact that it has a certain degree of educational value is no excuse for an inflated price tag.

TIME BOUND

CBS Software
$31.95

Overall Rating	B-	Medium	*Challenge*
Creativity	B	C	*Graphics*
Documentation	B	C	*Value for Money*
Game Depth	B-	C+	*Holds Interest*

Time Bound is an educational game from the Children's Television Workshop, the folks who created *Sesame Street*. It teaches the order of events, discoveries, inventions, and completion of landmark buildings in the time-frame of modern history—1 A.D. to 2,000 A.D. Since the memorization of events, along with their corresponding dates, does not appeal to most kids, *Time Bound* presents the pertinent facts as background information which is used to rescue Anacron, a mad scientist who is trapped in a time warp.

Your time machine carries you backward and forward through time. On board are a scanner and screen that's divided into eleven quadrants. These quadrants represent the division of events into eleven categories: political leaders, architecture, air and space, sports, communication, and so forth. You move your scanner around the outer band of your screen with the joystick as you travel through time.

When a red, circular event is caught by the scanner, time stops at a particular year and the event is displayed at the top of the screen. For example, the sport of tennis was devised in 1793. If you stay in one particular quadrant, you could learn about all of the events in a particular subject, such as communications. Anacron's current location is also displayed at the bottom of the screen. If you know approximately when the event he's near took place, you could rush to that time period,

locate Anacron's blue circular blip, and catch him. However, he doesn't stand still for very long; a beep indicates that he is traveling again. Depending on the level, Anacron either stays within one category or switches to others. While time travel is automatic, you can control time's direction with the space bar, and accelerate to faster speeds until you accidentally, or intentionally, catch an event which immediately stops you. If you are in a hurry, it's easier to proceed forward in time because events stream outward from the center, giving you enough reaction time to move your scanner. You can't avoid them when they stream inward as you proceed backward through time.

This imaginative game provides a subtle, painless way for children to learn history—if they have any hope of winning, they will soon have to learn the skill of approximating the time period during which key events took place. While it is possible on the easiest level to recongnize Archon's event category, then fix your scanner to that quadrant and travel until you run into him, this is impossible at the advanced levels. The fifteen minute time limit almost guarantees that most players will have to exercise their minds. While *Time Bound* is not an exciting game, either visually or in terms of game play, it is quite interesting and original in concept. The main value of the game lies in its ability to make your child think. *Time Bound* provides good family entertainment for adults as well as kids.

TUK GOES TO TOWN

Mindscape, Inc.
$34.95

This game package emphasizes several educational areas, including spelling and vocabulary building, computer literacy, and visual discrimination. *Tuk Goes to Town* maintains a good balance between instruction and entertainment. While playing the interactive adventure that makes up the main part of the program, the child gets to play a number of other extremely appealing and educationally pertinent games. (For a complete description of this program, please refer to the review in the Education section of this book.)

WEATHER TAMERS

CBS Software
$39.95

Overall Rating	B+	Easy	*Challenge*
Creativity	B	A-	*Graphics*
Documentation	B-	B-	*Value for Money*
Game Depth	B	B-	*Holds Interest*

People always complain about the weather, but the old adage that you can't do anything about it is old hat now that *Weather Tamers* is on the scene. In this game, up to four players or teams can enter the business of predicting and modifying the weather for their clients. One client might want sun in Tuscon for a picnic, while another might request snow in Vermont for skiing in mid-April. It's your job to fulfill your clients' wishes by either moving pressure systems or by modifying temperature, humidity, and air pressure. It isn't quite as simple as it appears to be at first glance, since weather systems aren't as predictable as you would like them to be, and the changes you make today in some distant weather system are like to occur over your client's location two days down the road.

The joystick-controlled game is played on a multi-colored map of the U.S. with the states outlined. Temperature gradations are shown in ten different colors; and clouds, rain, and snow are depicted just as they are on real weather maps—except without the fronts that often mark their separation. These pressure systems are guided by the prevailing winds. They are not necessarily westerlies, like in real life, but may be easterlies, as well. It's not unusual to see pressure systems migrating out of Florida westward across the country. Weather for the starting dates you've chosen usually reflects seasonal weather conditions.

The first step when deciding how to devise your plan is to obtain data from orbiting satellites. Players choose different sized readings for two locations. One may be in your client's location and the other several days upwind, in an area that you may want to change.

Changing weather in any particular location will cost you credits, depending on the extent of the change. It can be costly to move a high pressure system halfway across the nation, or just moderately expensive to raise the humidity thirty percent or lower the temperature twenty degrees in a weather system that you expect will reach your client's location two days hence. Changes affect the system just like in the natural weather system. Since hot air can hold more moisture than cold, lowering the temperature can sometimes cause rain. But it isn't quite that simple, since cold air is heavier than warm air. Lowering the temperature creates high pressure that brings generally fair weather, while raising the temperature creates a low pressure system that usually means cloudy or stormy weather.

Naturally, weather is unpredictable. High pressure systems tend to vanish in the middle of the country. The changes you make sometimes just evaporate. To keep the game from becoming too frustrating, you receive credit for both trying to please the client and for correctly predicting the weather. You may have tried your best to produce rain where there is drouth, but you don't lose your credibility if you correctly predict the day's event the day before.

A player whose predictions match those of his client's wishes receives the entire fee and a new client at a higher rate for his services. However, if only the prediction matches the resulting weather, the player gets a percentage that matches the accuracy of his prediction. It really doesn't seem fair that the player collects from a client who has requested snow and has gotten sunny skies instead, merely because the weather person has predicted it correctly. He can get a little behind in a multi-player game because his fee remains the same for the next client. Players who can't match the prediction to the weather don't get any fee but aren't penalized either on their rates. Woe to the poor weather tamer who manages to please the client but predicts only a twenty-five percent or less chance of the effect's occurring. He gets next to nothing for his work. I think the designers have developed a very screwed up scoring system here.

Weather Tamers is a very novel, marginally educational, game. In a way, it gives you insights into how weather systems work and shows how unpredictable they are. It is an interesting program, perhaps a little too random in nature and saddled with a questionable scoring system, but it does provide entertainment and piques a bright child's instinct for experimenting. Maybe it is best suited to a classroom environment where a teacher could guide a child through relevant observations and experiments.

ZENJI

Activision
$31.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C-	C	*Value for Money*
Game Depth	C	C+	*Holds Interest*

If you think you'd be entertained by an intriguing video variation of a jigsaw puzzle, then you should give *Zenji* a shot. Instead of sifting through a pile of pieces, then putting them in the right places, you must determine the correct orientations of the *Zenji* puzzle pieces. Each piece contains traces of a circuit diagram. The object is to turn each of the pieces correctly so that the traces interconnect and link with the central power source. Sections, or pieces, turn from grey to green when they're connected.

The connected parts form a roadway over which you can move your joystick-controlled player from square to square. Since you cannot move onto squares that are not connected, the puzzle is harder to solve than it looks. Each of the progressively larger and more difficult levels has to be completed within a predefined time period, or you lose one of your five lives. The less time you take, the more points you receive.

On the easiest levels, the puzzle grid is five across and four deep. If you just turn pieces at random, you'll never beat the clock without extraordinary luck. If the clock does run out, you can continue from where you left off. Your pieces won't be reset, but you'll be fined a life. Occasionally, a countdown bonus number appears, usually on an unconnected square. If you are a quick thinker, you can make the proper connections to reach it and get 100 points times the remaining number. On progressively harder levels, the grid grows as large as eight across and seven deep. Added to your problems are a couple of nasties that pursue you. You can always stop one from touching you by disconnecting your square from its. Their job is to slow you down.

Zenji is definitely original—a thinking person's game. It is challenging, yet has little depth of play and quickly becomes repetitious. The graphics are fair, but merely adequate for the game. I doubt that *Zenji* will have a wide following among arcade fans, but it should find an appreciative audience somewhere.

Arcade Games
General

ANNIHILATOR
Victory Software
$19.95

Overall Rating	C	Hard	*Challenge*
Creativity	C-	C	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C-	B-	*Holds Interest*

Ladies and Gentlemen, fasten your seat belts and prepare for take off. Aboard your starfighter "Mogul," you will journey through space and time, across mountain ranges, doing battle with strange, multifarious aliens. Your destination is the flatlands of the Messeir 31 Galaxy, where you will take on prisoners to be used as slaves in your star system.

Your mission is not an easy one. You must try to imprison these life forms as you pass over them. Your intended victims stubbornly launch ships against you, which, upon first appearance, are friendly. Looks, though, are deceiving. Furthermore, in this galaxy, the sentient life developed as savage rabbits which roam freely over the flatlands. They can be very deadly. Fortunately, prior, unsuccessful missions from your star system have left fuel depots you can use.

This arcade-style game is very action-oriented. It does, however, seem to weight the odds in the enemy's favor. For instance, it is impossible to outrun the alien attackers; you must out maneuver them by your skill alone (which increases the challenge). The graphics are smooth, with the exception of your starship. When you move the joystick to change directions, you experience a noticeable pause which, on many occasions, makes the difference between successfully annihilating the aliens and becoming their lunch! Other than this, I found the interaction afforded by *Annihilator* very enjoyable.

This game was a pleasure to play and review. As with all of Victory Software's entertainment products, a demonstration mode is included. This is a very convenient feature, since you can evaluate the game before you buy it. *Annihilator* is lots of fun, but don't take my word for it; check it out for yourself!

ARCADE PACK
Computermat
$24.95

Overall Rating	F	Easy	*Challenge*
Creativity	F	F	*Graphics*
Documentation	F	D	*Value for Money*
Game Depth	F	D	*Holds Interest*

Arcade Pack consists of three programs: Alien Invasion, a simplistic *Space Invaders* game; Target Command, a shoot-'em-up program a la *Missile Command*; and Head-On, a primitive racing-car-type program. It's as if Computermat adapted three of the original, crude VIC 20 programs for the Commodore 64 and put them together to sell as a cheap, three-cassette package.

Arcade Pack includes two versions of Target Command, one for keyboard and one for joystick. The five skill levels have few differences. You must protect your bases, which look like houses, from enemy fire, which resembles lightning falling from the sky. You place a crosshair to try to blast the enemy fire from the sky before it hits the houses. The sound is okay; the graphics are terrible. The only thing that makes the game difficult is its lousy joystick response. Target Command displays the high score, but does not keep a running tally during play.

Head-On is similar to the VIC 20 game *Car Chase*. It opens with some nice, colorful lettering and a clear explanation. You are to get all of the dots before the enemy gets you, sort of like *Pac-Man*. Your car travels counter-clockwise, and the enemy travels clockwise. You may play with keyboard or joystick. If you have no joystick, use the "A" and "Z" keys to move up and down, and the ">" and "?" keys to move left or right one lane. To continue after a crash, hit any key or push the joystick in any direction. Hit the Stop button or press the fire button to restart.

Like Target Command, the sound is adequate, but the graphics are primitive. The maze, or race track, consists of six, concentric, oblong rings filled with small diamonds. The cars are VIC 20 quality. The best part of the game is a crash, which flashes multiple colors. Head-On offers nine levels (with not much difference

between them), and constant score and high score displays. Unfortunately, maneuverability is poor in this game as well.

The third program, Alien Invasion, is a pitiful version of *Space Invaders* with little color, poor graphics, and little challenge. One to four players may compete on any of twenty levels. Each level presents a new character. You must shoot them in reverse order. For example, before you begin a level, the computer shows you a new character, which is worth the most points. You must shoot that character first, then shoot the one which first appeared the last time, etc. It's sort of a memory trainer in *Space Invader* form. You receive points if you shoot the invaders out of sequence, but correct order greatly increases your score and earns you an extra ship. The twenty aliens are shown before the game begins. Study them carefully. They are small, and it is no easy task to tell the difference between, say, a "Leg Man" and "Saggy Cheeks," or "Bug Face" and "Beetle Head."

You begin with three ships. Aliens descend in an attempt to destroy your ships and claim the planet. They'll also drop bombs on the way down. You shoot back with lasers, but only one at a time. If you shoot while a laser is in the air, the previous shot disappears. Unlike *Space Invaders*, the aliens here don't move quickly and rhythmically across the screen. They just move down one space at a time. And they're so small! In early levels, the screen looks like a big white void with a few, small, blue, bizarre-looking creatures throwing slow bullets. The only challenge lies in remembering the correct order of aliens. At least this program offers better maneuverability. The sound is not bad, and the score, high score, and status are constantly displayed.

To be fair, Computermat's programs are more than two years old, and game design has come a long way since they were created. You might consider purchasing these games if you *really* miss the day you got your first programs for the VIC 20. But if you purchased a Commodore 64 because its memory allows sophisticated graphics, sound, and smooth arcade action, don't waste your money.

ATTACK OF THE PHANTOM KARATE DEVILS

Phantom Software
$34.95

Overall Rating	C-	Hard	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

In *Attack of the Phantom Karate Devils*, you test your karate skills as you do battle with the dreaded Ninjas. You're out to avenge the murders of the Master and his beautiful daughter. By maneuvering your joystick in various ways, you can kick with either foot, jump, and deliver high, low, and in-between punches with either hand. The Phantoms are never fully visible; at times you see only their hands. *Attack of the Phantom Karate Devils* has a pretty unique, well-executed concept.

The program seems to be entirely in machine language, so the action is fast. You go through four successive game backdrops, two of which scroll, and if you succeed, you advance to another level where the screens are the same but you're stronger. The sound effects, especially when you're being pummeled by your Ninja opponents, emphasize the violence of the game. A freeze option is also available.

I found *Attack of the Phantom Karate Devils* quite challenging, mostly because of the complex joystick action required. Some of the joystick commands seem a bit backwards compared to other games. For example, you push the fire button and move the stick to walk left or right, while you simply move the stick to fight or block thrown daggers and such. I inevitably push the button when I want to fight. It is frustrating. Expect to spend a while getting the hang of this, and if the violence doesn't turn you off, the game may hold your interest for many sessions.

The graphics are fair, but not fancy. It's all character, not bit-mapped, graphics. While the displays look fine, and are colorful, they're a little rough around the edges in some spots. Scrolling is smooth, but only occurs when you reach the left side of the screen. When you move to the left, there's a pause while your character is placed on the right of the new screen, and then on you fight. I found this a little distracting.

The one-page documentation has the essentials: how to load the game, a short description of play, and a chart of the various moves available and the joystick action required.

Attack of the Phantom Karate Devils is acceptable, quite challenging, but with little depth and constant repetition. If you don't care for violence, stay away from the game. It isn't destined to be a classic.

THE CASTLES OF DOCTOR CREEP

Broderbund Software
$29.95

Overall Rating	B+	Hard	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	B	B	*Value for Money*
Game Depth	A	B+	*Holds Interest*

The Castles of Doctor Creep is a diabolical strategy game that's guaranteed to test even the toughest adventurer. It's not that the game requires a lot of arcade skill; it's just that the puzzles in some of the screens are so involved—or seemingly impossible—that it will take you hours to escape, even if you had unlimited lives (which you don't). And, if you do escape from one castle, there are twelve more on the disk.

The object of the game is to escape from one of Dr. Creep's Transylvanian castles. Each of the castle's thirty-two rooms is booby-trapped, and may be full of living surprises (if you catch my drift). Who would live in one of Doctor Creep's castles? Try Frankenstein's monster, with a few mummies thrown in for good measure. These rooms are connected by color-coded walkways. You can access most of the walkways by pushing the doorbells adjacent to them, but some require finding the color-coded keys that fit into their locks. The rooms themselves have catwalks connected by poles and ladders. Obviously, you need to reach other doors in order to continue your search, but you are often blocked by obstacles, such as lightning machines, force fields, moving sidewalks, open trap doors, and the dear old monsters themselves. Sometimes you can find switches to turn off non-living obstacles, but often you can only reach them by either getting rid of the monsters, or taking some roundabout route through other rooms. One room has a matter transmitter that teleports you to various colored positions on top of poles. Switches beneath them close the trap doors necessary to reach other doors.

You risk getting shot by robot rayguns while you work, and can become trapped if you throw switches out of sequence. Some diabolical rooms have as many as four Frankensteins who you must lure, one at a time, to platforms over trapdoors you can open to imprison them. That's all well and good, but after sliding down a pole to the bottom, you become trapped and must press Restore to get out, thereby losing a life. You'll often get trapped. I believe I've been doing a poor job of solving the puzzles. If not, this game is virtually impossible for anyone to win with only three lives.

Doctor Creep's games are fairly deep and require good problem solving skills. Since some of them can last for hours (depending on your patience), you can save your current position to disk at any time.

Each castle is different, and all are cleverly designed. Many will try your patience, because solving the puzzles of some rooms requires a series of repetitious movements leading you through a circle of other rooms. The colorful graphics are nicely implemented.

While it's a good game, *Doctor Creep* will appeal only to players who enjoy long, thought-provoking games. With thirteen castles to choose from, avid gamesters will definitely get their money's worth.

CAVE KOOKS

Victory Software
$19.95

Overall Rating	B-	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C	C	*Holds Interest*

In *Cave Kooks* strange little creatures constantly bore out the surface of the earth, threatening to make it collapse. Your goal is to search out these creatures, enter their dens, and, with a special weapon, spin them to death. As with most Victory Software arcade games, an extra man is awarded for every 10,000 points.

I grew to enjoy this game. At first, just seeking out these creatures and spinning them to death was rather boring (no pun intended). But as the game wore on, the creatures changed and fought back, adding a lot of excitement. The best approach to this game is to systematically destroy the creatures one at a time. But, *beware* of their secret weapon, against which you have no defense. Naturally, if I told you what that weapon is, it would spoil the fun of the game.

If you enjoy fast action and shoot-'em-up games, this won't do it for you. On the other hand, *Cave Kooks* does test your ability to reason with only a moderate test of reflex. The graphics are quite acceptable, but not fancy. Perhaps the best part is when you capture a creature and begin spinning him. The poor thing spins like crazy! *Cave Kooks* is a good value for the money, but I feel that its novelty will wear off, as it lacks the pace which makes many games truly exciting.

CLOWNS

Commdore Business Machines, Inc.
$19.95

Overall Rating	D+	Medium	*Challenge*
Creativity	C	C-	*Graphics*
Documentation	D	D+	*Value for Money*
Game Depth	C-	D+	*Holds Interest*

Clowns brings a touch of circus ambience to the Commodore 64 screen. The object in this arcade classic is to pop three rows of moving balloons at the top of the screen by bouncing a clown off the end of a teeter-totter. You use paddles to position the teeter-totter beneath the falling clown. If you don't position the apparatus quickly and acurately, you wind up with a squashed clown. Clearing all of the balloons is difficult; if you inadvertently clear all of the balloons on the bottom row, you are rewarded with a bonus, but also a completely new row of balloons. Also, the clown speeds up as he ricochets off the balloons, making the game a tad too difficult.

As in the arcade version, this game's graphics are very plain. The clowns are merely stick figures, while the moving balloons are depicted in one of only three colors. The circus music is brief (only several measures long). *Clowns*' repetitive play quickly becomes stale. A much dated and inferior piece of software.

DIG DUG

Atarisoft
$44.95

Overall Rating	B-	Medium	*Challenge*
Creativity	B-	B-	*Graphics*
Documentation	C+	C+	*Value for Money*
Game Depth	C-	C+	*Holds Interest*

You control Dig Dug as he burrows through the earth in search of tunnel-dwelling monsters. Both types of monsters can kill Dig Dug upon contact: Pookas and Fygars. The latter are extremely dangerous fire-breathing dragons. You must time Dig Dug's entrance into their territories, and quickly pump them up by pushing the joystick button until they explode. Tackling a Fygar is very chancy: the creature's flaming breath has a very long range. Your best bet, attacking from the side, is worth more points.

Both the Fygars and the Pookas can turn into ghosts and escape from their tunnels, only to reappear just behind Dig Dug. You can't pump them up until they metamorphose back into their original form. For more points, you can tunnel under a boulder, causing it to fall on a passing monster. After two rocks have fallen, a bonus fruit appears at the top of the screen. When you have killed all of the monsters, you advance to a harder level. These levels present more monsters (sometimes two in each tunnel), a greater percentage of Fygars, and much shorter time periods for the monsters to turn into ghosts. Any of these advanced levels can be reached at the start of the game by using the Option key.

Dig Dug is a fairly close adaptation of the arcade version. The graphics are good, but the familiar background music sounds similar, but not exactly the same. Game play is repetitious; only the skill involved to kill the monsters, and the number of monsters, vary with each level. Collisions are sloppy in the Commodore version. My falling rock clearly missed a Fygar, but the creature was squashed nonetheless. Since this arcade game has a great many devoted fans, I'm sure the Atarisoft cartridge for the C-64 will also attract a large audience.

DROL

Broderbund Software
$34.95

Overall Rating	A	Hard	*Challenge*
Creativity	B+	A	*Graphics*
Documentation	B-	A	*Value for Money*
Game Depth	A-	A	*Holds Interest*

This delightful four-level, multi-screen scrolling arcade game takes place in a dream world called Drol. An evil witch doctor has kidnapped a family consisting of a mother, two children, and their pets, a lizard and an alligator. The children, bewitched, wander zombie-like through the corridors. The little girl follows a floating balloon in the first scene and the boy follows a toy helicopter in the second. The mother, not as easily bewitched, lies tied up at the end of a long corridor on the bottom level of the third scene. Your three-stage mission consists of rescuing the girl and her pet lizard, then the boy and his pet crocodile, and finally the mother. Your character has an anti-trance suit, a jetpack for hovering, and an unlimited supply of luminous reality pellets to shoot at the witch doctor and his minions. With the jetpack you can fly through the trap doors that connect each of the four levels or floors in *Drol*'s scrolling world. A radar map at the top of the screen alerts you to the location of the moving monsters, but not the children or their pets. You must search for them.

The first mission proves relatively easy because the hopping scorpions don't shoot back and you can easily avoid the flying turkeys. However, if you're after points, five quick shots at the bird results in a turkey dinner and 500 bonus points. This is a dangerous

maneuver because you must be flying to hit the bird, but any scorpions approaching from the rear must be killed at ground level. You need speed or sneakiness, popping up from a trapdoor just as the turkey flies past. You can kill enough turkeys and scorpions to amass thousands of points, but by the time you reach 4,000 points the monsters begin shooting back and an indestructible vacuum cleaner begins roaming the corridors. This makes your second mission very difficult. Try shooting the girl's balloon so that she remains stationary; otherwise, inadvertently running into her fast moving pet (he has a jetpack) advances you to the next mission.

On the second mission the witch doctor appears along with magnets that prevent you from shooting. You can remove the magnets by changing levels, but you can only shoot the witch doctor when he leaps for you. The hopping monsters appear in greater numbers here, so rescue the boy and his pet quickly on this very dangerous mission.

The third mission is definitely the hardest. Few trapdoors connect the levels, so you must proceed down long corridors filled with bouncing serpents resembling sea horses and a multitude of arrows, daggers, and twirling hatchets. This tough game is a perfect spot to lose the rest of your five men, especially if you have passed the 4,000 point mark—the monsters shoot back. You must fly high to avoid the monsters' shots, but all those arrows, daggers, and hatchets approach at all levels. If you succeed in reaching the trapdoor leading to the fourth level, beware the man-eating plants. Once you rescue the mother, a priceless cartoon rewards your success before the game repeats at a much harder level.

The exceptional graphics are smoothly animated. All of the characters are colorful, cute, and charming, and the final cartoon is a masterpiece. The game requires quite a bit of skill to master because both the pets and monsters move at variable speeds, making *Drol* rather unpredictable. You can easily miscalculate which hazard to deal with first. This first-rate arcade game possesses both charm and playability, appealing to both the novice and the skilled arcade player. The novice can attempt a quick rescue before the game becomes too difficult, while the expert can deliberately enter the difficult stage to amass points. Either way, *Drol* offers hours of entertainment.

FROGGER

Sierra On-Line
$34.95

Overall Rating	A-	Medium	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	C	A-	*Value for Money*
Game Depth	B-	B+	*Holds Interest*

Frogger for the Commodore 64 is a close translation of the popular Sega arcade game of the same name. The object is to move your frog in a limited amount of time across four lanes of traffic, then jump on the backs of diving turtles and moving logs across a pond to the safety of home. The frog can jump in any of four directions when you move the joystick controller, or by means of four keyboard keys. Success in the game is strictly a matter of timing: traffic moves in opposite directions in alternating lanes, and the turtle and logs move in opposing directions and at different speeds. When all five frogs have reached home, the game advances to a more difficult level of play. After five levels, you are rewarded with an extra frog.

On advanced levels, you're threatened with tightly spaced cars in the one fast lane, deadly snakes that patrol the bank and some of the logs, and hungry alligators and otters that move with the current. Logs become faster and fewer, and the diving turtles are prone to vanish just when you need them. Bonuses are awarded for escorting a lady frog home, and for gobbling insects. The game has a slow and a fast speed mode to suit all players.

Frogger's sound and colorful graphics make the game enjoyable. Layered scrolling character graphics and player-missile animation are apparent throughout the game. Most of the music is identical to that of the parent arcade game; but several additional tunes have been added, so the music isn't quite as repetitive. Even so, the jingle does become tiresome after long play periods. Mercifully, you are allowed to toggle the music off without eliminating the necessary sound effects.

Frogger is an addictive and enjoyable arcade game, especially for children. It does become a bit repetitious after a while, but it features good game play and will hold the interest of most players for moderate periods of time.

GHOSTBUSTERS

Activision
$31.95

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	C-	B	*Value for Money*
Game Depth	B	B+	*Holds Interest*

Activision has taken *Ghostbusters*, the biggest movie comedy box office hit of the decade, and turned it into a video game that's destined to be a hit. They've created an entertainment program that retains the basic ghost hunting flavor of the movie, combining it with great music and amusing sound/speech effects.

The object of the game is to set up your own "Ghostbusters franchise" in your neighborhood. The bank loans you $10,000 to buy a vehicle and equip it with important ghost hunting tools, such as a PK energy detector, marshmallow sensor, portable laser confinement system, ghost vacuum, traps, and bait. The more expensive cars go faster and hold more equipment, but they are usually beyond your budget. Most players settle for a 1963 hearse or a VW Beetle, unless they have accumulated money from previous games. You load your ghostbusting equipment onto your car with a forklift. Be sure you purchase the right items, for you can't put things back once you've loaded them onto your vehicle.

Your neighborhood is shown on the map as a grid of streets with various buildings depicted, such as your headquarters and the temple of Zuul. Ghosts slowly stream toward Zuul's temple, some stopping to haunt other buildings along the way. Your PK energy indicator creeps upward. When a building flashes red, you guide your vehicle along the shortest trail to it. The screen shifts to an overhead view of the road as you drive. You can steer side to side, vacuuming up passing ghosts (roamers) as you go (assuming you bought a ghost vacuum). This requires little skill, but the sight and sound effects of ghosts being sucked into the Ghostbusters decal on the top of the car are adorable.

You arrive at the site of the disturbance to find a ghost wandering in and out of the upper windows. Direct the first Ghostbuster in your team toward the center of the building to place a trap. Then you move him to the far left side of the screen, turn him around toward the trap, where he waits while you position the second member of the team at the far right. When the ghost moves into range, you power on their negative ionizer backpacks, slowly directing the streams inward (but *never* crossing) in an attempt to catch the slimer directly above the trap. Once it is above it, you release the streams and the trap opens like a jack-in-the-box, jumps up, and grabs the slimer. If you're successful, the men shout "Ghostbusters!" and you earn the $300 fee. But, if you miss, one of your men gets slimed and the city's PK energy level increases by 300. The defeated man utters a sad lament ("He slimed me").

The scene is just like in the film, where the Busters are warned not to cross the streams. Again, not much skill is required here. The beams are set inward at an angle, and you can only move them inward, hopefully toward the ghost, if it hasn't already escaped up and out of the range of the beams. The ghosts are dumb, however, and will wander back within range if you don't run out of energy first (in which case, you automatically get slimed). Capturing one is just a matter of timing: you must release the button when the ghost is directly above the trap. You can capture it regardless of whether your beams are in exactly the right postion or not. When all your traps are full, you return to headquarters.

When the PK energy level gets dangerously high, a "Marshmallow Alert" flashes on the bottom of your screen. Roamers are roaming about; they mass together to form a Marshmallow Man. M. Man does from four to five thousand dollars worth of damage to the city, which is charged against your account. Sometimes, you can stop him by dropping bait (using the B key).

The Gatekeeper and Keymaster begin wandering the streets as the PK energy level nears 10,000 units. There doesn't seem to be anything you can do about this; chalk it all up to fate. However, the instructions do hint that you can sneak two of your Ghostbusters into the entrance and reach the top of the Temple of Zuul. I have tried in vain, but nothing ever happens. The first Ghostbuster just picks up his trap and leaves because Zuul's building wasn't flashing red (the sign of a haunted building).

The game usually ends in a frustrating, seemingly uncontrollable way. The Gatekeeper and Keymaster join forces, and as usual, you do not have more money than you started with (a prerequisite for winning the game). Sooner or later, you will stop Marshmallow Man and earn your just rewards.

Ghostbusters is an entertaining game that probably will appeal to movie and game fans of all ages. The great music, sound effects, and cute ghost capture scenes outweigh the game's average playability and repetitiveness. *Ghostbusters* provides the fantasy that players crave; it will invariably sell like hot cakes, regardless of its drawbacks.

GUMBALL

Broderbund Software
$29.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C+	C+	*Graphics*
Documentation	B	C	*Value for Money*
Game Depth	C	C	*Holds Interest*

Games sometimes mirror real life. Although sorting gumballs all day as a blue collar factory worker probably isn't your fantasy, *Gumball* gives you the chance to try it without having to pay union dues. You sort a steady stream of gumballs by color, guiding them into the correct bin. To control each gumball's path, you open and close a series of mechanical gates in a huge Rube Goldberg contraption. You also control the bin's placement below with a paddle or joystick.

Of course, you must meet your quota each eight-hour shift, so you send your partially filled bins to the shipping area at the right side of the screen. The quota changes, depending on how many gumballs you miss, and quality control is rigidly enforced. If a gumball falls in the wrong container, Mr. Nitpicker comes out, shakes his fist at you, and tips over the bin while you stand helplessly by. When the gumball machine sends out rotten, speckled gumballs, you must send them through the drop chute at the bottom right. However, if you send them anywhere, ten times the level number will be deducted from your score.

Level one is easy. Two gumball colors go into two containers. You'll easily meet your quota and get promoted to foreman. On the second level, with three colors and containers, the going gets rough. Pretty soon you have the wrong gates open as gumballs flow all through the machine. Send one down the wrong path, and you have to scurry to move the right color bin below that chute before Mr. Nitpicker comes out.

If you're really good and get through the four gumball colors on level three, level four presents a serious problem. Overzealous dental assistants (terrorists in any other game) planted dynamite in the sugar supply in an attempt to blow up the factory. When their "gumball bombs" enter the production line, a warning siren sounds. You have a limited amount of time to deactivate them with the bomb deactivating crosshair. The space bar turns them on in the joystick mode (software pirates will have to guess the key in the keyboard mode). Aligning the crosshair on the bomb defuses it. Once you've turned the production line back on, you still have to meet your quota.

Gumball has smoothly implemented sound and graphics. It's difficult, requiring intense concentration and timing skills, but isn't especially captivating. I guess you could think of it as masochistic fun.

H.E.R.O.

Activision
$34.95

Overall Rating	C	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	C	C+	*Holds Interest*

Kids, having a basic need for superheroes, usually turn to the pulp comics and the Saturday morning cartoon shows. Activision, in an attempt to fill this need, invented their own paragon of virtue, named Roderick H.E.R.O. Unfortunately, this superhero remains one-dimensional, and totally lacks character and feeling. Children perceive him as merely a man who shoots laser beams from his helmet and flies with the aid of a backpack.

His mission is to rescue miners trapped in a lava mine. The mine shafts extend both vertically and horizontally with many dead-end passages. R. H.E.R.O. carries a supply of dynamite to blast open some of the narrower passages. He merely has to push the stick downward (to place it against a wall) and light the fuse. If he is quick to move aside, the blast will open the passage. The shafts are alive with bats, spiders, and nesting snakes. These can be blasted away with the laser or merely avoided. Lanterns light the various passageways. You must maneuver slowly as you descend, and be careful not to break a lantern. Dark passageways are treacherous and difficult to traverse, since you can't tell which blocked walls are too thick to blast open. Once you reach the first trapped miner, you descend even deeper to find the next. Soon the mine walls become lethal and glow from the heat. Somewhere near the bottom are lava rivers that can only be crossed on heat-resistant rafts.

The majority of hazards (like the spider and bat) offer you little challenge. You have to be extremely uncoordinated to die from a dynamite blast. However, the control system, which requires a very light touch, results in your doom more than you would like—particularly after level eight, when contact with the walls becomes a factor. The control system doesn't react as one would expect; perhaps there is too much lag or delay for the controls to respond properly.

H.E.R.O. does have very pleasing and colorful graphics, though not as detailed as Activision's other recent offerings. Game play is somewhat repetitious, but children enjoy the quest even if the game isn't that much different from other rescue games. While the first levels aren't much of a challenge, upper levels are, especially if you haven't mastered the art of hovering. Lower levels can be skipped. While *H.E.R.O.* lacks the charm and strong leading character necessary to make it into a classic, it still is a pleasant game.

J-BIRD

Orion Software
$29.95

Overall Rating	C	Medium	*Challenge*
Creativity	C-	C	*Graphics*
Documentation	C	D	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

J-Bird is an obvious *Q*Bert* clone, even as far as the similarities between the heroes is concerned, and the shapes of several of his adversaries. The playing field is a seven-tiered pyramid of colored blocks. The object of the game, like the original, is to competently guide a bird with a pointed beak so that he jumps diagonally upon each pyramid block, changing its color to the properly designated one. On the easiest levels, you only have to change the color once; upper levels, though, require two color changes for each block. You must be careful where you jump, for a slip into the abyss means instant death.

Every entertainment game of this kind has a bunch of villains to make life difficult for you, and *J-Bird* is no exception. King Bo, the coiled snake, is the most dangerous since he will follow you anywhere. He can be enticed to follow you off the pyramid when you jump to the saucer that transports you back to the top block. Spheres that start at the top and bounce downward are less dangerous, but you should still avoid them. Pouncing on an occasional green sphere freezes the board for several seconds, possibly long enough for you to finish changing the remaining blocks. Although not dangerous, frogs can mean trouble since they change blocks back to their original colors. Better to get rid of one of these creatures quickly.

Success at playing *J-Bird* depends on mastering diagonal joystick movements. One wrong move, and it's curtains for you. The graphics are good in this game, but the play mechanics are too close to the coin-op version for me to recommend it as a brand new product. I think that all those consumers of C-64 entertainment programs who want *Q*Bert* will buy the original; consequently, *J-Bird* will get lost in the shuffle.

JUPITER LANDER

Commodore Business Machines
$14.95

Overall Rating	D	Easy	*Challenge*
Creativity	C-	D	*Graphics*
Documentation	C	D	*Value for Money*
Game Depth	D+	D+	*Holds Interest*

The object in *Jupiter Lander* is to safely land your spaceship on one of three sites on the planet's surface. Each site is rated according to difficulty. The easiest, on the center high plateau, is worth twice the bonus, while the other two (in deep, narrow canyons) are worth five times and ten times the bonus. You score points based on the softness of your landing—based on your speed in meters-per-second, which is displayed on the right side of the screen. If you land while the gauge is below the yellow zone, you crash.

Joystick or keyboard commands control your spacecraft's main descent engine, and the two smaller side thruster engines for making horizontal adjustments. You must use your limited fuel supply wisely or risk crashing with an empty tank. The more landings you can make, the higher the score. As you approach a landing site, the display shifts to a magnified view of the landing area. This is quite helpful in guiding the ship past narrow clearances in the two canyons, and for gauging your final touchdown.

Jupiter Lander is an old classic that's fun to play for a short time, but soon becomes tiresome. The cartridge only has one screen, and the landing sites do not vary. Mediocre from start to finish.

KICKMAN

Commodore Business Machines
$19.95

Overall Rating	B-	Medium	*Challenge*
Creativity	B	C+	*Graphics*
Documentation	C	B-	*Value for Money*
Game Depth	C	B-	*Holds Interest*

This is the Commodore 64 version of the Bally-Midway arcade game. You assume the role of a clown/unicyclist attempting to catch falling balloons on your pointed hat. Your unicycle is controlled via the joystick. The unicycle moves horizontally along the bottom of the screen, and you must get yourself into the proper position under each one of the falling balloons. If you miss and the balloon is within reach of your legs, you can kick it skyward with your foot. By then, however, another balloon has begun to drop, and you've got to catch both of them before either hits the ground and you lose your balance.

In the first round, balloons that hit your hat pop. In subsequent rounds, the balloons pile up four-deep, making catching them somewhat more difficult. The figures of Pac-Man and several ghost monsters appear among the six columns of balloons. A munching Pac-Man, caught on top of your stack, eats all of the balloons and earns you bonus points. Unfortunately, the Commodore 64 version does not include bonus rounds from the original version of *Kickman* (where bonus balloons and an occasional bomb break up the monot-

ony). Worse yet, all the screens are basically the same, and as the game progresses, they don't get harder. The balloons fall at random, yet predicting which one will drop next is not all that hard.

The background graphics are colorful and nicely done, but, unfortunately, they remain the same for all screens. Game play is easy and extremely repetitious. While the arcade version never won a wide or loyal audience, it is likely that this version will fare even worse. *Kickman* just doesn't have enough depth of play to hold the player's interest for very long.

NECROMANCER

Synapse Software
$34.95

Overall Rating	A-	Hard	*Challenge*
Creativity	A	A-	*Graphics*
Documentation	B	B	*Value for Money*
Game Depth	A-	B+	*Holds Interest*

Necromancer is unlike any other arcade game on the market. As a sorcerer or Druid, you must grow an army of trees in an enchanted forest, then march them through spider-infested vaults to confront the Necromancer in his foul lair.

The game has three distinct parts. You must plant, grow, and protect an army of trees from prowling ogres. These ogres stomp on young trees, while a deadly forest spider poisons adult trees and drains your strength if you touch it. You stand in the center, emanating a joystick-controlled Wisp. This magical Wisp has a store of tree seeds you can plant. It also kills ogres and spiders on contact. Hitting a dancing Eye Pod gives you more seeds. Faces appear on the poisoned trees screaming for help as they struggle to survive. Your strength ebbs each time you kill an ogre or spider, receive a spider bite, or cure a poisoned tree until, eventually, Act One ends. The number of trees that survive determines the difficulty level and your strength during the rest of the game.

Strange and original music sets the mood in Act Two. The vaults have five levels, each containing eight spider larvae. Each vault is sealed, but your enchanted trees' roots break through the concrete and fall into the open pit, smashing the larvae. Meanwhile, you can press the joystick button to move, or use the Wisp to animate the trees, making them move. As you or the trees move, Hands of Fate rhythmically descend from the ceiling, lowering question mark (?) prizes. If you manage to get one, ladders may descend to the next level. However, the prize might raise ladders already in place. If the Hands of Fate grab you, they pull you screaming to the ceiling, and sap some of your strength. If this happens to a tree, it is lost for good. The Hands of Fate move faster and faster in each of the lower levels. The hands move so frenetically on the lowest levels that you (virtually) cannot reach the question mark prizes needed to lower the ladders. You should try to kill all the remaining spider larvae before it's too late.

Gravestones fill the Necromancer's lair in Act Three. The Necromancer himself appears and disappears on these gravestones, leaving little trail of flames behind him. Killing him with your Wisp gives you strength, but the evil one soon reincarnates on another headstone. When you walk over the gravestones you remove them, but you musn't touch the Necromancer. Hopefully, you killed all the spider larvae in Act Two. If not, they turn into deadly Zombie Spiders which appear at the ends of the Necromancer's flames. They suck your strength away until you kill them or escape. If you kill them with your Wisp, the Necromancer can revive them again and again. When you remove all thirteen gravestones, the evil one has nowhere to go, and you advance a level. When you complete level five, you win the game.

Necromancer's animation is unparalleled; trees seem alive as they waddle around. Their anguished screams when poisoned are lifelike, and the original music adds a great deal to the program. Act One has extremely fast action, but becomes so repetitive that you wish your strength would run out so you could move on to the game's more interesting parts. The second act is both interesting and difficult. You can neglect the larvae and rush to the lair; however, those fast-moving Hands of Fate really challenge you. I've yet to see Act Three, despite the help of several skilled players. *Necromancer* is a very unusual, challenging, and creative game. If any game deserves an award for outright originality, this is it.

PARK PATROL

Activision
$31.95

Overall Rating	C-	Easy	*Challenge*
Creativity	C-	C	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	C-	D+	*Holds Interest*

Becoming a park ranger isn't all that it's cracked up to be; it entails more hard work than prestige. As the Poconose Park Ranger, you're responsible for cleaning up the litter, keeping an eye on the swimmers. Then there are all those big bad forest creatures, like the land turtles, deadly water snakes, and pesky giant ants that steal your food. If you don't keep everything in line, you'll lose control.

Your joystick-controlled ranger patrols the park's shoreline on foot, or cruises its littered waters by raft. You must pick up sixteen pieces of trash on each level. Dangers exist everywhere: turtles and swamps on land; snakes, logs, and even swimmers in the water.

Rangers, of course, don't carry weapons, so you have to deal with each creature in its own unique way. The snakes will dive if you use your snake repellent, ants will give up your stolen food if you kick them in the behind (!) or side, and the turtles can be lured into the water where you sail over them for points. You have to avoid the swimmers, too, unless they're drowning and yelling for help.

The ranger's supply hut contains his energy supply, presumably in the form of food. He can return there whenever his caloric energy level falls below 1,000. Energy dwindles constantly, and is hard to replace. Those pesky ants are always stealing your food, and using snake repellent costs 200 calories. Only by rescuing a swimmer do you gain even a minimal 1,000 points, but sometimes an odd-looking plant growing to the left of the hut bears strange power fruit. Eat some. The game ends when all of the ranger's lives are gone, or when he needs more energy and his supply hut is empty.

One nice feature of *Park Patrol* is that you can customize the difficulty of each of the game's five levels. Using the joystick, you determine the number of snakes, swamps, swimmers, ants, and turtles. You may even save your customized version to disk.

Park Patrol is mildly entertaining, and suitable for youngsters. Its single screen and lack of more interesting play elements make it a somewhat shallow game for older children. Some may even say it borders on dull. However, it does have lovely, colorful graphics and a touch of animation.

PINBALL CONSTRUCTION KIT

Electronic Arts
$40.00

Overall Rating	A	N/A	*Challenge*
Creativity	A	A	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	N/A	A	*Holds Interest*

So you've played *Raster Blaster, Midnight Magic,* and *Night Mission* and you think that they'd be a little more exciting if only the programmer had put in one more bomber, perhaps another spinner, and a drop target for extra scoring potential. Close your eyes and imagine the perfect electronic pinball game. It has two sets of flippers at the bottom, the second pair offset wider above. Lane lights alternate with spinners above a forest of bumpers that add extra action and thousands of points as the ball (or balls) careen endlessly around the playfield. Drop targets . . .

Pinball Construction Kit is a pinball wizard's dream. With it you design a playable pinball machine from a box of forty-two components. The parts box, which sits to the right of the designer's playfield, displays all the components so that you can select and place each one anywhere on the field.

This entire process is "exceptionally user friendly." You can manipulate any of five tools with just a joystick and one push button. You'll probably use the "hand" tool most often. By positioning it over a component and pressing the button, you can place the component anywhere on the playfield to within a pixel of accuracy. If you change your mind, just move it again—now or sometime later. Removing parts from the board is as easy as placing them: you simply move them back to the vicinity of the parts box, and they disappear when you release the button.

The first thing you need to do is put some of the basic pinball parts into place. First, you need a ball launcher. It doesn't have to be in the traditional spot; it can be on the left, in the center, or even near the top. Then add a pair of flippers to keep the ball in play. You can have two different sized flippers either in pairs or singly. You also can have two or three pairs of flippers; they all work, no matter where you place them. In fact, all of the parts work, no matter how many you place or where.

Your choice of parts is practically unlimited: two sizes of round bumpers and four rectangular ones, kickers and knockers to kick the ball selectively, and two drop target sets which turn on as each of the four parts is struck, and then reset. A ball hopper catches balls; it holds two of them, and free all for multi-ball play when it catches a third. There are also lanes and gates to direct balls, rollover lights, a spinner, and targets for more scoring, and a magnet that holds onto a ball for a second or two. Last, but not least, a ball disintegrator (or hole) eats balls.

The set has a number of tools to assist you with the finishing touches. Most pinball games have obstacles to keep the ball within certain boundaries—on the edge or in the middle of the playing field, for example. You can place a square obstacle anywhere, color it with the paintbrush, and then change its shape by stretching the boundary "knobs" with the painter tool. The hand tool can move the obstacle about. A polygon with four knobs isn't very useful, so you can add more with the hammer, or delete one with the scissors. The entire process is quite simple, but you must remember to color the polygon while it is still a square shape, or you'll wind up with a stretched polygon and no way to fill it in.

No pinball game would be complete without the name scrawled on an empty section of the playfield. A special paintbrush with a magnifier lets you add fine artistic touches. You pick a small area to paint on the playfield, then do the actual painting in the magnified view on the right side of the screen (where the parts box used to be).

Of course, pinball pieces come from the parts box with preset values for sound and scoring. You can use the joystick cursor to change these by selecting the And Gate icon. When you select a piece on the playing field, the score and sound are highlighted. You can change these values from the displayed menus. You may also choose the conditions which allow a player to score a bonus. Moreover, you can decrease or increase gravity, the ball speed, the kick strength of the bumpers, and the elasticity of the collisions between the ball and the polygon surfaces.

One to four players can play your pinball game with either two paddle buttons or both buttons on a single joystick. You can also save everything to another disk as a runable file. You can give the game away to your friends, or even sell it.

All things considered, Bill Budge's remarkable program is extremely well engineered and a delight to use. The *Pinball Construction Kit* creates a breed of pinball games limited only by your imagination. Although many game players don't enjoy electronic pinball, most I've met have become totally fascinated with constructing their own games. The package is reliable in every way. The *Pinball Construction Kit* is a superbly designed program that will give you, your family, and friends hours of fun. Definitely a software package that's worth owning!

PINBALL SPECTACULAR

Commodore Business Machines
$14.95

Overall Rating	C-	Easy	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

Pinball Spectacular is a cross between video pinball and the arcade classic, *Breakout*. While certain elements of pinball are present, such as the two circular bumpers in the upper corners, a pinner, and letter targets that spell "Commodore" for an added bonus, most of the action is right out of *Breakout*.

The paddle controls two sliding flat deflectors, one at the bottom, and one near the center of the screen. The upper area of the screen consists of two sets of color bricks which you knock out—brick by brick—by the ball's impact. Set between them is a barrier protecting the Commodore logo. Hitting this barrier deactivates it and sets up a barrier at the bottom of the screen that rebounds any wayward balls. This bottom barrier deactivates when the first ball hits, or when you hit the Commodore logo for bonus points. Each of the six target letters around the field lights up the letters in the word "Commodore" at the center of the playing field. When you hit all of the letters, the bonus multiplier comes on. Hit the gate under the Super Logo when it flashes purple to earn an extra ball.

Game play is rather mixed. At first, the ball is agonizingly slow, but if it gets caught in the bumpers for too long its vastly increased speed makes the game nearly impossible. You must resort to catching it with the bottom deflector. The playing field graphics are colorful, and the sound effects are adequate. Pinball fans may find this game a big disappointment, but there are other more realistic pinball simulations on the market from which to choose.

PIXIE PETE

Merlin Software
$19.95

Overall Rating	C-	Medium	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	C	D+	*Holds Interest*

Pixie Pete is a poor man's *Dig Dug*. You control a dauntless pixie whose sole goal in life is to dig his own maze in search of buried carrots. But deep underground are four dragons and an occasional ghost who pursue him. Fortunately, Pete has a hydraulic ram pump which he can use to blow them up if they get within range. Once he digs up all of the carrots and destroys all of his adversaries, he can move to a more difficult level.

The play mechanics are quite similar to that of *Dig Dug*, but the pump can only be used near the center of the screen and only in a horizontal direction. Thus, the strategy is different. Instead of attacking the dragons in their dens, you must free them, then lure the little darlings toward you in the center of the screen, where you can dispose of them. The dragons move slowly (only vertically and horizontally) through your tunnels, but the ghost can move diagonally anywhere on the screen and is quite dangerous.

Pixie Pete lacks originality and doesn't play nearly as well or as smoothly as an arcade game should. The quality of the graphics is only fair; play is, at best, mediocre-to-dull. The game offers some challenge, but

if you like this type of game, buy the original arcade version.

PURPLE TURTLES

Quicksilva
$29.95

Overall Rating	D+	Easy	*Challenge*
Creativity	D+	B-	*Graphics*
Documentation	C-	D	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

Purple Turtles is a cute though simple game meant for family fun. In reality, however, it is entertaining only for very young children. Game play involves crossing a pond by hopping on the backs of four bobbing turtles in order to retrieve several pieces of fallen fruit on the opposite shore. You receive 100 points each time you bring back a piece of fruit to your starting point. Yes, that is all there is to *Purple Turtles*. It is an easy enough game to grasp, even for a four-year-old kid, but utterly boring (even at the higher difficulty levels) for any player who's seven or older. There is some degree of challenge at the higher skill levels, when the bobbing becomes more frequent and you must back-track to avoid sinking. However, even at this level, the game fails to hold the interest of children over the age of six or seven.

The graphics are colorfully animated yet not particularly pretty. The turtles, of course, are purple, as the title implies. Balloons float by, but do not have anything to do with game play. The music that accompanies game play is quite cheerful. Overall, however, the nice graphics and sound do little to make up for the game's shallowness and game play weaknesses. If you think your child may like *Purple Turtles*, bring him to the store to try it out first. And trust his judgment, not your own.

RESCUE SQUAD

Muse Software
$29.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C-	C	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	B-	C+	*Holds Interest*

This three-screen arcade game has you rescue people from a burning building. First, you have to race your ambulance safely through chaotic rush hour traffic to the burning building at the opposite corner of the screen. This may seem like a simple task along the grid-like streets, but if you don't apply the brakes frequently with the joystick button, you almost certainly will hit a building as you steer through the turns. Sure, you get more points for reaching the fire quickly, but if you crash you can't save anyone. The rush hour traffic isn't at all fair, especially along the edges of the screen, where cars enter randomly. Since you have to be near the screen edge at both your fire house and destination, you can easily lose a truck near either.

On the second screen, you have to run back and forth at the base of the building to catch crazed people as they leap from windows far above you. Try to earn more points by catching the people wearing blue or purple nighties. Unfortunately, their suicidal actions knock flower pots off ledges which you must avoid. Once you have been beaned three times, you must enter the burning building via your tall ladder.

On screen three, you find yourself on one of the upper floors of the building. It is a maze of hallways with fireballs randomly scouring the hallways. You have to find the person cowering in an office and carry him to the open window while avoiding the fireballs. You can don the blue asbestos suits you find in the hallways, but they only protect you for a short while. If you rescue everyone, you return to the first screen, earn an extra man, and begin once again at a higher level.

Rescue Squad is essentially a child's game, with fair graphics and some nice background music. Its three screens tend to look much too familiar as they combine elements of other widely popular VCS games, such as *Dodge 'Em*, *Kaboom!*, and *Pac-Man*. They are not, however, executed nearly as well. Despite the game's overall simplicity, it does have some depth, and may well be worth your consideration.

SCROLLS OF ABADOM

Access Software
$34.95

Overall Rating	D+	Medium	*Challenge*
Creativity	C-	C+	*Graphics*
Documentation	C-	D+	*Value for Money*
Game Depth	B-	D	*Holds Interest*

Your quest in *Scrolls of Abadom*, an unimaginative arcade adventure game, is to find all the pieces of a magic amulet. Each game level consists of a number of grid blocks connected by magic power disks that appear only after all of the gems have been collected on that grid. Direction arrows are displayed behind the joystick-controlled screen player as he moves around the three-quarter perspective grid. Trying to move

against the arrows only angers the Wizard; when he's enraged, he releases the Beast, who loves nothing better than to chase after you.

The Beast isn't the only creature that you've got to worry about. The most numerous of the critters out to get you are the Kitz. They follow the rules of the arrows, unlike the Beast. The Arrow Eater naturally eats your arrows and replaces them with more gems. Fortunately, he is harmless to the touch. Then there is Kim, the swamp creature who jumps around the grid. It may seem as if there's no defense against it, but protection rests with one of the spells revealed on the scrolls (that you occasionally see on several of the blocks). Incidentally, you can see a map of all the blocks that you have visited by pressing the space bar.

Scrolls contain clues to help you complete the adventure. For instance, one reveals a secret word to type in that lets you walk against the arrows. Sometimes it works—but sometimes it doesn't. Perhaps it works only for a certain number of times. Other scrolls help you defend yourself against monsters.

Scrolls of Abadom is very, very repetitious, even a little boring. The graphics are fair, the sound effects minimal. It is challenging nonetheless, but only if you really go for this type of game.

SLAMBALL

Synapse Software
$34.95

Overall Rating	B	Easy	*Challenge*
Creativity	C-	B	*Graphics*
Documentation	C	B-	*Value for Money*
Game Depth	C+	B-	*Holds Interest*

Pinball simulations appear on the market with surprising frequency. Some are quite realistic, others only make the ball go through the motions. The few that are truly outstanding are either near perfect simulations of popular mechanical pinball machines, or have something brand new to offer. *Slamball* falls into the latter category.

Slamball has a scrolling playfield that's four screens deep. Each screen has its own set of flippers, targets, and bumpers and is connected to the screens above and below by chutes. While the ball's motion is mainly downward throughout the game, it is possible to hit or ricochet the ball with enough force to reach the screen directly above. In order to complete one play level, you must hit each of the thirty-seven targets arranged in banks throughout the four screens. These banks reset from solid to hollow targets when they've all been knocked out. Knocking out a bank of targets releases floating bumpers which quickly disappear when they hit any portion of the playing field. Hitting these targets increases the scoring multiplier. In addition to the ball's normal bounce, you can propel it horizontally by pressing the joystick button. You are only allowed a randomly determined number of horizontal jostles per ball. If you exceed this level, the machine tilts, and the ball in play is lost forever.

The game has exceptionally nice, true-to-life graphics. The ball, in general, responds realistically, with only a few problems around the flippers. I've seen balls saved that were definitely past the flippers. *Slamball* is an easy pinball game that's noteworthy for its high scoring capacity. I am not a hot-shot arcade game player, and I've reached the fifth level with 418,400 points. (For a moderately good player, this is quite satisfying!) You should be able to clear all of the targets and proceed to the next level about one third of the time. The upper levels feature exactly the same playing field with the same degree of difficulty, only in a different color. *Slamball* is a well-conceived, professionally designed pinball game. Pinball fans won't be disappointed.

SPARE CHANGE

Broderbund Software
$37.95

Overall Rating	B-	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B-	C+	*Value for Money*
Holds Interest	B	C+	*Game Depth*

You are the game-happy owner of the Spare Change Arcade and business is better than ever. You've just put in a new arcade machine that's breaking all the records, when zikes! two fun-loving Zerks break out of the game and begin stealing tokens from your machines and putting them in their piggy bank. The arcade runs on a token economy, with tokens supplied by four machines. You must race from each token machine to your storage bins and back again, collecting as many tokens as possible. Speed is essential because the Zerks race you to collect the tokens. If the machines run out of tokens, they require money, which you get from the cash register. If the cash runs out, then you must go to the safe for another bag of money. All this running around, combined with the Zerks' knack for stealing your tokens, results in a frantic game.

Luckily, you can easily distract the Zerks. They can't resist dancing deliriously if you drop a token in the jukebox, which keeps them occupied while you collect a few more tokens. On higher levels, you can employ a popcorn machine as an added distraction. If it looks like the Zerks may win, take ten (or more) tokens from

your storage bins and enter the Zerk Show. There, you can collect points for your tokens. You miss the cartoon, but at least you're able to play a little longer.

You control the game either with a joystick or the keyboard. A joystick is almost essential, especially for youngsters. An extra feature (not included in many home arcade games) is the ability to adjust the difficulty of play by altering the Zerks' behavior patterns. Thus, you can make the game easy for a seven year old or almost impossible for an adult. *Spare Change* is a light, humorous game with good graphics and sound.

SUPER PIPELINE

Interphase
$34.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	B	*Graphics*
Documentation	C	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Super Pipeline is an original, interesting, and refreshing arcade game, a breath of fresh air in this world of copycat games. Fred and his assistant, Ed, are trying to get a set amount of oil through a long convoluted pipeline and into a barrel at the other end. However, there are a bunch of nasties that are trying to plug up the pipe or gobble Fred and Ed up. Fred, as supervisor, is responsible for protecting the pipe, his helper, and himself against Venusian pipe spiders and the hard-cased lobster. He also has to make sure that expendable Ed fixes the plugs that the saboteurs drop from above.

Fred and his helper can be guided along the pipe via a joystick. Ed will follow close behind once Fred has passed, and he will pause to fix any plug he encounters. The nasties reach the pipe and metal wedges overhead by climbing a ladder on the right side of the screen. Fred can stand guard and shoot them as they climb, but if any get overhead, trouble begins. The saboteur drops a wedge and the oil stops.

Meanwhile, Fred has to drop his guard to show Ed where the wedge has to be removed. Luckily, Ed works unassisted, steadily hammering away, because spiders most likely have reached the pipe and have to be dealt with. If one reaches your helper, he dies, and you have to get another helper just reporting for work at the beginning of the pipe. Sometimes you can keep everything under control while the oil flows smoothly. Then the lobster enters the screen and begins chasing you. You'll have to work your way behind it and shoot it in its vulnerable tail, otherwise, if it reaches you, you are down one man. Filling one thousand barrels completes the level, but the next level has an even longer pipe.

Super Pipeline is a madcap game with never a dull moment. It has eight increasingly difficult screens and can be played at three different skill levels. The fourth screen which has barriers beside the ladder to protect the nasties as they climb is more than enough challenge for even hardened arcade players. Best of all, you can even choose your starting screen. The game's graphics are nicely animated. The oil flowing in the pipes has a rounded three-dimensional look. The background music is nicely done and varies with each screen. On the whole, *Super Pipeline* is definitely a fun game to play. With nice graphics, exciting and challenging game play, it will hold your interest for a very long time. It is one of the best new Commodore games that we have seen.

TAPPER

Sega
$44.95

Overall Rating	A-	Hard	*Challenge*
Creativity	A-	B+	*Graphics*
Documentation	B+	B	*Value for Money*
Game Depth	A-	A-	*Holds Interest*

Tapper was adapted from the novel, madcap, coin-operated game of the same name by Bally Midway. You play an overworked bartender slinging sodas (the original has sudsy beers) to customers in an old west saloon. In the first screen, customers line up at each of four separate bars. You fill mugs from taps located on the left, then sling them across the bar to the patrons. The joystick controls your vertical movement between bars, and sideways movement from bar to taps. You must be quick, since your customers get impatient and move toward you. If a disgruntled customer reaches you before you serve him, he slings you down the bar. Some drinkers take their sodas and leave, only to be replaced by new customers. Others gulp their drinks and sling their empty mugs back at you. You lose a life if a mug crashes to the ground, or you slide a soda to a customer who's still drinking or watching the floor show. These things don't happen until you pick up tips left by happy customers.

At first, only one customer stands at each bar. The second round has two per bar; things begin to get hectic. If you survive, you advance to the bonus round. The infamous "soda bandit" shakes five of the six Mountain Dew soda cans, then shuffles them like a con man's shell game. When he stops, you must guess which one he didn't shake. The correct guess earns you 3000 points.

Tapper has three other bar scenes: the Jock Bar, Punk Bar, and Space Bar. While all the taps in both the

Old West Saloon and the Jock Bar are on one side or the other, the Punk and Space bars split them up. The Punk Bar has two taps at the bottom right and two more at the top left. You get from one to the other through a passageway between the second and third bars. The split is even worse in the Space bar. Unfortunately, you have to play the screens in order. I've never reached the last two.

Tapper is a zany, fun-filled game with great graphics. It is certainly an original concept, and holds your interest for some time. One player can sling the suds alone, or two can alternate turns.

TIME RUNNER

Funsoft
$29.95

Overall Rating	D+	Medium	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	D+	D+	*Holds Interest*

In *Time Runner*, an arcade game based on the coin-operated *Amidar*, you fill in the dotted lines enclosing twenty rectangles on a grid, while four defender droids chase you. When you complete your task, you advance to the next level. Your score increases by the point value on the bonus timer. Even numbered levels have countdown point values for each block, where the point value inside the rectangle falls rapidly once you have surrounded two sides. Unless you quickly finish the perimeter, you lose hundreds of points. You get three jumps (you can set the game for three to seven) that momentarily paralyze the droids, and you can even pass through them while they stand stunned.

The game suffers from its simplicity, lack of depth, and overworked, repetitive concept. Although not a bad game, it cannot match similar clones with better graphics and more depth.

TOOTH INVADERS

Commodore Business Machines
$20.95

Overall Rating	B-	Easy	*Challenge*
Creativity	B	C	*Graphics*
Documentation	C	C+	*Value for Money*
Game Depth	C	C+	*Holds Interest*

Tooth Invaders is a truly strange arcade game, reminiscent (to readers over the age of thirty) of those toothpaste commercials in the fifties that featured Bucky Beaver battling tooth decay with the help of Ipana toothpaste. In this arcade original, you control "Plaqueman" who uses either dental floss or a toothbrush with a fluoride toothpaste to remove plaque germs deposited by arch enemy "D.K.," the Tooth Invader.

You are presented with a standard screen showing the status of the four upper and four lower teeth, and a zoom screen for fighting plaque. You must use the standard screen for detecting tooth decay, hunting for D.K. or the plaque germ, and for switching from toothbrush to floss (and vice versa). Armed with a toothbrush dipped in toothpaste, you switch to the zoom screen by pressing the joystick button. You then move the brush over the tooth to remove the black specks of plaque germs on the enlarged tooth. It is a race against D.K., and one that he eventually wins, as the tooth decay "bong" soon sounds. This signifies that a tooth is in danger of decaying. Depending on the level, you have from four to twenty-one seconds to clean the tooth with the brush and to floss between it and neighboring teeth. D.K., who is deadly to the touch, is always nearby. However, if you manage to save the tooth, it sparkles and makes you invincible for ten seconds—usually enough time to catch your nemesis. The game ends when you've used all of your Plaquemen, or four teeth have decayed.

The game certainly is original and teaches a good lesson in dental hygiene. It appeals most to kids aged ten and under. I suspect some toothpaste company executive or advertising whiz had a hand in designing *Tooth Invaders*. Anyway, it's a cute, fun game that boasts good graphics.

VIC ALL STARS

Computermat
$34.95
VIC 20

Overall Rating	B-	Easy	*Challenge*
Creativity	C	C+	*Graphics*
Documentation	B	A-	*Value for Money*
Game Depth	C	C	*Holds Interest*

One should approach an eight-pack of VIC 20 games for $34.95 with a skeptical eye. At less than $4.50 a game, I didn't expect much from the Computermat multi-pack. But the package is a mixed bag, and while some of the programs were as weak as anticipated, some exceeded my preconceptions.

The eight programs include: Paratrooper, Target Command, Artillery, Cattle Round-up, Head-On, Trapper, and Snake-Out. (Actually, you get seven different games for your money because Trapper is a variation

of Snake-Out.) They are stored on three cassettes, which means that sometimes you must go past a game or two to find the one you want. All instructions are programmed on the cassettes as well; first the instructions load, then the program follows. This is very inconvenient; to refer back to the directions you must reload them and then reload the game.

Paratrooper is one of the best of the set with simple but attractive graphics. In this shoot-'em-up, you are in command of a ground-based cannon defending your territory against an invasion of helicopters and paratroopers. Either joystick or the keyboard controls the cannon, and the instructions acknowledge that the keyboard is more sensitive. You may select either guided or non-guided missiles as you try to blast the invaders out of the sky. There are some nice touches. As the paratroopers are dropped from helicopters, their parachutes open and they descend to the ground. Once in a while, a parachute fails and the soldier falls, arms and legs flailing, to his death. You can also shoot the parachute and the soldier falls and dies. Show no mercy for the paratroopers—if three make it to the ground, they run off the screen and return driving a tank which will most certainly destroy your cannon. The game is fun, but not very difficult. It is easy to sweep the sky with unlimited ammunition and protect your base.

Artillery, a two-player game, begins with a colorful opening screen including some cute animation. Players take turns firing their cannons over a mountain, attempting to hit their opponent's cannon. You adjust the angle and force using the function keys, and you must also take note of the wind factor. The Return key fires the cannon. The game is slow-going and rather dull, relying more on computation of angles and numbers than quick action. It is the weakest in the package.

Two versions of Target Command are included, one for keyboard and one for joystick. The object is to shoot down enemy missiles before they destroy your six bases. To complicate your mission, you only have two minutes worth of ammunition. There are ten levels, the last five being the same as the first, but with slower response time. The graphics are almost identical to the Commodore 64 version, but because of the VIC's twenty-two character screen, they are larger and better looking. The instruction screens are colorful and add to the game.

Head-On, similar to *Car Chase*, gives you four chances to clear all of the dots from a simple track without colliding with the enemy. Your car travels counter-clockwise, and the enemy travels clockwise. Graphics are simple, but effective. The maze, or race track, consists of five, concentric, oblong rings filled with small diamonds. There are nine levels of play with the enemy car increasing speed with each level. Current score and high score are displayed as well.

Cattle Round-up features the most original concept of this series. The object is to guide a cowboy through a maze-like barn as he rounds up a number of stray cows. He can either shoo, push, or coax them to a cow pen to the left of the barn. Shooing is least effective; the cowboy must get behind the cow and keep it from straying. Progress is slow and painstaking, as the cows neither remember nor care where the pen is. Pushing is the tried and true method, slow but sure. Coaxing is the trickiest but most effective method. You make a noise which the cows can't resist, and they all follow you—eventually. Once at the corral you must open the gate, guide the cow through, and close the gate. The instructions are long, especially when depicted a few lines at a time on a number of screens, but the game is easy to learn. As the instructions warn, the key to Cattle Round-up is patience. The maze is drawn quite slowly, and the cows are "dumb." Graphics are primitive (the cows look nothing like cows I've ever seen), but sound is clever. The cows utter a testy, "moo," when pushed. Computermat must be awarded some points for originality.

Snake-Out claims to be three games in one, including a one or two-player version and two-player Trapper. You may choose between nine speeds and rounds. Fortunately, you can also rerun the instructions before the game loads. The object is to eat blocks which appear at random to gain points, making sure not to eat spiders, one's own body, the score at the top of the screen, or the screen border. In the two-player version, you can attempt to eat your opponent and the survivor continues to play the game. Trapper employs the same graphics under different rules; both snakes try to trap each other. The snakes are cute, but in the solo version, the snake can dip below the screen and be lost to sight. Maneuverability is based on speed, and action is quite responsive. However, two control keys are not very effective in commanding movement in four directions. Each key turns your snake ninety degrees either clockwise or counter-clockwise.

One drawback of this multiple package is that the right-hand control keys vary from game to game, making them difficult to remember. Since the programs are all written by the same programmer, why couldn't they all be the same? The more serious drawback is a lack of depth to each game. None held my interest for very long, none seemed that difficult to master, and none are addicting.

Arcade Games

Shoot-'em-up

ATLANTIS

Imagic
$39.95
VIC 20

Overall Rating	C+	Medium	*Challenge*
Creativity	B	C	*Graphics*
Documentation	B	C	*Value for Money*
Game Depth	C-	C	*Holds Interest*

Imagic's *Atlantis* is built upon an interesting concept, but lacks the variety to make it a truly exciting home arcade game for the VIC 20.

In *Atlantis* your mission is to save the fabled underwater city from the dreaded Gorgon fleet, which attacks from above. Spaceships cruise across the sky, dropping to hover over the water in attempts to zap the installations of Atlantis.

To fight back, you are equipped with two sentry posts with cannons which fire in diagonal lines across the sky. A joystick is unnecessary, you can control the game with the keyboard easily. Any of four lower left keys fires the left cannon, and any of the four lower right keys fires the cannon on the right. The "B" key releases special blitz bombs.

Joystick play is also simple. Pull the joystick to the right to fire the right-hand gun, left to fire the left cannon. The fire button triggers blitz bombs.

Your artillery is immobile, you can only hit enemy craft when they are in certain portions of the screen. If the Atlanteans really wanted to protect their civilization, they would have built movable guns, rather than waiting for enemy craft to be caught in a crossfire.

According to the instruction booklet, the Run/Stop key pauses the game. I wasted many lives discovering that this isn't true—the game continued. Imagic should revise its instructions or implement that feature.

The city of Atlantis is divided into three sectors: Temple del Mar, Veiled Downs, and the Domed Palace. Each is protected by a glimmering force field, produced by a generator. The Gorgon vessels must destroy each generator before they can attack a sector. So, in effect, you are given six lives. If you weather an attack wave with no damage to the civilization, a part of the city already hit by the Gorgons is replaced, providing additional lives. Play ends when the entire civilization has been destroyed.

Atlantis boasts neither captivating graphics nor great depth of play. Speed is the only difference between easy and hard games, and beginning and advanced play levels. I found no graphic surprises, only two ship designs flew over the skies of Atlantis. The city sectors are low resolution, and the stars maintain a constant place in the sky, although they do change color to simulate twinkling. There is no screen scrolling, and no attempt at three-dimensional graphics.

Two players may compete to save the fabled city, or one may play alone. Players' scores are large and easily visible throughout play, but a high score is not maintained for single-player games. Points are awarded for destroying enemy ships. At first, downed Gorgon vessels garner ten points each, but their value increases through progressive waves of attack to a maximum of one thousand.

Players may resort to one blitz bomb on each wave, if the fate of the city looks dismal. The bomb will destroy, and award points for, every vessel in the sky when it goes off.

Atlantis includes some sound effects to help defenders: the drone of Gorgon vessels, and a series of beeps to signal that one wave has been completed and a new one is approaching.

Imagic offers a two-year conditional warranty for this game cartridge. Just mail it in and if it has not been abused, it will be repaired or replaced free of charge.

I did not find *Atlantis* a good value for its $39.95 retail price. It has few surprises, little challenge, and disappointing graphics, all of which add up to a game which soon gathered dust on my shelf.

AXIS ASSASSIN

Electronic Arts
$35.00

Overall Rating	B-	Varies	*Challenge*
Creativity	C	C+	*Graphics*
Documentation	C-	C-	*Value for Money*
Game Depth	C	C+	*Holds Interest*

Axis Assassin takes the perimeter-shooting type of arcade game one step further. Your joystick-controlled Axis Assassin can enter any of the corridors of the program's more than 100 geometric battlefields. The opposition is tough. Spinners weave traps and drones methodically lay down webs that prevent you from moving over sections of the grid. You can free up space if you shoot fast enough. In addition, hunters pursue you relentlessly, and spores will split into pairs of mutant guards if they reach the bottom of the screen.

Surviving an attack is difficult. The best strategy is to hold your position along one of the end corridors about one third of the way in. The enemy will attack from all sides, but if you are careful, you can whirl around and fire from the rear. Eventually, when enough fighters have been dispatched, the Master Arachid appears. You must blast away the rest of the web and detonate your pulse bomb as you thrust from the grid in order to reach the nest.

The Master Arachid holds one of your Axis Assassins prisoner inside his fortress. Your attack vehicle drives like a car and can elude the dozen or so fighters left over from the previous grid. The object is to blast a hole through the nest cavity and link up with the trapped Axis Assassin. It may look easy, but you are bound to lose two ships for every one you manage to save.

The game is tough and will please the diehard arcader. Many will find the battle more than they can handle, and most will prefer the less demanding and more reflexive *Tempest* clones. The best part of the game is the rescue portion, but if you don't fire the pulse bomb at exactly the right moment, you will never get there. With only three ships, it's all over pretty quickly.

Axis Assassin has very plain graphics that are colorless—but I didn't find this a big drawback. The absence of enough starting levels and a save-game feature may annoy the skilled player. Overall, this entertainment program is a good, reflexive shoot-'em-up game with more play depth than any of the other *Tempest* clones on the market.

BEACH HEAD

Access Software
$34.95

Overall Rating	A-	Hard	*Challenge*
Creativity	B+	A	*Graphics*
Documentation	B	B+	*Value for Money*
Game Depth	B	A-	*Holds Interest*

Beach Head, a multi-screen action game for one or two players, employs full color, high-resolution three-dimensional graphics, and excellent sound effects that you can modify to suit yourself.

The object of the game is to capture the enemy fortress of Kuhn-Lin by penetrating the island's defenses. There are two strategies for attack; a full frontal assault against a well prepared fleet followed by a beach landing, or an attempt to sneak through a heavily mined secret passage and catch the enemy fleet unprepared. The secret passage approach is the sanest, even though each ship must carefully navigate through a narrow passage littered with floating mines and speeding torpedos launched from shore. You may lose some of your fleet, but in the long run, surprise may be the only key to victory.

Upon contact, the enemy immediately launches an aerial bomb attack against your fleet. Your only defense is an anti-aircraft gun with adjustable elevation and direction. You have unlimited ammo, but your supply crew works much slower than the gun fires. Accuracy is important, for you must hit planes nearly dead center to score a kill. If you're slow, the planes drop their load of bombs to either damage or sink your ships. The attack goes much faster if you take the secret passage.

After the air attack you must sink the enemy fleet with your artillery. Enemy ships in the distance fire round after round at your ships, trying to zero in on one of them. You have to eliminate them by firing and adjusting your guns until you find the correct range. Splashes in front of the enemy ships indicate your shells fell short, and presumably the ones without splashes went too far. It may sound simple, but many times even the slightest adjustment in elevation will do the trick. When you successfully eliminate the enemy fleet, you still haven't won the war; the toughest part is yet to come.

Your final obstacle is the fortress itself. You are awarded two tanks for each ship that survived the first battles, up to eight tanks. Your goal is to destroy the ten white targets on the side of the fortress in the order that they light up. Speed is absolutely essential, since the fort is protected by a cannon that never misses!

Beach Head features good graphics and sound effects. During the air attack, the planes fly at you with scary realism, then fade off and up to each side. You almost want to duck your head as they fly off. During

the ship battle, the heavy artillery shells that miss splash into the ocean, kicking up a plume of water. You can pause or stop the game at any time, which allows you to let the computer control the game and play by itself until you touch the joystick again. In this way you can start play at any point and practice on certain segments.

Four levels of difficulty guarantee that even the most fanatical of arcade game players won't get bored, because the higher levels are fast and furious.

BEAMRIDER

Activision
$34.95

Overall Rating	D	Medium	*Challenge*
Creativity	D	D+	*Graphics*
Documentation	C	D	*Value for Money*
Game Depth	D+	D	*Holds Interest*

Beam Rider is a somewhat disappointing shoot-'em-up game. It's too bad, for the advertising leads you to believe that your light ship can travel along the three-dimensional grid of beams hunting for alien craft. Instead, your ship can only travel horizontally along the bottom of the screen and shoot laser fire or torpedoes at the enemy along one of five spaced vertical grid lines. Yes, the action is fast, but game play is mostly reflexive; in other words, you have to avoid getting hit by return fire or space debris, and must quickly and accurately shoot to eliminate fifteen enemy saucers on each progressively harder level.

The game is joystick-controlled. You have unlimited laser fire, effective against only some of the alien fleet, and only three torpedoes per level which are activated by pushing forward on the stick. The torpedoes are particularly useful against the enemy sentinel ship. While you don't receive bonus ships for points, you can get one by allowing one of the yellow rejuvenators that float through the beam matrix to land on your deck. Don't shoot one by mistake, for it will turn red and explode. Get out of the way, since the wreckage will zap you upon contact.

The game gets harder with the addition of a new danger every two sectors, up to sector fourteen. You can start at three different levels corresponding to sectors one, five, and ten respectively. Surprisingly for an Activision game, *Beamrider* has very weak graphics. The horizontal lines tend to scroll forward, giving you a sense of movement that is ineffective. The enemy craft are nothing but small sprite shapes. Game play is often hectic, but on the upper levels, it's a drag. Don't pin your hopes for excitement on *Beamrider*; it just won't hold your interest.

BLOCKADE RUNNER

Interphase Technologies, Inc.
$36.95

Overall Rating	D	Medium	*Challenge*
Creativity	D	C	*Graphics*
Documentation	D	D	*Value for Money*
Game Depth	D	F	*Holds Interest*

As shoot-'em-up scenarios go, *Blockade Runner* is about as simplistic as they come. The object is to steer your ship through an asteroid field, past robot mines and alien ships to Earth. As the pilot, you see the battlefield out of the nose of your ship. The joystick steers the ship past life-threatening asteroids that upon collision, convert their kinetic energy into shield heat. You cool those shields with random ice crystals, but if the shield overheats, you're history. Speed is regulated with the F1 and F7 function keys. Use the joystick button to fire missiles into either the asteroids or the enemy. These missiles autotrack once they're fired so you can still steer to avoid the asteroids. You have to be quick to eliminate alien ships, for their plasma beams heat your shield thirty percent. It takes three hits to kill one, so just pray you're good.

Blockade Runner is too simplistic to hold anyone's interest for long. The three-dimensional effect of the asteroids' approach tends to give the game a realistic feeling, but game play leaves much to be desired. Beginners, who will lose games quickly after colliding with their first few asteroids in the opening thirty seconds of the game, will become frustrated quite soon. Skilled players will survive longer, but will invariably find game play too easy and superficial. I'm afraid all gamesters will find *Blockade Runner* a waste of time and money.

BLUE MAX

Synapse Software
$34.95

Overall Rating	A	Hard	*Challenge*
Creativity	B+	A	*Graphics*
Documentation	B	A-	*Value for Money*
Game Depth	B+	A-	*Holds Interest*

Blue Max is a three-dimensional, diagonally scrolling, aerial combat game. Your mission in this three-stage game is to destroy as many as possible of the enemy's fighter planes in aerial dogfights, while simultaneously blasting the enemy ground targets by bombing or low level strafing runs. Eventually, you'll reach the city where you must bomb three specific ground targets to win.

Your aircraft is joystick-controlled. For some strange reason, the author has installed the controls backwards.

However, if you select reverse controls, the game works well. Once in the reverse control-position, you can pull back on the stick to make the plane climb, and push forward on the stick to make the plane dive. The machine gun is activated with the trigger button, and bombs are released by pushing the button while lowering altitude. An instrument panel displays airspeed, fuel, altitude, and the status of your plane's equipment. A letter flashes when a part is damaged. Likewise, a flashing asterisk indicates whether an enemy plane is above or below your craft, or approaching from forward or aft.

The plane takes off from a small landing field. It must reach 100 m.p.h. before lift-off or else it will crash. Once in the air, your plane begins flying over enemy terrain which includes a river, heavily fortified with anti-aircraft guns, some on moving barges. Your plane casts a shadow over the scrolling terrain below, giving a good visual indication of the plane's altitude and providing a useful bombsight. Wind plays a factor in this game, and falling bombs tend to drift. Some of the targets are marked with an "X," offering you more points if you succeed in demolishing them. The plane's machine guns may be used to strafe at altitudes between twenty-one and twenty-five feet.

When you have scored 1,000 points, the screen begins to scroll over a roadway and the enemy's airfield. You can bomb their hangar and several planes parked beside the runway. Afterward, the terrain begins to scroll back to the river. Only after you have achieved a score of 5,000 points does the display scroll over to the enemy's city. The objective here is to bomb three specially-marked targets in the center of the city; you must fly down between tall buildings in order to reach them.

The most thrilling part of *Blue Max*, in my opinion, consists of the aerial dogfights. Planes approach either from the front or rear. You attempt to fly at the same altitude and line up your guns. Tackling a plane head-on is outright dangerous, since you are more likely to collide with it than shoot it down. Planes coming from the rear are easier to hit if you wait until they pass before blasting them with your machine gun. As your aircraft flies through heavy anti-aircraft flak, damage is likely to occur. Letter indicators advise you of damage that your craft sustains, such as decreased maneuverability, leaking fuel, or damage to bomb gear or machine guns. When all four letters are lit, the plane will crash.

You can arrange for your plane to be refueled and repaired at your airport. The computer alerts you as to when you are approaching an airport. Put down the landing gear, fly low, and land as close to the main building as possible. If you land too far up the runway, you'll never manage to reach lift-off speed before reaching the runway's end. You also become a sitting duck on the runway, since enemy planes are flying overhead.

Blue Max is a very enjoyable game that gives you a realistic sensation of flying a bi-plane over three-dimensional, diagonally scrolling terrain. A challenging amusement, it takes some practice to avoid becoming thoroughly frustrated. You have only one plane at your command, so once you crash, you are compelled to begin the game all over again. *Blue Max* has great depth of play and will hold almost anyone's interest for long periods of time.

BUCK ROGERS—PLANET OF ZOOM

Sega
$39.95

Overall Rating	C+	Easy	*Challenge*
Creativity	C-	B	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	C-	C+	*Holds Interest*

Though it's a fairly typical shoot-'em-up game, *Buck Rogers—Planet of Zoom* is noteworthy for its stunning graphics. The object is to defeat the Mother Ship and its hoard of alien saucers and kamikaze space hoppers. You navigate your joystick-controlled ship over the Planet of Zoom. The view of your ship is from behind (like in *Pole Position*), as you fly past electron posts in this simulated three-dimensional screen. The mountains are off in the distance. Pushing the joystick forward speeds you up; pulling it back reduces your speed toward the minimum for that particular level.

You are given minimum goals for each of the four sections of each level. For example, you must either fly between fifteen pairs of electron posts or destroy that many aliens in order to advance to the next round. Round #1 has no aliens, Round #2 offers attacking saucers, Round #3 involves both saucers and space hoppers, and Round #4 presents both saucers and a Mother Ship for you to destroy. Subsequent levels pose larger quotas and the electron posts fire at you. Yikes!

While it's true that you don't have to fly between the posts when chasing and firing upon saucers, they make it more dangerous for you to try this on upper levels. Obviously, the easiest way to complete many of the rounds is to slalom between the posts at more than the minimum speed. (This becomes apparent if you run out of fuel before you defeat the Mother Ship.) The spacing between them becomes narrower as the game progresses, and smashing into one results in the loss of a ship.

There isn't all that much to *Buck Rogers*. It resembles a driving/road racing game in which the enemy shoots

back at you. The first three rounds take place on the ground and the fourth is in space. The forward scrolling effect is quite realistic and gives the game a sense of motion. The color flashing between rounds is quite pretty, but the first few times you experience the effect, you may think you've accidentally lost one of your ships—especially if it looks like you're about to hit one of those electron posts. If you like this kind of game play, you will enjoy *Buck Rogers—Planet of Zoom.* Although it is a somewhat mindless program, it's still a game that will help you pass some time away in a pleasant fashion.

CENTIPEDE

Atarisoft
$44.95

Overall Rating	B-	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C+	B	*Value for Money*
Game Depth	C+	B-	*Holds Interest*

Centipede takes you into the deadly world of garden bugs, where an endless stream of jumping spiders, poisonous scorpions, frenzied fleas, and slithering centipedes thread their way through a mushroom garden. They're out to get your dreaded bug blaster in this fast action, shoot-em'-up arcade game. The object is to stay alive, kill as many bugs as possible, and score high.

Staying alive sounds simple, but every time you kill a bug it turns into a mushroom that clutters the playfield. You can remove mushrooms by hitting them twice with your blaster; however, a frenzied flea, which drops toward the bottom of the screen like a kamikaze pilot, has a magical power to create mushrooms wherever it lands. The centipede snakes back and forth through the garden until it bumps into a mushroom. When this happens, it reverses direction and drops down one row. You must destroy every segment of the centipede before it reaches the bottom of the screen, where it can run into your blaster, destroying it. Centipedes, like worms, split in two when cut (or shot) in the middle, each half growing a head and taking a separate path down the screen. *Centipede* also has a scorpion that leaves poisoned mushrooms in its wake. The poisoned mushrooms madden the centipede, who insanely charges your bug blaster, making the game more challenging.

Centipede is easier than the arcade version, since you play with a joystick on a horizontal screen, not with a trackball on a vertical screen. Beginners might find this hard to believe, since fast, precise positioning is difficult to achieve with a joystick. Also, the horizontal screen gives you slightly less reaction time. However, I've seen seasoned players score over 1,000,000 points. You receive a bonus blaster every 10,000 points, and can accumulate six in reserve.

The game resembles the arcade version, with similar graphics and sound effects. Joystick control is irksome, since you often need to tap the controller to accurately position the blaster beneath a mushroom. (Trackball controllers perform this effortlessly.) The game is fun to play, and seems appealing to many women. It could be because the designer is a woman . . . or maybe women just like the idea of killing bugs.

CREATOR'S REVENGE

Victory Software
$19.95

Overall Rating	B	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C	B-	*Holds Interest*

In *Creator's Revenge*, you must defend a city from the Creator and his attacking hoard of insects, robots, and atomic weapons, while picking up various nondescript treasures you encounter along the way. The playing field scrolls toward you as you control what seems to be a tank, shooting down whatever villains cross your path. Once you have defeated the insects, you must deactivate an atomic bomb by shooting it with a special weapon you acquire among the treasures. If you're successful in destroying the bomb, play (on Level 1) resumes as before. On levels other than 1, you encounter a field of vicious robots sent by the Creator. If your mission to destroy the bomb fails, you face attack by the mutant survivors of the blast.

The game concept resembles many others I have played, but possesses enough originality to be enjoyable. While not unique, the combination of several standard game concepts in *Creator's Revenge* is rather creative. The game has two different skill levels, but I had to play it many times at each level to spot the difference between the two. Level 2 involves the attackers' coming at you at a slightly faster speed, and does have a few twists (like the field of robots). But overall, the difference between the two levels is small.

The joystick control is relatively fast, though somewhat erratic. Whenever your tank encounters one of the objects littering the field, the tank seems to stumble momentarily; this, however, occurs infrequently. The game is easy enough that my five-year-old can enjoy it, and challenging enough that thus far, I have found mastery impossible.

The graphics could definitely be better, especially the treasures, which are difficult to identify. The other

objects have an alien quality, but all that I can surmise is that they are bugs of some sort.

In general, I think *Creator's Revenge* a fairly enjoyable game. While I imagine I could find a better game for the same amount of money, I don't feel that the $19.95 price tag for this program is at all a ripoff.

CROSSFIRE

Sierra Vision
$29.95
Commodore 64 and VIC 20

Overall Rating	B	Medium	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C-	B	*Holds Interest*

Crossfire, a shoot-em'-up contest in which you defend a city's streets from attacking aliens, originates from the arcade game *Targ*. While *Targ* lets you shoot only in the direction you're traveling, *Crossfire* lets you stop at any intersection and shoot in any direction—making it more interesting.

You patrol the block-like grid of streets in a city surrounded by aliens. Your gun contains thirty-five missiles. You play cat-and-mouse with the advancing alien forces, moving into intersections and firing at them. When you hit one, it metamorphoses into another creature with more points. Occasionally, a bonus shape appears on one of the central streets. If you reach it before firing six more rounds, it's worth points; otherwise, it disappears. When your ammunition runs low, a fuel depot appears in the city. You'll have trouble reaching it, since nearly a dozen laser-armed creatures fire at you.

Crossfire, translated from the Apple version, is very challenging and offers effective, smooth, but simplistic graphics. The sound effects are adequate, but the short tune that plays throughout can ruin your concentration. Fortunately, the F5 key turns it off. You can play the game using keyboard control, but I wouldn't recommend it. The joystick control works well. You remain stationary at an intersection, depress the fire button, and shoot by positioning the joystick in the direction that you wish to fire. (The stick doesn't fire when centered.) You can also shoot on the run in the direction you're moving. If you defeat all aliens on level one (forty-eight kills), you advance to the next faster and deadlier level.

There is little doubt that this is one of the better strategy shoot-em'-ups for Commodore computers. It requires considerable practice, it remains tough, and won't easily tire you.

DEFENDER

Atarisoft
$44.95
Commodore 64 and VIC 20

Overall Rating	A-	Medium	*Challenge*
Creativity	A-	B-	*Graphics*
Documentation	B	B+	*Value for Money*
Game Depth	B	A-	*Holds Interest*

Defender is an outstanding rendition of the William's arcade game. It is an intense, fast-action, shoot-'em-up game in which your ship's mission is to defend the planet's last ten humanoids from alien kidnapers who will transform them into deadly alien mutants. The skies above the scrolling, mountainous terrain are besieged with a variety of alien craft. The scanner, a radar-like display at the top of the screen, helps pinpoint their locations throughout the battle.

The alien fleet attacks in force as you maneuver your ship back and forth and up and down using joystick control. Lasers are the standard weapon, while three smart bombs capable of destroying everything on the main screen are also available. Unfortunately, these are activated by the space bar rather than by a second button which a single joystick lacks. You must hover over the keyboard to use it, but since this makes playing awkward, a friend will be of help to trigger the smart bombs when needed. Hyperspace control is also keyboard-controlled.

The alien force is massive and persistent, yet you are able to manage it as it is spread over five to six screens. The Landers are the first to appear. They kidnap humanoids while defending themselves with white charges. Next, Bombers lay mines that you must avoid, and then the attack force must be quickly dealt with before the Baiters appear. These ships fly faster than the Defender and home in on him with deadly white charges. The Pod is also dangerous, for it releases a group of Swarmers when destroyed. These Swarmers, or little red pellets of death, track you as you zoom in and out among the alien fleet. Destroy them quickly before you're trapped between them and the fleet.

Screams of help heard over the din of battle signal a kidnaping. The humanoid must be rescued before it is abducted to the top of the screen. If it is transformed into a mutant, it must be dealt with swiftly, for it will fly directly above or below you where you can't hit it, and then charge. Thus, rescue becomes the more logical approach. Careful aim will kill the alien, and allows you to catch the falling humanoid in mid-air and return it to Earth. There is a substantial bonus for this maneuver, but humanoids can survive short falls without your consummate skill. In addition, if you lose all your people, the battle shifts to space, for the planet is lost. You have three ships and three smart bombs to

start, and can earn extra weapons at various point levels.

Defender is one of the best action-packed, shoot-'em-up arcade games on the market. It offers excitement that most of the competition lacks. It is a complex game with many nuances of play strategy that keeps the player thoroughly involved and willing to play for long periods of time. The graphics are stark but adequate. The scrolling and radar displays are exceptionally smooth and detailed, and all things considered, it is a game you won't tire of quickly.

DEMON ATTACK

Imagic
$39.95
VIC 20

Overall Rating	B+	Medium	*Challenge*
Creativity	C	A-	*Graphics*
Documentation	A	B	*Value for Money*
Game Depth	B	A	*Holds Interest*

Imagic's Demon Attack is an addictive shoot-'em-up for the VIC 20. I was first introduced to *Demon Attack* on a friend's Atari 2600 a few years back. I admired the graphics, depth of difficulty, and the fluid motion of the Atari version. Imagic's translation of the game faithfully lives up to it.

As in *Space Invaders*, the player mans a laser cannon to defend a planet from deadly enemies from the sky. In this game, you are marooned on the ice planet of Krybor as legions of eerie creatures hover overhead and threaten to destroy you. The creatures arrive in waves, and are easy to destroy at first. As the game progresses, however, a shot no longer kills an enemy but splits it into two!

Demon Attack may be played with the VIC 20 keyboard, or a joystick. Both are easy to handle. Players who use the keyboard have a choice of a number of keys to move the cannon, and the space bar to trigger firing. The Run/Stop key pauses the action, which sometimes comes in handy. To resume play, either hit the space bar or press the joystick button. The joystick is also easy to maneuver, except that you must be near the computer to pause or select another level of play. When two players compete, the joystick must be handed from one to another—standard for the VIC 20.

In *Demon Attack*, your laser cannon is afforded unlimited ammunition. You begin with four lives (three reserve bunkers), and accumulate more with each wave you survive, to a maximum of six. Scoring is based on the number of demons shot from the sky, worth from ten to 140 points each. Your score is shown in bold letters on the screen. As is the case with many such games, however, a high score is not displayed for one-player games.

There are essentially eight variations of *Demon Attack*. One or two people may engage in the basic game, a tracer shot version, the advanced game, or the advanced tracer shot game. Many games simply use speed to provide advanced play, but *Demon Attack* adds more challenges to the upper levels as well.

The tracer feature is an interesting variation, although I found it too difficult at times. You can "pull" your tracer shot while it is in the air, guiding it into an enemy alien.

The demons are nicely animated creatures, and part of the fun is seeing the more dangerous ones as they advance in waves. The demons of the easy levels look somewhat like stingrays. During the first wave of the basic and tracer games, they shower the planet with shots. On levels two and three, the stingray demons use more powerful death beams. When a creature of level four or five is hit, it splits into two creatures; one fires at you, and the other swoops around. If you hit either one, its twin turns yellow and hunts you down. Upper levels include demons which look like cosmic crabs and split in two. The graphics are crisp, clean, and colorful.

Vendor support for *Demon Attack* is excellent. Imagic offers an unconditional two-year repair or replacement guarantee.

Demon Attack brings arcade quality home to your VIC 20. The concept is not especially original, but the colorful action of the game makes it a fun addition to your software collection.

DRAGONFIRE

Imagic
$15.00
VIC 20

Overall Rating	C	Easy	*Challenge*
Creativity	D	C	*Graphics*
Documentation	B	C	*Value for Money*
Game Depth	D	D	*Holds Interest*

Easy is the word for this silly game. *Dragonfire* has two screens. In the first, you guide a prince across a drawbridge while ducking and jumping over fireballs. On the other side of the bridge lies the dragon's treasure room. The prince must race around the room picking up the treasure while avoiding the dragon's blasts of fire. When you retrieve all the treasure, you are returned to the first screen for another round at a higher speed.

For more experienced (hardcore) computer game players, *Dragonfire* lacks polish, depth, and challenge—in short, it disappoints. On the other hand,

Dragonfire seems just right for beginners and young children. I find it boring, but the elementary school students I teach adore it. They enjoy it for the very reasons I avoid it: it's easy to learn the moves—they can win!

Dragonfire exemplifies an earlier era of computer games in several ways. The graphics are static. Only the figure of the prince actually changes form to show motion. The game plot and action are simple and somewhat repetitive. As in the good old days, princes fight dragons and do pretty well.

FLAK

FunSoft
$34.95

Overall Rating	C	Hard	*Challenge*
Creativity	C-	B+	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	C	C-	*Holds Interest*

Flak is a vertically scrolling arcade game in which the object is to destroy Computer Control, a renegade CPU out to take control of the universe. You are flying an advanced AGX fighter using your joystick. The fighter is actually a bomber, and your objective is to destroy as many computer controlled Flak batteries as possible. These batteries guard the long approach—over two dozen screens—to its fortress.

The bombing runs and terrain are somewhat reminiscent of *Xevious*, except that game play consists entirely of bombing targets while being careful to avoid their return fire. To survive for even a short time during *Flak*, you must fully concentrate on your mission, destroy each target quickly with precise bombing, and duck the return fire. There is little room for error; if you lose, your next plane is automatically flown from your runway to the last point you reached, and all of the targets that you had previously destroyed become operational. This is grossly unfair, for there are targets shooting at you from the rear. While it is usually easy to dodge their fire because the Flak stays on its initial course, if three or four batteries are firing simultaneously, you lose your maneuvering room. While the game has two levels of play, I don't think the beginner's level is that much easier. I haven't ever seen anyone, with the exception of myself, get past the Funsoft logo (about halfway to the 6502 fortress).

Flak has colorful, first-rate scrolling graphics. Terrain runs from open countryside with airport and roads, to that which resembles the circuit board inside your computer. You can view the entire mission if you delay starting the game and let the playing field scroll automatically during the title screen.

Game play is frustratingly difficult. It is a long, intense bombing mission with nothing to relieve the monotony. There are no breaks and no "perks," nothing to urge you on except the faint hope of final victory. Unfortunately, this isn't enough to hold most people's attention. Sure, the game will appeal to the arcade fanatic who has beaten every single game that he's ever played, but the average player will beg for mercy long before victory is even remotely in sight.

FLYING ACE

Avalon Hill
$26.00

Overall Rating	C-	Medium	*Challenge*
Creativity	C	C-	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	C	C-	*Holds Interest*

Flying Ace puts you in the cockpit of a World War I biplane. Your mission is to attack and destroy enemy trucks carrying ammunition to the front. Each convoy is protected by enemy planes and banks of ground-based, anti-aircraft guns. Otherwise, the moving vehicles are easy targets for a skilled pilot (such as yourself) armed with a machine gun.

The multi-screen battlefield scrolls as you fly. You have landing fields at both ends. The field that you take off from can't be used for refueling, because you can't fly your plane behind it, and you can't fly in the reverse direction except when you're upside down at the top of a loop. The plane is highly maneuverable, but only on the pitch axis. Pulling back on the joystick causes the plane's nose to go up; in level flight, the plane climbs until it eventually loops. Pushing the stick forward produces the opposite result: the nose drops. Pressing the joystick button activates the guns. You apparently have unlimited ammunition and fuel, except if you overfly your landing field. Then you abruptly run out of fuel and crash. It is important to complete your mission by destroying at least eight trucks, or you are penalized a reserve plane. Enemy trucks are worth twice the number of points as any enemy plane, and the enemy staff car is worth risking your life for in terms of bonus points. It takes several strafing hits to destroy an enemy target.

The game is very sound in terms of its design. It's well-balanced as games go, although difficult to play on the beginner's level. Harder levels, which give you less range on your guns and pit you against a tougher computer opponent, are nearly impossible. You have to fly dangerously low, at treetop level, to destroy trucks. *Flying Ace* isn't a very exciting or addictive game, but is a fairly good diversion requiring consider-

able skill. The only fault I found with it are its crude and grossly executed graphics. Sound effects in *Flying Ace* are minimal.

FORBIDDEN FOREST

Cosmi
$19.95

Overall Rating	C+	Medium	*Challenge*
Creativity	B-	B+	*Graphics*
Documentation	A	C+	*Value for Money*
Game Depth	C+	C-	*Holds Interest*

Forbidden Forest immediately commands your attention with unique multi-plane scrolling graphics and eerie musical sounds of which only the Commodore 64 is capable. The background forest is astounding, complete with ponds, fruit-laden trees, and shrubbery. With foreground objects scrolling faster than background objects, there is a three-dimensional effect similar to that in the arcade version of *Jungle Hunt*, only much better. The sky even darkens at night. Stars twinkle, colors fade in the gloom, and the moon rises and sets. The programmer used overly large sprites to achieve the secondary background playfield. The rest of the graphics including the archer are simple playfield character graphics. The music that plays throughout the game is creepy and haunting. It changes slightly during the primal victory dance between game phases. It sets a marvelous mood for a somewhat weak game.

The object is to guide an archer through a forest inhabited by numerous enemies. He is equipped with a bow and fifty arrows and must load and draw his bow before aiming to shoot. Large, black spiders are the first to attack. You must kill them by hitting them near their center, otherwise, the arrow seems to pass right through them. This trait is somewhat irksome, particularly when you face some of the more lethal enemies like the Dragon. You never have time to re-load and shoot once you have missed, so you must turn and run to avoid becoming a tasty meal. You can only move when you aren't working with your bow. You're even frozen while the arrow is in flight. This fault often contributes to your instant demise. Fortunately, you can always press the joystick button to continue the game at the current phase and level after losing all three archers. With this method, at least, you get to see most of the game.

After the spiders comes a lone but dangerous bee. Next, hundreds of bears fall from the sky. You only need to avoid getting crushed while you shoot a few to reach the next phase and the Dragon. This creature, who hurls fireballs, is perhaps the most difficult to kill. While it might appear easier to kill because it looms large and close, it is much too dangerous to face. Next, you are attacked by hordes of skeletons. They are only a distraction, for you must kill the hovering Forest Phantom. Then if you can kill the Demongorgon's pet snake, you face "him" alone. Lightning heralds his approach as he moves fleetingly but randomly above you. Kill him or he kills you.

Forbidden Forest is unique. While it only has fair game play, the graphics and sound are totally mesmerizing. Since Cosmi's price is fairly reasonable, the game might be worth it.

FORT APOCALYPSE

Synapse Software
$34.95

Overall Rating	B-	B	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	C+	*Value for Money*
Game Depth	C+	C	*Holds Interest*

In *Fort Apocalypse* you must assault a fortified underground fortress, and rescue sixteen hostages. The assault craft is a joystick-controlled helicopter; it can fire rockets when facing sideways, and drop plasma bombs when facing forward.

Your task isn't easy; even the outside of the fort is well defended. Kralthan Tanks launch drone missiles to track your helicopter, and robot choppers patrol the sky. Fortunately, you can keep track of everything using your Navatron scanner at the top of the screen. This miniature, radar-like map scrolls with you as you fly around the fortress.

You can blast open the entrance doors, even though they're well-guarded. Once inside, you must carefully fly down narrow, guarded corridors. A light brush against a wall means instant death. You can blast open the laser and hyper chambers' access doors, but must carefully time your assault on the RFE shafts, since slow moving energy blocks (with gaps between them) guard them. Eventually, the entrance to the fort's second level is revealed. This level resembles the first, but includes a brick-like shield connected with the fort's power supply. Once you've taken care of that, you quickly escape to the surface, and fire one last rocket into the fort which blows it sky high.

Fort Apocalypse requires concentration. The pull of gravity is nerve-wracking as you fly your helicopter down a narrow passage while under full attack. Skilled players enjoy the battle's tension; the less skilled sweat. The well-implemented game has a responsive control system. The scrolling graphics use an excellent redefined character set. Some players master the game with

a fair percentage of wins after only an hour, but the Commodore translation seems slightly tougher. Overall, the game is fun to play and should hold your interest for a moderate amount of time.

FOURTH ENCOUNTER

Thorne EMI Computer Software
$39.95

Overall Rating	D	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	B	D	*Value for Money*
Holds Interest	C-	B	*Game Depth*

In this one or two player "alien shoot-'em-up," four waves of aliens (each a different type) attack you. During the first three waves, your ship can only move left and right at the bottom of the screen. The first wave drops toward your ship in a zigzag pattern. Any that you miss reappear at the top, only to fall on you again. The second wave fires at you as it drops and then bounces off the edges of the screen to continue fighting. In the third wave the aliens continue firing, but instead of dropping on you, they actively dodge your shots while pursuing your ship. During the fourth wave, you can move your ship anywhere on the screen. This "fourth encounter" pits your ship against laser beams that move around the edges of the screen. You must avoid getting penned in by multiple beams while destroying the laser guns.

If you succeed in destroying all four waves of aliens, you advance to the next skill level where the aliens are faster and more persistent. Menu selections allow you to start at any of the three skill levels. You can also practice any of the four waves, freeze the game, or start over at any point.

While *Fourth Encounter* is challenging, especially at the higher skill levels, it wasn't interesting for very long. The graphics and sound effects aren't bad, but the limited game concept can't hold your attention. This program might have been popular two years ago, but it seems overpriced considering the games available today.

GRIDRUNNER

HesWare
$19.95

Overall Rating	D+	Medium	*Challenge*
Creativity	D	D	*Graphics*
Documentation	C+	D+	*Value for Money*
Game Depth	D	D+	*Holds Interest*

Gridrunner, a translation of a popular and fast-moving VIC 20 shoot-'em-up game, resembles *Centipede* except that you are trapped on a grid and must battle the caterpillar-like Droids, while X and Y Zappers shoot at you as they run across the bottom and sides of the screen. Pods form at the intersection of their plasm beam. If you knock off the caterpillar's parts one at a time, you have a chance. If you split them, you've got trouble. A further hindrance comes from the pods that impede your movement along the grid. When they finally mature, they hurl a lethal bolt of energy downward. Woe to you if you are in the way.

Although action-packed, *Gridrunner* is crude in play mechanics and graphics and has virtually no depth of play. Skill increases with each level, but everything looks the same. While it was a good game for the VIC 20, it should have remained there. Despite its early popularity, it is nothing more than a mindless shoot-'em-up.

GYRUSS

Parker Brothers
$47.10

Overall Rating	B+	Medium	*Challenge*
Creativity	B-	A-	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C+	B+	*Holds Interest*

Gyruss, a game in which you must survive a journey from Neptune to Earth past multiple waves of rhythmically attacking alien ships, is quite addictive. It also is one of the most faithful translations of a coin-op shoot-'em-up game to date. Perhaps the real attraction of *Gyruss* is its combination of music and onscreen movement, which makes game play hypnotic. Your vessel traces a circular path around the swooping, swirling ships that seek refuge in the distant center. But you must be careful: sometimes they shoot back and meteors hurl outward from the center. Defeat the two small planets to earn double firepower until you lose your next ship. If you survive two successive waves between the planetary stops along the way, you have the opportunity to shoot down non-lethal enemy craft during the Chance Stage.

Gyruss is a simple game, although it has a medium difficulty level. Many players consider this version

harder than the coin-op one. None of my circle of friends has ever made it to Earth—even when cheating with a rapid-fire "blaster." The graphics are rhythmic and quite well-done. The classical music is a nice complement; most of the music is from Bach's famous *Toccata and Fugue in D Minor*. There is something special about this game that elevates it well beyond the typically mindless C-64 shoot-'em-up diversion. Perhaps it's the game's overall visual depiction of swirling, looping galactic enemies pitted against your lone circling ship that sets it apart. Or maybe the way that the music and game play work so smoothly together creates the strong attraction. In either case, *Gyruss* comes up a hands-down winner.

HELLCAT ACE

MicroProse Software
$29.95

Overall Rating	B	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	B+	B-	*Value for Money*
Game Depth	B-	C+	*Holds Interest*

Hellcat Ace puts you in the pilot seat of a World War II fighter craft in a realistic flight simulation. The battlefield is the Pacific, and you must defeat either one or two Japanese Zeros in five separate battles of your choice. Some of the historic battles include Leyte Gulf, Midway, Coral Sea, and Pearl Harbor. The tactics of the Japanese pilots differ, depending on whether they're engaged in escape or victory flights. Remember, five victories is your goal, so sometimes it is prudent to retreat and fight some other day. Also keep in mind that being shot down once ends the game. It is possible, however, to ditch your crippled plane in the Pacific, or even bail out by pressing the button on your second joystick. Hopefully, you won't be captured.

Your *Hellcat Ace* fighter is controlled by joystick #2, but a second joystick in port #1 allows you to adjust the engine throttle. The plane flies exceptionally well. It can perform loops, split S's, and Immelman turns. This means you can do some pretty fancy flying to shake an enemy off your tail by first rolling the plane and executing a 180-degree diving loop until you are under him. As you bank to either the left or the right, the ocean horizon tilts. The compass heading and the position of the sun give you your bearing. Pulling back on the stick or pushing forward causes the plane to climb and dive respectively. The plane realistically gains velocity in a dive and stalls during a climb that's too steep.

Your weapons are two wing-mounted machine guns that you activate via the firing button on your joystick control. A gunsight cursor acts as a guide, but this is a World War II craft, and tracer bullets are not automatically tracked to the enemy plane. Gravity and velocity affect the aim, and you waste a lot of ammunition until you learn to fire accurately. In addition, it isn't easy to tell if you scored a hit because multiple hits are required to down a Zero, with the higher skill levels requiring you to score even more hits.

At a distance, the enemy appears as yellow specks, but resembles aircraft at close range. It is difficult to tell at a distance whether the planes are approaching or fleeing. Even when they are near, their bullets are difficult to recognize until it is too late. The enemy is also dangerous if it gets on your tail. An indicator on the instrument line at the bottom of the screen advises you when this occurs.

The graphics are plain but adequate, with dark blue water and light blue skies. Movement is exceptionally fast: the programmers must have used the fastest color-fill routines in the world so that you can roll your plane and the horizon spins around smoothly.

Hellcat Ace is a very good fight/combat simulator and is exceptionally playable. While its graphics are slightly on the unacceptable side, it poses enough of a challenge to interest both novices and experts alike. So far, it is the most realistic air combat game on the Commodore market, and one that will intrigue you for more than just the few obligatory try-outs a new game usually demands.

LASER STRIKE

Isis Hathor Digital Productions
$29.95

Overall Rating	D-	Medium	*Challenge*
Creativity	D	D	*Graphics*
Documentation	C	D-	*Value for Money*
Game Depth	D	F	*Holds Interest*

Laser Strike is another one of those amateurish scrolling shoot-'em-up games. This one is in two parts. As you maneuver your joystick-controlled ship through an asteroid field, you get points for dropping bombs on the enemies' asteroid cities, and destroying their solar pods with your lasers. You need only avoid anything that is brown and an occasional ship that always attempts to ram you with the usual set pattern. The challenge here is to lure the ship ahead then slowly drop back in order to shoot it. You still have to be careful as the joystick is unduly sensitive in the vertical direction. The ship makes almost instantaneous jumps on the screen. You also have to avoid flying too close to the left edge of the screen, as asteroids don't scroll into view gradually, but are placed intact at the edge. That means that sometimes a four-character wide asteroid suddenly pops on the screen directly in your path.

Ice caves appear in the second part of the game. You gain points for bombing the red reactors on the cave floor as you carefully wend your way through. Ironically the same ship from the first part of the game is still trying to ram you. While this may make the game more difficult, it is amazing that it can fly through solid ice to reach you.

Basically, the game is poorly conceived and implemented. It lacks any kind of excitement, and is just a game of avoiding obstacles. The graphics, too, are weak and uninteresting. *Laser Strike* is definitely a dud game.

LUNAR LEEPERS

Sierra On-Line
$29.95 (disk) $34.95 (cartridge)
Commodore 64 and VIC 20

Overall Rating	B	Medium	*Challenge*
Creativity	B	C+	*Graphics*
Documentation	C+	C+	*Value for Money*
Game Depth	D+	D	*Holds Interest*

The whimsical creatures who populate *Lunar Leepers* have captured your companions. You must rescue your friends from the Leepers and carry them to the safe cliffs before these longlegged creatures eat them. The creatures look harmless enough when you approach in your joystick-controlled rescue craft, but don't be deceived: they can out-jump any Calaveras County jumping frog. They extend their long legs, which seem spring loaded, and leap almost to the top of the screen. They can digest metal, so if your ship gets in the way, they grab it, shake their heads several times, and swallow you whole.

Your ship lacks brakes and has some inertia. Even after you learn to control it, outwitting the Leepers still takes practice. They leap predictably, and, of course, you have guns activated by one or the other joystick buttons, depending on which direction you're shooting. Although you learn to kill them easily enough, they're worth more alive than dead. You get twenty points for killing one, but one thousand points for each one left alive after you've rescued all your men.

Your strategy: learn to outwit them. You can't just rescue a captive and fly high to avoid the Leepers, for, invariably, they steal the guy you're carrying beneath your ship. You must perform the rescue quickly because, when Leeper lunchtime comes, they creep over and eat your friends, whom they regard as gourmet morsels. Your rescue strategy must also include refueling. You must out-fly those leaping Leepers, and return to one of the two bases before you run out of fuel. The bases are on either side of the terrain; a radar gauge at the bottom of the screen tells you the distance from them. When you have rescued all the hostages, or killed all the Leepers, you advance to stage two.

Your new mission: destroy the gigantic Queen Trabant at the end of a long tunnel beneath the planet's surface. Of course, an army of smaller Trabants (which look like giant eyeballs), and strategically placed laser weapons, guard the queen. It's actually an easy mission at the first level of difficulty, if you don't run out of fuel before you dispatch the enemy. The Trabants don't shoot back until level two, where the Trabants who escaped from the cave fill the above ground rescue scenario. They really challenge you in the second round. At higher levels, the little buggers even shoot back in the caves. The game lets you choose your starting level.

Lunar Leepers is a silly, but thoroughly enjoyable game. The cute animation and slow paced action effectively blend the straight rescue game and typical shoot-em'-up scenario.

LUNAR OUTPOST

EPYX
$35.00

Overall Rating	D+	Easy	*Challenge*
Creativity	D+	C-	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	C	D	*Holds Interest*

Lunar Outpost combines a dull shoot-'em-up theme with a mediocre strategy game. You have to defend a large moon base from a Zytron attack. You're equipped with a Lunar Assault Vehicle which can be driven around a large scrolling map, viewed from overhead. The map shows the locations of craters, repair and power stations, munitions buildings, and red power strips that allow you to travel at full speed without using up your batteries. A scanner at the top of the screen indicates the location of the current Zytron attack and a status display informs you of the number of buildings intact, and the current lunar day of the prolonged attack.

Zytrons, in an effort to destroy your base, attack your buildings. You can engage them in combat by locating them on the map and driving to them. The screen shifts to the combat zone, a perspective view with mountains in the distance. As in most shoot-'em-up games, the various sized ships dart about erratically at the top of the screen, then move in close to drop bombs. Different types of ships require more hits to vaporize. Game play here isn't challenging at all. Your only concern is to avoid being struck by slowly falling bombs and monitoring your missile supply. Sometimes a message appears that a building is in danger. It is best to break

off combat, and move to the Transmatt Capsule to get back to the main map. Eventually, the computer-controlled Zytrons decide that you are a skilled opponent and they launch Black Bombers and Decoy ships. They attack you only when you are on level ground, and leave you spinning helplessly in a red radioactive crater. You can always hide in a regular crater or atop a building, but the only way to eliminate theme is by activating a Deflector Shield with the space bar. Another plus on your side is four hidden Pulsars that scramble the Zytron navigational computers. The attack ships inadvertently converge on these black pulsing rectangles and are destroyed. However, you can only use each of these once.

Unfortunately, *Lunar Outpost* is only a so-so game at best. It is too reminiscent of a hundred games with shoot-'em-up scenarios that you have probably played before. The graphics are average with Zytron ships that appear very blockish when they are enlarged. I think colorful but monotonous are the words that describe this game. It obviously has an audience, but it won't keep them entertained for very long.

METAMORPHOSIS

Victory Software
$19.95

Overall Rating	B-	Medium	*Challenge*
Creativity	C+	B	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C	B-	*Holds Interest*

In this game of quick wits and reflexes, you are Earth Warrior, who battles the evil robot Cyglorx. Cyglorx has constructed a mighty fortress which you must penetrate. His defenses include tanks, guardian robots (and their babies), and his personal guard of indestructible robots. You must destroy Cyglorx before his mighty minions engineer your demise. If you enjoy playing arcade games on the C-64, you'll like this game.

Metamorphosis is a game of skill. In the opening scene, entitled The Gateway, you maneuver through attacking guardian robots. Defenseless, you must move from the bottom of the screen to the gateway at the top. Beyond the gateway lies the Hatchery, where you battle robot tanks. These tanks search randomly—they don't seek you out. You can (and should) ambush them while they wander.

Once you clear the screen of tanks, the baby robots begin hatching. The graphics here impressed me. Once you conquer the babies (no small feat, since they have a nasty habit of swarming about you like flies), you face the Elder Robots, who are even more intimidating. But, since you're a mighty warrior, you bravely press on to meet Cyglorx in his personal lair. His henchmen attack en masse and you must destroy the power generator and catch Cyglorx before he escapes.

You'll love *Metamorphosis* if you enjoy playing arcade games—its graphics are smooth and its action is fast.

MOTHERSHIP

Softsync, Inc.
$29.95

Overall Rating	D+	Hard	*Challenge*
Creativity	C	D+	*Graphics*
Documentation	B-	C-	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

Mothership is an arcade-type game claiming 3-D graphics, three different screens, fast action, and authentic sound effects. Actually, the 3-D graphics appear on the first screen only, and how can anyone determine whether or not the sounds of the simulated space battle are authentic?

In the first screen, you pilot a joystick-controlled spacecraft through a crude, three-dimensional trench in hopes of destroying enemy drones launched from the Mothership, which hovers out of range at the far upper left. This slotted trench, called the Zarway Space Corridor, resembles the Death Star trench in *Star Wars*' final battle scene. Moving lights at its bottom, growing enemy ships make you feel like you're zooming down the trench. Unfortunately, the crude graphics and Mothership, which never changes size as you get closer, shatter the illusion.

The object is to eliminate twelve drones in a row without losing a single fighter. May the Force be with you, for this game is near impossible, even on the easiest level. Your large, crude ship nearly blocks your view of the aproaching drone, who tries to shoot you with a laser if you miss him, and rams you if that fails. A small hole in the center of your ship helps you line up your shots, but it isn't big enough for you to see when an enemy shot is approaching you dead center. Your ship maneuvers sluggishly, and you can only fire one shot at a time. Worse yet, if you lose a ship, the enemy kill count goes back to zero. At least your score remains intact. It's frustrating, and definitely takes considerable practice to overcome the enemy.

The second screen is by far the most fun. On the mothership, now you must make your way to a control pod at the top of the screen, taking an elevator to reach each progressively higher level and switching from the elevators on the left to those on the right. As you go from side to side, "Alien Meanies" pop out of the two doors on each level, and mechanical scanners move through the entire screen. If either touches you, you

lose a life and must start the screen again. You may shoot the Meanies or scanners, and they cannot get at you while you are in the elevator. However, a Meanie can get in the elevator with you and there's no way to escape without being destroyed.

The third screen is the hardest, but unfortunately, I derived no pleasure from it. The scenario involves your having reached the mothership's home base; you must now destroy the planet's generators. The planet is surrounded by a barrier of energy pods which you have to destroy (each requires four hits) so that you may fire at the generators. At the same time, the planet fires energy torpedoes at you. You barely have enough time to dodge the energy torpedoes, so completing this screen requires memorizing the pattern of the torpedoes and avoiding them. If you complete this screen, you start Screen #1 again, but at a higher level of difficulty.

Mothership appears to have been dumped on the market before it was thoroughly polished. The third scenario needs to be dropped entirely, and the first scenario needs cleaning up with improved 3-D effects, a gunsight, upgraded graphics effects when you are hit, and the ability to conceal your ship onscreen. The events in the second scenario should occur in a more random fashion. I always know when to watch out for a scanner, and usually can guess from which door the Meanie will emerge. With the third screen eliminated, perhaps the second screen could be extended so that after touching the control pod, you have only a limited amount of time to escape. Additionally, this routine of touching the control pod would be improved if, instead of merely touching it, you had to plant a bomb atop it.

Mothership needs to make at least one more trip back to the drawing board at Softsync. The game's execution is nowhere as good as its concept.

OMEGA RACE

Commodore Business Machines
$19.95

Overall Rating	D	Medium	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	D+	C	*Holds Interest*

Don't let the name of this game fool you. *Omega Race* is not a racing game; instead, it's a poor home adaptation of a simple arcade shoot-'em-up that pits you against a fleet of enemy Droids in a donut-shaped arena. The center rectangle that defines the track is off limits, and bounce wires that light up when you hit them prevent the ships from exiting the arena. The object is to defeat the Droid forces, then advance to a more difficult fleet.

You control your ship, which thrusts and steers much like the ship in *Asteroids*, with either a joystick or paddle. The trouble here is that even the slightest touch causes rapid acceleration and uncontrollable speeds. Before you know it, you're bouncing off a barrier and into an enemy ship or mine. The usual arcade strategy of catching the moving enemy fleet from behind becomes impossible. You end up attacking as best you can as you careen around the arena. You may fire four shots at a time in this game, so it's easy to lay down a barrage of fire. Some of the Droid ships merely lay mines, while others, like the command and death ships, attack you.

The game offers very little depth and challenge. Perhaps Commodore intentionally made the control system difficult to even up the odds. The graphics, too, are plain and simple, and match the original black and white vector style arcade game. While you can alter the colors of the background and ships, it doesn't enhance the game in any way. In short, *Omega Race* is a weak translation of a shoot-'em-up classic that is fatally marred by a poor control system.

QUASAR

3R Import & Export Corp.
$16.95

Overall Rating	D+	Easy	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	B	C	*Value for Money*
Game Depth	C	D+	*Holds Interest*

Quasar is an exciting, but limited, machine language arcade game imported from Britain. As pilot of a sophisticated space fighter, your mission is to destroy the Etron rocket base on the planet Hagon. The fate of the galaxy is in your hands, of course. Sprite graphics highlight this game, which is in the vein of *Empire Strikes Back* and *Destroy the Deathstar* shoot-'em-ups.

You begin the game with three lives as your starfighter zooms down a brightly-colored canyon. The canyon's brown and green stripes roll toward you as two-toned flying saucers come over the horizon, growing larger and larger. The joystick controls side-to-side and limited forward/backward motion. Your ship angles to the side as you move left or right for added realism, and it also casts a shadow for a somewhat three-dimensional effect.

Quasar's graphics are certainly not high resolution. Your ship is kind of blocky, and humanoid figures look comical. Flying saucers look friendly instead of menacing, but the asteroids and space mines aren't too bad. The stars move like the white lights of a Hollywood marquee.

If you survive the first screen (easy), you find yourself in open space, where the star effect improves a little. Ships, mines, and asteroids come at you, and you score 1,000 points for each alien you shoot. You score one point for every second you stay alive.

The third screen combines the striped movement of the first with a background of mountains. You're on the planet nearing the rocket base, under attack from objects which resemble fighter planes. Destroy the planes and saucers, or just avoid them, and you move to the fourth level.

Unfortunately, the fourth level is merely a repeat of the first with some new objects coming at you. Likewise, the fifth is the same as the second, etc.

The low quality sound is puzzling. The game beeps obnoxiously when it begins, and destroying an enemy ship produces only a tap sound. If you are unlucky enough to have your ship destroyed, you at least deserve the sound of an explosion.

Quasar displays a high score during play, which is helpful. The program seems to be crash-proof; the C-64 keyboard is disabled so you can't accidentally press Run/Stop. The action is fast, and movement is smooth. But *Quasar* is not very difficult and the limited number of screens become boring. It's the sort of action game which you'd love if you'd typed it in from a magazine. It's colorful and fun, but you might think twice about buying it when there are so many programs available with better graphics.

QUINTIC WARRIOR

Quicksilva, Inc.
$29.95

Overall Rating	F	Medium	*Challenge*
Creativity	D	D	*Graphics*
Documentation	D	F	*Value for Money*
Game Depth	D	F	*Holds Interest*

Quintic Warrior is an awful space shoot-'em-up game. The basic objective is to blast away at Zoronian mutants as they slowly try to reach the top of the screen. Your joystick-guided ship can move anywhere on the playing field and can actually kill mutants by running them over. The game is not as simple as it may first appear to be, since the enemy fleet is protected by three laser snares or guns located on the left, right, and bottom edges of the screen. They track you as you move. When the left and right guns, which work in tandem, line you up with the bottom gun, you are dead meat, (i.e., history). As the game increases in difficulty, another gun (called the "red rammer") appears. A mutant worm who is difficult to destroy also lurks around.

Perhaps the game's name conjures up visions of fantasy-role playing. In reality, the screen instructions babble on about some nonsense concerning the Quintic Warrior's having a sixth sense that consists of a combination of instinct, cunning, and the supreme fighting ability, known as the "Quintic Factor." Dream on, Quicksilva hypsters! Like movie titles, game titles are designed specifically to sell games. Do not be misled. *Quintic Warrior* is dated, boring, and lacks even minimally acceptable graphics.

RAID ON BUNGLING BAY

Broderbund Software
$29.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	B-	C	*Value for Money*
Game Depth	C	C	*Holds Interest*

Helicopter arcade games must be the latest rage at Broderbund Software, for, once again, they've pitted the good guys in helicopters (you) against the bad guys of the evil Bungling Empire. The game begins with the Empire's War Machine building a powerful aircraft carrier to demolish your fleet. Your only hope is to penetrate their defenses and destroy the factories scattered over six heavily defended islands, forcing them to delay further build-up of their fleet. You can even get their carrier, which is under construction in drydock on one of the islands.

Your heavily armed helicraft has an unlimited supply of missiles, but only nine bombs. It handles just like you'd expect a real copter to feel. Throw the stick forward, and the gunship opens up to full throttle; pull back, and the craft slows down, and even flies slightly in reverse. Moving the joystick side to side rotates the craft.

Your point of view is from above, on a vast, 100-screen scrolling map. A small square at the lower left shows a nine-screen radar scan. Colored dots represent enemy forces. The battlefield has a wraparound feature, so you're never in a confined area. You take off from your aircraft carrier and fly over ships and ground fortifications that intend to destroy you. A status display indicates your damage, score, factories, and bombs remaining. You spend most of your time destroying targets like the radar, which helps the enemy's fighter planes find you. These, along with the anti-aircraft guns, don't come into play until you've destroyed half the factories. Once you've neutralized a factory's defenses, it's safe to hover above it and drop bombs (by pulling back on the joystick with the button

pressed). If you eliminate all six factories quickly, a newspaper headline heralds your victory, and a parade is held in your honor. Don't hope for too much, though; *Raid on Bungling Bay* is not an easy game. The bad guys rebuild their factories so rapidly, that you may never be able to achieve victory.

This game can be very exciting, or merely repetitious and boring, depending upon your tactics. If you just casually bomb everything in sight without concentrating on eliminating the factories, it takes about fifteen minutes for the enemy to prepare their carriers. I think attacking the operational carrier is the most exciting part of the game. You inevitably have trouble getting in close enough to drop a bomb—you're almost always engaged in a fight for survival against a heat-seeking missile. You usually don't last very long here, but it is without question the most enjoyable part of *Raid on Bungling Bay*. Too bad you can't skip the preliminaries by pressing a special key.

I think Broderbund has designed a nicely realistic game, although it is a bit dull and repetitive for the first five or ten minutes. The game's scrolling graphics are nice, and sound effects realistic. The way the helicopter sounds and feels belies the programmer's attention to detail.

RAID OVER MOSCOW

Access Software
$39.95

Overall Rating	A	Hard	*Challenge*
Creativity	B+	B+	*Graphics*
Documentation	B	A-	*Value for Money*
Game Depth	A	A-	*Holds Interest*

You command a raid against Soviet nuclear missile launch sites and the well-guarded Soviet Defense Center. The action in *Raid Over Moscow* varies in type and difficulty, and takes place on six separate screens.

The game begins with a global view of part of the Northern hemisphere, showing launch detection from one of four bases in Russia. On the beginner's level, you have only seven minutes to stop nuclear war. As a fighter pilot you must quickly take off, steer a path to Russia on the global map, then make an attack run on the missile silos. Taking off from the station requires considerable skill. Your craft is in a semi-weightless condition, but can be maneuvered by one vertical thruster to lift off, two side thrusters to turn, and a main engine to accelerate.

The controls feel quite realistic. The trick is to take control quickly as your ship veers to the left, then guide it through the hangar doors in front of you. Since you can't open the hangar doors until you are off the ground, you must take firm control or risk colliding with the ground or hangar walls. You can try to fly as many as nine jets at once (since it saves time), or just one or two, if that's all you expect to lose on the attack run. It is ironic that beginners, who need the most ships, will find launching the ships the most tedious part of the game.

The enemy territory is defended by heat seeking missiles that approach from the rear, and numerous surface guns. You have to fly low and let the missiles pass while avoiding trees and buildings. Shooting many of the latter earns you points. Your aircraft responds well as it flies over the scrolling terrain.

Knocking the missile silos out isn't difficult. They are defended by rockets and enemy aircraft. Only the large middle silo is important, but the others are worth additional points and bonus planes. The small window they fire through is their weak spot. When your ship is lined up with a window, it turns blue. When you destroy one launch site, you begin an attack on the next, until you've hit all three.

Attacking the Soviet Defense Center is the most fun. You begin in a trench behind a stone wall in front of the defense center, which resembles the Kremlin. Soldiers on top of the walls, and a tank in the courtyard, guard the building and return your fire. You must keep moving, stopping only to adjust and fire your rocket launcher. Soldiers you hit are quickly replaced. You have to blow open the building's doors to reach the robot-guarded Reactor Room.

The maintenance robot moves about injecting coolant into the reactor cells. A frontal attack can't destroy it; you have to destroy it from behind by bouncing a disk grenade off the rear wall of the facility. You must hit it four times to destroy it. A laser beam guidance system helps you adjust your firing angle; it appears as a black dot on the rear wall. You can retrieve disk grenades that miss by simply catching them. Good luck, for the robot fires at you constantly.

Raid Over Moscow is an exceptionally well-done game, with good depth of play. The graphics are lovely, and the sound effects are realistic. Joystick control during the flight sequences is very good, with detailed graphics matching the maneuvers. The game offers three levels of difficulty; the hardest is more than a match for even the most skillful player. The lowest level, however, may not prove easy enough to let many players reach the last two—and most interesting—sequences. I wish a mode were provided for practicing or playing those two fascinating scenes.

ROBOTRON: 2084

Atarisoft
$34.95
Commodore 64 and VIC 20

Overall Rating	C-	Medium	*Challenge*
Creativity	B-	C+	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	B-	C-	*Holds Interest*

Although this free-wheeling, shoot-'em-up game proceeds at only a moderate pace, it does offer extreme freedom of movement, the ability to shoot in directions other than the one in which you are heading, and the challenge of fighting against impossible odds as you contend with a dozen or more armed robots. In the year 2084, the robot population has eliminated all but one family of humans. You must rescue them before the robots succeed in destroying or reprogramming these last survivors.

You can destroy all your enemies except the Hulks with a single shot. Hulks are indestructible. Shooting at them only slows them down. Robot Grunts appear in overwhelming numbers, programmed to converge on your position. Predictable, they offer little challenge. You can easily trick them into running into the many immobile obstacles called Electrodes. Hulks are indestructible. Shooting at them only slows them down. Brains are the most dangerous opponents; they appear beginning with the fifth wave. They fire cruise missiles that chase you around the screen; they also have the power to reprogram humans into kamikaze-like Progs. The second deadliest opponents, Tanks, fire shells that rebound off the walls. Kill them fast. Other dangerous objects, Spheroids, don't pose much of a threat in themselves, but release deadly Enforcer Embryos after ten seconds. You must destroy these circular objects before it's too late. The Embryos grow into Enforcers that launch Sparks at you.

The Commodore 64 version of *Robotron: 2084* offers two control options. Like the coin-op game, the best system uses two joysticks, one for controlling the direction of movement and the other for controlling the direction of fire. However, it is tricky to hold two joysticks at once. You may prefer to team up with a friend, each controlling one stick. The alternative is the one-joystick mode in which you can fire only in the direction you move. Frankly, this system doesn't work when a dozen robots begin converging on your position.

The graphics of the VIC 20 version are a disappointment. Granted the VIC lacks sprites or player/missile graphics, but considering the game's high price, I expected something better. At first, everything looked squatty and indistinguishable. It took a few plays to identify things.

The C-64 version of this game is also sadly lacking. While the graphics offer a fair rendition of the original game, it is much slower paced. The exhilarating pace against impossible odds has been reduced to a Sunday shoot-out. I'm sorry, but *Robotron* fans will be disappointed.

SAUCER ATTACK

Sachs Enterprises
$29.95

Overall Rating	C-	Easy	*Challenge*
Creativity	C	A	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	C	C-	*Holds Interest*

While simple shoot-'em-up arcade games are a dime a dozen, *Saucer Attack* stands out because of its highly detailed, realistic graphics. You aim your laser weapons with the joystick as flying saucers attack on our nation's capital. You must shoot the saucers down before they damage our historic monuments or land on the Capitol Mall.

The saucers fly in random patterns to evade your weapons, and the gunsight is deliberately sluggish to make the game more difficult. Your shot has to be almost exactly centered to destroy a saucer. You gain points for zapping saucers; the aliens accumulate points for destroying buildings, as well as for the times you miss. If you reach 150 points, you get a chance to destroy a large alien mothership. Each time you hit a ship, a section is destroyed. The ships become progressively harder to hit since they get noticeably smaller. You should lead the gunsight by a far margin, since you are shooting from a great distance, and hope that the ship's random meanderings don't change course as your laser beam approaches its intended target.

The graphics are stunning and richly detailed, showing a scene of the District of Columbia. Historic buildings like the Washington Monument, the White House, and the Capitol Building are accurately rendered in picture-postcard detail. The alien ships flying randomly overhead seem to spin. And when the aliens attack with their lightning-like rays, sections of the buildings slowly crumble. The victory fireworks that explode over the city if you're the winner are a sight to behold!

Unfortunately, terrific graphics don't necessarily a great game make. Game play in *Saucer Attack* is repetitive and dull. There is little depth to the contest, and it does not hold your interest after you've seen the graphics a few times. I do think, though, that the exceptional graphics and good sound effects are what will initially impress most consumers because they are so realistic. I recommend that you see this game in person. Trying it out for yourself in your local software or

computer store is the best way to determine whether or not you want to own *Saucer Attack*.

SEAWOLF

Commodore Business Machines
$19.95

Overall Rating	D	Easy	*Challenge*
Creativity	D	C-	*Graphics*
Documentation	C-	D	*Value for Money*
Game Depth	D	D	*Holds Interest*

Seawolf is another of the many Commodore programs that have been translated from classic arcade games. As a submarine commander, your mission is to sink as many enemy ships as possible within a user-adjustable time period. Your paddle-controlled ship is armed with four torpedoes. You just position your sub along the bottom of the screen and press the trigger when you want to fire. If you aim far enough ahead of your target, the torpedo will cross paths with it and destroy it. The freighters and cruisers are slow while the PT boats (which are worth more points) are faster and more difficult to hit. Some mines are poised to block your path, but you can either shoot around them or waste a torpedo removing them. Once you have used all four of your torpedos, it takes three seconds to reload four more.

Since all of the targets travel at a constant speed and in a straight line, the game is relatively easy to master. Unfortunately, it also becomes quite boring. The graphics are mediocre, and there is only one screen. To be short and to the point, I'd pass on this one without a second thought.

SENTINEL

Synapse Software
$34.95

Overall Rating	B+	Medium	*Challenge*
Creativity	B-	A	*Graphics*
Documentation	B	B	*Value for Money*
Game Depth	B-	B+	*Holds Interest*

Sentinel is an exciting space shoot-'em-up, arcade-style game in 3D. It is loosely based on Atari's *Star Raiders* 8K cartridge. *Star Raiders*, which first came out in 1980 for the Atari 400 and 800 home computers, was a landmark game, years ahead of its time and superior to anything that was then available in the arcades. It was an awesome and realistic game featuring a battle scenario with a 3-D point of view. You were pitted against an enemy fleet intent upon destroying your network of star bases. As enemy ships launched their attacks from the front, then zoomed to the rear, your computerized tracking system shifted views to track them. It challenged even the best arcade players at the highest levels because the enemy fleets used highly intelligent tactics. Owners of other computer systems seethed with envy.

Well, C-64 fans, seethe no more. *Sentinel* is an updated version of its predecessor that offers even slicker, more colorful graphics. The battlefield is a sixty-sector pop-up grid that displays the locations of friendly and unfriendly forces. The object is to defeat the Gorganitor base stars and their fleet of Gamma fighters, cruisers, and saucers.

The tactical display has a three-dimensional perspective with a joystick-controlled tracking gunsight. A short range scanner on the bottom helps locate enemy ships within the sector and works in tandem with the distance gauge incorporated within the actual gunsight. Thus, you can engage ships located within the sector in battle just by steering toward them. Approaching them is a slow process, as you have no control over your speed. However, once the battle commences, you must shoot fast and accurately, or else risk losing some of your shields. The attacking aliens are entirely in front of you. Their attack is unsophisticated—a simple circular pattern—but it seems to be different if your ship is turning. Depending on the level of difficulty, some enemy ships can be eliminated with a single shot, while others require several hits. As a last resort, you can take advantage of Proton Helix Charges, activated by the space bar on your keyboard. These are primarily used to destroy enemy star bases, but they will eliminate all ships on the screen if you are caught in a tight bind. You only have a few at your disposal, so use them wisely and well.

Scrolling messages often appear along the bottom informing you that one of your mother ships is now engaged in battle. To check the battlefield grid at any time, press the Commodore key (C=). Pressing the fire button causes the grid to appear automatically after you have cleared a sector. Traveling to your destination sector requires a dangerous hyperspace jump. Asteroids hurl toward you while you are in the void of hyperspace. You can try to thread your way through them, or use your energy shield to deflect the ones that are dangerously close. The length of time you spend in the void depends on the distance of your hyperspace jump.

The approach to your star base or to one of the enemy's is through a narrow, mined corridor. This narrow horizontal band sports scrolling color bands above and below it. Many a battle is lost due to lack of concentration while clearing a path through this highly dangerous and cluttered passage. You have to reach your base for repairs, additional energy, or shields. The

approach to an enemy base is very similar. The base isn't vulnerable until an entrance portal appears; once it does, one proton charge will instantly eliminate it. While these bases are normally stationary space forts, Gorganitors will warp their Base Star in and out of your continuum on advanced levels.

The graphics and sound effects are superb throughout *Sentinel*, from the opening bars of Strauss's *Also Sprach Zarathustra* (the theme from *2001*) to the final battle scenes. Game play is quite good and occurs on five levels of difficulty. The only major criticism I have is that the alien tactics are always simple, regardless of what level of play you are on. Once I watched the aliens circle aimlessly after I ran out of energy and they were unable to finish me off. However, the size of the alien fleet and the intensity of their attack increases according to your choice of difficulty level. I think *Sentinel* becomes a bit tedious over time. While it's definitely a nice game, it lacks the strategic play aspect and the addictive lure of *StarRaiders*, the granddaddy it tries so hard to imitate.

SHAMUS

Synapse Software
$34.95

Overall Rating	A	Hard	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	C+	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Shamus is a real-time adventure game that combines the shoot-'em-up aspects of an arcade game with the puzzle-map qualities of an adventure. The object is to reach the very heart of the Shadow's lair and destroy him. This is accomplished by exploring the variously-colored levels of the lair.

There are four levels, each containing thirty-two rooms. The rooms (which are mappable) contain dangerous whirling drones, robo-droids, and snap-jumpers. These creatures must be defeated with your ion-shiv (vaporizer) before you can proceed to the next room. Some of these rooms also harbor mysterious bonuses and provide extra lives; and in a few, a colored key will open more passages into the lair—if you find the corresponding lock.

You play the Shamus (slang for detective), and must have sharp reflexes to defeat the Shadow's henchmen. There is danger in every room, and a quick exit leads to another room filled with more shooting enemies, even if it is the room that you just rid of the last robo-droid. Linger too long and your nemesis, the Shadow, appears. One touch and you're dead. However, a quick shot will stun him long enough for you to escape.

As with most adventures, this game should be mapped as you explore the maze by joystick control. Each room is numbered. Since the game doesn't have a pause control and the action is nonstop, it is difficult to draw a map without a friend's help. Even with a map, unless you can read it during the brief lulls, it is best to either have a friend navigate, or develop a good memory. The Commodore version has a bonus of four extra mazes, besides the original, that are user-selectable.

The sound and graphics are very good. A variety of sounds alert you to danger, success, or failure. A combination of sprite and re-defined character set graphics are used throughout. The game concept itself is very viable, with the play becoming more difficult and rapid as you advance through the blue and green levels until the speed becomes insanely fast on the red level. I assume the game is possible to beat, although it's going to take considerable practice. *Shamus* is really more of an arcade shoot-'em-up than a true adventure game. If you have the skill this can be a fun game. If not, you'll never see much more than the first level.

SHAMUS: CASE II

Synapse Software
$34.95

Overall Rating	A-	Medium	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	B-	A-	*Value for Money*
Game Depth	B+	B	*Holds Interest*

Shamus: Case II combines the fast action of arcade shoot-'em-ups with a graphics adventure. As the Shamus, a futuristic version of a fifties private eye, you battle your way through a maze of underground passages, until you reach the lair of your arch enemy, the Shadow.

Have no fear: the author of the original *Shamus* is not attempting to capitalize on its success with a weak sequel. Aside from the lead character's name, the two games have few similarities.

Shamus: Case II has new graphics and perils, including poisonous snakes, walls of vicious mutant creatures, and ladders with rungs which disappear at just the wrong moment.

Although strategy is important in *Shamus: Case II*, great reserves of speed and accuracy will serve you far better. You must avoid the horizontally moving snakes, a complicated feat, since you cannot stand still on a ladder. In some chambers, you must destroy dozens of mutants before they descend on you. When they reach the bottom, a segment of the chamber's floor disappears. As the last piece of floor vanishes, you drop to the chamber below.

Fans of *Shamus* will welcome the pause feature included. If you press the space bar, a map of the explored cavern areas appears, including your present location and goal (with much empty space between the two). You can display the map as long as you like, and press the space bar again to return to the fray.

Shamus: Case II is far from a run-of-the-mill rehash of a successful game. It's even more original, exciting, and difficult than its predecessor. It almost takes the dread out of the word "sequel."

SPACE SENTINEL

T & F Software Co.
$29.95

Overall Rating	D-	Medium	*Challenge*
Creativity	D+	D+	*Graphics*
Documentation	C-	D-	*Value for Money*
Game Depth	D	D-	*Holds Interest*

Earth's survival is at stake in this shoot-'em-up game. You control the laser on board an orbiting satellite high above the planet. At first the alien ships are easy targets for your lasers, since they fly in fairly set patterns. You need only compensate for your up- and downward screen movement to line up your targets. Even wildly shooting beginners are likely to hit a few. The second, and more difficult, phase pits you against the alien ships that set up base at the four corners of the screen and launch deadly orbiting missiles that eventually destroy the planet. While sharp shooting is your only hope, some enemies inevitably get through and destroy sections of the planet. The game ends when all of Earth's land mass is destroyed.

Space Sentinel is a relatively simple and boring game. While the prevention of the planet's destruction has long been a popular arcade game theme, most such programs implement it with exceptional graphics, numerous screens, and/or fast action. *Space Sentinel* lacks all of the above. The graphics are plain and dull, with your ship firmly located halfway between Earth and the moon. The Earth is a multi-colored circle with a satellite orbiting from bottom to top, then around the back side.

Features on the planet show the polar regions and parts of North America and northern Europe. Aliens attack along a single plane, with no movement that creates the illusion of three dimensions. The game offers absolutely no depth. The odds are stacked very much in favor of the computer-controlled aliens. It isn't that they attack you with any degree of intelligence or skill; the odds are simply against you. What a drag!

The manufacturer assumes you understand the game intuitively, since they include instructions only for booting the disk. In sum, *Space Sentinel* is far from a bargain and you'll inevitably tire of it quickly. Take my advice and save your money; this one's a loser.

STAR POST

Commodore Business Machines
$14.95

Overall Rating	D	Easy	*Challenge*
Creativity	D	C-	*Graphics*
Documentation	C	D	*Value for Money*
Game Depth	D	D-	*Holds Interest*

The object in *Star Post* is to defend your space outpost from the colorful, tumbling invaders who attack it along eight corridors leading to the base. You aim your rotating laser cannon via either joystick, paddle, or keyboard. You can use your "Super Zapper" once on each level; Unused Zaps can be stored for use later.

Your four-unit outpost can withstand only seven alien hits per level of play. Each level lasts a specific number of seconds; that time, and the difficulty, increases with each level. As things get tougher, more and more aliens attack at once. You also must defend yourself against a "Super Alien" that disrupts your viewing screen as it spirals toward your Star Post.

The game presents three levels of play: beginners, advanced, and the Hyper version. The beginner's game features automatic firing and fewer aliens attacking at once. The advanced version does not have automatic firing, does have more levels, and has as many as sixteen aliens attacking you simultaneously. The Hyper version features very fast aliens.

Star Post is an extremely simplistic game that requires intense concentration. The game has limited depth and only one screen. Graphics are nicely implemented, but the game as a whole is somewhat boring and considerably below the standards of today's more intricate arcade games.

STAR RANGER

Commodore Business Machines
$24.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C-	B-	*Graphics*
Documentation	C	C+	*Value for Money*
Game Depth	C+	C+	*Holds Interest*

Star Ranger might be of some interest to you if you enjoy simplistic shoot-'em-up games. In this arcade-type game you have to defeat successive screens of

hostile aliens: Nasties, Bombers, Cibolians, and Invisions. Then you navigate through a treacherous asteroid field and a narrow tunnel at the entrance to your moonbase. Each of the enemy waves are distinctly different. The Nasties are the usual sort of aliens who slowly come closer as they fire; the Cibolians, who travel in a saucer-shaped craft, lay down a circular barrage of fire that's downright treacherous to approach. You must defeat these ships at the far range of your laser cannon. The Bombers are defenseless, but they plant a field of deadly mines. The Invisions are extremely dangerous since they appear only when they shoot their twin lasers at you. You earn points for destroying each ship, but will earn even more if you sideswipe them and roast them with your rocket blast.

Three levels of play are available. At the practice level players may practice without being shot; the training and arcade levels are more challenging. The main difference between the two is the number of ships you get (three versus five, respectively). The level increases after you dock with your moonbase.

The graphics in *Star Ranger* are quite colorful and the scrolling is smooth. The sound effects are average, but on the whole, this game has a professional look. Despite average game play, depth, and challenge, some game collectors may find *Star Ranger* interesting and worth their time and money.

STAR TREK: Strategic Operations Simulator

Sega
$44.95

Overall Rating	C	Easy	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C+	D+	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

Star Trek: Strategic Operations Simulator trains cadets as potential captains of the USS *Enterprise*. Predictably, the marauding Klingons and Anti-Matter Saucers have besieged friendly starbases all over the galaxy. You must destroy as many of the enemy as possible with your joystick-controlled ship, using phasers and photon torpedoes. Naturally, your ship has defensive shields and warp drive energy. Each of the bases can supply you with one shield, one torpedo, and one warp drive unit per docking.

The split screen shows a long range, overhead view on top, and a close up of your opponents at the bottom, with gauges at the top left. While you need the long range scanner for navigation and tracing, the close-up view helps you line up the enemy in your crosshair.

Phasers, the weapons you'll use most frequently, use up energy. Photon torpedoes, on the other hand, are in short supply. To fire them, you pull the stick back, rather than press the fire button. They destroy everything in the line of fire, not just the first ship. Pressing the button while pulling back engages the hyperwarp engines much faster than simply flying forward on warp engines.

Lifting a siege or securing a sector is relatively easy. The red Klingons ignore you while they try to destroy a starbase. The purple Klingons keep their distance, but fire plasma energy orbs at your ship. When you destroy a starbase, both kinds of Klingon turn white and attempt to ram your ship. Yellow Anti-Matter Saucers are the most dangerous. If they collide with you, they attach themselves to the Enterprise, draining the ship's warp drive energy.

After surviving two rounds of Klingon encounters, your ship maneuvers through asteroid fields seeking starbases. During the sixth sector you encounter Nomad. It lays mines in your path while defending itself with deadly missiles. It's swift and cunning, but you can destroy it with a burst from your phasers. After defeating Nomad you advance to a more difficult round against the Klingons.

Frankly, the game is too easy, even though it requires a lot of quick maneuvering. Anyone who fights carefully and resupplies often can survive at least three levels and score 200,000 points. The upper levels are more challenging, as Klingons evade you more often, but you always have to work your way through the lower levels to reach them. It's a fair game, but fans of the older text-style *Star Trek* games won't be converted. I assure you *Star Trek* is no *Star Raiders*. If you liked the coin operated version, you'll be disappointed.

STARFIRE/FIRE ONE

EPYX
$35.00

Overall Rating	D	Easy	*Challenge*
Creativity	F	D+	*Graphics*
Documentation	C	D	*Value for Money*
Game Depth	D-	D	*Holds Interest*

EPYX has reincarnated two arcade classics from the past and has packaged them in a single cartridge called *Starfire/Fire One*. While they were moderately successful three years ago, they are dull, unimaginative, and have poor graphics by today's standards.

In *Starfire*, you are in command of a Starcraft. Your mission is to prevent Exidy freighters from reaching

their destination. You steer your fighter over a section of space indicated on your radar screen. When the ships are in range, a pair of aiming sites appear for you to lock on your target with your lasers. While some of the merchant ships are unarmed, enemy commanders flying the red spaceships shoot back. You can't shoot recklessly, since your lasers begin to overheat. You should always keep some laser power in reserve, otherwise you may be a sitting duck. The graphics are primitive and game play is dull and repetitive.

You are a submarine commander in *Fire One*. Your mission is to destroy the enemy fleet that appears in red on the sonar map at the top of the screen. Using a joystick, you can control the speed and direction of your ship as indicated at the bottom of the screen. You can also submerge if necessary and still fire torpedoes, but the periscope view of the enemy ships vanishes. The enemy's defenseless fleet is fairly east to hit. A tracking computer shows when an enemy ship is in range. This helps compensate for your ship's speed and direction when firing your torpedoes. However, the game isn't always winnable. You are constantly being stalked by an enemy submarine. Sometimes you can see it, but usually you feel its presence when your ship takes a hit. When you spot him, if you don't sink him quickly or dive quickly, your ship becomes heavily damaged.

The graphics are better in this game, but game play is too simplistic. It would have been better to leave both of these games as old and forgotten classics.

STAR MAZE

Sir-Tech Software, Inc.
$34.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C	B-	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	C	C+	*Holds Interest*

In this multi-directional scrolling game you must recover nine power jewels on each of sixteen levels. Your ship has a replenishable fuel supply, unlimited missiles, and three anti-matter bombs. You'll need most of the ammunition to shoot down enemy cruisers, saucers, space stations, and various sized meteors that clutter your path. Don't shoot the Bug Train that hugs the maze's walls unless you need to, since it releases a fast, bat-like creature that is difficult to kill.

Controlling the ship is the most difficult part of the game. Using the normal joystick mode, the ship turns and thrusts in the direction you move the stick, and must be retro-thrusted to slow down. It is hard to turn and shoot without thrusting the engines, which makes you careen off the walls. You press the "J" key to activate an alternate mode. In this mode, the ship turns when you move the joystick left or right, and thrusts when you push it forward. It takes a little more time to turn around, but you have more control during battle.

You still have to learn to control the ship, since you can't pick up a jewel unless you're moving slower than the speed indicated by vertical bar on the speedometer. Likewise, you need to move slowly when you return to base to refuel and drop off the jewel. Your unreliable hyperwarp (activated by the spacebar) gets you out of tight situations, but it can blow up your ship.

Star Maze is not a very demanding shoot-'em-up game once you master the control system. It effectively combines a mission objective with good game play and colorful graphics. Neither addictive nor particularly exciting, it is interesting, and gives fair value for the money.

SUICIDE STRIKE

Tronix
$34.95

Overall Rating	C+	Hard	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C-	C	*Value for Money*
Game Depth	C+	C	*Holds Interest*

Suicide Strike is a nicely implemented but simplistic shoot-'em-up game. The object is to fly your fighter craft past waves of enemy defenders until you reach the intended mystery target—hopefully before you run out of fuel. Sorry, but I can't tell you what the target is; the gang down at the beach hasn't been practicing enough (too busy surfing); they'll have my hide if I give it away.

The fighter craft's speed, direction, and altitude are joystick-controlled. The ship flies faster when you push forward on your stick and press the button. However, if you fly faster, you use up more fuel. At first you encounter helicopters that shoot at you with regular guns. Defending yourself against the tank wave is easier once you notice that the tank alternates its fire, first forward then at a forty-five degree angle. Just wait until it fires at an angle, then demolish it head on. The jet fighters that follow are really dangerous: they launch non-heat-seeking air-to-air missiles. The fourth wave of defenders approach your craft from the rear (that's what the rear view mirror at the top of the screen is for). You have to watch one on your tail, then quickly slide sideways as he passes you from behind. Once he is in front, you can nail him with your cannon. You never meet more than two enemies at once.

Suicide Strike has average play depth for a shoot-'em-up game. The best part of the game is its attractive graphics. The moving colored bands get wider as they approach you, and the clouds overhead become larger. These are interesting touches; they give you a feeling of forward motion as you view the targets out of your cockpit window. *Suicide Strike* isn't actually a point-of-view game, since the ship that you are controlling is hundreds of feet in front of you. You watch it as it maneuvers across the landscape, rather than as if you were actually in the cockpit. The sky doesn't tilt one iota. The game is not very exciting at all. I think it causes more anxiety than excitement. *Suicide Strike* has only one difficulty level, so if you master it quickly, you will tire of it just as fast.

SURVIVOR

Synapse Software
$34.95

Overall Rating	C	Medium	*Challenge*
Creativity	C-	C	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	C	D+	*Holds Interest*

The object in *Survivor* is to destroy all four space forts on the screen by eliminating the gun emplacements within the forts. During the daring attack, your Starwedge Cruiser is constantly harassed by enemy trackers and kamikaze fighters, while outside the forts, swarms of fast-moving asteroids are gunning for your hide.

The game may be played by one player; however, it is most enjoyable when a second player signs on as crew. Two-player participation is the most fun, with the player using joystick #1 acting as pilot, and the second player, using joystick #2, acting as gunner. As you maneuver the ship about the screen, the large space battlefield scrolls. The ship isn't confined to the center, thus giving some illusion of free floating as it gradually accelerates and decelerates. (Once it moves slightly off center, it immediately scrolls the screen.)

The attack on a fort is only a matter of persistent and carefully timed shooting in tight spaces. Some of the gun emplacements are difficult to reach in the single-player game because the ship's guns only fire fore and aft. For instance, one particular gun emplacement can only be reached through a narrow tunnel. The ship in the two-player game has more of a fighting chance. There, the gunner can fire in eight directions while his partner navigates.

While *Survivor* is a basic shoot-'em-up, a bit repetitive, and not particularly difficult on the easier levels, it is a playable game, especially for two players acting as partners. In fact, it's one of the few enjoyable participation games. You will seldom get frustrated over your partner's mistakes, perhaps because you'll almost always fare worse when playing alone. The game's graphics are plain, but contain some character set animation. The sound is minimal, except for a bit of leaden Wagnerian fluff during the title screen. In brief, *Survivor* offers a fair game—nothing great, but nonetheless a pleasant video amusement that provides enjoyable play for two friends.

THRESHOLD

Sierra Vision
$29.95 (disk) $34.95 (cartridge)

Overall Rating	B-	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	B+	B-	*Holds Interest*

Threshold closely resembles the arcade game *Astro Blaster*. You must destroy waves of attacking aliens with a joystick-controlled spaceship. It's the usual scenario, with this exception: the game offers substantial depth and variety. There are twenty types of attackers. Some are easy targets, while others are durable, vicious, elusive kamikazes. Some fly in formation, while others bounce around the screen erratically. Each has a personality and shape of its own. There are flying fish, maple tree helicopters, Volkswagen Beetles, and revolving spaceships that turn smoothly on their axes.

You have five battle ships. Aiming and shooting is precise and effective, but too much rapid firing will overheat your gun. When this happens, you have to bide your time and dodge your enemies until it cools. During a rest period every four levels, the mothership retrieves your ship while the game accesses the disk for the next set of shapes.

Even though the game doesn't use sprite graphics, it has exceptionally smooth animation. Objects easily pass in front of each other. Good sound effects enhance the excitement.

Threshold will appeal to any dedicated space game fan. It is a good translation, slightly faster than the Atari and Apple versions. The contest has many levels, so only a few expert players will reach the end.

WIZARD OF WOR

Commodore Business Machines
$19.95

Overall Rating	B	Medium	*Challenge*
Creativity	B	B-	*Graphics*
Documentation	C+	B+	*Value for Money*
Game Depth	A-	B	*Holds Interest*

Commodore has recreated the arcade game *Wizard of Wor* for the C-64 home computer. It has the look and feel of the original game, although it is somewhat easier to play. Basically *Wizard* is a combination shoot-'em-up and maze game in which one or two warriors challenge worlings, worluks, and a wizard on each of twenty-one increasingly deadly levels. Your warrior, controlled by means of the joystick, hunts down the Burwor, a creature that patrols each dungeon level. As time passes, the Burwors move faster and are joined by fish-like Garwors and their dragon-like Thorwor allies. The latter two creatures are invisible unless they are within your line of sight. However, they do appear on a small radar display at the bottom of the screen. The Worluk appears after these creatures have been dispatched. He moves around quickly, attempting to kill your warrior, then makes his escape. If you can destroy him before he escapes, the next dungeon is worth double points. Finally, the Wizard himself may appear. He teleports very quickly to random spots in the dungeon, staying around only long enough to hurl lightning bolts.

One or two players can participate. In the two-player mode, the warriors are supposed to act as allies. But warriors are worth a whopping 1,000 points, so intentional mistakes are occasionally made, or outright feuds develop with the object of killing your partner. It will take cooperation, however, to advance to the upper levels. The Worlings begin to shoot back on Level 2, and become increasingly dangerous the deeper you penetrate the maze. The fourth level is called the Arena because of the open area in the center. All levels have a passageway at the end that leads from one side to the other. The passageway closes for seven seconds after anything passes through it.

The game's graphics and sound are good. *Wizard of Wor* is an action-packed shoot-'em-up, and is an entertainment program that certainly will hold your interest.

ZAXXON

Synapse Software
$39.95

Overall Rating	A-	Medium	*Challenge*
Creativity	B	A	*Graphics*
Documentation	C	A	*Value for Money*
Game Depth	B	A-	*Holds Interest*

This official Commodore 64 version of the arcade game is an aging classic. When released, its high quality graphics made it stand out from the crowd. While great graphics are no longer so unusual, it is still an impressive game.

You fly your fighter ship over a space platform's flat surface. On the platform are oil tanks, guns, anti-aircraft missiles, barrier walls, and other futuristic machinery. You strafe the oil tanks and guns while dodging the gunfire, barriers, and launching missiles. Skill and persistence bring you past the platform to a space battle with other aircraft, then to a sequence of more difficult platforms and a battle-robot named Zaxxon. A splendid three-dimensional look distinguishes *Zaxxon* from many similar games: you control both your horizontal and vertical positions over the space platform. During the space battle you must match positions both vertically and horizontally with the oncoming ships to hit them with your fire.

Commodore owners should be pleased that Synapse's version of the game is the best on any home computer or game machine. The huge, scrolling fortress is the most color and graphically detailed. The diagonal scrolling is smooth. The only disappointment is the robot Zaxxon, who who is somewhat crude and unrealistic. The excellent sound effects closely mimic the arcade version.

The spacedraft is well drawn, and joystick control is smoothly implemented. The ship climbs, dives, and banks left and right just like a real airplane. Beginners need to either watch the altitude guage on the left of the screen, or determine their height from a combination of size, shadow placement, and laser strikes. One thing that makes this game easier than the arcade version is that you don't have to worry about crashing into the fortress's deck—you can't fly that low.

The enemy ships in the outer space sequence are hard to hit. They change altitudes and move from side to side as they approach. Like your ship, they look smaller at lower altitudes—a visual clue to help you line up your target. Fortunately, you are as hard to hit as they are. The Commodore version sets a time limit on this round, rather than holding off the second space platform until you've destroyed twenty ships, as in the arcade version.

Mighty Zaxxon resides in this second fortress. Narrower openings, more force fields, and guns and missiles protect him from your assault. If you make it

through all six or seven sections of the fortress, your ship stops in front of the robot and he fires slow, deadly heat seeking missiles at you. To win, you must shoot down the missiles and score three direct hits on the launcher. When you defeat Zaxxon, you begin again at a harder level.

This version of *Zaxxon* compares favorably to the coin operated machine. While definitely easier, and about twenty percent slower, it has the same feel and play mechanics as the original. The outstanding graphics are almost as good as the arcade version's. On the whole, *Zaxxon* is one of the better shoot-em-up games, one that will capture your imagination and hold your interest.

ZEPPELIN

Synapse Software
$34.95

Overall Rating	B+	Hard	*Challenge*
Creativity	B-	B	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	B+	B	*Holds Interest*

As pilot of a zeppelin, you explore a 250-room cavern. Your mission is to dynamite enemy lairs on seven levels despite the heavy defense offered by enemy zeppelins, laser gates, balloons, falling rocks, and hamburger creatures. Moreover, your joystick-controlled craft responds to the vagaries of the wind. If you crash into a wall, you lose your craft. All passageways go somewhere, but some are more interesting than others. If you find a key, you can open doors to new areas of the cavern, though the key located at the entrance to the first level provides more hindrance than help because both you and it must fit through the passageways and barriers—and you can't use it on the first level anyway. Switches scattered around the cavern offer further aid; shooting at them turns parts of the enemy's defense system on or off. Each switch has a specific function, which remains unchanged throughout the game, of either turning off the balloons or starting earthquakes.

The game demands almost constant shooting. Your zeppelin can shoot in four directions, blasting through barriers, throwing switches, destroying objects, or clearing your path. If the ship touches anything, you lose one of your five lives. You gain a life by touching a life symbol or accumulating 10,000 points.

Zeppelin has colorful and animated graphics. The game offers plenty of action and strategy, and two people can play together, one acting as pilot and the other as gunner.

ZWARK

Software Consultants
$24.95

Overall Rating	F	Easy	*Challenge*
Creativity	D	D	*Graphics*
Documentation	C-	F	*Value for Money*
Game Depth	D	F	*Holds Interest*

Zwark is the dullest and most simple-minded shoot-'em-up video game that I have seen in ages. Computer magazines don't even print this kind of type-in game anymore. The object here is to shoot down invading Zwarks with a joystick-controlled gun that moves horizontally along the bottom of the screen.

At first, Zwarks appear one at a time and move in fairly predictable patterns; but as the game progresses, more pop up and their movements become increasingly random as they head for the bottom of the screen. If you miss, you just have to get out of their way. Poor marksmanship can become a deadly handicap against four or more rampaging Zwarks. Fortunately, these huge aliens don't shoot back.

The game is simply horrible. Graphics are poor, with no background screen. There is little depth of play, no excitement, and the entire program adds up to one big yawn. The vendor has some nerve to ask $24.95 for this pitiful piece of software.

Arcade Games

Mazes

BLUEPRINT

Commodore Business Machines

$19.95

Overall Rating	C-	Medium	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C-	D+	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

Blueprint is an arcade game that is somewhat difficult to classify. It takes place in a maze but it isn't a maze game. And it has been changed just enough that it no longer resembles the subtle memory game that was the best part of the VCS game design. Briefly, it is a game in which you must find the necessary parts that have been hidden in houses within a maze so that you can assemble an Ammo machine. This machine can then be used to kill an Ogre that is chasing your sweetheart on the track at the top of the screen.

You need to find eight different parts hidden in twelve houses, bring each one, one at a time, to their correct position on the machine's blueprint at the bottom of the screen. If the job were easy, this wouldn't be a game.

First, some of the houses contain bombs. Red ones are shorter-fused than blue ones, and both must be dumped into the bomb disposal pit. You can run with the bomb by pressing the joystick button, but that uses up valuable "run" time. Also, if you mistakenly go back to a house where you previously found a part, you find another bomb. Second, there are several monsters that make your life difficult. Weird Willie who lives in the bomb pit is harmless. However, he likes to hop over to the machine's Start button and press it. This causes the machine to fall apart if it is not completely assembled and slows you down. It is best to catch Willie and put him back in the pit. Then there is the flower pot that the Ogre knocks down as he chases your girl. This can suddenly end your day. You also lose a life when your time runs out and the Ogre catches Loni. If you ever complete your machine in time, you press Start and aim it to kill the Ogre.

Blueprint has a solid game design, but fails to hold the player's attention for long. While game play is dull and simplistic, there is definitely a challenge, for the game is not as easy as it first appears. Some players may find the joystick control unresponsive on turns, but I don't think this problem contributes to the overall difficulty. Instead, I think the time limit is a wee bit short to win the game on a regular basis even on the easiest level. You'll have to be good to reach harder levels as there is no difficulty setting for this single-screen game.

BRISTLES

First Star Software

$29.95

Overall Rating	B-	Medium	*Challenge*
Creativity	C+	B	*Graphics*
Documentation	B	C+	*Value for Money*
Game Depth	B	C	*Holds Interest*

There'a probably a small bunch of kids out there, under the age of twelve, who will get a kick out of playing *Bristles*. This arcade game takes the word "madcap" to the extreme. The object is for Peter the Painter to paint all the rooms of a multi-level house before the clock runs out. The higher the level, the bigger the house, and the more adversaries you'll encounter who will try to keep you from completing your task.

Each house has several stories connected by elevators or stairs. As you run across each floor, you leave a trail of paint. However, you have to be careful not to fall into one of the open elevator shafts that separate many of the rooms. This game requires split second timing, or else it's back to the basement with one less brush. Lose all ten brushes, and you are out of a job. Each time you finish a house, words flash on your screen which form parts of a secret message. You have to finish all eight houses on all six levels to learn the message. (It's probably easier to cheat by disassembling the code with a HesMon, than to finish the game.)

What you especially have to avoid are the Half-Pints and Dumb Buckets. Both of these move across the screen on a single floor, but the later often change floors by riding the elevators. You can avoid both by

ducking or leaping over them. The Bucket Cruncher is more intelligent, but it doesn't appear until the fourth building. You can destroy it if you lure it into the paint mixer in the basement. Then there is Brenda the Brat. She leaves hand prints all over your freshly painted walls. You can stop her temporarily by giving her a candy cane, but you will still have to go back and repaint the spots she has ruined. There are a few safe rooms in every building where the Dumb Buckets won't enter. The trouble is that they look like all the others and they don't stop the rest of your foes. Fortunately, the basement is a safe refuge from all the scoundrels, with the exception of the Bucket Cruncher.

The game has lovely and colorful graphics, and pleasant classical music from *The Nutcracker Suite* playing throughout. Whenever you make a mistake and fall down to the basement, the up tempo *Russian Dance* from the famous ballet score plays.

Game play is rather frantic, with everything happening at a fast and furious pace. It is a truly madcap diversion, rather than a relaxing one. *Bristles* is definitely a challenge, for you can even paint with invisible varnish, if (for some strange reason) you become bored. Most players will find the game rather silly and frustrating. This is not to say that *Bristles* isn't fun; it just hasn't garnered the mass appeal among the many young gamesters in my neighborhood that ordinarily would indicate a game of "star quality."

CHOMPERMAN

Victory Software
$19.95

Overall Rating	C	Medium	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C	B+	*Value for Money*
Game Depth	C	C-	*Holds Interest*

Victory Software's *Chomperman* follows the classic maze game design. You must maneuver through eight mazes, eating dots and treasures while avoiding "ghosts." In each maze, you must eat the dots three times before advancing to the next maze. The third time you finish, the maze walls disappear, making the game much trickier. Also, as you advance further into the game, more ghosts materialize who actively seek you out. The program has a demo which starts automatically—nice if you've never played before.

I enjoyed playing *Chomperman*, rejoicing all the while when I thought how many quarters I was saving. It has clean graphics and smooth action. It synchronizes the joystick and response time well, as arcade games should. When you press the fire button or space bar, an extra burst of speed helps you out of those tight situations you inevitably encounter at higher difficulty levels. You can select one or two players, and set the difficulty level from one to nine (nine is definitely for the experts).

If you enjoy playing *Pac-Man*, you will enjoy this variation. It keeps you on your toes every step of the way.

CREEPY CORRIDORS

Sierra On-Line
$33.50
VIC 20

Overall Rating	C+	Medium	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	B	C	*Value for Money*
Game Depth	C-	B-	*Holds Interest*

Creepy Corridors is a graphics maze/adventure game for the VIC 20 that fuses elements of *Pac-Man* and *Shamus* with classic treasure hunt. The corridors offer untold riches and pose dangerous threats to those who dare enter them. The wealth of diamonds beckons, but the deadly touch of creeping critters makes treasure hunting difficult. No memory expansion for the VIC 20 is necessary to use this game cartridge. A joystick is helpful but not required. *Creepy Corridors* may be played with pre-set or user-selected keys.

The game's title screen demonstrates its object: kill the critters that shadow you, who are much like those familiar ghosts that haunt and taunt *Pac-Man*. You will be constantly lured by those darn diamonds, but carefully read the accompanying directions for the "last word," a hint that will definitely boost your score.

The graphics in *Creepy Corridor* are endearing but somewhat crude. The screen displays an overhead view of a simple maze, a large diamond in each corner. Your four men are lined up like pinballs waiting to be sprung.

Each of the nine levels offers a different colored maze and border, but other graphics—including men, creatures, and jewels—are white. The mazes do not change from game to game.

The first four levels are not too difficult. You quickly learn to grab the diamonds and elude the creatures, who look like giant spiders. You can shoot the creatures, as in *Shamus*, but you must be facing them.

I found maneuvering in *Creepy Corridors* difficult. Keyboard control was awkward, and the joystick response was terrible. That must be why you can redefine keys. I often got zapped as I struggled with the joystick, trying to turn my man around to shoot approaching critters.

After you've killed all the creatures, or have taken all four diamonds on the first level, a trap door appears—a portal to the next level. If you lurk in a corner and ambush the creatures, you're spared the trouble of chasing after gems. The trap door appears after you've defeated all the critters on a level. A ghostly creature joins the "spiders" on level three; another ghost joins the fun on level four.

At the fifth level, skulls join the pursuit, which complicates the game. The skulls don't disappear when you shoot them, so you must venture forth and collect all four diamonds in order for the trap doors to appear.

The scoring scheme is challenging. You lose 100 points when one of your men is killed. Diamonds are worth the same (100 points for each one claimed), but killing a critter only adds ten points to your total. If you nab all four diamonds and complete a level, you are awarded an extra man. Because you can lose points, this game never lets you rest on your laurels. A high score can be whittled away in no time as a game is lost.

Sound effects (footsteps, gunshots, and so on) are minimal, though effective; music is noticeably absent. *Creepy Corridors* is a one-player game. Players may alternate turns, but a high score is never displayed, so competition is difficult. Don't bother with joystick extension cords, because you must sit near the VIC to restart, pause, or stop the movement using function keys.

A particularly good feature of *Creepy Corridors* is that if you lose a man, play continues where it left off. You don't have to start over again if you've already killed some critters and collected some diamonds.

I enjoy playing *Creepy Corridors* despite its shortcomings. It tries to be a combination maze game, adventure game, shoot-'em-up, and game of pursuit, but it falls short in many respects. *Creepy Corridors* offers you fast action and an interesting challenge, but lacks sufficient depth to make it a truly memorable game.

JAWBREAKER II

Sierra Vision
$29.95

Overall Rating	D+	Medium	*Challenge*
Creativity	C	C-	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	C	D	*Holds Interest*

Jawbreaker II is a completely revamped eat-the-dots arcade-style game. The chomping set of teeth is still loose in the candy factory, but the locale is no longer exactly a maze. This candy shop features five parallel corridors with moving doors between them. Each corridor has a patrolling happy face that is out to pull your teeth. You have to quickly gobble a few pieces of candy, then use either keyboard or joystick to pass through the moving door and avoid the grinning faces closing in on you. Using one of the four corner energizers gives you a few seconds to pursue and kill the faces. When you consume all the scattered candy, you advance to the next level.

Jawbreaker II is easier than the maze style eat-the-dots games. It has fewer dots and more predictable adversaries. You must avoid the edges since a happy face that has been offscreen might suddenly reappear. On the other hand, game play is more tense, since escape is a matter of timing rather than strategy. The four power dots generously help you clear the beginning levels.

The game stores your last up or down joystick movement, even if you are stationary and in the neutral position. This annoying quirk makes your chomping teeth unexpectedly switch corridors as the moving door passes. I've seen many unwary players lose a man to a patrolling happy face because his teeth made an unexpected move.

Jawbreaker II is different—briefly amusing, but shallow and quickly boring. The graphics better suit the VIC 20 or a VCS game machine.

LABYRINTH OF THE CREATOR

Victory Software
$19.95

Overall Rating	D	Medium	*Challenge*
Creativity	C	D+	*Graphics*
Documentation	C-	D+	*Value for Money*
Game Depth	C	D+	*Holds Interest*

This matrix maze game contains hostile creatures, nondescript treasures, and keys in several rooms that lead to the "Creator"—who, of course, you are supposed to kill. The monsters shoot at you, and touching them is deadly. I have yet to reach the Creator with keys in hand before losing all ten lives.

Although based on a familiar concept, the game is not simple. I enjoyed its challenge and difficulty, yet relative easy of play. It requires very little skill—just extreme dexterity and infinite patience.

I was a bit disappointed with its graphics. I found the map in the opening screens and documentation very hard to read, and some of the treasures unrecognizable. I'm still not sure what the player shape is supposed to be.

The opening screens contain all the documentation and, unfortunately, you can't return to them once

you're in the game. Some of the instructions seem rather cryptic until you encounter the situations to which they apply. I still haven't determined whether you must pick up the keys in a certain order.

This game can hold your interest if you don't get frustrated trying to figure out the rules, but it isn't worth $19.95.

RADAR RAT RACE

Commodore Business Machines
$14.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	C+	C	*Value for Money*
Game Depth	C-	C	*Holds Interest*

Frequent arcade customers will immediately recognize the similarities between *Radar Rat Race* and the arcade game *RallyX*. Here, rats pursue cheese instead of cars pursuing gasoline cans, and cats are the obstacles instead of boulders. For folks who are not familiar with either of these video amusements, the object is to maneuver a joystick- or keyboard-controlled white rat through a maze in search of ten cheeses before the timer runs out. One of these cheeses is worth twice as many points, and if you find it quickly, the value of all the subsequent ones is doubled. Hot on your tail are four black rats. They closely track you, and try their best to catch and destroy you. If these meanies get too close, you can press a button and leave a screen of small stars which creates a false scent to confuse them—at the expense of some of your valuable time units.

The screen is divided into a four-way-scrolling playing field on the left, and a radar screen of the entire playing field on the right. You can keep tabs on the location of the cheeses and the pursuing rats in relation to your present position. The cheeses are represented by white squares and the rats by somewhat difficult to see small red Xs. You must constantly watch this screen to avoid being taken by surprise by a rat in front of you.

Radar Rat Race is a very tense and playable game, though the arcade version never achieved much popularity. The graphics in the Commodore version aren't as nice as the original's, and the scrolling isn't very smooth. The background music (which consists of several bars of *Three Blind Mice*) eventually becomes maddening. (I'd suggest turning it off.) Controllability is sluggish, especially on the diagonals. The level of difficulty increases as more and more rats join the pursuit.

Radar Rat Race is a simplistic, but fairly challenging race/maze/chase arcade-style game that may appeal to the seasoned gamers yearning for a taste of the arcade classic.

SPACE TAXI

Muse Software
$29.95

Overall Rating	B-	Medium	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	B+	B	*Holds Interest*

You drive a space-age taxi amidst the bizarre landscape of a city in the twenty-third century. You transport passengers from one section of the city to another, and if necessary, between different screens. Each screen has a different number of landing pads (taxi stands). Little men appear, one at a time, at each of these stands, and, in deep voices, yell, "Hail, Taxi!" The game talks—and talks well; but for those who may not understand, the message is repeated in the text at the bottom of the screen. You guide your taxi to the hailing fare using four joystick-contolled direction thrusters.

Maneuvering requires a considerable amount of hand-eye coordination, since you've got to keep your speed under control while avoiding all obstacles. When you are just about to land, and your speed is slow enough, you press the joystick button to lower the landing gear. Be careful that you don't land on top of your man—he'll demand ten dollars if you fry him. Your passenger then gives you instructions about his destination. ("Pad four, please," for example.) You have to be quick in this game, for the tip meter is constantly running down. The man pays you five dollars for delivering him between pads, and ten dollars for going to a different screen, plus the amount shown on the tip meter. You spend some of that money on gas—you use up a lot of fuel while you're flying.

The game has twenty-five screens, including the mystery screen at the end. Each one presents a different landscape. Some are simple cityscapes, while others range from wide open beaches to intricate mazes with moving gates. You never know what might get in your way: magnets, lasers, shooting stars, force fields—even black holes. The difficulty levels range from the day shift (easiest) to the night shift (hardest). Each consists of eight scenes. You can play all of the screens in order, or have the computer randomly select them.

What *Space Taxi* lacks in excitement, it makes up for in terms of variety and the need for concentration. The graphics and sound are very good, and the depth of play is more than adequate for even the most skilled arcade player. The best part of this game is the thrill of reaching each subsequent screen and facing a brand

new challenge. I think Muse has come up with a genuine winner.

WARGLE

Hayden Software Co.
$29.95

Overall Rating	C-	Medium	*Challenge*
Creativity	C	C-	*Graphics*
Documentation	B	C	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

Wargle is a maze game in which you must shoot nine critters with a beam, in each of seven successive mazes, to escape from "Wargle City." In addition to the seven screens, there are six skill levels available. All the little extras included in this package (menus, keyboard or joystick option, ability to customize the keyboard, saving of high scores for each skill level, pause feature, and so on) set it apart from the usual maze game. It's obvious that a lot of thought went into the design of this program.

The documentation is short (only four pages) but nothing seems to be missing. The menus also help to make the various options comprehensible. The program is copy-protected, but a backup disk is available for ten dollars. My impression that no detail was overlooked was further reinforced when I stopped the program (with Stop/Restore) and tried to list it. The phrase, "Don't do that!" was printed on the screen.

Although I found this game to be quite challenging, a new gamester shouldn't be intimidated. The Novice level begins very slowly, so you can get a feel for the action. But even at this level, if you start scoring the action gets hot and heavy. Those Wargles can really get nasty! The top level, Tournament Wargle, was quite difficult. It took me awhile to get used to the joystick action. After you push the joystick in a given direction, you'll keep going that way until you change the direction. You don't stop when you release the stick. On one particular maze, the joystick response seemed quite slow. Since the program is all machine language, I suspect that this was done purposely to make this maze more difficult. The other mazes have prompt joystick response.

If there is a weakness in this game, it lies in the graphics area. The various characters who travel around the mazes could be more interesting. However, each is distinct and easily recognized. Sound is nicely done.

In sum, I was very impressed with this game and enjoyed playing it. If you like fast-paced game action, *Wargle* would be an excellent choice.

Arcade Games

Flight Simulators

COCKPIT 64

Susie Software
$31.95

Overall Rating	C	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C	*Value for Money*
Game Depth	C	D	*Holds Interest*

In this flight simulation program, you must safely fly and land at any one of seven airports. It has seven difficulty levels ranging from zero (no turbulence) to six (next to impossible).

After the opening screen and selection menus, you take the pilot's seat. With joystick or keyboard you direct the plane to your destination. The screen displays gauges showing pertinent information, such as fuel level and course. If you stay on course, the runway where you must land appears on screen. You have to raise the flaps, lower the landing gear, slow your air speed, and descend smoothly onto the runway. If you succeed, you land perfectly. Naturally, you have a limited amount of fuel, so your trip's duration is crucial. A display of elapsed time and accumulated points follows successful landings.

I enjoyed *Cockpit 64*'s challenge, as I strove to maintain proper "glide slope," and learned to compensate for turbulence. I had to make many last minute corrections which could spell success or failure as I approached the runway.

Since this program is written in compiled BASIC, its response time to the controls is sluggish. For example, when you drift off course during the flight, it seems to take a long time to regain your bearing, so you tend to over-correct adjustments. The view through your tiny cockpit window is a pathetic example of Commodore 64 graphics. As you approach the runway, you see only a vague outline. All in all, *Cockpit 64*, a sluggish flight simulation game, performs adequately, but by no means spectacularly.

FLIGHT SIMULATOR II

subLOGIC Corporation
$49.95

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Graphics*
Documentation	A	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Flight Simulator II is a superb three-dimensional flight simulation, realistic in every detail. Its perspective puts you, the pilot, in the cockpit with your instruments below you, and your field of view through the window at the top of the display. The simulation is so realistic that you hear the engine's propeller and even the stall warning buzzer if you pull back too much on the stick. The out-the-window graphics are superb as the horizon tilts and skews correctly when you bank and turn. The features of the terrain are even color-filled properly. This is a vastly improved version of Bruce Artwick's original 1979 flight simulation program for the Apple II computer. The major improvements include more accurate flight equations, color terrain displayed at about a half-second framing rate, a full instrument panel with artificial horizon and navigational radios, variable weather conditions, rudder control added to the ailerons for coordinated turns, variable view selectors, and a realistic representation of the actual terrain around airports in Boston, New York, Chicago, Los Angeles, and Seattle.

The program simulates the performance characteristics of a single-engine Piper Cherokee Archer II PA-28-181 airplane, with a top speed of 125 miles per hour. The simulation would almost qualify as an actual flight simulator if only you could substitute a control yoke and rudder pedals for the Commodore's keyboard or joystick control system. Joystick control works fine in this version. The rudder is centered automatically after banking left or right with the stick. Some may prefer keyboard control, but pilots will find flaws in the "feel" of the controls and may experience some initial frustration in learning the proper keystrokes to control the simulator, with separate aileron, elevator, rudder, throttle, elevator trim, and flap controls. The default entry mode links aileron and rudder controls to guaran-

tee coordinated turns (so the plane won't slip sideways while banking). However, you can uncouple the rudder and aileron controls. This is a useful option during landings.

The upper portion of the screen shows a three-dimensional color view of the terrain. You can adjust the view for the right, left, rear, or bottom views. The bottom looks virtually like a road map; you can zoom in and out on it. While you may have trouble discerning the details of the terrain from the flat perspective of low altitude flying, the view improves radically from altitudes of one thousand feet and up. The lower portion of the screen shows the instrument panel. Rather complete, it features airspeed and altitude indicators, a bank indicator, an omni-bearing indicator (with glide scope), a slip indicator, a vertical speed indicator, and a heading indicator. Further additions provide the "pilot" with more realistic instruments and controls: navigational radios, a transponder, fuel, oil pressure and temperature gauges, a tachometer, gear up/down, lights, carburetor heat, and magneto indicators.

Skilled pilots can adjust the dynamics of the craft to achieve the most realistic conditions, while novices can leave the settings alone. The reality mode requires you to start the plane with the magneto switch and starter, then trim the plane properly. You must keep the plane on the runway or risk getting stuck in the mud. A set of default modes include night or dusk flying and moderate or bad weather flying conditions. Saturday afternoon pilots or arcade game enthusiasts will appreciate just how easy it is to take off and fly the plane in the coordinated turn mode (if you do not bank the plane too steeply). The plane is not an arcade-game starfighter. It flies slowly and crashes easily. You may find it particularly difficult to land safely. You need to slowly glide in at half throttle. You can follow the glide slope on the omni-bearing indicator and adjust your rate of descent. The slow framing-rate of the graphics display can cause the pilot to overcompensate if he assumes the aircraft isn't responding quickly. There have been instances where I got the plane in an unnerving oscillation after coming out of a stall.

Flight Simulator II possesses one particularly interesting feature: the ability to rapidly position the airplane at any desired location, altitude, pitch, and heading, either through the use of a system called "slewing" or through direct entry of parameters in the Editor mode. Slewing helps you get the aircraft in position to practice instrument landings, and you can save the values to disk for later use. At one point, I shifted from Meigs Field in Chicago (the default airport) to Santa Monica Airport in California, entering the coordinates myself. To my surprise, I found the airport's runway layout exactly correct.

The New York City area is particularly interesting. Besides the key airports, JFK and La Guardia, there are the twin World Trade Center towers and the Empire State Building. On one flight I spotted a thin line on an island just south of Manhattan. I took the plane down for a closer look and found the Statue of Liberty complete with torch. This program has detail beyond belief. A word of warning, though: don't run into buildings—they are real.

A Game mode, called "World War I Ace," involves bombing runs and dog fights with computer-controlled enemy planes. A radar set replaces the radios to indicate the position and relative height of the enemy. You need a color monitor here because different colors represent different heights. The space bar acts as a machine gun, but since the planes appear as dots and the present version of the simulator lacks tracer bullets, you will have trouble ascertaining the results. When you get hit (usually from the rear), your plane's performance degrades until you crash. You score points by bombing fuel depots and factories.

The program comes with superb documentation. Navigational charts accompany an easy-to-read ninety-page manual. The detailed manual explains everything you need to know about flying and navigating an airplane. A second booklet explains the technical aspects of aircraft flight. This outstanding piece of software is visually detailed and realistic in every aspect. It allows computer owners to become Sunday pilots in the relative safety of their own homes. I highly recommend *Flight Simulator II* for entertainment, but it is more than a game. Any would-be pilot will find it an excellent training aid.

SOLO FLIGHT

MicroProse Software
$34.95

Overall Rating	B+	Hard	*Medium*
Creativity	A	A	*Graphics*
Documentation	B+	B+	*Value for Money*
Holds Interest	B	A	*Game Depth*

Solo Flight offers an exciting chance to pilot your own airplane and learn all the basics of instrument flying without leaving the comfort of your living room chair. You can crash the plane without injury and begin flying again after pressing just a few keys. A real-time flight simulator, it employs excellent three-dimensional graphics and aircraft sound effects to mimic takeoffs, landings, and cross country navigation under both visual and instrument flight rules. You may fly to any one of twenty-one different airports in three distinct areas of the continental United States. Options include touch and go, visual and instrument flying, full cockpit instrumentation, dual VOR navigation radios, an in-

strument landing system (ILS), multiple air navigation maps, four difficulty levels, and emergency procedure practice. As an added bonus, *Solo Flight* includes a Mail Delivery game in which you try to deliver as much mail as possible in the shortest period of time. The program awards points after each landing, based on your performance during the flight.

Let's take a look at what you'll see on the screen. In the visual mode, the top half of the flight screen shows your plane and the highlights of the local terrain (updated as you fly). At low altitudes, you can see your shadow on the ground. Airports are black, VOR towers and mountains white, and farms gray. If you fly above the clouds, you can't see objects on the ground. Normally you look ahead, but you can also look to both sides and behind the plane by pressing the cursor keys. The bottom half of the screen shows the instrument panel with the altimeter, the airspeed indicator, an artificial horizon/altitude indicator, throttle, pitch indicator, flaps indicator, direction compass, vertical velocity indicator, fuel gauge, temperature light, landing gear, brake lights, the two VOR indicators, the ILS landing approach guidance system, and a clock that tells you the elapsed time of your flight in seconds. The program updates all instrument readings constantly as you fly.

The Mail Pilot game tests your flying skills and judgement. You must deliver five bags of mail to their destinations in the least amount of time. Using the function keys described in the flight menu, you select the quantity of mail and fuel that you take on board at each airport. If you don't make a selection, the program enters the demo mode. When in this mode, you can regain control of the aircraft at any time just by moving the joystick. At the more advanced levels, your plane tends to develop instrument and mechanical failures. Landing at any airport allows you to repair the equipment and continue on your way.

One of the better flight simulations on the market today, *Solo Flight* comes with well written documentation that makes learning the program relatively easy even for a beginner. I took several hours of flying lessons many years ago and found that I could fly and land the plane after only a few trial flights. However, the Instrument Flight Rules section targets advanced flying students with many hours of experience. I strongly recommend *Solo Flight* for anyone interested in flying, from the new student to the professional airline pilot who just wants to have a little fun at home. Who knows? You may have to take over the controls sometime, just like in the disaster movies!

Arcade Games

Racing

LEMANS

Commodore Business Machines, Inc.
$14.95

Overall Rating	C	Easy	*Challenge*
Creativity	C-	D+	*Graphics*
Documentation	D	C	*Value for Money*
Game Depth	D	D	*Holds Interest*

Lemans is a paddle-controlled road racing game based on an old Bally-Midway arcade game. Since the game is somewhat dated, all you get is a bird's eye view of a vertically scrolling track, rather than the behind-the-wheels feeling of *Pole Position*. The goal is to score as many points as possible by passing cars and accumulating mileage within a three minute time limit. The colorful course is divided into sections: straight, icy, night, and slight curves. You drive the night portion of the course with your headlights on. You can see the other cars only as they enter the small area illuminated by your headlights.

The other cars present a challenge since they are always trying to run you off the track. Going full speed rarely works because the other cars tend to box you in. You usually have to slow down and look for the chance to pass suddenly. While you do have an unlimited number of reserve cars, you lose valuable time each time you crash because you have to begin from a standing start in the pit.

Though *Lemans* isn't a really terrible racing game, newer arcade fans who are used to the exciting action and stunning graphics of the most up-to-date video races will be a bit disappointed when they try this one out. Still, Commodore did a reasonably commendable job by including such niceties as the four-light progression at the starting line and a realistic sound track.

MOTOCROSS

Tronix
$34.95

Overall Rating	D+	Hard	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C-	D	*Value for Money*
Game Depth	D+	D	*Holds Interest*

Remember the old arcade road racing games, like *Night Driver*, where you had to keep yourself centered on a forward-moving, snaking track that gave the illusion of rapid forward motion? If you substitute a motorcycle for a race car, and bales of hay for road markers, and run the race in daylight, you've got *Motocross*. Graphics and game play are a little better than in the old games, since you have a gearshift and instrument panel, in addition to being able to steer with your joystick. The color screen displays a nicely animated cycle that even leans into the turns. But, on the whole, the game plays much the same as its predecessors.

Motocross is actually very difficult, even on the easiest level where you have an automatic transmission. The bales marking the course are too widely spaced. The screen shows only the next three bales on the straightaways, and usually only two on tight curves. There isn't enough of a visual cue to center your cycle on the track. Beginners may become frustrated and disappointed that they can't drive at high speeds. The lack of other competitors, except for one other cycle at the highest level of play, makes *Motocross* repetitive and boring. This is definitely an inferior entertainment program.

PITSTOP

EPYX
$40.00

Overall Rating	B-	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	B-	*Value for Money*
Game Depth	C	B-	*Holds Interest*

In order for road racing games to become more realistic, the action must shift to where races are basically won or lost: the pits. *Pitstop* combines the typical hand-eye coordination racing game on a scrolling track, with the dramatic action in the pit, where the driver refuels and changes worn out tires with the assistance of his four-man pit crew. It is here that the precious seconds which can result in the loss of a race mount up.

The racing portion of this game requires the usual skill in steering a joystick-controlled car through gentle turns and around slower cars. Instead of crashing, bumping into another car or against the sides of the tracks causes tire wear. Tires change from dark blue, to light blue, to green, and finally red. Once red, the slightest bump will cause the tire to blow and the car to crash. A radar map on the right side of the track shows your current position in relation to the pit lane. When your tires start going bald, or your fuel is running low (the faster you go, the more fuel you burn), it is time to look for the pit lane leading to the pits.

The view then shifts to the pit where the car is surrounded by a four-man pit crew. The pit clock is ticking ominously overhead while you position your joystick cursor to the mechanic closest to the worn tire. He pulls it off and grabs a new one from the stack of fresh treads. When he has finished, you can move in the man with the hose to fill-'er-up. You'll have to be careful here, for if you overfill, you will rupture the tank and must start all over again. When you finish, move the cursor to the flagman, and continue the race. Thus, the game becomes one of strategy. Should you drive faster, using more fuel, you'll only find that you may lose your lead due to an unscheduled pitstop.

The game may be played by one to four players, but only one can race at a time. (Look for *Pitstop II* [soon to be released] for a split screen race designed for contestants to play simultaneously.) Players have a choice of three, six, or nine laps, three difficulty levels, and can select a single race course, or a racing circuit of three or six different race courses.

Pitstop has decent graphics and realistic racing sounds. Your point of view, like that of *Pole Position*, is from behind, but much higher up so that the horizon is not visible. Signs whiz past and the lane markers move to give you the feeling of forward motion. The pits show the car in simulated three-quarter, three-dimensional detail.

The game has a very nice quality to it. While *Pitstop* certainly does not offer the excitement or driving skill precision of *Pole Position*, it definitely requires cunning strategy both on the course and in the pits in order to emerge victorious. I think the pitstop portion of the race adds a highly realistic touch, and turns the program into an exciting video race.

SPY HUNTER

Sega
$44.95

Overall Rating	B+	Medium	*Challenge*
Creativity	B-	C+	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	B	B+	*Holds Interest*

At first glance, *Spy Hunter* looks like another overhead-view, vertically scrolling roadracing game. However, it's a little different in that the player's spy-mobile is armed with deadly weapons. You are supposed to be chasing enemy agents, but the game has very little to do with espionage. Think of it, instead, as a game with a "Road Warrior" theme, in which you must battle a gang of thugs with names to match their deadly cars: Road Lord, Switch Blade, Enforcer, Doctor Torpedo, and the Mad Bomber. You must be quick and merciless, either ramming them and pushing them off the road, or gunning them down when they're in your sights. In other words, you've got to destroy them before they destroy you. Violence to the max!

This joystick-controlled amusement is partly a timed game with an unlimited number of cars, and partly a game with a set number of cars. At first, there is a set course on land and in the water that you have to complete before the counter (which starts at 999) runs out. You can get killed a number of times, but every time you do, the weapons van drops off a new car. Once the timer runs out, you are awarded one extra spy car in addition to the one you are driving, and you may also earn an extra one at 20,000 points.

You control the car's forward speed and side to side motion with the joystick. Enemy cars crowd the narrow scrolling track which sometimes splits in two with a center divider. Each of the cars, except the Road Lord which is bullet-proof and has to be rammed off the roadway, has its own unique weaponry. The Enforcer fires a shotgun out the sides as you pass, and Switch Blade is dangerous with its buzz-saw hubcaps. One touch, and your vehicle will be totally out of control. At one point in the game, your car can enter the boathouse and automatically become amphibious for a while. Both the Barrel Dumper and Doctor Torpedo are your nemeses on water.

Each time you enter new terrain, the weapons van appears on the side of the road. It pulls out and you attempt to dock with it by allowing it to pass you, then driving up the ramp into it. The extra weapons (smoke screen and oil slick) are activated by the second joystick button on an extra (optional) joystick. A plastic holder comes with the game to allow you to hold two joysticks together for easy playability.

Two levels of play are offered: easy and difficult. The primary difference between them is the number of enemy agents with which you have to contend on the road. On the difficult level, they cluster in packs waiting for you to exit the van. It is difficult to score many points in the early stages of the game. The many red cars, although not explained by the instructions, are friendly. You can ram them off the roadway, but if you shoot one, you'll receive a "no score" penalty that takes effect for about five seconds. The part of the game that takes place in the water is by far the easiest. Both the Barrel Dumper and Doctor Torpedo are pussycats compared to Switch Blade and the Mad Bomber in his helicopter (who appears after 30,000 points). Take the first turn off the boathouse. You can easily score a quick 10,000 points if you avoid running aground on an island.

Spy Hunter has been the hit of the coin-op arcades for the last year or so. Despite its lack of state of the art graphics and a potentially dull scenario, it is a fun and addicting game to play. Some arcaders like it because it apparently gives you an edge by awarding you as many cars as you need, instead of the obligatory three that most games alot you. Thus at first it looks as if *Spy Hunter* is both fair and easy—which it really isn't! I must hand it to the designer. He (or she) has cleverly disguised a timed game by giving the player his last spy car after the timer has expired, in order to play as long as he manages to survive—even earning extra cars every 20,000 points. For this feature, the game gets a ninety-nine for ingenuity.

UP 'N DOWN

Sega
$35.00

Overall Rating	C	Medium	*Challenge*
Creativity	C	C	*Graphics*
Documentation	C	C-	*Value for Money*
Game Depth	C	C	*Holds Interest*

Up 'n Down is a translation of an obscure Bally-Midway arcade game. The object is to race your Baja Buggy over a series of vertically scrolling, criss-crossing roads that often undulate up and down steep hills. You earn points by collecting flags and other prizes along the course while avoiding the pickup trucks, flag cars, tanks, and toasters that are intent on colliding with you.

Driving is mostly forward, although you can roll slowly backward if you decrease your speed to zero. (This is useful only if you have missed a turnoff and need to back up, assuming that an enemy vehicle is approaching from behind.) Normally, you can jump to avoid an approaching enemy, but you cannot jump while rolling backward. In fact, the only defense you have against all these opponents is to carefully time your jumps so you land on top of the baddies as you hit the pavement. You must also be careful not to jump near a turn and subsequently land off the road. There are a few spots where you can jump from one zigzag track to another if your timing is perfect and you are moving fast enough. The hills are the tricky parts, for if you don't give it enough gas, you will stall and drift backward, often into an approaching enemy. When you have collected all ten colored flags, the game progresses to a more difficult level.

Game play is a little shallow and repetitive, but it does not detract much from an enjoyable amusement that requires little thought. The graphics are decent but the jingle that plays throughout gets on your nerves quickly. There's no way to silence the melody, so you must resort to turning off the sound and thus lose the sound effects, too. *Up 'n Down* is an appealing game that really is more suited to younger preteens than adults.

Arcade Games

Climbing and Jumping

BUGABOO

Quicksilva, Inc.
$29.95

Overall Rating	D-	Medium	*Challenge*
Creativity	C-	B	*Graphics*
Documentation	D	D	*Value for Money*
Game Depth	D	F	*Holds Interest*

It is always surprising how first impressions are often shattered after trying a game. *Bugaboo* has some of the most original screen graphics that we have encountered, but the game itself is frustrating. The programmer/artist created a world out of a child's dream. Strange and outrageous rock outcroppings with tufts of hanging plants litter the scrolling landscape. A flea hops from rock to rock from the very top to the bottom of the dream world. Your job is to get him back out.

The joystick-controlled flea can make enormous leaps as you guide him upwards along the ledges. Sometimes he misses and falls back to the bottom and must start climbing again. There are two enemies in this forest primeval to avoid along the way. The venus flytrap is stationary and easy to avoid, but the pterodactyl finds you every time. It isn't bad enough that you don't even have a fighting chance, but the next flea starts at the very top and you have to sit back and watch him slowly hop down to the bottom before you can start to play again.

Bugaboo is frankly a terrible game. The graphics are intriguing, but they just don't make up for the lousy game play. I wish they would just recall the game, add a few things to make it more interesting, and give you a chance to escape the flying reptile. They made a nice start with the graphics, but don't buy this one until they re-work the play action, if ever.

CANNONBALL BLITZ

Sierra On-Line
$29.95
VIC 20

Overall Rating	B	Medium	*Challenge*
Creativity	A	B	*Graphics*
Documentation	A	A-	*Value for Money*
Game Depth	B-	B+	*Holds Interest*

"The British are coming! The British are coming!" beckons Sierra On-Line's *Cannonball Blitz*. As an American freedom fighter, you must defeat the Redcoats in this arcade escapade by storming their hill and capturing their flag.

If *Donkey Kong*, or *Miner 2049er* are not realistic enough for you, try *Cannonball Blitz*, a clever and engaging game for the VIC 20. It transports the jumping and climbing challenges offered by those video amusements back in time to the period of the American Revolution.

Three scenes allow you to overwhelm the Redcoats' superior fire power. A joystick is optional, but helpful, as your three-man battalion jumps cannonballs, climbs ladders, pounds cannons, and heads aloft (ultimately) with the aid of catapults and balloons.

Cute graphics highlight this imaginative game, which is infused with humorous touches. Look closely at the cover illustration of a Revolutionary War battle. A can of Budwiser beer sits at the General's elbow. And his cannon is actually a computer "loaded" with the game. Curiously, *Cannonball Blitz* does not allow for more than one player. The high score is retained until you turn off the computer, so direct competition is impossible, but players can take turns and compete against each other for the top score.

One of the game's best features is the option for choosing between the three screens or levels. You begin at the first level, but may go directly to the second or third with a pull of the joystick. (Of course, when you complete level one, you go on to level two, and so forth.)

Cannonball Blitz is a cartridge. The game's pause, reset, and sound on/off features are delegated to the function keys. This means that if you have an extra long

joystick cord, you'll have to leave your comfortable chair to use these functions. But pausing is rarely needed with three men per game, and restarting is possible with the joystick.

The sound mute is a great addition. Some games bombard you with constant music, forcing you to lower the TV volume before succumbing to a nervous breakdown. Even so, with *Cannonball Blitz*, the mute is a luxury item. Music and sound effects are sparingly used throughout the program; they are pleasant but not overwhelming.

The game commences with a rousing rendition of *When Johnny Comes Marching Home Again*. Your battalion faces a steep hill covered with catapults and trap doors. A Redcoat guards the hill, kicking cannonballs toward you. You score 200 points for each cannonball that you successfully jump. You can also rely on the munitions to fall through trap doors onto catapults which launch you closer to the top of the hill. Bonus points tick down as your time wears on. When (and if) you reach the top, an allied balloon transports you aloft to claim the flag.

Level three is more difficult. The Redcoat stands near the top of the hill firing his cannon. Moving cannons roam the hill, elevators are added, and hammers aid you in storming the hilltop. You are awarded points for jumps as well as disabling the cannons, but here, too, you must drop your hammer before you can climb or jump. Even a small fall will kill you, as will those treacherous cannonballs the Redcoat lobs in your direction.

The graphics of *Cannonball Blitz* are good, though not remarkable. Only the Redcoat, his cannon, and the flag are colorful. (The remaining graphics are white.) Your soldier has the charm of a character from the Sunday comics. You can see his head ache after he's been beaned by a cannonball. He also covers his eyes to avoid seeing those awful, fatal falls.

Cannonball Blitz is one of the more clever games for the VIC 20. It combines arcade-type challenges with humor and historical significance. Go ahead—try *Cannonball Blitz* and fancy yourself a hero of the Revolution who has taken an enemy hill by storm. In the computer age, it's great that an armchair general can still win a war the old-fashioned way.

CONGO BONGO

Sega
$44.95

Overall Rating	C-	Medium	*Challenge*
Creativity	C+	B-	*Graphics*
Documentation	B	C-	*Value for Money*
Game Depth	C+	C-	*Holds Interest*

While graphically interesting, *Congo Bongo* is a weak climbing and jumping arcade game. The three-quarter perspective graphics lend the game a realistic, three-dimensional look. The Commodore disk version contains all four screens of the original coin-operated version, while the cartridge version has only two.

You play a hunter pursuing a huge gorilla named Congo. In the first screen, he resides on the top of conveniently staircased Jungle Mountain, on Monkey Plateau. You have to climb up ledges, jump across streams, avoid the bouncing coconuts Congo hurls at you, and elude a troupe of monkeys that climb on your shoulders to hinder you. The monkeys are just a nuisance; jumping three times dislodges them. But you must hurry to reach Congo before the bonus timer runs out.

You can play with either joystick or keyboard. If you don't rotate the joystick forty-five degrees while holding it, you'll misjudge the necessary diagonal movements and make many crucial errors.

The graphics are colorful and detailed, but the ape is neither realistic nor animated. It's nice to see collisions (between you and bouncing boulders) handled properly. You can cling to one edge of the staircase while boulders bounce past you on your right (actually, in front of you because of the viewing angle). In many games, these boulders would register as a collision, and you'd lose your life, but not here.

Loading screens from disk takes thirty-five seconds—most annoying when you're just learning the game and must often reload it. It can really ruin the game's spontaneity. *Congo Bongo* has charm, but it's too simplistic. On higher levels, it's challenging, but you have to start at the beginning every time.

CRAZY CAVEMAN

Merlin Software
$19.95

Overall Rating	D	Medium	*Challenge*
Creativity	D	D	*Graphics*
Documentation	C-	D	*Value for Money*
Game Depth	C	F	*Holds Interest*

You can journey back to prehistoric times to fight the dinosaurs, dodos, and prehistoric birds in the arcade

game *Crazy Caveman*. The rest of your clan has been ambushed by a huge saber-toothed tiger, and you must get back to your cave.

At first you must avoid groups of rolling rocks by timing your jumps as they come toward you. It is best to begin moving left toward your cave, or you may face the rocks indefinitely. If you manage to survive, you face the crude looking tyrannosauri that try to mow you down. Swing your axe with the joystick button and they'll be reduced to half their original size. The trouble here is that you feel cheated if the computer says you missed and you must die. It is hard to tell exactly when the axe makes contact. Dodos come at you next; they haven't learned how to fly properly, so they move in leaps and bounds. Most likely, you will find yourself in their way. Nasty prehistoric birds who drop rocks upon your head are your last adversaries.

Crazy Caveman looks and feels very amateurish. The designer/programmer was definitely not an artist, and game play lacks consistency. On the whole, *Crazy Caveman* borders on awful—but I'll opt to be kind and say I have seen worse.

DONKEY KONG

Atarisoft
$49.95

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

The heroics brave Mario performs in order to rescue his girlfriend from the clutches of Donkey Kong (who holds her captive atop a mass of broken girders) have resulted in making *Donkey Kong* one of the most popular games in arcade history. I'm glad to report that the Commodore 64 computer game cartridge duplicates the arcade game in all four screens.

You assume the role of Mario, who begins his rescue attempt at the bottom of a stack of inclined girders from a construction project. Some of these girders are connected by ladders. Donkey Kong, a large and sinister looking ape, attempts to stop Mario from climbing up to rescue his sweetheart by rolling barrels down ramps. Mario has to either jump over them, or smash them with a hammer as they roll toward him. The preferred method is to ignore the hammer business and proceed as quickly as possible to the top, since bonus points dwindle rapidly with time.

Mario moves as directed by the joystick; to make him jump, you press the button. He must beware of falling barrels that sometimes take shortcuts down the ladders. Barrels that reach the bottom are ignited by a burning canister, turning them into roaming fireballs that plague Mario if he doesn't proceed quickly to the top. Mastering this level of the game is a matter of good timing and dexterity.

Mario proceeds to the second screen which consists of a pyramid of girders. His goal is to dash over the eight steel rivets that hold the structure together, while being careful to avoid the gaps and the pursuing firefoxes. It isn't a difficult screen; you merely must learn the proper pattern to reach all eight rivets without getting torched. The hammer next to the top level will help you to kill several firefoxes if you are cornered. It's not necessary, though, to reach all the rivets and bonus prizes dropped by the girlfriend, who remains a prisoner at the very top.

The third screen is perhaps the toughest. It consists of a series of platforms connected by ladders and separated by two fast-moving elevators. Several firefoxes guard the platforms and make jumping hazardous, at best. Donkey Kong compounds the problem by throwing bouncing, spring-loaded girders from the top of the heap. It requires careful timing to help Mario to jump over this never-ending series of falling girders. The trajectory varies slightly from the original arcade version, and the girders fall in three offset but predictable places. Again, this level requires much more skill and dexterity than the other screens.

The last screen, similar to the second, consists of a complicated series of conveyor belts, connected with ladders. Firefoxes pursue you as you leap over moving sand piles on the conveyor belt. The object, naturally, is to reach your honey at the top. The graphics and sound effects in *Donkey Kong* are outstanding. All of the characters are drawn in detail, multi-colored, and well animated. The firefoxes flicker just like fire, and the barrels look like they are really rolling. All of the screens are virtually identical to the ones in the original arcade version.

The game can be played by either one or two players alternating turns. You can start at different levels, but each of these starting levels begins with the first screen, thereafter shifting to the selected level. Each player starts with three lives and earns an extra life after 7,000 points. Overall, *Donkey Kong* for the Commodore 64 is an excellent arcade translation and is nearly as good as the popular original.

DRELBS

Synapse Software
$34.95

Overall Rating	B-	Medium	*Challenge*
Creativity	B+	B-	*Graphics*
Documentation	B-	B-	*Value for Money*
Game Depth	B-	B	*Holds Interest*

It took a vivid imagination to create *Drelbs*. In this game, you must defeat the evil Trollaboars who have imprisoned your land (represented by an atomic flip grid). To defeat them, you hop around the grid, flipping gates (ninety degrees each move) to form squares. A roaming destroyer Trollaboar moves around the grid destroying the squares that you have built. His touch is lethal, but you can briefly imprison him in a square.

Screwhead tanks patrol the perimeter of the grid, firing bullets that ricochet off the gates. I hardly consider them dangerous; few of their bullets have ever made direct hits. Gorgolytes that occasionally appear in the windows of your completed squares offer little threat. While they can't harm you, they do eventually release the square. If a lady Drelbish prisoner appears in a window, you gain bonus points if you succeed in jumping into the window while she is still there. In addition, a heart-shaped figure momentarily freezes the Trollaboars.

Eventually, you complete the squares and jump through the Drelbish window to free your people who are held prisoner in the Dark Corridor. Your only other means of passage is to catch the magic diamond that occasionally appears; it opens the window for you. Once in the Dark Corridor, you must work quickly to free every Drelb that you touch. The Trollaboars feel your presence and hunt you relentlessly until they throw you back into the grid. Their cousins, the Gorgolytes, act as slave masters in the Dark Corridor.

Drelbs is an imaginative and challenging entertainment program. Random motion will not help you complete the blocks in the grid, so you must use careful strategy to win. Once I understood the game's concept and rules, I found it very playable—and lots of fun.

FLOYD OF THE JUNGLE

MicroProse Software
$29.95

Overall Rating	C+	Easy	*Challenge*
Creativity	C+	C	*Graphics*
Documentation	C	C+	*Value for Money*
Game Depth	B-	C-	*Holds Interest*

Floyd of the Jungle is a cute and enjoyable arcade-style game that requires considerable dexterity to win. The object is to avoid the pitfalls of a multi-tiered jungle environment and rescue lovely Janice, who has been kidnapped. The jungle trails are beset by dangerous tigers, poisonous snakes, and vicious pygmy warriors who blow poisonous darts at the hero. The river is a raging torrent where dangerous alligators lurk; the clearings are filled with elephants. Our hero, or three others who simultaneously compete in the rescue, must negotiate the hazards with carefully timed leaps, climb vines connecting the various tiers, wrestle pygmies to the ground, and ride the backs of dangerous animals.

Each player controls his man with a joystick. The hero leaps or jumps when you push the joystick button. He can move left and right, as well as climb or descend vines. Timing is critical. Leap too soon, and Floyd falls into the river, the undergrowth, or the jaws of a dangerous animal. After his demise, our hero returns to the bottom of the screen where he must begin once again with one less life.

The level of difficulty controls the number of lives with which the player starts out. *Floyd of the Jungle* isn't a tense or riveting game, but it is one that's enjoyable for players of both sexes and all ages.

HARD HAT MACK

Electronic Arts
$35.00
Not compatible with MSD drives

Overall Rating	B+	Hard	*Challenge*
Creativity	B	B	*Graphics*
Documentation	C+	B	*Value for Money*
Game Depth	B	B	*Holds Interest*

Hard Hat Mack is a jumping, climbing arcade game in which you, as the ambitious Mack, try to construct a building while avoiding the OSHA inspector, falling rivets, and other construction hazards. There are only three screens in this joystick-controlled arcade game.

The first screen shows an unfinished five-story building. You must first place girders into the holes in the framework. Having done this, you then have to rivet them into place with the riveting gun, which you must first chase to catch. All this is extraordinarily difficult because the OSHA inspector is chasing you and deadly rivets are constantly falling around you. You can travel between floors by climbing the chains, riding the elevator, or jumping on the springboard on the left side of the screen. If you don't rivet the girders in place before you die, you'll have to put them in again with your next man.

The second screen is a little easier and has more interesting graphics. The object is to collect all the toolboxes scattered around the many unfinished floors

of the building. A girder on the hoist will move you from floor to floor. Several of the toolboxes are easy to get. Nevertheless, you must time yourself carefully when you leap past an opening and closing contraption and sneak past the inspector, who stands guard on the street level. Once you have gotten all the toolboxes, you have to time your ride to the top so that the big magnet will pick you up and transport you safely past the last conveyor belt.

Your mission on the third screen is to grab all the steel blocks that are scattered about the five-story structure and put them into the rivet machine. This is not easy at all, since an abyss exists between the right and left sides of the building. You must cross over this chasm by carefully falling into the twin springboards. There is also an elevator-type conveyor that can transport you up and over the top, but not around the bottom. It sits dangerously over the chemical toilet—en garde! Adding to the danger are the exposed wires on one of the conveyor belts, and the riveting machine itself.

You need much time to master this game. "Master" perhaps isn't the right word because the objects that you collect are randomly placed during each game. However, you can learn the technique of finishing each level. Overall, the Commodore version of *Hard Hat Mack* is much faster than the original one for the Apple. Trying to catch the riveting machine on the first level can be a very exasperating experience. The first screen is definitely the most frustrating, difficult, and least interesting. You can begin the game on other screens if you press the numbers 2 or 3 before pressing the joystick button to start. The animated graphics and the game design are top-notch. *Hard Hat Mack* is without a doubt an arcade game that will challenge the best of players.

HEIST

MicroLab
$35.00

Overall Rating	C	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C+	C	*Value for Money*
Game Depth	C	C+	*Holds Interest*

Our hero, Graham Crackers, is engaged in international espionage. He breaks into a museum, a front for a criminal organization, to retrieve a microdot hidden in one of the paintings. Which painting? He'll have to steal them all. The museum has thirty rooms in ten interconnected screens. *Heist*, a slimmed-down version of the Apple's 144-room game, resembles a climbing, jumping arcade game, since you leap across chasms and over robot drones and monitors. I hesitate on the climbing part since there isn't much—only the elevators and escalators remain from the original game.

Unfortunately, most of the cleverly booby-trapped screens, with moving scaffolding and ropes, are gone (unless they appear in the last ten screens I didn't reach).

Artwork adorns the museum's walls on each screen's three floors. You collect keys to some passages along the way, and you must backtrack to reach certain rooms. Graham Crackers collects each painting after he's defeated the obstacles before it. Work quickly: you have only two minutes to defeat the security between paintings. If you go over, the game ends. On the advanced level, you have only ninety seconds. When you've collected all the paintings in one area, you see ten more rooms.

Like most adventures, you learn by playing until you can reach all the treasures. Since the game plays the same each time, it won't be much fun once you've recovered the microdot several times. *Heist* certainly isn't easy, but it lacks the Apple version's play depth. When you lose a man, you're sent back to your initial position, which gets frustrating. Retracing your path is just as deadly each time through. Nonetheless, this game is playable and entertaining, with very good, detailed and animated graphics.

IMPOSSIBLE MISSION

EPYX
$32.00

Overall Rating	A-	HArd	*Challenge*
Creativity	B	A	*Graphics*
Documentation	B	B+	*Value for Money*
Game Depth	B+	B+	*Holds Interest*

In *Impossible Mission* you, as Special Agent 4125, must penetrate Elvin Atombender's underground stronghold and stop him from blowing up the world. This is no simple task: you must evade the mad scientist's robot guards, find hidden clues for breaking his security code, find his secret control room, and deactivate the doomsday computer before your time runs out. If this sounds like your kind of adventure, read on.

The labyrinthine underground complex, which is serviced by elevators, leads to the professor's living quarters and computer rooms. Each of the thrity-two rooms is peculiarly constructed so that only Elvin can negotiate them easily. All the furniture is suspended on catwalks or sitting on floors that end abruptly. One wrong step, and you may find yourself plunging headlong into the abyss. Elvin's robots patrol the catwalks, which are connected by a series of lifts. You can find the passwords that absent-minded Elvin hid in the furni-

ture (of all places!). Some deactivate the robots, others reset the lifts when you feed them into any of the terminals within a room. However, the control room's password is much more involved. It is broken up into small pieces: you match up four using your pocket computer to maneuver and flip pieces. The solution reveals one of the nine letters you need to enter the security room.

Success in this game requires a considerable amount of joystick dexterity. You have to leap across gaps and perfectly time your somersaults over the robots. While you have an unlimited number of lives, each loss costs you ten minutes of game time—and you have only six hours to stop Elvin. You can call the Agency's main computer for help with the phone on your pocket computer. The computer's clues cost you two minutes of precious time each.

Impossible Mission's scenario is excellent, albeit difficult. There are no easy levels for beginners, and none of the teen-aged gamesters in my neighborhood have even come close to winning. The graphics and sound are outstanding. The game has some of the best simulated speech I've ever heard: it sounds exactly like a Vincent Price horror film! Walking through the corridors, your footsteps produce metallic sounds, and your screams as you fall into the abyss are realistically eerie.

Impossible Mission should hold your interest game after game. Hopefully, its high level of difficulty will neither frustrate the average player, nor spoil his enjoyment.

JUMPMAN

EPYX
$39.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	B	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

The object of the thirty-screen arcade game *Jumpman* is to defuse bombs that have been planted in the buildings of Jupiter Headquarters. You assume the role of Jupiter Jumpman, who has seven lives (just two short of a cat's) and the amazing ability to leap between widely spaced girders. One misstep, whether an ill-timed leap or an encounter with a trap, robot, or dropped girder, means instant death and the end to the bomb disposal quest.

The game, which can be played by one to four players, is controlled via joystick. Jumpman moves left or right, and climbs ladders or ropes with easy left, right, up, or down movements. Leaps are made in the desired direction by pointing the stick in the right direction and pressing the trigger. Jumpman jumps further if he has a running start. His speed, which defaults to medium, can be changed at any time during the game.

Jumpman offers considerable depth of play. Each of thirty levels provides a unique challenge. The beginning levels are very predictable: certain robot-like monsters chase after you as you collect the bombs. Some of the girders are connected by ladders, while others use ropes. Sometimes bullets are fired at you from the edges of the screen; and on one level, two gunfighters try to track you down. One level features a dragon that you have to slay by spearing. And another ends in a merry chase after those last few bombs that continually move about the screen as you clammer up and down the ladders in hot pursuit. Upper levels tend to be much more puzzle-like. Usually something is still chasing you, but the order in which you defuse the bombs can prove to be very important. Touching one will often remove an important ladder or girder, making another bomb unreachable. One level even appears to be completely blank, becoming visible as Jumpman moves around. You sometimes have to leap into the unknown, gambling throughout that a girder will appear on the other side. Fortunately, when you make a mistake on any level, you don't have to start that level over. Only the bombs you have not collected reappear.

The disk contains five games. The beginner's game has eight easy levels (1 through 8), the intermediate has ten (9 through 18), and the advanced has twelve (19 through 30). The Grand Loop has all thirty levels, while the Randomizer allows you to play a random selection (though always starting with Robots II). Each play level is timed, so if you finish the level quickly, you receive a bonus score added to the points collected for dropping bombs and killing creatures. In the multiplay games, each participant plays until he completes a level or loses all his men. Then the joystick is passed to the next player, who tries his hand at the same level of play.

Jumpman is much like several other jumping and climbing games (e.g., *Miner 2049er*, *Candy Factory*). Although it is less polished, *Jumpman* offers considerably more levels or depth of play than its competitors. It is a very playable game that depends on the curiosity factor to entice you into becoming an addict. Control is good, although you may occasionally get stuck on a ladder during an intense confrontation. Jumping to safety usually corrects the problem. The graphics and sound are little better than average. *Jumpman* is a very good game that will certainly hold your interest for a long time.

JUMPMAN JUNIOR

EPYX
$40.00

Overall Rating	B+	Medium	*Challenge*
Creativity	A	B	*Graphics*
Documentation	B	B+	*Value for Money*
Game Depth	B-	A-	*Holds Interest*

Jumpman Junior, a smaller, cartridge version of *Jumpman*, has twelve brand new levels. You guide your man up and down ladders, ropes, and over platforms to defuse bombs planted in Jupiter Headquarters. Your joystick-guided character can leap great distances through the various levels. Electrocution traps on the second level impede your progress, while enemy bullets track you. Other levels present hazards like hurrican winds, moving walls, and hailstones. One level contains objects that remain invisible until you touch them. Like its predecessor, *Jumpman Junior* holds your interest.

KONGO KONG

Victory Software
$19.95

Overall Rating	C+	Medium	*Challenge*
Creativity	B-	C	*Graphics*
Documentation	C	B-	*Value for Money*
Game Depth	C+	B-	*Holds Interest*

Kongo Kong, by Victory Software, is an arcade-style game patterned after the popular *Donkey Kong*. In this scenario, a huge gorilla has escaped from the city zoo, captured a hostage, and taken refuge at the top of a building under construction. Your job as a fireman is to rescue the hostage by scaling all four levels. On the first level, you leap over barrels and carts as you climb to the top. The second level consists of conveyor belts which draw you toward a boiling pot. The third level has large gaps in the girders and in order to reach the hostage, who is now locked behind a door, you must leap and hang onto the cables dangling from the passing cranes. Obtaining an umbrella and a key, and climbing back to the top advances you to the fourth and final level. Here you must pull out the rivets to destroy the structure and finally free the hostage. You're awarded an extra man for every 10,000 points. You earn extra points by leaping over the obstacles, getting the umbrella and key, pulling out the rivets, and freeing the hostage.

I enjoyed playing *Kongo Kong*. Although the concept is not original, the execution of the game is smooth. The graphics are acceptable, but the characters are little more than dressed stick figures—there is room for improvement here. Your character is responsive to the joystick as he leaps and climbs. There are nine skill levels increasing the difficulty of play from the simple and mundane to the impossible! I'm confident that you'll enjoy hours of fun with *Kongo Kong*.

MINER 2049ER

Reston Computer Group
$29.95
VIC 20

Overall Rating	A	Hard	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Miner 2049er is a climbing/jumping arcade game cartridge for the VIC 20, in the vein of *Donkey Kong*. One or two players become "Bounty Bob" in a quest to claim seven abandoned uranium mining stations. Along the way, Bob must either destroy or sidestep deadly mutants roaming the mineshafts.

Although similar in concept to other jumping/climbing games, the VIC 20 version of *Miner 2049er* features seven very different and challenging screens. Each takes considerable time, practice, and patience to master.

You control Bounty Bob with a joystick. As Bob moves through the mines, the framework beneath his feet fills in with a solid color. Each girder must be filled in before Bob can claim the station and advance to the next level. Frequently, Bob must climb ladders or brave treacherous jumps, slides, or moving platforms to reach girders. A fall is usually fatal, but each player has three turns per game.

Progress through the mines is made more difficult by the mutants, who pace back and forth on each level. Touching a mutant kills Bob, but they are easily killed if Bob first touches a treasure—the time-tested Pac-Man "power pill" concept. Touching a treasure causes the mutants to cower and renders them vulnerable for a few seconds; beware, though, when they begin to bounce back. There are also a few other hazards to overcome, notably the deadly radiation pool on level six (mentioned in the instructions, but I have yet to reach it).

Bounty Bob must race against the clock on his mission to claim the stations. The clock, however, does not tick off the remaining seconds or minutes, but displays the number of bonus points which will be added to your total score when you complete that particular level. The bonus points drop away by the hundreds as time grows short. You hear a shrill warning when bonus points reach 100, a sharp reminder that time is about to run out.

Miner 2049er has some very appealing graphics. Bounty Bob is quite cute, and he and the mutants are nicely animated. The vibrant colors add even more excitement to an already exciting game. The arrangement of levels at first seemed rather random to me, but it turns out to be rather refreshing. For instance, the third level appears easier than the second, but the fourth is much more difficult than the first three. Level five seems easier than level four. The disparity is not necessarily a flaw—I look forward to level three after my nerves have been jangled by the second level. Alas, the sound effects for the program, although appropriate, seem very ordinary.

Overall, this superior arcade game for the VIC 20 system has few and relatively insignificant drawbacks. One problem: the game is virtually self-explanatory, yet the instructions can confuse you. For example, the instruction booklet explains that you must help the legendary mountie chase dastardly Yukon Yohan through the mine, but so far, I have seen no sign whatsoever of Yukon Yohan. Of course, I've only made it through five levels. Another confusing point: the program's packaging claims that the game has ten screens; however, a sticker on the lower portion of the box correctly specifies seven screens, as does the short instruction booklet. Perhaps this error results from the ten-screen version of the game manufactured for more complex computers. Other shortcomings include the confusing time clock (mentioned previously) and the automatic reset to one-player action after each game. Of course, you have the option of choosing a one- or two-player game each time, but a quick jump from a completed game to a new game could conceivably leave one player out in the cold.

Miner 2049er is one of the best arcade games marketed for the VIC 20—colorful, challenging, addictive, and fun. I highly recommend it; it will provide gamesters of all ages with weeks of enjoyment.

MR. ROBOT AND HIS ROBOT FACTORY

Datamost, Inc.
$34.95

Overall Rating	B+	Hard	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	B-	A	*Value for Money*
Game Depth	B	A	*Holds Interest*

Due to various factors such as ingenuity, challenge, and playability, certain computer games are destined to become classics. *Mr. Robot and His Robot Factory* is one of those: a jumping/climbing game resembling such "senior citizens" of the genre as *Jumpman* and *Lode Runner*. Somewhat similar to *Miner 2049er*, *Mr. Robot* offers much variety of play with its numerous escalators, conveyor belts, trampolines, ladders, transporters, energizers, bombs, poles, and other elements that deliciously complicate game play.

In this joystick-controlled, arcade-styled game, you must collect all of the "power pills" on one level before moving on to the next. In fact, you have to collect twenty-two pills before you can progress to the next level. Point values are awarded during play for various actions, such as destroying alien fires and having a surplus of energy at the end of a level.

Your robot moves from platform to platform using connecting ladders, poles, escalators, and transports; he jumps in response to the button on your joystick. While jumping, you can't let your robot fall too far; if he falls more than one and a half his own height, he dies. To keep you on your toes, your robot has a limited quantity of energy for each level, and he must complete his task before he runs out. He also has to avoid or destroy the alien fires that wander menacingly along and among the platforms and ladders. Jumping over or touching an energizer (represented onscreen as a pulsating square) produces a powerful force shield around Mr. Robot. When he is energized in this manner, he can kill the alien fires just by touching them, though the force shield lasts but a short time before he reverts back to his more vulnerable state.

No level of *Mr. Robot* is a pushover. Each one requires planning and strategy on your part to navigate successfully, since many obstacles exist throughout the twenty-two levels of your journey. You have five lives at the start. You lose lives by misjudging your position and falling or jumping too far, or by running out of energy. On the other hand, you can win "bonus lives" by making contact with the circular-shaped "life tokens" suspended in the air at various levels. You gain one bonus life for each token.

The second part of the game package is the Robot Factory. Using the construction set feature, you may design your own custom-made screens for the game, twenty-six of them in all at the bottom of the screen. All of the possible game parts appear. By using your joystick to move the cursor to the desired part and pressing the fire button on the joystick in order to grab the part, you can move it to the location of your choice. You then may press the button to set it down.

Holding the fire button down will "paint" a row of parts, which you must do to build a ladder or escalator. You erase mistakes by picking up a "blank" from the bottom panel with the cursor and painting the blank over the object you wish to erase. In designing your own custom screens, you're limited to one robot, four alien fires, and four transporters per screen.

Several commands at the bottom line of the panel are also executed by using the joystick to place the cursor

over them and depressing the fire button. You can test the screen you created, clear it, or edit it. You can also save the screen to disk or load the screen back into the game. A special load variant, "play," allows you to load a series of screens (created by you) in the order in which you created them, A through Z.

Game documentation is limited, though adequate for both the game and the Robot Factory construction set. A bit of confusion stems from the instructions since they are acutally written for the Atari computer. A special insert sheet specifies Commodore 64 power-up and key controls. Conveniently, though, the C-64 version makes good use of the function keys. For example, F1 is used to start the game, F3 to choose levels, F5 to enter the Robot Factory, and F7 to temporarily stop the action. A demo mode allows you to become familiar with game operation.

Mr. Robot has excellent graphics, and is challenging and fun to play. An added perk is provided by the Robot Factory, which places *Mr. Robot and His Factory* a cut above the majority of Commodore 64 jumping/climbing entertainment software.

OVER THE RAINBOW

City Software
$29.95

Overall Rating	C-	Medium	*Challenge*
Creativity	D+	C	*Graphics*
Documentation	C-	D+	*Value for Money*
Game Depth	C	C-	*Holds Interest*

*Q * Bert*-type games are definitely in vogue with computer programmers. *Over the Rainbow* is another such arcade game with different graphics. Basically the object is to guide a character who hops around a geometric grid of squares. The squares turn to different colors as he lands on each one. In the case of this game, they turn to a rainbow of colors, one color for each row of blocks. Complete a board and you advance to a different screen.

There are several adversaries that make your life difficult. Some like the Gumdrops can simply be avoided by keeping ahead of them, or by jumping straight upward as they pass. The Rabbit steals your colors, and the Frog smashes your blocks, making holes to avoid. Sometimes rain clouds appear. You can destroy the evil Witch or zap the Bat by jumping on one of these clouds.

The main problem with this game, besides a lack of originality, is the control system. We don't mind having to rotate the joystick an eighth-of-a-turn so that the right, left, up, and down positions line up diagonally with the cubes, but the hero seems to have a mind of his own when choosing directions. You are always certain that you didn't move the joystick in *that* direction and you become frustrated when you lose a man as a result. The graphics and game play are average for this type of game, but if you like *Q * Bert*, you will prefer the original.

PHARAOH'S CURSE

Synapse Software
$34.95

Overall Rating	B+	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B	B+	*Value for Money*
Game Depth	B	A	*Holds Interest*

Pharaoh's Curse is an arcade/adventure in which the object is to recover sixteen treasures from a labyrinth of underground chambers that make up a pharaoh's tomb. The tomb is protected by hidden traps and locked passageways. The ghosts of the Pharaoh, his Mummy servant, and the Winged Avenger stalk the chambers in search of intruders.

Game play requires considerable dexterity, as there is a lot of jumping, climbing, and quick shooting needed to survive. The adventurer, a la Indiana Jones, must leap over snake pits, climb up ropes, and shoot the undead with his gun. He can fall as far as he likes, but traps are everywhere. Also, the Winged Avenger, harmless to the touch, stands ready to carry off the adventurer to the deepest recesses of the tomb.

The sixteen treasures are all represented by markers at the upper left of the screen. These markers will disappear when you obtain a particular treasure, and an extra life will be awarded with each treasure you gain. Once all of the treasures are captured and you exit the tomb, a secret password is given, enabling you to play the more difficult and faster-moving levels.

Like most adventures, the game is initially enjoyable when learning the layout of the tomb and all the tricks needed to recover the treasures. Depending on the arcade skill of the player, it will take from several hours to several days to play. It has very good graphics and uses a lot of color on at least sixteen different screens, giving the game considerable depth. While it may not offer the expert a big challenge, it certainly is a fun beginning or intermediate level game, and one that should be extremely popular with those who like the jumping and climbing arcade-style games.

PITFALL

Activision
$31.95

Overall Rating	A	Hard	*Challenge*
Creativity	B	A	*Graphics*
Documentation	A	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Pitfall is an imaginative treasure-hunting adventure done with arcade-style play. Pitfall Harry's mission is to travel safely through the jungle collecting the "Lost Treasures of Enarc" within an allotted amount of time. There are dangers in nearly every screen. Some, like scorpions, rolling logs, snakes, and alligators, are visible, while others, like quicksand, and vanishing pits, appear with time or are triggered when stepped on. Most of these hazards are deadly. Fortunately, Harry has three lives.

Despite the nearly two hundred different rooms, there are only seven basic scenes. The others are merely combinations. Different dangers or treasures appear within the same scene. The graphics and animation in each scene are excellent with a lot of detail and color.

The game requires considerable skill to master. Harry has to do a lot of running, jumping, and swinging on vines to avoid many of the game's dangers. For example, the use of a swinging vine may be the easiest method to bypass a pool of quicksand or one full of alligators. Without the vine, Harry's timing must be perfect to jump across the backs of three alligators without being eaten. There are numerous rolling barrels in this game so it pays to run from right to left to avoid having to jump them. Many of the screens also contain ladders leading to underground tunnels, some of which bypass several surface screens and save you a lot of valuable time. It requires precise timing, however, to jump over the scorpions lurking in these handy tunnels.

Pitfall is a great game. It is very addicting and never becomes boring. The game isn't easy, and novices will have trouble until they become adept at avoiding the obstacles. Since it is an adventure game, *Pitfall* should be mapped, but I'm sure that most kids will just memorize the entire layout after conquering it room by room. *Pitfall* is worth the money.

PITFALL II

Activision
$34.95

Overall Rating	B+	Medium	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	B	B	*Value for Money*
Game Depth	A-	B	*Holds Interest*

The exciting adventures of Pitfall Harry continue in this new sequel. Harry was exploring the vast underground Inca caverns in Peru for the Raj Diamond when his niece and her cat Quickclaw disappeared. Now his dangerous treasure hunt takes on the urgency of a rescue mission.

Activision created a world for *Pitfall II* that's eight screens wide and twenty-four levels (three levels per screen) deep. The sequel, like its predecessor, has very good graphics and poses a significant challenge. But like all adventure games, it has a set layout with locations of treasures, enemies, and rooms that are totally predictable. Initially, Harry must overcome obstacles to reach his niece and her cat, and then find a valuable rat and diamond. The gold bars that are scattered throughout the cavern are secondary, and are gathered in earnest once the player has learned the layout. The layout consists of tunnels connected by ladders, pools of water across which Harry can swim, and vast chasms over which Harry can safely leap.

The game is somewhat frustrating. Many of the obstacles, such as the poisonous frogs, vampire bats, Albino scorpions, and deadly condors require precise timing to pass. Beginners make the mistake of falling uncontrollably down the chasms and hitting a bat, rather than climbing safely and cautiously down the ladders. Perhaps they fail to realize that they can grab the ladder if they push downwards on the joystick as they reach the holes in the floor. Getting killed isn't all that bad since you have an endless number of lives and you return to the last red cross that you have touched. However, some of the points that you have accumulated are lost during your slow journey to the last cross. Beginners lose so many points along the way that it is useless to search for every gold bar that appears along the path. Reaching the niece and her cat requires locating the balloon that carries you across the wide chasm. The balloon can be caught only from one specific ledge. (Important clues like these are thoroughly explained in the instructions which, I'd suspect, are rarely consulted.) The journey after this point is difficult and requires an enormous amount of persistence to safely pass the numerous condors that inhabit the maze of passageways.

While the greater number of scenes in *Pitfall II* make it easier to determine your position, the game is slightly disappointing. Perhaps it's because the original *Pitfall* had fun challenges like swinging on a vine across quick-

sand, and snapping alligators that you can use as stepping stones in a pond. The frogs, bats, and birds, deadly creatures in this sequel, lack charm. Harry's ability to swim is an interesting addition to *Pitfall II*, but here again, it offers too little in the way of challenge.

The continuous music, while pleasant and tuneful, begins to grate on your nerves after a half hour or more of playing time. Turning down the sound robs you of the rest of the sound effects. Perhaps I shouldn't be so critical, for *Pitfall II* is a fitting and absorbing sequel to its entertaining predecessor. It may lack some of the original's charm, but it does have remarkable play depth and graphics.

POGO JOE

Screenplay
$24.95

Overall Rating	A-	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	C-	A-	*Value for Money*
Game Depth	A	B+	*Holds Interest*

At first glance, *Pogo Joe* looks like *Q*Bert*: a game in which the hero jumps from block to block on a pogo stick. Although the premise here (which involves changing the color of cylinder tops by jumping on them) is the same, I think people will be pleasantly surprised by this program. There are enough variations in the play mechanics of *Pogo Joe* to bring you to the realization that it's quite a different amusement.

First of all, our hero cannot mistakenly jump off the playing field into an abyss. Many of the sixty-four playing fields have gaps between clusters of cylinders that you can only bridge by making a double jump when you press the joystick button. These gaps usually keep monsters pursuing you from roaming all over the playfield, unless they escape via black teleport tubes. If Pogo Joe enters one of these tubes, he begins popping up repeatedly and randomly at other black squares. You need split-second timing to get out at the right one. Most cylinders just change color when you hop on them, but on some playing fields, they disappear when you touch them.

Your adversaries begin as eggs—small and vulnerable. They hatch into cute, but dangerous, creatures, some wearing glasses. Others, like the tops that undo your work, can be safely disposed of. Playing fields even have a few green tops that will neutralize all the other monsters when you hop upon them.

You can customize *Pogo Joe*. Besides being able to start on any of the sixty-four different geometric-patterned playfields, you can set the speed of both your hero and the monsters, and choose whether the monsters are allowed to double jump, too. The graphics of the game are cute and colorful. The *Pogo Joe* jingle that plays continually will probably get on your nerves fairly soon. You cannot toggle off the music, so you just have to turn down the sound on the TV. Diagonal joystick control is marginal and sluggish. While the fact that you can't jump everywhere is sometimes confusing, you get used to it, believe me. To sum up, *Pogo Joe* is a nice game with considerable variations to prevent it from becoming a bore.

SAMSON AND DELILAH

Davka Corp.
$24.95

Overall Rating	C-	Hard	*Challenge*
Creativity	B	C	*Graphics*
Documentation	F	C	*Value for Money*
Game Depth	C-	C+	*Holds Interest*

This unusual hybrid biblical arcade and educational game is part of Davka Corporation's Bible Action Series. It takes its inspiration from four chapters of the Old Testament (*Judges* 13 through 16), but you don't have to know the Bible to play. In fact, if you've forgotten the high points of this Old Testament tale, the game provides an onscreen text summary, set to music, just after the disk is loaded and before actual game play commences. You can spend as much, or as little, time reviewing the story as you like, since you can use the space bar to flip through the story "pages." Read it, or merely scroll through the screens, as you desire.

Following the mini-review, you indicate the number of players (one or two). You may also select any of the game's twelve "special settings." These include various scenario variations, such as four different speed modes, night and alternating day-night modes, calling in Delilah's fiery scissors, adding pits and secret doors, and other interesting twists that spice up the action considerably.

In this game, you assume the role of Samson, the mighty hero of the Israelites, who is now in chains. You must not allow your Philistine captors to get away with celebrating your defeat. Your objective is to move from the sixth floor of the Temple in which you are imprisoned, to the foundation pillars, which are also visible on the screen. Once there, you must leap over the hungry guard lion to get your hands on the Temple's pillars, heave them apart, and bring the structure crashing down on your captors.

As you fight your way down the six floors of your Temple prison to its foundation, three kinds of obstacles block your path. The Temple guards (gray, red, green, and yellow) are impediments; you must jump

over them, or whack them with your jawbone club. You should also avoid the beautiful but sly Delilah by jumping up or down a floor, and avoid the hungry lions by jumping over them. (To obtain the jawbone, you place Samson on it and pull down on the joystick. Once Samson has the jawbone, he'll swing it whenever you press the trigger and smash any guard in his way. But alas, Samson holds the jawbone only for a short time, so you must act fast!)

To jump up a level, you push up on the joystick when Samson is under a hole. To jump down a level, pull down the joystick when he reaches a ledge. But you must proceed carefully from floor to floor, making sure that Samson faces the hole when he jumps. Samson falls on his head if you turn him around and jump backward.

You pick up points as you progress. Each time you are thwarted in your attempt to reach the Temple's foundation pillars, your numerical score is displayed. At the end of the game (after three attempts), you'll see both your numerical score and the rating of your overall "fighting spirit." The "fighting spirit" ratings range from the abysmal "Spirit is Sleeping," up to the top-ranked "Spirit is Incredible." You also earn points for jumping over obstacles and hitting with the jawbone. Scores are also provided for reaching the lower floors—the lower you get, the more points you rack up.

Once you have perfected your escape technique, you can vary the action by choosing one or more of the twelve special settings.

I found *Samson and Delilah* rather difficult to play; making progress toward the pillars was especially hard. Getting lower than the second floor was a real challenge, and none of the three game testers in my house ever made it to the basement. This frustrating situation was relieved, to some extent, by the fact that the games are short, and it's easy to try again. Game graphics and sound are adequate, although not inspiring. There is no provision for saving a game in progress, and I never came across more than one playing screen.

Documentation is minimal, consisting of a single sheet of paper. The manual doesn't specify which of the C-64's two joystick ports to use, and the instructions tell you to first insert the disk into the drive, then turn the drive on—not the usual starting procedure at all!

Nevertheless, for the kid who is more interested in playing a video game early on a Saturday or Sunday morning rather than attending religious services or instruction, *Samson and Delilah* represents a realistically "educational" compromise.

WATERLINE

Tronix
$34.95

Overall Rating	C+	Easy	*Challenge*
Creativity	C+	B-	*Graphics*
Documentation	C	C+	*Value for Money*
Game Depth	C	C	*Holds Interest*

Heroic acts are what make dime novels so interesting. The S.S. Slipshod has just hit an iceberg and the frantic passengers are running hither and yon unable to find their way upstairs to the lifeboats on the top deck. Water is gushing in and the waterline is rising rapidly. Your last heroic act as Captain is to save the passengers and the gold.

The ship's decks and compartments are connected by ladders and air locks respectively. The Captain can walk through the air locks but he should remember to close them afterwards or water will rush through. It isn't that important, however, as water pressure will eventually force them open anyway. Starting the pumps by stoking the boiler will buy you time, but the ship is doomed. You have to leap in the water and hold your breath for limited amounts of time to rescue the submerged gold, but the treasure can wait. Greed sometimes prevails while the Captain neglects passengers, but those who bother to read the instruction book will notice that passengers are worth triple that of a gold bar. Incidentally, you have to stand beside the gold and face it to pick it up. You can carry three bars at a time. Passengers, on the other hand, need to be assured that you know where you are going. You must stand close and press the button. A message is displayed if they respond, and then they begin to follow you up the ladders. It is best to rescue the passengers on the lowest levels first, for they drown easily. When you have rescued all of the passengers, you advance to a higher level with more passengers and less time to rescue them. There are four levels of difficulty that can be selected from the title page.

Waterline's graphics are detailed and colorful. They scroll horizontally to encompass much more of the ship than a single screen could. Game play is repetitious and offers little challenge on the easier levels. Passengers are rarely placed in the bottom compartments but it is always best to reconnoiter the entire ship just in case. This non-violent game's recommended audience is children, but it would be suitable for the entire family.

Adventure Games

General

ADVENTURE CREATOR

Spinnaker Software
$32.95

Overall Rating	B	Medium	*Challenge*
Creativity	B-	N/A	*Vocabulary*
Documentation	B-	B	*Value for Money*
Graphics	C+	4	*Save/Restore*

Basically, adventure games fall into two categories. In the text/graphics type, the adventurer explores a multi-room environment either for treasure or to achieve a goal, solving a number of puzzles along the way. The game proceeds at the player's own pace, since time—if it matters at all—advances based on the number of moves he's made. The other type of adventure is more closely related to arcade games, for it occurs in real-time. The quest is usually for concealed loot, and the game permits the player to interact with the monsters (rather than just killing them off). For example, one of the monsters might be willing to trade items with you, or you might pick up a clue from overhearing two monsters talking.

Adventure Creator is a construction kit that produces arcade-style adventure games. While the cartridge comes with a ready-made, twenty-room adventure game, the real fun comes in when you add to or modify it, or create a game all your own. You can save four eighty-room adventures to a single disk. The game on the cartridge gets you started and shows you, by example, how to combine the construction kit's building blocks.

The goal in your adventure is to either find a particular treasure or to accumulate a specified amount of gold. You begin with a certain amount of energy, and lose some if you're zapped by creatures, or by touching walls or barriers that are considered "hot." The game ends either when you accomplish the mission, or your hero runs out of energy. With the exception of the T key (to change tools) and the I key (to produce an inventory of your treasures), games are completely joystick-controlled.

You design your game using the joystick and four keys. The space bar aborts an operation, the F and B keys cycle room pieces forward and backward, and the C key changes room colors. The screen is divided into a twelve by eight design grid at the top, and a menu area on botttom.

Would-be adventure designers should have a preconceived design in mind before they begin, preferably on graph paper. Each of the rooms that make up your maze must be properly linked, and the interconnecting doors have to be aligned. Beneath the number of the room that you are editing is a column of directions with the current connecting room numbers. You may change these by moving the cursor to the desired direction, then pressing the numbers. It is entirely possible to leave Room one via the North door, entering the same room via the South portal if you have aligned the doorways and set the room connections that way. You position the doorways by selecting "Doors" from the menu, then moving the joystick-controlled cursor around the perimeter. Each wall can only have one doorway.

In the Build mode, you choose from among sixteen pieces. These include plain or hot walls, mines, secret doors, hollow hot boxes that drain only on the edges, pairs of walls or tall and wide bars that flash off and on alternately, and either top or bottom traps. The latter pieces slowly grow from empty space to an energy draining hot trap. Placing a piece is as easy as positioning your cursor with the joystick and pressing the button.

Chests can either contain tools or treasure, or can be empty. While you may have only sixteen treasure chests, you can replace the included treasures by typing in your own. And these treasures don't always have to be things; instead, they can be clues. Tools that adventurers find in the chests are always added to his remaining supply. Shields protect you from energy-draining traps and creatures, torches briefly illuminate a dark room, hobbles, when shot, temporarily freeze a creature, nippers disable a hot trap, and ferrets determine whether a creature intends to talk, trade, zap, pop, or give, or accept a bribe.

You design creatures in the Creature Lab. You can choose the body, head, color, and its name. Pick one of

five preset movement patterns, or guide the creature in a pattern of your own devising. You can also program creatures to trade items, give a treasure or a tool, accept bribes, pop you to another location within a room, or zap some of your energy. When you finish, just use the joystick to place the creature within a room. You can only have one creature in each room.

Although designers can go wild cleverly creating huge, intricate mazes with lots of traps, playing the game doesn't necessarily require a great deal of thought. These adventures fall more into the realm of children's games, requiring persistence and arcade skills to win. Still in all, *Adventure Creator* is an entertaining program with colorful, imaginative graphics. Its main appeal lies in designing your own arcade adventure games; to this end, the software is definitely worth buying.

ADVENTURE MASTER

CBS Software
$44.95

Overall Rating	B-	N/A	*Challenge*
Creativity	N/A	C-	*Vocabulary*
Documentation	B	B-	*Value for Money*
Graphics	N/A	1	*Save/Restore*

If you dream of designing together your own adventure game, *Adventure Master*, a construction set for text/graphics-style adventure games, will interest you. In many ways, *Adventure Master* can be likened to a specialized database generator, where each location is treated as a record. Players must meet specific conditions to gain access particular data (items or information) within each record, or to be allowed access to another record (location).

The size of your adventure is limited by the amount of data you can store on a disk. Your average adventure should have about fifty rooms, ten illustrations, and fifty to one hundred words and phrases (with possible responses). With less illustrations and text, you may be able to add a few more rooms, but you are limited to thirty-two objects per adventure.

The first step in designing an adventure is to map it out carefully, numbering the rooms, the objects in them, and the phrases necessary to operate or succeed in each location. You access all editing phases through the main menu. A password prevents other adventure players from cheating, or modifying your finished scenario. All locations must be linked by connecting passageways. The editor shows what room number lies in each of the eight compass directions, in addition to up and down. Zeros indicate no link for a particular direction. You can designate one special direction in each room, and require input of a key phrase for the player to proceed in that direction, or even require that an object be in his possession before he can proceed. You can add messages to indicate both right and wrong combinations. These are both important and necessary, because they are the only way the player has of knowing when he's met the conditions.

Space for descriptions of every room allows for simple or complex prose. You may even illustrate rooms with graphics. *Adventure Master*'s graphics package isn't fancy; its single-sized joystick-controlled brush dips color from three inkwells. You can load each inkwell with one of the Commodore's sixteen colors.

You can place any object in any room, and it doesn't have to be in a specific location. You can put in a key phrase that the player must input before he can collect the object. For example, suppose you place a box containing two candles in a room, and describe it like this: "Ants crawl in and around the box." The player must say "Kill Ants" before he can open the box and find the candles. You should indicate whether his actions are right or wrong with a follow-up sentence, such as "The ants bite you and you die" if he tries to open the box, or "There are some candles here," if he kills the ants first.

Once you've designed a game with the database editor, you need to edit a list of words or phrases that the computer will accept. The program has eighteen built-in commands including Look, Take, Drop, Inventory, Score, Save, Quit, and the ten directions. You must add additional words or phrases like Dig, Climb, or Cook Fish. You can even have a few magic words to do things like teleport you from one room to another. Unfortunately, the parser is the weakest part of the program. Typed-in responses must exactly match what appears on the list. For example, if the parser is looking for "Climb," it won't accept "Climb Cliff." The screen just repeatedly flashes "I do not understand." It would be much less frustrating if it accepted separate lists of verbs and nouns, and understood most combinations.

After that you assign point values for found objects, and add an introduction. Then it's ready for testing. The came reads the disk nine to ten seconds each time the player changes locations. While this may not seem lengthy at first, it gets bothersome when you're backtracking through familiar territory.

When you're satisfied with your game, you can transfer it to your data disk, creating a self-running adventure game that does not need the master.

Adventure Master comes on two separate disks. Disk one contains the adventure editor and a complete adventure entitled "Clever Catacombs." You can look at this game using the editor, but you must have the password, which reputedly is revealed through the game clues. I tried playing clever catacombs, but found the vocabulary and parser so limiting that the whole thing became a big, frustrating headache. A

word of advice: Don't bother trying to guess the password. Once the editor prompts you for it, there is no escape. You either input the correct one or turn off the computer and start over.

Disk two contains two semi-completed adventures. Using the password in the manual, you can look at each adventure's twenty rooms and its word list, then complete the games.

The twenty-four-page manual is instructive. It thoroughly outlines the procedures, and presents many clear examples. Unfortunately, the quality of your game depends on making a clever vocabulary list simple enough for the poor parser to handle, without causing the player to abandon the quest. Keep in mind that your descriptions must have lots of clues.

Adventure Master is the first adventure program generator I've seen. It gets an "E" for effort, but is still quite crude, especially with regard to its parser. It does, though, give the would-be adventure designer, with no programming ability whatsoever, a chance to be creative and design his own adventure games. At least, that's a first step.

Adventure Games

All Text

ALTAIR 4

3R Import & Export Corp.
$19.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	A-	*Vocabulary*
Documentation	B	A	*Value for Money*
Graphics	N/A	∞	*Save/Restore*

This is a great text adventure game, unfortunately on cassette. *Altair 4* takes almost twenty minutes to load successfully, and I have experienced an incredible number of load errors with it. In fact, it's lucky that the program is recorded on both sides because one side never loaded for me at all! But once you get *Altair 4* loaded, you're in for many weeks of adventure on a hostile planet. This British import is a mind-wracking mystery with a lot of nice touches for the experienced gamester.

As in most adventures, you must find your way through a number of rooms, collecting and using items left behind by your mysterious predecessors. The simple story has you flying through space when an asteroid storm damages your Strato-Cruiser. You're forced to crash-land on Altair 4, a penal colony planet, which houses the most dangerous criminals in the universe. You must live long enough to explore the planet and find enough equipment to repair your ship. Along the way, you should keep an eye out for valuable treasure. You'll find your way over the rugged terrain, into strangely abandoned cities, and you'll come face to face with some very deadly foes.

Altair 4 handles quickly and smoothly (once loaded) with no errors. It's a well-formatted adventure, easy to read with bright lowercase text on a black background. The C-64's text colors are used to great advantage; commands, inventory and score, descriptions of surroundings, and items which you can take are each a different color. The computer's real-time clock prints elapsed time with each command so you can keep track of how long you've been adventuring. The screen and border colors flash when you've completed an especially important act. Also, you can learn your score at any time. This allows you to see the value of each treasure or to differentiate between treasure and repair items (which offer no points).

There are other nice touches. Return executes a Look command. Several such abbreviations save you time, but you must figure them out by trial and error—there's no list of abbreviations. If you "say" something, the computer beeps as if it were speaking. You may also stumble upon a mechanical dog which will call you "Master" and follow you around.

I don't want to spoil any other little surprises, but each helps make the game more interesting. After many, many hours of play, I'm still far from solving *Altair 4*, but I've not tired of it yet. At 19.95, *Altair 4* is a good buy. It is a first-rate adventure.

CYBORG

Sentient Software, Inc.
$37.95

Overall Rating	A-	Medium	*Challenge*
Creativity	A	B-	*Vocabulary*
Documentation	C	B+	*Value for Money*
Graphics	C	70	*Save/Restore*

Cyborg is an imaginatively written, all-text science fiction adventure game. You have to guess the object, which doesn't become clear until late in the game. At the outset, all you know is that you are a Cyborg—half-human, half-robot—who must soon recharge. Having an unusually cohesive plot, the game is more like a novel than an adventure.

Cyborg is big, like Michael Berlyn's first game, *OO-Topos*. There are 130 mappable locations, including two maze-like areas. You must make a map as you go. Explore every area in all ten directions; the text does not always indicate the exits. The text, while generally well-written, is sometimes distractingly excessive. Except for the Droid's speeches, the text contains little humor or sidelights. The twenty-eight or so objects you need are well scattered, but don't present a difficult inventory management problem. You either eat or wear many of them. The well-laid-out screen display,

obtained by entering Full Scan (one of four scan types available), clearly shows your inventory, what you're wearing, and a description of your location.

One of the game's challenges is its sheer size; you must find the proper sequence to successfully attack it. The actual puzzles are few—more would detract from the game's novel-like nature. Several, however, are difficult, and clues are limited to the remarks of a small Droid (who comes close to stealing the show); a Help command comes through occasionally. With the exception of clearing the Cargo Hold, the puzzles are not too involved or interactive. The puzzles are usually logical—but who ever heard of an iguana playing cat's cradle?

Cyborg is disk interactive, and a little slow for a text game. This version, which is in Commodore FORTH language, has a full-sentence parser. The vocabulary is adequate. Seventy save-games may be written to or called from a separately formatted disk at any time. Fortunately, it is relatively difficult to get killed off. Should this indeed happen, the game permits a reincarnation not far from where you expired, with your objects remaining at the site of your demise.

All in all, *Cyborg* presents an interesting challenge, dominated by the "what, where, and why am I?" theme. Furthermore, it offers a well-developed plot with a few surprises, twists, and turns along the way. There are no points awarded in this game, for a completed mission is your only goal. *Cyborg*'s puzzles, definitely secondary to its excellent plot, are rendered difficult by the size of the game. I would highly recommend this game for the intermediate to advanced adventurer.

DEADLINE

Infocom, Inc.
(Distributed by Commodore Business Machines)
$39.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
Graphics	N/A	8	*Save/Restore*

Deadline, the first in Infocom's series of all-text mystery adventure games, challenges and totally engrosses (like Infocom's fantasy adventures, such as *Zork*). Indeed, it seems to pull you right through your CRT into the mansion where a death has occurred. You play detective, investigating the suicide of a wealthy and philanthropic industrialist. Naturally, you suspect it was murder. The game has no monsters, treasures, mazes, or wizards: just seven suspects on an estate with forty-eight mappable locations. You must poke around all the dark corners and question the suspects carefully, because in twelve hours you must solve the mystery. Sounds simple? Guess again, gumshoe! The puzzles are tricky, the suspects are enigmatic, and the plot constantly thickens. All the characters move independently (of each other and you). *Deadline* has twenty-five different endings, including your own early demise.

Like any good mystery, *Deadline* unravels slowly, and abounds with false leads and subplots. Don't try constructing your case in the first hour; events transpiring throughout the day will affect your investigation. Even if you can solve the mystery early on, you must have physical evidence, which is hard to get. You can't completely solve it until early afternoon—the computer won't accept insupportable accusations, and if you unduly accuse the suspects, you may just violently offend them.

Regardless of which of four principal suspects you attempt to convict, you must prove the motive, opportunity, and means. When you believe you have enough proof, arrest your suspect(s). A summary letter advises you of the result, ranging from a Grand Jury dismissal, to a Trial Jury conviction. Some endings come with shocking suddenness, while others are quite a surprise, or contain a strange twist or clue for your next attempt. Many solutions are simple variations of each other; however, one "complete" solution exists, which contains the author's three-screen analysis of the crime.

Deadline has the quality, feel, and humor of its *Zork* predecessors, from which Infocom adapted its flexible, multiple command parser. It has excellent vocabulary and synonymous word recognitions, but it lacks a few good detective words: Who, Why, When, and Where. Also, a fast and alarmingly illogical sequence of events occurs near one ending. Lastly, an obscure, but fatal, bug exists: don't shake an empty bottle before you've saved the game.

The game's response time is excellent, and the disk-interactive nature of the game isn't bothersome. While the puzzle quality and difficulty level are moderate, the puzzles are quite involved and interactive, requiring more deductive logic than is usually called for in adventures. After seeing the many screens of possible responses and descriptions, my biggest single question is, how did Infocom manage to get all that text onto one disk?

ENCHANTER

Infocom, Inc.
(Distributed by Commodore Business Machines)
$49.95

Overall Rating	A	Hard	*Challenge*
Creativity	B	A	*Vocabulary*
Documentation	A	A	*Value for Money*
Graphics	N/A	8	*Save/Restore*

Infocom consistently produces the best all-text adventure games, and *Enchanter* surpasses its predecessors. The setting is a mythical land beset by a mythical and very powerful evil force. You take on the role of a novice enchanter sent out by the Circle of Enchanters to battle the ruthless Warlock, magic your only weapon. As you progress through the adventure, watch for scrolls that may contain a new spell to add to your collection.

While *Enchanter* may only hold your interest until you solve the last puzzle, during that time you will find yourself enthralled by a richly woven story with an extensive vocabulary. Unless you are extremely imaginative, solving the puzzles could take quite a while, but I doubt you'll lose interest in the process.

The beautifully designed documentation includes a scroll describing your mission, starting with the words, "If you truly are the one brave enough to face unspeakable peril, let your wizardly powers reveal our words." Also enclosed is a "Guild Directory" which contains the documentation you need to read to play *Enchanter*.

You can save as many as eight games on a disk, and it might be a good idea to make frequent use of this capability, since you are likely to find yourself sacrificed by the evil Warlock many times before you finally succeed. Your score and number of moves are displayed in the upper right screen. Knowing how well you have done at the point when you save a game can help you decide whether or not to try certain strategies again. Making a map is critical to your survival, while looking beyond the obvious is essential to success. If you enjoyed the *Zork* series, consider this game your postgraduate training.

INFIDEL

Infocom, Inc.
(Distributed by Commodore Business Machines)
$49.95

Overall Rating	A	Hard	*Challenge*
Creativity	B+	A	*Vocabulary*
Documentation	A	A	*Value for Money*
Graphics	N/A	8	*Save/Restore*

Michael Berlyn, author of *OO-Topos*, *Cyborg*, and *Suspended*, has another winner with his newest release, *Infidel*, an all-text adventure from the wizards at Infocom. You are a modern archaeologist (a polite term for grave robber) bent on finding the vast treasures in an Egyptian queen's pyramid, that are rumored to be buried beneath the sands of Egypt. Above ground, there are thirteen locations (and an infinite number of desert locations), but it's not too tough to find the pyramid. The fun really begins once you're inside the pyramid, where there are a myriad of rooms between you and the queen's sarcophagus (things really get thrilling when you get closer to her final resting place).

The puzzles are neatly put together, and are pleasingly interactive. The text is well-written and draws you cleverly to its unique conclusion. Here and there in the pyramid, you'll find "signs" that supply clues and suggest puzzle solutions. The signs, however, are in hieroglyphics, and you may not be able to decipher them until you've solved all the puzzles.

If you've played any other Infocom games, you're aware of their superb parser and save-game features. The vocabulary of *Infidel* seems even better than its excellent predecessors, and a variety of amusing wisecracks await the adventurer who goes off on the wrong track. This game is a must for adventure game fanatics.

MANSION!

Briley Software
$14.95

Overall Rating	C-	Easy	*Challenge*
Creativity	C	D	*Vocabulary*
Documentation	B	B	*Value for Money*
Graphics	N/A	0	*Save/Restore*

Mansion! from Briley software is a goal-playing, who-done-it, adventure game. You assume the role of a private eye, called to the scene of a crime by the mansion's butler. The crime is theft.

When you arrive at the mansion, you discover a dinner party in progress. The Chief of Police gives your assistant a list of all the party guests, who are also the suspects. So as not to alarm the guests, the butler asks that you keep your questioning short and to the point. All the Chief of Police can give you to go on is a description of the stolen item and in which room of the mansion it was last seen.

A copy of the floor plan of the mansion is provided to help you determine which suspect is lying about where he was or who was with him. To help you keep the facts straight, your assistant also keeps a dossier on each guest which you can review before you make an arrest. Be careful not to accuse the wrong guest, you could end up on the paying end of a false arrest charge. To successfully make an arrest stick, you must name the crook

and the time the crime occurred. If you nab the crook, you will be rewarded with a handsome bounty. The quicker you solve the crime, the more generous the reward.

Mansion! severely limits your ability to question the suspects. Basically, all you can ask is where each dinner guest was at a particular hour. The guest will volunteer where he was, who he saw near him, and sometimes, objects in the room during that hour. However, the brevity of commands makes *Mansion!* progress quickly. The average game should last less than thirty minutes. By keeping track of where all the guests were at a particular time, who saw them there, and if the stolen item was still in view, you can whittle down your list of suspects.

Mansion! is a text game. The screen displays information and you respond with one-letter commands. Illegal commands result in the program asking the question again. Graphics consist of the display of the mansion's floor plan and sound consists of the ringing of the telephone.

While this game will never replace more advanced text adventures, it is a good introduction to such games. Novice adventure game players will enjoy *Mansion!* because it's fun, not to mention inexpensive, but advanced players will be disappointed in the lack of complexity and its very limited vocabulary.

Mansion! is written in BASIC and is unprotected. If you own both a data cassette and disk drive, I suggest you duplicate *Mansion!* to disk for quicker loading as well as backup security. In addition to the standard ninety-day warranty, Briley Software includes a one-year, five-dollar replacement warranty.

ROBOTS OF DAWN

EPYX
$35.00

Overall Rating	B+	Medium	*Challenge*
Creativity	B+	C	*Vocabulary*
Documentation	B+	B+	*Value for Money*
Graphics	N/A	1	*Save/Restore*

Robots of Dawn is an adventure game which uses words rather than graphics and sound to stimulate your imagination and build excitement. The creators of this program have delivered a good text adventure game, not quite on a par with the excellent Infocom games. Part of a new breed of adventure games based on books or characters from famous authors, this game is based on Isaac Asimov's science fiction novel, *The Robots of Dawn*, and Asimov's detective Elijah Baley.

You play the part of the world famous detective, Baley, summoned to the planet Aurora to attempt to solve the death of a famous robotics scientist, Dr. Han Fostolfe. You have read everything: every description, every discussion, and every person's reactions in order to determine what happened and who did "it." You must present your solution to the planet's chairman with an explanation of the motive, means, and opportunity for the suspect you have chosen as the guilty person. Right or wrong, the game is over. However, this is a game that can be played again, and again, with a different set of clues and a different solution to the mystery.

Interrogating a suspect, just like a real detective, is one of the intriguising parts of this adventure. And there are many interesting people as suspects: the scientist's daughter, the chairman himself, and one of the scientist's robots, to mention a few. The documentation included with the game adds to the atmosphere of mystery. You get a front page of a newspaper, a space telegram, letters, an encyclopedia page, and six dossiers of possible suspects.

This is an interactive adventure game in which you choose the direction you want to move in and then give word commands to choose what you would like to do (such as: go up, go out, go north, pick up an object). I found the vocabulary to be too simple. You will have to work, at times, to find the *exact* word the computer is looking for before you can move ahead, even though you may have the correct move in mind. As with most adventure games, you are able to save a game midway. This allows you to return to your game without retracing all your steps. A very handy feature.

This is a good text adventure game which will give you a medium level challenge and an interesting tour through a science fiction world. It is also a good buy because of its multi-game feature.

SEASTALKER

Infocom, Inc.
(Distributed by Commodore Business Machines)
$39.95

Overall Rating	A	Easy	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
Graphics	N/A	8	*Save/Restore*

Seastalker is the first in a new series of Junior Adventures from Infocom, aimed at players aged nine and up. It is different in many ways from earlier Infocom offerings. An obvious difference appears as soon as you load the disk: the program immediately prompts you for your name, used throughout the game.

The packaging of *Seastalker* meets Infocom's usually high standards. It includes a logbook (the game instruc-

tions), a "Discovery Squad" sticker, a series of Infocards, and an Infocard reader, all contained in a colorful folder. Infocards, a series of eight cards, resembling computer punch cards, contain clues which help players solve the puzzle in the game. As you encounter problems, the program prompts you to place the appropriate card into the viewer to receive a hint. This is a good idea, but I think the program gives these instructions too hastily. The program prompts you the moment you encounter a problem. I believe it would be better if the program waited a turn or two, allowing the player to experiment first with his own solutions. Overall, *Seastalker* is not difficult and is quite enjoyable if it's played in the spirit in which it's offered; that is, in the "spirit" of *Twenty Thousand Leagues Under the Sea*. The game does, indeed, have the flavor of both the Jules Verne classic and the *Tom Swift* novels.

Concerning its flaws, I strenuously object to the absence of a cursor on the input line. This may seem like a minor complaint, but it made correcting typos a bit confusing. Also, every time you do something right, (such as solve a puzzle), a line on the screen tells you your score just went up.

Like all Infocom games, *Seastalker* contains a fabulous parser. The superb documentation is aimed at the first-time adventurer. It even provides a full page of printed dialog simulating an adventure, so that you know what to expect from the game. It also includes a map and drawings which help you visualize the game's milieu.

I think *Seastalker* is an excellent introduction to the world of computer adventures. I recommend it not only for youngsters interested in this type of game, but also for adults who are curious, but have never attempted an adventure game before. It will gently introduce you to adventuring and pave the way to other, more difficult games. I also recommend it for people who already know and love the adventure genre, with the understanding that this is not a "typical" Infocom product. Someone who has already played and solved other adventures will probably find *Seastalker* an easy, though thoroughly enjoyable, adventuring experience.

SORCERER

Infocom, Inc.
(Distributed by Commodore Business Machines)
$49.95

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	A	A	*Value for Money*
Graphics	N/A	8	*Save/Restore*

I've never had so much fun with a computerized adventure game. *Sorcerer*, Infocom's sequel to *Enchanter*, blends the versatility of complicated role-playing games with the playability of all Interlogic games.

You begin as a neophyte sorcerer, favored among the Guild because of your fantastic deeds in *Enchanter*. Your master, Belboz, has disappeared and it's up to you to figure out what happened. You have, at the outset, two spells committed to memory and five more in a spell book, available when you need them. During the course of the game, you must find nine more spells on scrolls, and five potions in order to finish. This wide selection of spells and potions make *Sorcerer* a lot of fun. To heck with Belboz—these Infocom guys do too good a job to rush right through their world.

Sorcerer is a very detailed game in which very little of the detail goes to waste. You must turn every stone and open every door (well, almost every door) to win your way through. Your forward progress depends entirely on whether you've done things in the correct sequence and collected the items you need. At one point, you must time yourself and use exactly the right spells to find a crucial scroll, or be caught in a time warp and ultimately die. You do not need to gather treasures, only save Belboz. To do that, you need two spells found along the way. You have very few adversaries and you can easily avoid them because the emphasis is on adventure, not destruction.

Sorcerer is filled with amusing little contrivances, like the encyclopedia containing entries on just about anything in the game you could possibly think of. Unfortunately, the book comes at the beginning, when you don't know what to look up. Once you've ventured further, when it would come in most handy, you can't go back to it without restarting the game.

As in most Infocom games, the documentation is delightfully full of hints and colorful details. An issue of *Popular Enchanting* outlines the vocabulary and game rules, while an Infotater (a device to identify monsters) provides an essential clue not given by the Infotater your character finds in the game. The hefty vocabulary, as usual in games using the Interlogic system, copes with simple sentences as well as one-letter abbreviations. Of course, you'll always find words you think the game must recognize—but it doesn't. You can and should save up to eight positions on a separate disk. Because the spells provide so much versatility, you should count on saving your position before making any move that seems crucial. Despite appearances, there is one right way to do just about everything.

Sorcerer is one of the most expensive adventure games for the Commodore, like all Infocom games, but you do get what you pay for—and *Sorcerer* delivers.

STARCROSS

Infocom, Inc.
(Distributed by Commodore Business Machines)
$34.95

Overall Rating	A	Medium	*Challenge*
Creativity	B	A	*Vocabulary*
Documentation	A	A-	*Value for Money*
Graphics	N/A	8	*Save/Restore*

It's long ago and far away. The alarm in your one-man spaceship advises you of an uncharted mass in space. Naturally curious, you rendezvous with what turns out to be an alien spaceship. As you disembark, your adventure begins. Carefully map the eighty or so locations as you uncover the mysteries of the ancient alien civilization's religion, technology, and tragedy. *Starcross*, a science fiction, all-text adventure game, upholds Infocom's high standards, including excellent vocabulary, command parsing, and save-game capability.

With a few exceptions, *Starcross* does not have extremely interactive puzzles. The game is somewhat less difficult than Infocom's other space adventures; however, in one challenging sequence, you must obtain one of twelve colored control rods. Then, you must logically follow through, placing the rods in the appropriate slots, and divining the real purpose of your presence (of course, nothing is coincidental). If you're lucky, you'll receive the Galactic Overlord's commendation.

The game ends rather suddenly at its high point; everything comes together, and all becomes clear. This final scene could have been the basis of a game itself. Several clever subplots crop up along the way. You can fire your ray gun at just about anything to elicit a unique, usually humorous response, and occasionally get yourself killed. In fact, you need the ray gun to successfully complete the game. But its true use is neatly disguised.

While Infocom's *Zork* series has more expansive prose, *Starcross* has an excellent plot and storyline. Like a good book, *Starcross* stimulates your imagination, but doesn't entirely explain what happened on board the alien ship as it drifted through space for generations before you arrived. And, if you really get stumped, you can go outside and play Frisbee with the flying saucer packaging.

SUSPENDED

Infocom, Inc.
(Distributed by Commodore Business Machines)
$34.95

Overall Rating	A-	Hard	*Challenge*
Creativity	A	A-	*Vocabulary*
Documentation	A	A-	*Value for Money*
Graphics	N/A	8	*Save/Restore*

This science fiction, all-text adventure makes you a planet's central mentality. Normally, three underground filtering computers keep planetary conditions stable and under control. Now, however, an accident has damaged the computers. They awaken you from your deep sleep and give you control of six robots who can perform the appropriate physical repairs. Should the planet's populace suffer drastically while you attempt these repairs, "talking mechanisms" enter the control center and quickly replace you.

The robots perceive their surroundings differently, so their reports about an object or room vary wildly. Only Iris sees, only Auda hears, and only Sensa perceives the state and patterns of electromagnetic energy. Waldo has a gifted touch, so he fixes things. Whiz gets you clues from the center's four computer peripherals (libraries). While not infallible, Poet touches objects and tells you if they work. His reports in verse give him a fresh personality that steals the whole show.

You must solve the few complex, highly interactive puzzles in a minimum number of moves. The first puzzle is pretty obvious: Iris can't see. But the others aren't so obvious. Considering the concept's potential, it's too bad only one puzzle requires that two robots work together. After rebalancing the repaired computers, a two-screen conclusion lists planetary casualties and the number of moves you took. You also get a relative efficiency score from one to seven and an appropriate reward, ranging from a burned effigy (of yourself) to a home in the country and an unlimited bank account.

Your best strategy: march each robot around and discover his limitations and visualizations. Then the game starts to make sense. Use the computer peripherals to get information on objects they encounter. Then, reboot the game and attempt to solve it. Watch for opportunities to conserve moves; for example, if you need two robots to arrive at two locations at the same time, order the one farthest from the destination first. As new robots come into play, those commanded earlier continue toward their specified goal, advising you when they arrive.

After you get a grade of three (savior of the planet) or four (a candidate for a frontal lobotomy), other levels of difficulty await. In Advanced, only five robots help you as events move faster. In Configure, you define the

starting setup. You can "cheat" a smidge if you position your robots better and start with Iris functioning. Also, you can set it up to challenge a friend. In the Impossible mode, it's two moves and zap! To add variety to replays, the computer reset codes change from game to game, or during the game if you try to cheat. The replays would be more challenging if the colors and lengths of the filtering computer replacement cables changed.

You don't need to map the sixty-one-room complex; the package includes a nifty map board with robot markers. You just have to carefully note what each robot sees in each room. The game has Infocom's superlative parser and save-game features. Use the latter frequently to avoid inevitable and frequent deaths. Also, note that a robot must have the "attention" of areas which you want it to investigate closer. This occasionally mars the fine vocabulary. *Suspended* has a superb plot and concept, which don't reach their fullest potential.

ULTRAVENTURE

Ultrasoft
$24.95

Overall Rating	B+	Hard	*Challenge*
Creativity	A	B	*Vocabulary*
Documentation	D	A	*Value for Money*
Graphics	N/A	0	*Save/Restore*

Ultraventure descends from the original *Adventure*, which was written in FORTRAN in the mid-1970's, and ran on the Digital Equipment PDP-11 series of mainframe computers. Despite its ancestor's great age (in microcomputer terms), *Ultraventure* looks good compared to many of its brand new competitors.

You search a unique world containing 140 rooms, using forty objects to find fifteen treasures. The computer—your eyes and hands—dutifully responds to your two-word instructions: it describes how your actions affect your environment. You tell it which way you want to go, and it tells you about your new location in its imaginary world.

Ultraventure begins with the message: "You are standing at the end of a road before a small brick building. Around you is a forest. A small stream flows out of the building and down a gully." With that, the computer awaits your order to enter the brick building or go in a certain direction (north, south, east, or west). With a little luck, you'll reach the enormous, beautifully described, underground caverns. Although the caverns have many none-too-savory inhabitants, the game does not rely on violence. You can get yourself killed pretty easily while learning to deal with the trolls, dwarves, dragon, pirate, and so forth, but once you know how to outsmart them, you don't have to worry—the situations don't change from game to game.

Ultraventure is highly addictive. You'll spend many hours obtaining all the treasures, and you must map it as you go. When you finally put all the treasures in the building, cheering elves name you Grand Master and carry you off on their shoulders. It ain't tickertape and Times Square, but it's close.

This game is definitely a classic. The adventure is very logical and fun to play. It requires patience and perseverance, and doesn't suit rank beginners. The Commodore 64 version, while fairly true to the original, is annoyingly slow, and, worst of all, lacks a save game feature—really essential to a game of this length.

ZORK I
The Great Underground Empire

Infocom, Inc.
(Distributed by Commodore Business Machines)
$39.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	C	A	*Value for Money*
Graphics	N/A	8	*Save/Restore*

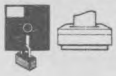
Zork is *the* definitive adventure game. Only the original *Adventure* and the Scott Adams series are comparable in challenge and complexity. It has the monstrous scope, fundamental tenets, and beautifully descriptive prose of *Adventure*, plus a complex enough puzzle structure to warm the heart of any Adams fan.

The scenario is familiar, but the specifics are totally new and different. Not surprisingly, you start at a deserted house, moving (in hopefully short order) to a cavernous underground complex, replete with varied and sundry treasures, a hungry Cyclops, an audacious Thief, a testy Troll, enchanted items (like mirrors and certain knives, an underground lake, dam, and a river, to say nothing of the coal mine, chapel, maze, and on and on, ad infinitum, even unto the very Gates of Hell).

The all-text, silent display is neatly formatted and scrolls very well. The vocabulary is out of this world, by far the most extensive I've encountered. *Zork* accepts compound and multiple commands, and acts upon them individually. For example, "Take all but shovel and pump. Enter boat. Examine scarab," is a valid, single command line. *Zork* will even answer a few abstract questions, such as "What is xxx?" and "Where is yyy?" Usually the answer is amusing, occasionally it is helpful. Through it all, the speed of the game is satisfyingly fast. Well conceived system commands permit you to diagnose your state of health, control the degree of text verbosity, enable/disable a

printer from within the program, and save a game's status.

It'll take you at least the same amount of time (probably more) to achieve a perfect score in *Zork* as it did in *Adventure*. If you're faint of heart or less patient, Infocom's well written documentation includes a price list for hit sheets and maps. But whether you tough it out or not, the best news is that this is only part one!



ZORK II
The Wizard of Frobozz

Infocom, Inc.
(Distributed by Commodore Business Machines)
$39.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	C	A	*Value for Money*
Graphics	N/A	8	*Save/Restore*

Zork II takes up the adventure where *Zork I* left off, in a Barrow in the Great Underground Empire. As the game begins you find a "strangely familiar brass lantern," a "sword of Elvish workmanship," and a path leading deeper underground. With that, you're off again. You don't have to play *Zork I* before you get into this game, but it helps.

Zork II is *tough!* As you wander through its mysterious corridors you encounter (among others) a princess, a demon, a red dragon, and the Wizard of Frobozz himself. You learn to deal with the others, but the wizard is a troublesome old fellow. He appears, seemingly at random, mutters something (always beginning with an "F" and usually unintelligible), and something "interesting" happens (inevitably to you).

You'll also find some truly bizarre places in *Zork II*, including the dreaded Carousel Room, the Bank of Zork, the Riddle Room, the Crypt, and the Menhir Room (go ahead, look it up). Naturally, a maze provides you hours of fun and frustration. It helps if you guess the maze's theme: there is an early clue.

Zork II has Infocom's excellent parser, with a feature which *Zork I* lacks: you can talk to non-player characters. That means you're allowed more sophisticated interaction with the game. The puzzles are hard, and, like the other Zorks, *Zork II* has the same wit and clever design. You can save eight game positions and recall them later—one of the most important features of a game this difficult.

So, as it says in U.S. News and Dungeon Report, set forth, battle-hardened adventurer, and conquer the realm of the Wizard, for fame, favor, fortune, and, most of all, fun! (But remember, *Zork III* is waiting just around the corner.)

ZORK III
The Dungeon Master

Infocom, Inc.
(Distributed by Commodore Business Machines)
$39.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	A	*Vocabulary*
Documentation	C	A	*Value for Money*
Graphics	N/A	8	*Holds Interest*

Zork III completes the classic all-text adventure originally written in 1979 on the DEC PDP-11. Like its predecessors, it has a lot of "new" material which the mainframe version didn't have, all written in the imaginative style that eliminates the need for graphics. *Zork III* requires a different approach than the earlier Zorks. The seven-point scoring system highlights this difference: the previous games had 400 points each.

When *Zork III* begins, you are at the bottom of a long staircase (which should strike a familiar chord if you've completed *Zork II*), equipped only with your lamp and imagination. At the end, you are in the Treasure Room with all of Zork's riches at your disposal, including a controlling interest in Frobozzco International. In between, you may hear (or even see) the fabled Dimwit Flathead, glimpse a ritualistic scene from a to-be-hoped-for *Zork IV*, and speak with—or even command—the omniscient Dungeon Master himself. All along the way, you enjoy the excellent save-game implementation, command parser, and vocabulary which characterize Infocom games.

Zork III, with its fifty-eight mappable locations (excluding the 8 by 8 matrix "Royal Puzzle"), is slightly smaller than its predecessors; but it is rich in subtle detail. Of the three, it entertains the most, having logical, highly interactive puzzles. You can successfully complete the game and still miss much of this detail: you may never find that peculiar set of conditions which changes a sign's inscription, and gently hints you may have gone astray. There are numerous amusingly tongue-in-cheek responses to input that otherwise get you nowhere. Overall, the game is somewhat harder than *Zork II*, since several individual puzzles are difficult and highly interactive. The puzzles can be killers, both figuratively and literally. You will probably play some sections over and over before mastering them. Some puzzles, if solved incorrectly, just wipe you out, and end with the dreaded "End of Session" prompt.

The conclusion provides an unexpected, novel twist, but getting that far requires an equally unusual ap-

proach as far as most adventures are concerned. Don't count on the seven point score system to give you any guidance about your progress. You can easily have all seven points, yet find yourself in another no-win situation. The points, like the game's other elements, only prove that things are not always what they seem. Indeed, the toughest puzzles award no points, and you can earn all seven points without solving several problems.

Zork III represents a high water mark for subtlety and logic. It's a Four Star must, not only for previous Zorkers, but also for anyone who enjoys adventure games or pleasant intellectual exercises. It's separate and complete: you needn't know *Zork I* or *Zork II*. However, for maximum enjoyment and imaginative continuity, I recommend you play them in sequence. By the time you finish, there may be a *Zork IV* (and if not, you can go on to *Enchanter*).

Adventure Games

Graphics

THE DALLAS QUEST

Datasoft, Inc.
$34.95

Overall Rating	B+	Medium	*Challenge*
Creativity	A-	C	*Vocabulary*
Documentation	B	A	*Value for Money*
Graphics	A	1	*Save/Restore*

The Dallas Quest is an adventure game with fantastic graphics and sound. The creators of this program have made full use of the color and sound capabilities of the C-64. The graphics are exceptionally well done and deliver a very beautiful representation of each room or location that you journey to. The use of sound is astounding. You will realize the impact of the sound effects early on in the game. While the program is loading, the actual theme music from the *Dallas* TV series can be heard. The program plays the entire piece of music—and quite well, at that.

In this adventure, you play along with J.R., Sue Ellen, and the many other characters from the famous Southfork Ranch. You are hired by Sue Ellen to find a map showing the location of a multi-million dollar oil field in South America. You begin your quest at the Southfork Ranch; however, the story soon takes you deep within the perilous jungles of South America. The stakes befit a high adventure game: if you solve the puzzle, Sue Ellen rewards you with a $2,000,000 bonus. You must be very cautious because J.R. and his hired cohorts are hot on your trail. Be very careful when making decisions. One wrong move, and you are a goner.

This is an interactive adventure game where you choose the direction in which you wish to move, then give word commands to indicate what you'd like to do (e.g., go North, pick up an object, and so on). I found the vocabulary far too simple. You must work very hard at times to find the *exact* word the computer is looking for before you are allowed to move ahead—even though you may have figured out the correct move. There are various levels of difficulty in *The Dallas Quest* which may be adjusted to suit beginners, as well as advanced adventurers. You select your level of play when you choose whether or not to take advantage of up to nine hints that are at your disposal throughout the game. Because of this feature, the game is quite flexible, and a challenge for players of any skill level—novice to expert. As with most adventure games, you can save a situation status midway through the play. You can subsequently resume your pursuit at a later time without having to retrace all your steps (this is a must for a *real* adventure game). Even though the graphics are stunning, it takes quite a while each time the disk drive is accessed to obtain the next picture. To overcome this disadvantage, the programmers have given you the ability to turn off the graphics and consequently move through the game at a much faster pace.

Although I've already mentioned it a couple of times, I must draw your attention again to the exquisite graphics in *The Dallas Quest*. I can honestly say that their quality is the best of any Commodore program I've ever run across. A real artist (or group of artists) must have had a hand in all this. Aside from the incredibly well-planned and well-executed pictures, the programmers have even included a compass indicating the available axis you can move along from the area in which you are presently located.

One aspect of the game that I especially liked was working with recognizable people (albeit characters in fictitious television world), rather than with some off-the-wall wizard or space creature. Don't get me wrong, though; I do enjoy video questing within the realm of pure fantasy and imagination, which is what you get in most *Dungeons and Dragons* types of adventure games. But I believe this game will provide a refreshing break for many *D & D* adventurers. One disappointment, however, was that I found the challenge to be only moderate. The maze through which you are led really isn't that complex, and the kind and number of puzzles that you must solve are not all that difficult.

The Dallas Quest is a superb program for all players who are seeking a moderately-hard adventure game. It also is a must for anyone else who appreciates outstandingly beautiful video graphics—not to mention the stirring music that all Friday night TV junkies recognize as the theme song from *Dallas*.

DEATH IN THE CARIBBEAN

MicroLab
$35.00

Overall Rating	B-	Medium	*Challenge*
Creativity	C	C	*Vocabulary*
Documentation	B	C	*Value for Money*
Graphics	C	9	*Save/Restore*

This graphics adventure game combines an easy plot with some difficult puzzles. You're searching for buried treasure, and most of the game is relatively simple unless you're a beginning adventurer. However, despite the game's overall simplicity, you encounter some surprisingly abstract puzzles on your search. For example, you find a rather unimportant, coded clue on an engraved plaque. If you're good at solving cryptograms, you'll find this puzzle only moderately difficult; otherwise, you'll have problems deciphering the message. In another spot, you must recognize that a piece (of sheet music contains a tune written in the key of G (a clue worth remembering when you start looking for "keys").

Death in the Caribbean comes to you complete with a large treasure map and two double-sided disks. I expected a larger than average adventure because of the disk space involved. I was a little disappointed. Due to some unsophisticated graphics storage methods, the disks contain only about the same number of locations found on most single-disk adventures. Most pictures take fifteen seconds to load from the disk (and every move brings up a new picture). This is very annoying, especially if the ghost comes along and steals your possessions (an event the instructions don't mention). The graphics are attractive, but I've seen better.

Side A of disk one is copy-protected, but if your disk is faulty, you can obtain a replacement from the manufacturer for five dollars and your non-working copy. For the price, *Death in the Caribbean* is a reasonably good buy (after all, you are getting two double-sided disks). If you have the patience to wait while the pictures load, *Death in the Caribbean* is an enjoyable way to pass a couple of evenings.

THE FABULOUS WANDA AND THE SECRET OF LIFE, THE UNIVERSE AND EVERYTHING

3R Import & Export Corp.
$19.95

Overall Rating	C-	Hard	*Challenge*
Creativity	B+	B-	*Vocabulary*
Documentation	A	C-	*Value for Money*
Graphics	D	0	*Save/Restore*

As its name suggests, *The Fabulous Wanda and the Secret of Life, the Universe, and Everything* is not your typical computer game. This British import combines an adult fantasy adventure with arcade action, all loosely based on Douglas Adams' *Hitchhiker's Guide to the Galaxy* series. It is a novel concept, but one of the secrets of life, we soon learn from Wanda, is that a great concept does not a great game make. The program gets bogged down with some tedious video game sequences, and the most appealing part gets lost.

The Fabulous Wanda comes on cassette and takes about ten minutes to load. Keep this in mind as you answer the prompts. You don't want to have to reload it.

The opening sequence is intriguing. You're traveling alone in an unfamiliar part of the universe, looking for a good time. All of a sudden, a spaceship appears and contacts you. It is Federation Patrolman Brutus conducting a security check. He has orders to destroy any vessel in the area, but offers you a way out. You must go to the planet of Copus and locate the Fabulous Wanda, a hostess in the Spaced-Out Inn. Wanda has been known to divulge the secret of life, the universe, and everything. Trouble is, the last known person to learn the secret inexplicably died after a "particularly satisfying experience" with the space hostess.

You're teleported to the Highsville teleport station, but find you can't afford the one hundred Klebs entrance fee. Luckily you spot a video game which someone left before completing. You can win the Klebs you need from the game. It may take a few tries at first, but you'll eventually learn this game-within-a-game. The graphics are extremely limited, but they're colorful, and offer exciting sound.

Once you have your Klebs, you proceed to Main Street. Four colorful (but primitive-looking) establishments line the street: the Spaced-Out Inn, Lucky Zaphod's Casino, Juicy Lucy's Bar, and Paddy O'Spacey's Bar. You can enter any of the four, and will be greeted with some amusing text conversation and a few options, but this is where the game gets tedious. You quickly find you need more Klebs to buy anything in Highsville, or to get anywhere with Wanda. The poor but clever traveler must stop first at the Casino to increase his fortune. Lucky Zaphod offers you a simple

card game. Unfortunately, the game didn't hold my attention long enough to win enough money. (Wanda's drinks always cost just a little more than you have.) After playing for many hours I have concluded that the "meaning of life" is compulsive gambling.

There is a technical problem with the program. Eventually you will lose all your money and be deported. Brutus attempts to destroy you, but there is one way of escape. Pressing the F1 key activates your ship's space/time continuum destabilizer, which transports you back to the beginning of your journey. It's a clever way to start again. However, the third time you try this, the game crashes. Then, the only way to start over is by typing Run. Be careful with the space/time continuum destabilizer. If you press any key other than F1, the game ends and erases itself from accessible memory, and you are faced again with a long reload.

This game has a first-rate concept, but the execution doesn't measure up. The graphics are sparse. The video games contained in the story are just not complex enough. *The Fabulous Wanda* merits attention for its humorous dialogue and adult tongue-in-cheek approach, but it comes nowhere near the quality of such games as *Softporn* for the Atari. That's too bad, because its packaging looks very promising.

GRAVE ROBBERS

Victory Software
$19.95

Overall Rating	D+	Easy	*Challenge*
Creativity	C-	D	*Vocabulary*
Documentation	D	D	*Value for Money*
Graphics	C	0	*Save/Restore*

This two part game contains a short graphics adventure followed by an arcade-style maze game that is offered as a reward for solving the mini-adventure. You begin at the entrance to a cemetery, a storm raging around you. With just a radio, some matches, and a stick of dynamite, you must find shelter, overcome several obstacles, and work your way through a series of dungeon-like rooms. With a little bit of luck and some perseverance, you'll escape from the final room with a very large diamond in hand.

The real challenge is overcoming program's limited vocabulary. The printed instructions accompanying the cassette include a vocabulary list. The instructions and list are repeated on screen when the game begins. Unfortunately, the two sets of instructions are not the same. The printed vocabulary list is far more extensive; in fact, the majority of the words listed do not function anywhere in the game. Since you cannot refer back to the opening screens, you must rely on the label card for vocabulary. You'll become extremely frustrated when nothing seems to work. Also, the card lacks several essential verbs.

The only real challenge, and a boring one at that, is the maze game. Once you escape with the diamond you are invited to play a little game with "Phydough," a villain from the previous adventure. You must run through a maze collecting diamonds while avoiding Phydough, who tries to eat you. A number of options, like making the diamonds invisible and affecting Phydough's ability to find you, adjust the game's difficulty. It doesn't matter, for regardless of how hard it is, the game is boring. The graphics are terrible, too, with characters so small they show no detail.

The main problem with this game is that the adventure is weak and shallow. Once you solve the puzzle, which has a fixed solution and no variables, the only challenge left is the maze game. Grave Robbers isn't worth stealing.

HIGH SEAS

Briley Software
$14.95

Overall Rating	C-	Medium	*Challenge*
Creativity	B-	D	*Vocabulary*
Documentation	A-	B	*Value for Money*
Graphics	D	0	*Save/Restore*

High Seas puts you in command of a sea vessel in the year 1811, with orders to capture the three fiercest pirates ever to raise sail. If you succeed, you and your crew share the government's handsome reward. You keep the ships you defeat in battle, and the booty they contain. You can also go ashore on deserted islands and dig for buried treasure—but beware of the booby traps!

A sea captain's life, however, isn't all battle and glory. A mutiny is always possible if the crew's morale is low. Push your crew too hard, and they'll put you adrift in a small rowboat.

Along with pirate ships, you must contend with the weather, icebergs, and the mysteries of the sea. You must sail uncharted waters, so be sure to make a map as you play *High Seas*. If you don't chart where you've been, you might use all your provisions before locating another friendly port—or worse yet—become shipwrecked on an iceberg.

As a new captain, you risk being assigned to a leaking barge with a small crew and morale problems, instead of a fast fighting ship. If this happens, you should head for the nearest government island, and do some worthwhile trading.

Because *High Seas* allows only a minimum number of commands, you quickly find yourself bouncing on the salty foam battling pirates, thirty minutes after loading your cassette. The program recognizes only eleven commands. You enter each with a single keystroke. For instance, to drop anchor, press "A" (for anchor). To select the sailing direction you want, press the first letter of one of the four points of a compass ("N," "S," "E," or "W,"). To fire at a pirate ship, press "F." To dig for treasure, press "D." The program doesn't have a Help screen to remind you of these legal commands. Also, you cannot save a game in progress and finish it later.

The brief commands help *High Seas* progress quickly. The average game, if you avoid the treacherous icebergs and mutinous crew, takes under an hour. But when you first learn *High Seas*, icebergs and a mutinous crew tend to end the game sooner.

Each turn of travel equals one day of real time, and diminishes your water and supply of provisions. To replenish them, you must sail into a friendly harbor to buy new supplies, and perhaps hire more sailors. You pay for these with the booty you've captured.

Keep track of your adventures (as I mentioned earlier) by making a map of where you've been, pinpointing each island, coral reef, and iceberg. If you don't, you'll soon find that winning is very hard. Without a map, you quickly lose your way on the open seas where everything looks the same. A detailed chart helps you return to friendly ports when your provisions run low, and avoid going around in endless circles. Unfortunately, Briley Software, *High Seas*'s maker, doesn't include a screen-generated map option.

High Seas is primarily a text game. The screen displays information to which you react with a one-letter command. Illegal commands make the program repeat the question. The graphics consist of the silhouettes of two ships doing battle. If you decide to fire at a ship, you'll hear the sound of explosions as the two ships "broadside." A text account of the battle will appear on the screen.

The program is written in BASIC and is unprotected. If you own a disk drive, as well as a cassette player, I suggest you copy *High Seas* to disk for faster loading, as well as backup security. In addition to the standard ninety-day warranty, Briley Software includes a one-year, five dollar replacement warranty.

This game will never replace, nor even mildly compete with, the more advanced text adventures, like *Zork I, II,* and *III*. However, it does serve as a good introduction to such games. Novice adventure gamers will enjoy *High Seas*. Priced at only $14.95, it offers anyone a sound and inexpensive introduction to the genre.

HOUSETRAP

Software Consultants
$29.95

Overall Rating	D	Medium	*Challenge*
Creativity	D+	D	*Vocabulary*
Documentation	D	D	*Value for Money*
Graphics	D	0	*Save/Restore*

Housetrap would have been an astounding adventure program three years ago. But in light of the many adventures featuring excellent graphics these days, *Housetrap* comes in a poor second—or third.

The packaging of the game is unusual, consisting of a very thin plastic folder which contains the disk. The documentation consists of a grand total of one page on the back of the folder. You are told how to load the game and get some examples of keywords, a list of the treasures you must find, and a few hints. This is it! Some instructions appear on the disk at the start of the game, but they contain little more than what's on the back of the folder.

The graphics in this adventure are color drawings plus crude black and white line drawings lacking shading. Several sound effects repeat continually throughout the game, essentially because you do the same things over and over again (for example, unlocking then opening doors). The creaking sound of the doors when opened seemed, at first, particularly well done, however, after hearing it fifteen or twenty times, it became irritating. To add to the annoyance, you cannot turn off the sound! Furthermore, I found that if I did manage to stumble upon one of the treasures, the accompanying color drawing was so poor that I was reduced to typing in the names of every treasure on the list until I hit the right one.

The parser is a simple noun-verb affair. When you use a combination the program doesn't understand, it beeps and says, "CAN'T," plus whatever you tried. This game rapidly degenerates into the old "guess the word" syndrome of early text adventures.

While one could pose an effective argument that it's often necessary to give up a certain amount of sophistication in the parser in order to obtain decent graphics in an adventure game, I don't feel that the graphics in *Housetrap* provide adequate compensation. When compared to other graphics adventures on the market, *Housetrap* cannot hold its own on any level. I strongly urge you to hang onto your money until you can afford something a little better.

THE MASK OF THE SUN

Broderbund Software
$39.95

Overall Rating	C	Medium	*Challenge*
Creativity	B-	C	*Vocabulary*
Documentation	C	C	*Value for Money*
Graphics	B	∞	*Save/Restore*

The Mask of the Sun is an animated hi-res adventure set in the Aztec ruins of Mexico. You play Mac Steele who must find the legendary Mask to cure a mysterious malady that's held in check only by the limited number of pills which you must always carry. Two of three pyramids in the game must be explored on this two-sided disk, but fortunately, you have to go through only two disk flipping interruptions to complete this location game (excluding the mazes) set in the Fifties.

The emphasis here is on animation, which is far from smooth, but initially captures your attention. You spend much of your time on the road in a bouncing jeep, and even more time is spent in a bouncing kind of walk through drab tunnels. The graphics themselves are moderately detailed, often colorful, and several of the animation sequences are enjoyable and provide a degree of real-time command responses.

Only the graphics, however, set *Mask* apart. The vocabulary and word recognition are average, at best. The puzzles are bland and generally of the one-on-one variety with very little interaction; however, you've had it if you don't have all the necessary objects upon entering the final pyramid. The save-game feature requires a separate scratch disk for each scenario, permits saving or recalling at any time, but does not provide for a two-drive option.

The Mask of the Sun offers you several challenges not found very often in adventure programs. You must hurdle a real-time, semi-arcade lava pit, and you must correctly answer any one out of three riddles in order to get through two locations. By far, the most difficult task is unraveling the mystery of the maze—actually two mazes separated by a room that is ready to fall in on your ears. Both are manageable, but require patience since the standard of dropping an item to mark a location demands that you *look* for it at each location. The first is a rather clever ten-room maze, but the second is kind of a cheat, and may well cause many players to give up out of sheer boredom. Fifty-two locations are supplied, but mapping—while a challenging possibility—is neither required nor recommended (since the next significant display appeared randomly in the four games played). Unfortunately, it may take well over a hundred moves of rocking back and forth through colorless tunnels (at twelve to fifteen seconds per move) before you need to wake up.

As an adventure, *The Mask of the Sun* is merely an average program, with a slightly higher than average level of difficulty resulting primarily from the mazes. Several well-done animation scenes here are promising. But for the present, you most likely will be irritated and bored by animation for animation's sake in the form of herky-jerky traveling. Back to the drawing board, Broderbund programmers!

MURDER ON THE ZINDERNEUF

Electronic Arts
$40.00

Overall Rating	C+	Medium	*Challenge*
Creativity	A-	C	*Graphics*
Documentation	A-	C+	*Value for Money*
Game Depth	B-	C	*Holds Interest*

Murder on the Zinderneuf takes place on a zeppelin on its way to New York City in the mid-thirties. A passenger is found dead and it's obvious that the murderer is one of the passengers. Your job is to identify him or her. You have twelve short hours before the great airship reaches its destination and your suspects scatter to the four winds.

Zinderneuf is a short, real-time graphics adventure that resembles the board game *Clue*. Using a joystick, you move around the various cabins aboard the airship. As you search them, you encounter and question your fellow passengers. With each new suspect, you choose the questions (via the joystick) that you want to ask and the style in which you will ask them. Should you be polite, or can you get more information with a forceful and more aggressive approach?

Since suspects may indeed lie, you'll have to watch out for contradictory responses to your questions. At any time, you may decide to accuse one of the suspects. Accuse the wrong person (or even the right person without sufficient evidence), and you lose the right to question that suspect for the remainder of the game. At the end of twelve hours of game time (actually about forty-five minutes), you will have one last chance to identify the killer before the solution to the mystery is revealed.

Murder on the Zinderneuf is a unique amusement. The authors have done their homework, evidenced by the historical detail throughout the game, and its fine instruction manual. The graphics, although far from spectacular, are full of clever little details which add to the experience of this program. As you move toward the rear of the airship, the noise level of the propellers increases. It is clear that much creativity and hard work went into this game.

In spite of all this, there's something about *Zinderneuf* which just doesn't work. Though you have a built-

in time limit, you feel no sense of urgency, a sense of urgency that you'd normally expect during a hunt for a murderer. (On the contrary, you may find that you will actually *welcome* the running down of the clock.) The joystick approach to questioning is cumbersome. In addition, there's far too much information to absorb, much of which (the responses from the suspects) is of questionable value. Solving this mystery bears a striking resemblance to swimming in quicksand.

As with many real-time graphics adventures, *Murder on the Zinderneuf* fails both as an action game and as an intellectual one. The authors have attempted to combine these two genres, but have produced an unplayable hybrid. Some day, someone may create an exciting and challenging real-time mystery game. It will, however, take place someplace other than on the good ship Zinderneuf.

RING OF POWER

Quicksilva
$29.95

Overall Rating	D-	Medium	*Challenge*
Creativity	D-	F	*Vocabulary*
Documentation	F	F	*Value for Money*
Graphics	D-	50+	*Save/Restore*

This rather typical, multi-room adventure gives you the option of playing with text only, or if you prefer, with text enhanced by minimal graphics.

As with most adventures, your objective in *Ring of Power* is to move from room to room picking up booty, keys, and other assorted odds and ends—while trying to figure out the object of your quest. Regrettably, there are several major flaws in this video adventure that drastically reduce its playability and entertainment value.

First of all, let's look at the parser. This is the part of the program that often makes or breaks an adventure game. The parser examines the command that you input via the keyboard, then logically responds to it with information and/or an action of some kind. The commands you use in *Ring of Power* are limited to one or two words (or the first letter of a directional command). This is very similar to one of the early Scott Adams adventures, but with an even smaller word/command library. *Ring*'s parser responds far more slowly than any I've tried in the past. For example, I gave it the command to drop an item that I knew was not in my inventory. The parser took *more than twelve seconds* before it figured this out! Quite depressing—especially since *Ring of Power* costs about as much as an Infocom adventure (whose parser accepts full-sentence commands and delivers almost instantaneous responses).

I did like having the ability to flip-flop between text-only and text with an "inside 3-D maze" view, although the lack of graphics detail was often disorienting. It bothered me to see only the barest of rooms at the same time that the text was describing "orange moss oozing from the walls," or "bunches of wild oleander budding from the floor." For the most part, I preferred using text alone, letting my imagination take up the slack. Play is rather subdued, as most of the rooms contain no portable or moveable objects whatsoever. The save-game feature comes in handy when things get a little dull.

The limited user vocabulary is probably the most frustrating aspect of this program. Initially, I found myself in a darkened room with an extinguished lamp within reach. I tried "Light Lamp" and nothing happened. "Switch Lamp" got me nowhere. "Shine Lamp" and "Use Lamp" yielded the same results: nothing. I even gave "Ignite Lamp" and "Turn Lamp" a go at it. Finally I stooped to "On Lamp" which did the trick. Imagine! A two-word command with not a verb in sight.

Most computer adventure *aficionados* will find this game slow, ho-hum, and not worth the effort it takes to key from room to room. The overall quality of *Ring of Power* barely rivals that of similar programs found in the type-in-and-run sections of monthly computer magazines. Sad.

ROBBERS OF THE LOST TOMB

Timeworks, Inc.
$24.95

Overall Rating	B	Easy	*Challenge*
Creativity	B-	C	*Vocabulary*
Documentation	A	B	*Value for Money*
Graphics	A-	1	*Save/Restore*

Robbers of the Lost Tomb is an interesting adventure game with 3-D sprite graphics. You are a professor of Egyptology sent on a dangerous mission to recover four sacred golden tablets from the Lost Tomb in Egypt. The tablets are buried deep within the five levels of a one hundred-room labyrinth within the pyramid, and you must rely upon your wits—as well as fast reflexes—while on your quest to fend off the perils of the Lost Tomb.

Deadly snakes and fearsome mummies inhabit the pyramid. The only way to stop these monsters is to kill them by throwing magic knives, or with the magic of a blue ruby (if you're lucky enough to find one). If all else fails, you can try to outrun the monsters to the next room or climb a ladder to another level. The most

daring adventurers will probably choose to hitch a ride with a friendly ghost to another (hopefully safe) room. Remember to watch out for deep pits, especially the bottomless ones on level five, which are deadly.

If you get a distinct feeling of *deja vu* but cannot put your finger on it, you are right. *Robbers of the Lost Tomb* shares the same logic structure as the microcomputer game classic, *Wumpus*. Fans of the latter should enjoy playing *Robbers*, only more so.

Robbers is either joystick- or keyboard-controlled, with just a few commands needed to move the professor about and throw knives. The lack of a variety of controls is probably the most serious flaw of this adventure game. *Robbers* is a good graphics adventure game for beginners, but it could have been a really superlative one if the author had emphasized the adventure element rather than the 3-D graphics.

I consider *Robbers of the Lost Tomb* one of the easier graphics adventure games still capable of challenging beginners and intermediate players, expecially if you give yourself a time limit. It offers you ten levels of difficulty, the last one user-definable. This is one feature I wish all games would include: supplying the option to change the game's basic parameters. The goal of finding all four of the hidden tablets and returning from the pyramid alive can be difficult, especially given a limited number of magic knives. However, you can either restart the game, or save a game in progress and restore it later.

Surprisingly enough, *Robbers* has already started to show its age, since the current crop of graphics adventure games have become so much more sophisticated in terms of both graphics and themes. When compared to some of these flashy newcomers, *Robbers* looks a bit like the low man on the totem pole, but it is by no means an inferior adventure game program.

SERPENT'S STAR

Broderbund Software
$39.95

Overall Rating	C	Hard	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	C+	C	*Value for Money*
Graphics	B	1	*Save/Restore*

Serpent's Star is the second animated Hi-Res adventure game from Broderbund. It borrows heavily from the concepts developed for *The Mask of the Sun*, the game in which Mac Steele, your alter ego, was first introduced. The setting is Tibet; your mission is to find the last three scrolls which lead to the fabled Serpent's Star gem, and to steal it. To accomplish this dastardly deed, you must visit two monasteries, buy and give away objects, initiate a few quick actions, dodge through an avalanche, answer a series of questions, map and navigate the maze, and even solve a puzzle or two.

The graphics on this two-sided disk are sometimes blandly repetitive; there are, however, a few excellent screens and sequences. Except for the "traveling screens" shown between locations where actions are possible, there are some sixty-five locations which you can map. Less emphasis than before is placed on animation; nevertheless, several animated sequences are superbly done, notably the resurrection of the Kara-Koram Monastery.

The puzzles are generally part of a series: either you solve them or get stuck where you are. Most of them are obvious, but a few are difficult because they require entering the word "Search" followed by the right object, which may prove frustrating to all but seasoned and determined adventurers. Unfortunately, *Serpent's Star* is "riddle-happy." Three of the five riddles are more tests of basic Buddhist and Yogi tenets, and you get only one chance to correctly answer each question. If you don't, by the Yin and Yang of Dragon and Man, you restart the stored game you quickly learn to make.

The text of the scrolls is interesting and advances a good plot, although they don't have any significant bearing on the game's solution—nor do they contain any real clues. For that matter, there are no clues to the tougher puzzles or questions, making *Serpent's Star* an uneven adventure game that many may start but few will complete before giving up in utter frustration.

URBAN UPSTART

Richard Shepherd Software
$19.95

Overall Rating	C+	Medium	*Challenge*
Creativity	B	C+	*Vocabulary*
Documentation	C-	B	*Value for Money*
Graphics	B	1	*Save/Restore*

Urban Upstart is an interesting text adventure game with one third screen, high resolution, 3-D graphics. You assume the role of a visitor to the rundown suburb of Scarthorpe. Your goal is seemingly easy enough—escape from the city limits. But Scarthorpe is no ordinary town; it is described as a place that's so tough, even the dogs carry switchblades. There are numerous obstacles to overcome before the local townsfolk will allow you to leave. If you do manage to find your way out, you have certainly proven your toughness—perhaps you're ready for the urban ghettos of the Big Apple or the Big Orange (though it's not recommended that you give this a try).

A few words of advice before you begin the game: avoid becoming too friendly with the locals or you are

likely to end up in the hospital. Also, be careful that whatever you attempt to do during your adventure is absolutely legal—otherwise, you are liable to be carted off in the paddy wagon to Scarthorpe's favorite hangout: the local jail. As in most adventures, you learn by trial and error. Therefore, make sure to spend a considerable amount of time exploring the layout of Scarthorpe before you attempt to find a way out of town. You can always check the progress of your current game with the Score command. At the very worst, if your game is going badly, you can always quit and start over.

Urban Upstart is a keyboard-controlled text adventure game. You move about Scarthorpe with the standard directional commands: North, South, East, West, Up, and Down. There are many other commands at your disposal, including Take, Drop, I (for Inventory), and Quit. You may string together commands to form sentences. This useful feature makes the game very playable. For purists who prefer text-only adventures, *Urban Upstart* offers Graphics On and Graphics Off commands. Playing the game without graphics speeds things up, since high resolution graphics are relatively slow.

Overall, *Urban Upstart* is rather an average text adventure game that's been spiced up considerably with some good looking graphics. It certainly is not in the same league as Infocom's *Zork* programs with their sophisticated dialogues which create the illusion of artificial intelligence. Nor is it comparable to the newer class of adventure games that are "living" novels in which you assume the role of the main character. But, if you derive enjoyment from the old-fashioned kind of adventure game, and *Urban Upstart*'s escape-from-a-tough-town theme appeals to you, then by all means look this one over.

VIKING RAIDER

Interphase Technologies, Inc.
$44.95

Overall Rating	D	Medium	*Challenge*
Creativity	C	C	*Vocabulary*
Documentation	N/A	D	*Value for Money*
Graphics	B-	0	*Save/Restore*

Viking Raider, an animated graphics adventure game, has little to offer in the way of plot and entails no strategy. Although the graphics are pleasant enough, and the sprite movements are well-coordinated, the rest of the program is quite unacceptable.

Getting the game started is easier than with many others because *Viking Raider*'s cartridge autoloads the program from disk when you hit Return. It does take several minutes, though. Once it's loaded, you can play *Viking Raider* repeatedly, so you needn't reload it after each loss.

After choosing a skill level, you are dropped into the game scenario. Using the joystick to move your little viking man around, you must search for the treasures needed to free the queen from enslavement. These are located in places like trees, buildings, the ocean, and the mountains. In some cases, they are just barely out of reach. Though the instructions say that you can extend your reach with a pikepole (once you've found it), I discovered no command to accomplish this.

Throughout the game, you use word commands to do everything except move your character. The Help command lists other valid commands and obtainable objects. You may also employ it to freeze the action so you can take a well-deserved breather. Since the program keeps track of elapsed time, occasionally stopping comes in handy. (For instance, while you try to figure out how to sail the boat, eat, rest, and fight off an eagle—all at the same time.)

The onscreen weapons that I found lying around were utterly useless; raising them against an attacker proved futile. Enemies include eagles, sea monsters, frost giants, and a dragon. Supposedly, the weapons may be used to hunt bear, reindeer, and flying fish.

My biggest complaint concerning this game is its annoying lack of strategy. The locations of items are far too random, and vital tools are frequently out of your reach and unobtainable. When they are available, getting them is seldom worth the trouble, since they don't function anyway. Frustration city!

You are allowed the use of a boat—but you have to find it first. When you finally do get aboard, you will discover that getting off again is difficult, if not impossible. Should you manage to locate the bucket for bailing and the tools to repair the ship (if it springs a leak), bailing works temporarily, and you can't repair the boat while you're at sea.

When you come right down to it, *Viking Raider* is an exercise in futility, and emerging victorious seems to be impossible. The best way to get your money's worth from this program would be to buy something else! (Please note that I based this review on a preliminary copy of this program; the documentation was incomplete and not in its final form.)

Adventure Games
Fantasy Role-Playing

AZTEC
Datamost
$39.95

Overall Rating	B+	Hard	*Challenge*
Creativity	A	N/A	*Vocabulary*
Documentation	D	A-	*Value for Money*
Graphics	A	1	*Save/Restore*

Datamost's *Aztec*, by Paul Stephenson, is an enjoyable graphics game that has nicely bridged the gap between the two main computer game types, arcade and adventure: it's a little of both. True, *Aztec* may, in fact, have little to do with the fascinating civilization that flourished in central Mexico before being conquered by Cortes in 1519. But it does have a good deal to do with the dangerous treasure hunt theme of two recent major motion pictures, *Raiders of the Lost Ark* and *Indiana Jones and the Temple of Doom*. In fact, if you're an armchair adventurer who enjoyed those films, you will probably enjoy playing *Aztec*, with its swashbuckling, Indiana Jones-like character that you must guide on his quest through the ancient temple in the dense Central American jungle.

To set the stage, *Aztec* commences by relating the legends that pertain to the "fabulous golden idol" hidden deep within the mysterious lost pyramid. Native tales refer to the Aztecs as having cleverly protected their temple treasure with a variety of traps and guardians; there are ten different types of "opponents" that you can find within the temple. In addition, the eccentric archaeologist, Professor Von Foerster, who never returned from a doomed expedition to the pyramid, is rumored to have planted booby-traps to protect his finds from other curious explorers.

Aztec is a nicely animated, keyboard-controlled game that makes good use of high resolution multicolored graphics. Direction keys are used for turning around, and various movement keys at your disposal help you walk, crawl, climb stairs, and jump. Other keys help you open and look inside chests, rummage through piles of rubble, and fight—about two dozen keys in all. The heavy use of the keyboard makes the game frustrating to learn, but fortunately, only a few of the keys are used at any given time.

When you boot the game, the screen asks you to make various choices (whether to start a new game or to resume an old game), and to select the difficulty level for your play (from 1 to 8). The "opponents," human or otherwise, are chosen by the computer according to the level of difficulty you chose.

Each of the randomly picked temples consists of a sixty-four room maze containing eighty floors with eight rooms each. A room can have up to three levels. The arrangement of floors varies from game to game, and is randomly drawn from thirty-two possibilities. You begin your quest for the idol with three "units of strength" and three sticks of dynamite. Certain opponents can deplete your strength; you need the special elixir to regain your powers.

On first playing, you'll notice that the temple is chock full of surprises and traps, some logical and others not. Sometimes, the walls of a room begin to close in on you, or the room seals itself after you enter it—or even fills with water! Monsters, tigers, poisonous snakes, scorpions, giant spiders, man-eating prehistoric denizens, and even extremely unfriendly humans make the trek through the pyramid highly hazardous to your health. You can, however, freeze game play if you feel the need to regroup.

Achieving the goal of finding the golden idol and escaping alive can be a very formidable task. Scoring is based on the level of difficulty you've selected and the time you need to find the idol and escape with it. And, as the instructions point out, no extra points reward unnecessary killing or wanton destruction.

While the game itself is a marvel of ingenuity, the documentation is minimal; that provided by Datamost was actually written for the Apple II with a Commodore insert. While you need little in the way of instructions to play the game (other than a listing of the keys used to control the game) and a Help screen is available, an inadequate description of the important save-game feature annoyed me. Confusion resulted when I tried to save and restore an in-progress game. The lack of screen prompts when inserting and removing the

game and save-game disks caused me to mix up the disks once, thus "crashing" (rendering unplayable) the current game and forcing me to reboot. Moreover, I found no instructions for how to save my score on disk.

Despite the deficiencies in documentation, *Aztec* is nevertheless a well designed game that features superb high resolution graphics, significant challenge, and good variety. If you prefer games that are real-time adventures, chock full of nasty critters and plenty of excitement, expect to experience many hours of enjoyment playing *Aztec*.

CURSE OF RA

EPYX
$40.00
Temple of Apshai Required

Overall Rating	B	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	B+	B	*Value for Money*
Graphics	B-	0	*Save/Restore*

Curse of Ra is the second expansion module for the *Temple of Apshai*—you must use it with the main program. This module adds four new levels to explore, more treasures to find, and more monsters to fight. To get started, you boot *Temple of Apshai*, awaken or create a new character, and insert *Curse of Ra* when you're ready to leave the inn.

The setting is ancient Egypt. You must gain entrance to two pyramids, the Great Sphinx and the powerful Statue of Ra, and get the four treasures powerful enough to overcome the Curse of Ra. Naturally, the pyramids' inhabitants take exception to trespassers, and traps and associated dangers abound. The best way to face the monsters is by visiting each level in numerical order. *Ra* contains over 100 rooms, so mapping is a must. To complicate matters, you can only find many secret rooms by thoroughly examining every known room.

Curse of Ra's game technique is like *Apshai*'s. You see hi-res figures inside or outside of a maze of walls, as if viewed from above. Room and treasure descriptions only appear in the Player's Manual—a gap in the game's flow, especially if you're trying to fight a monster and check your surroundings at the same time. As in *Apshai*, running away from some monsters materially prolongs your character's life.

Survival in *Ra* is not too difficult, and players of the *Dunjonquest* series will thoroughly enjoy this new edition of monster-whomping, mapping, and exploration.

GATEWAY TO APSHAI

EPYX
$40.00

Overall Rating	B	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	B	B-	*Value for Money*
Graphics	B	0	*Save/Restore*

Gateway to Apshai nearly crosses the boundary between fantasy role-playing and arcade games. Your joystick-controlled hero moves in real-time through a dungeon full of treasures and monsters. You choose from sixteen eight-level dungeons with seventy rooms on each level. With only six and a half minutes to explore each level, the game moves much faster than its sister program, *Temple of Apshai*. If you finish in time, you're teleported to the next deeper, harder level. The game ends when you've completed all eight levels—or exhausted your eight lives. Luckily, you're endowed with strength, agility, luck, and health. The computer awards you bonus points if you fight well, and complete a level under the time limit. Watch your health, since you will die if it falls to zero. Fortunately, you sometimes find salve to heal your wounds.

You use the joystick and three function keys. The Option key lets you use items in your bag, such as unlocking doors with the key. The Select key lets you search a room for a secret door or trap, drop an item, move to the next level, or check your status. The Start key puts you in the fight mode. You begin with a dagger, but soon obtain a bow, arrows, and a short sword. You repeat the fight mode command to change weapons.

As you begin your search, the unexplored areas are hidden. When you move into a room, its contents and walls become visible. Sometimes bats, snakes, ghouls, and slime mold protect the treasure. You can kill most with a sword thrust, but it's safer to shoot them from afar with an arrow. Keep your weapon drawn, as monsters may lurk nearby. You can easily acquire treasures and other items like healing potions and spells with little regard for traps—they seem to have little effect.

Although *Gateway to Apshai* is intended to be an introduction to the more difficult fantasy role-playing games like *Temple of Apshai*, I found it a better game in many ways. It moves faster and holds your attention longer, and eliminates many keyboard commands that frustrate children. Nevertheless, the game retains the original series' popular flavor.

THE STANDING STONES

Electronic Arts
$40.00

Overall Rating	B-	Hard	*Challenge*
Creativity	D	B	*Vocabulary*
Documentation	A	C	*Value for Money*
Graphics	C	12	*Save/Restore*

The Standing Stones is Electronic Arts' long-awaited entry into the *Dungeons & Dragons* genre of role-playing adventures. In the past few years, the release of a new Electronic Arts game has been cause for excitement among diehard gamesters. EA's reputation for design innovation, stellar graphics and music, and terrific packaging has been honestly earned. They are a first-rate outfit.

Alas, with *The Standing Stones*, EA may have laid its first egg. Let me explain. Two years ago, a game from Avalon Hill called *Telengard* entered the C-64 entertainment scene. It was the first highly-sophisticated, real-time, *Dungeons & Dragons* clone, and won instant popularity among the fans of the original *D & D* format, as well as introducing many new players to the craze.

The Standing Stones is, surprisingly, an almost perfect duplication of *Telengard*, right down to the names of the monsters and types of magic spells. So much for Electronic Arts' reputation for innovation! The graphics and sound in *Stones* are disappointingly pedestrian. Anyone who's seen the kind of hi-res animation that's helped EA earn its reputation will feel cheated in this respect.

As far as game mechanics go, you are a novice knight who has decided to test his mettle in the dungeon of the noted baddie, Kormath. Armed with the usual weapons (sword, armor), as well as some unusual ones (magic spells), you attempt to fight your way through the many levels of the dungeon in search of the Grail.

You begin the game by creating your character. The computer randomly generates characters for you, one after another, until you see one whom you feel has the right combination of qualities to survive in the dungeon. These characteristics include virility, holiness, intelligence, agility, and, perhaps the most important, stamina. Your knight will be pummeled unmercifully by the many inhabitants of the dark; a knight who cannot endure many blows will have a short life.

After choosing a suitable knight, you must name him. Then you may "lock him away" in a file which only you can open with a secret password. Entering the dungeon for the first time is a baffling experience. The dungeon is a maze, you see, and your perspective is that of your knight walking through it. No facility for viewing the maze from above is offered. While this will cause you much hopeless wandering, it does add a sense of realism. The documentation provides you with a partial map of the first level to help you get started, but even this is of limited use. The manual suggests that you make a map as you wander, which will help you to retrace your steps should you become lost. This is a real-time simulation, though, and I found that I simply didn't have the time to draw an accurate grid map and fight off the attacking monsters at the same time.

You'll be confronted often by a wide assortment of low-life creeps, and your ability to deal effectively with them is crucial. You may choose to either flee, bribe, fight, greet, or cast a spell in order to come out on top in each situation. Successful encounters with your adversaries in the dungeon will gain you experience points; as you gain experience, you earn more spells. The dungeon has many levels which you must endure as you quest onward toward the Grail. I suspect that many players will not make it through the first.

A highlight of *The Standing Stones* for me was the programmer's sense of humor, which is in evidence everywhere. The documentation is a riot, even if you don't intend to play. While playing the game, you're humorously insulted by all kinds of weirdos. The many spells you may use in the dungeon include: Charm, Kitchen Sink, Dispell, and Datspell. The three Help screens come in very handy here, since you can choose from among over twenty spells.

Scattered throughout the confines of the dungeon are various oases. At an oasis, you can relax and watch the roach races, or else pick up messages from other knights or creatures. You will also encounter the usual gold, locked chests, scrolls, books, and potions during your travels. The program's documentation is a model of perfection. It concisely explains—with humor—all the features of the game and makes it easy to begin playing *Stones* right off the bat.

If you want to try a *D & D* simulation on your C-64, you might give *The Standing Stones* a try. At $40.00, though, I cannot honestly say that you'll get your money's worth—especially since you can buy *Telengard* for half the price.

SWORD OF FARGOAL

EPYX
$40.00

Overall Rating	D-	Hard	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	C	F	*Value for Money*
Graphics	B	0	*Save/Restore*

Sword of Fargoal is a first generation graphics adventure game, based loosely on *Dungeons and Dragons*. Your quest is to enter the dungeon, fight off monsters, and find treasures (spells and magical items).

Starting at Dungeon Level 1, you work your way down to find the sword. The further down you go, the fiercer the monsters and the slower you're able to move to avoid them. The character you portray and the monsters are represented by attractive sprites. The battle sounds are well done, but some of the other sounds become annoying after a while. You move so very slowly at the lower dungeon levels that it is almost painful.

The sword is hidden somewhere between the fifteenth and twentieth levels. Once you find it, you have 2,000 seconds to escape back up through the levels of the dungeon. If the sword is stolen on the way up, you must return to the level on which you found it and search for it again. The sword will certainly be stolen, if you get that far.

Using a joystick for movement plus the keyboard and fire button for spells, you gain experience points by finding gold and slaying monsters. Begin at Experience Level 1 and progress to Level 2 when you get 200 points. Each subsequent level requires double the number of points as the previous level (400 for Level 3, 800 for Level 4, etc.).

When you enter a new Dungeon Level (not to be confused with Experience Level), you can only see the square you are in and the surrounding squares. As you move, each new area lights up, filling in the map of that level. First, you should look for the temple (one per level), so that you will be able to exchange gold for experience points and speedy healing after battle. Since each level is randomly generated, you can leave a level after clearing it out and return to find more gold and magic spells. If you're willing to spend the time, you can amass an unlimited number of points and advance to any level you wish. It would seem that with enough time, you would simply have to win. Well, that's just not the case. Some monsters steal your magic spells and others drain your experience points. If you manage to get to the Sword of Fargoal, you cannot get out before it is stolen as many times as it takes to deplete your time.

Simply put, it is *absolutely* impossible to win without cheating. Since the program is written in BASIC with Machine language subroutines, you can List the main portion of the program if you know how (using a certain sequence of commands, including Load, Run, Sys, and Poke). From the listing, you can determine the variable names. Employing the Run/Stop key, you can change the value of any variable and resume the game using Cont. With this technique, I gave myself a billion experience points and 10,000 "hits" capability. Starting at Dungeon Level 1, I got the sword and started back up. It was stolen quickly, as all of my magic spells had been. My hits were used up in combat, and my experience points were depleted several times. I was slain while trying to recover the sword (sob).

Restarting the program in the same way and finding the level on which the sword was located, I put myself one level above it. I took the first staircase going down, located the sword, and started up. It was stolen twice before my time was up and I lost. I repeated the experiment, going to the first level immediately after finding the sword (cheating once more), and tried to find an up staircase. My speed was still set for a lower level and I lost yet again. Finally, doing the same thing but setting the speed to high, I won. Only a computer could keep a "straight face" as it announced, "Your Quest is Complete!!"

If it were possible to win honestly, you would have to spend at least five hours piling up enough points and magic spells to have a chance for survival at the lower levels of the dungeon. At Level 19 and below, the monsters move as fast as you do and you cannot avoid combat. Although the documentation says that the temple represents a sanctuary, you are not safe from attack within it. You will, however, have to stay there for some time on each level in order to "heal." Even so, your maximum hits will reach only a few hundred, not the thousands you need for half a chance at survival. Since you cannot save a game (which at first seemed the program's worst failing), you must devote at least five consecutive hours (!) to a game you cannot possibly win—and which will probably end abruptly. Strangely enough, you cannot foresee that it is impossible to win unless you cheat as I did. Otherwise, you will be under the misapprehension that you *could* have won if you had taken more time, played better, or had had better luck. It's not nice to fool the innocent software consumer.

TELENGARD

Avalon Hill
$28.00

Overall Rating	B+	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	A-	A-	*Value for Money*
Graphics	B	∞	*Save/Restore*

Telengard is a *Dungeons & Dragons*-type role playing adventure game. You control (i.e., play the role of) a character as he descends through the depths of the Telengard labyrinth. Within the labyrinth, you must battle many fierce monsters, with the help of your weapons and/or magic spells, as you attempt to find numerous hidden treasures. This is an extremely fast-moving game. You have to make a decision concerning your next move every five seconds. A demo mode for beginners to learn the game has no time limit.

Telengard is an excellent rendition of the D and D concept. You actually see yourself moving through the

labyrinth. The graphics and sound effects are nicely done, and enhance the feeling of being deep within the dark recesses of the labyrinth. Some of the effects are truly spectacular (such as when you teleport from one level to another). The backgrounds consist of simple walls representing the room you have entered; however, the characters you encounter are excellently rendered multi-colored sprites. These monsters and their numerous modes of attack create many of the challenges you must overcome as you make your way through the enormous *Telengard* maze.

The maze is gigantic, with fifty dungeon levels containing thousands of rooms each. Twenty monsters await you, and there are thirty-six magical spells. You can obtain gold, silver, gems, rings, armor, shields, and swords as you travel through the maze. During your travels, you may visit the inn, which serves as a safe haven where you can rest and leave your bounty. Your moves are not timed when you are within the sanctuary of the inn. The summary of your status, displayed on the upper right of the screen, tells you how well or badly you're faring.

Telengard is an action-oriented game, and differs greatly from the interactive, vocabulary-oriented, all-text adventures. It is a hybrid, somewhere between a fast action shoot-'em-up and a pure maze puzzle. *Telengard* requires fast reactions, as well as a strategy for exploring the labyrinth. You must be prepared to use your weapons or your magic spells at a moment's notice to protect yourself.

Selecting a character is your first step. You name him (or her) and choose the values for his attributes (e.g., strength, intelligence, wisdom, constitution, dexterity, and charisma). Your character reacts to situations according to his attributes. You must always remember that your character's attributes control your approach to the many challenges you will face. Consequently, *Telengard* presents a never-ending array of new challenges.

Telengard is so large and complex it requires more than five minutes to load from the cassette. (This long wait may just convince countless Commodore owners of the undeniable merits of disk drives.)

Telengard is an excellent adventure game. The time required for loading is its only negative feature. Its strengths—good graphics, fast action, and intriguingly entertaining challenges—totally overshadow *Telengard*'s slow loading speed. I'm sure that this is one adventure game you'll enjoy playing over and over again.

TEMPLE OF APSHAI

EPYX
$39.95

Overall Rating	B-	Medium	*Challenge*
Creativity	B	N/A	*Vocabulary*
Documentation	B+	B-	*Value for Money*
Graphics	D+	1	*Save/Restore*

Fantasy role-playing games give the player's character certain attributes in order to accomplish a particular goal or task. The character gains experience, strength, and knowledge from his adventures. *Temple of Apshai* is a good example of this type of game. You must make good use of dexterity, intelligence, strength, tools, fatigue, and so on, to fight your way through a maze populated with monsters and other untoward dangers.

This is the longest and most versatile of the *Dungeonquest* series. Use the dungeonmaster program to create your own character, or let the computer randomly select character traits and abilities. Your character moves through a series of rooms displayed on the screen, and gains experience or treasures while fighting a never-ending series of terrible monsters. The combat portion is nicely conceived. Your character can attack, thrust, parry, or fire arrows. Of course, he has to be facing his opponent. You control movement and fighting with single-stroke keyboard commands. This means you have to become a fast, proficient typist to beat the time allotted to make a move. The monsters don't wait for you to turn around or fight. One of the drawbacks in the game is that a monster's status isn't displayed. You never know how much fight is left in it, and might use one of your precious arrows to finish it off when one more sword thrust would do. Also, since your commands are held until executed, sometimes you waste a shot after the monster's demise. Your status is displayed on the left of the screen, so you can tell how wounded or fatigued your character is immediately. When fatigued, you can't move very far without becoming exhausted. This slows the game considerably. If the status of your wounds reaches zero, you die. There is, of course, the possibility of resurrection; but that depends on who finds you. The dwarf and wizard—who can perform this miracle—demand a very stiff price in treasure or belongings.

The object of *Temple of Apshai* is to explore a four-level dungeon and obtain its twenty treasures. Some rooms contain secret doors and traps. Whenever you leave the dungeon, you can pawn your treasures at the inn for weapons, armor, and healing salves. Since the program doesn't keep track of each treasure's worth (you look it up), it is quite possible to cheat. With its numerous difficulty levels and play options, the game can last for hours. Fortunately, you can save a game to return to later.

The author has shown as much thought in preparing the documentation as in writing the program. The doc-

umentation includes a "Book of Lore," which not only relates how to play the game, but provides the player with the background and mechanics of fantasy role-playing games in general.

The Commodore version of this 1980 Apple game is quite slow, since it is in BASIC. Its tedious slowness and laborious keyboard commands put it in the realm of fantasy role-playing games rather than arcade/adventure. Although it has had a steady following since its conception, newer games with better graphics and faster, more involved play surpass it.

ULTIMA
Escape from Mt. Drash

Sierra On-Line
$19.95
VIC 20; 8K expansion required

Overall Rating	B-	Medium	*Challenge*
Creativity	C	N/A	*Vocabulary*
Documentation	B+	A-	*Value for Money*
Game Depth	B+	1	*Save/Restore*

You're escaping from the evil Garrintrots prison through Mt. Drash's monster-infested mining tunnels. Fortunately, you have a few spells up your sleeve. Unfortunately, the Garrintrots enjoy seeing their pet greeblies attack you. *Ultima: Escape from Mt. Drash* is a maze-type, graphics adventure game for the VIC 20.

To win *Ultima*, you must escape from the mountain's fifteen levels. Your spells include blast walls, sleep (monsters, not yourself), and teleportation (within the same maze). There are three commands especially for fighting, and you use the cursor and Return keys to move through the maze.

At first glance, *Ultima* looks like the adventure game VIC users have been waiting for. Unfortunately, I find this version inferior to those for other machines, and ultimately uninteresting. Even its good graphics and music don't spice it up enough.

Ultima divides the screen into three sections: a frontal maze view in the upper left, an overhead maze view in the upper right, and close-up battle scenes with nice graphics in the bottom half. The bottom half also lists your current rank, from Quimby, through Corporal, Cadet, Colonel, and, finally, Questor.

After only a few moments of play, the game's shortcomings become apparent. The music provides excitement, especially when you make a narrow escape, but it can annoy others in the room. If you want to silence it, you must turn off your monitor's sound.

The split screen is impractical, since the bottom half goes unused during most of the game. As you wander through the maze, it displays just your rank; only when you meet a monster in battle does the program really use all that screen space. Why didn't they put the head-on maze view in the bottom half and the rank listing and battle scenes in the upper left (or devote the entire screen to animated graphics during battles)?

It has no numeric scoring system. You progress quickly from Quimby to Captain, but no matter what rank you've achieved when you die, the game always concludes with "You Lose, Cadet." That's hardly fair.

The game takes a long time to complete, and you can't pause it. It has only a brief delay between levels (not even enough to get a Coke from the refrigerator). You can save one game position—not really enough for such a complex adventure.

The game's simple mazes disappoint the most. Essentially, you should move directly north or west. You can bypass obstructions with your teleport spell, or clear a path with your blast wall spell.

True to the instructions, levels one through four are all the same—easy to overcome. Levels five through twelve are not much different. Level seven, however, is different: the overhead view of the maze disappears. Monsters from level nine on are invisible, and at level eleven the directional indicators disappear. These enhancements make upper levels somewhat more difficult, but not more interesting.

The game has exciting battles, but, even after many plays, I couldn't figure out why the Gremlin, Floating Orb, Dancing Demon, and other monsters sometimes attack with an extended sword. The creatures are among the highlights of the game; some are awfully cute.

Despite terrific music and nice graphics, *Ultima* ultimately, disappointed me. It is not a faithful adaptation of the game (one of the most challenging microcomputer adventures). I'd gladly sacrifice some of the music for more difficult mazes. I'd even rather it require more expanded memory, if it were more exciting.

One positive observation: *Ultima*'s $19.95 price tag makes it a good buy. Its greatest drawback: it promises excitement through great music and graphics, but does not deliver challenge.

ULTIMA II

Sierra On-Line
$59.95

Overall Rating	A	Medium	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	B	A	*Value for Money*
Graphics	A	1	*Save/Restore*

Ultima II is the long-awaited follow-up to the original *Ultima*, by Lord British, that is available on other computer systems. It seems that when Mondain was

finally killed in the earlier game, we didn't find and deal with his apprentice, Minax. Now that she has come of age, she is even more powerful than her predecessor.

More than a mere successor with new maps and challenges, *Ultima II's* three disk sides take you to several towers and villages, five time periods, and ten planets, in addition to some of the towns, castles, and dungeons from the original game. This time, towns and castles, as well as villages, are in the colorful, multi-screen scrolling form that so distinguishes *Ultima*. Each of their layouts and contents are different, except that one of the castles appears in two time zones. There are time portals, horses, ships, airplanes, and rockets to ride around in. Fewer dungeons and towns provide a more balanced game.

The keyboard commands are generally the same. The least used ones have been dropped and two more useful ones, (Y)ell (to pause and make plans) and (V)iew (to see an excellent single screen graphic of your current location) have been added. Without it, *Ultima II* would be a mapmaker's ultimate challenge; as it is, mappers will have plenty of action in the dungeons, which seem to go on forever. The command execution time is also pleasantly faster than the original. The game even comes complete with a neat cloth map representing most of the time portals on a "from-to" basis; it's pretty, but not much use in the game.

To rid the universe of Minax, your fantasy character (your choice of four races, three types, two sexes, and six allocatable attributes) faces many hours of searching, interrogations, and monster whomping. The monsters serve as a source of gold, which you can spend in a number of ways; some are mandatory if you are ever to succeed in winning. You only need to obtain two objects to defeat Minax, but both take time, thought, and money—so it's back to whomping monsters.

Ultima II is a fabulous fantasy role-playing game, a graphical *tour de force* with extraordinary play depth. It's one of those must-have games.

ULTIMA III

Origin Systems
$59.95

Overall Rating	B-	Hard	*Challenge*
Creativity	B	C	*Vocabulary*
Documentation	B	B-	*Value for Money*
Graphics	A-	1	*Save/Restore*

Ultima III is third in the series of Hi-Res fantasy adventures by Lord British. Drawing heavily on the successful elements of *Ultima II* and the *Wizardry* series, *Ultima III* combines them into an awkward, lengthy, and rather less satisfying game than its predecessors. *Ultima I* and *Ultima II* players may recall dispatching the demonic Mondain and Minax. In *Ultima III*, you must seek out and destroy their creator, Ultima. First, however, you must become powerful enough to deal with him.

As in the other games, you build your character's experience and gold supply by tramping around (and underneath) the countryside, doing battle with various and sundry monsters. Your party consists of four members, each with a unique spell, armor, and weapon-handling capabilities. The characters are all of good alignment, so true role-playing isn't really possible, and the real-time nature of the game play, requiring quick keyboard commands, prevents it from becoming a multi-player game.

Luckily, some interesting elements have been added to offset the game's repetitiousness. For example, you must explore at least two dungeons to find four marks and the Lord of Time. There are also four shrines where you can beef up your attributes (if you have enough gold), and find four cards you'll need later.

The realm of Sosaria is huge, consisting of one large continent plus a few smaller islands. It is somewhat smaller than the area encompassed in *Ultima II*, but it is more focused. The terrain is dotted with towns and underground rooms. The time doors found in *Ultima II* have been replaced by the mysterious Moon Gates, which can teleport characters to areas that might be otherwise unreachable. They are hard to find, and even harder to use, but they are an important key to finishing the quest.

You need copious quantities of gold to feed and equip your men, bribe guards, buy tips from bartenders, and buy the Oracle's clues (at 4,500 gold pieces each). You obtain this loot in countless monster-whomping encounters during which you also build up experience and, with the King's blessing, your hit-point capacity to a maximum of 2,550. You can also find large clumps of loot while winding your way through one of the mazes in Death Gulch or on certain dungeon levels.

Unfortunately, you cannot access your character's status and equipment prior to beginning play, nor can you change the characters in your party from within the game. You can save the game by pressing the "Q" key; otherwise, the program automatically saves the game every time you enter or leave a dungeon or town. You cannot restart the single Saved-game position from inside the game; instead you must reset or shut off the power. Also, you cannot shorten the lengthy boot cycle as you could in *Ultima II*. Generally, the interesting challenges offered by the game almost offset the monotony of the battles and the countless unnecessary key pushes. Inveterate fantasy gamers will love the game, but most neophytes will give up after the first 200,000 moves. Still, it's an adventure player's dream.

Sports Simulations and Games

AQUAPLANE

Quicksilva, Inc.
$29.95

Overall Rating	D+	Medium	*Challenge*
Creativity	C	D+	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	C	D+	*Holds Interest*

Aquaplane is the micro world's first water-skiing arcade game. This isn't a game of tricks, but involves skillfully guiding your skier to avoid obstacles. Action takes place on a horizontally scrolling screen where you control the motorboat's position and speed with your joystick. You can maneuver the boat up and down and, by increasing the speed, move it forward. At first you and your trailing skier must avoid the rocks and logs that float past. This is easy if you take into account that your skier skis off to one side when your boat is near the top or bottom, and allow for extra clearance.

You confront dozens of sailboats on race day in the second level. While their motions aren't exactly erratic, they do cross your path quite frequently. Power boats driven by inexperienced rich kids who don't know the rules of the road are your nemesis on level three. Besides, there are a few floating logs to keep you on your toes. This level separates the men from the boys, but those who survive must outwit the sharks next. These sharks seem to sense human flesh nearby, and are particularly hard to avoid. Oh, there may be another level beyond, but I wouldn't know from experience: Jaws has put an end to me every time. Drat!

Aquaplane doesn't have exciting game play or even good graphics. The graphics are quite plain: nondescript water, four or five obstacles, and your boat and skier. Everything is small in order to allow for a larger playing field. Game play is dull, dull, dull. You don't do much in this game but concentrate on avoiding the obstacles in your path. There aren't even any jumps that you can take to relieve the monotony. Nevertheless, it isn't an absolutely horrible game, just an uninteresting one.

CHAMPIONSHIP GOLF

Hayden Software Co.
$24.95

Overall Rating	D	Easy	*Challenge*
Creativity	D	D+	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	C-	D	*Holds Interest*

Championship Golf lets one to four players compete on an eighteen-hole championship golf course. Each of the holes has a fairway and several sand traps guarding the green. The upper portion of the screen displays a bird's eye view, and the lower third shows a side view (with the tee marker block at the left and the flagstick for the hole at the right). Players choose a club from among nine woods, nine irons, and two wedges. Each is capable of hitting a certain average distance in yards, much like real golf clubs would. Players try to match the distances to the hole with an appropriate club, then choose the strength of the shot (0 to 10), and the direction (0-360 with 0 facing North). This is all accomplished by means of keyboard input.

The bottom display shows the ball's trajectory and roll, while the top display pinpoints the location on the green. Balls that are hit out of bounds stop near the boundary and are placed in bounds nearby. This limits any dogleg shortcuts. The view shifts to a circular overhead close-up of the green when you've reached it. Players need only give the angle and strength of the shot to make the putt.

Championship Golf is an extremely boring game. Virtually no skill other than judging angles is needed to play it successfully. There isn't even a player to line up when you are hitting the ball, and variables (like slices and hooks) that plague real-life golfers are not implemented. The graphics are plain: just a solid green fairway and several square brown blobs for sand traps. There are absolutely no sound effects or music supplied with the game, perhaps one of the few C-64 video games I've ever seen that has neither! I think golf fans will be sorely disappointed with *Championship Golf*.

COMPUTER BASEBALL

Strategic Simulations, Inc.
$39.95

Overall Rating	B-	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	A	C	*Value for Money*
Game Depth	B+	C	*Holds Interest*

Baseball was my sport. I began in Little League and played until the end of high school. So it was with a sense of anticipation that I tried *Computer Baseball* by Strategic Simulations, Inc.

I am the type of person who likes to read the instructions before jumping in, and with *Computer Baseball* that was a pleasure. The documentation explained quite clearly that I would play the game from the bench as the manager. This was a new position for me, to say the least, but I soon became intrigued with the new perspective.

As a real baseball player, I never gave any thought to batting orders and strategic decisions of that nature, but, in *Computer Baseball*, that's the name of the game. The manual told me that when my team is on the field, I can: set the infield positions, set the outfield positions, indicate how close to hold base runners, change pitchers, make defensive substitutions, and indicate how to pitch to the batter. In short, all those things my coach always used to worry about while I was out there in left field, hoping the ball wouldn't get hit my way.

When my team is batting, in *Computer Baseball*, I can send in pinch hitters, signal a steal, select the degree of aggressiveness in running the bases, and tell the batter how to hit. The documentation gave me a very enjoyable thirty minute education on each of these strategic decisions, and by the time I loaded the program from disk, I was ready to guide my team to victory.

The first menu invited me to select a two-player game, play against "Casey" the computer, enter player data for a ball team of my own choosing, or see a demo. I challenged "Casey" and next matched two classic teams from my boyhood, the Yankees, and the Dodgers.

I chose to manage the Yankees and thrilled to see old familiar names, like Yogi Berra, Whitey Ford, and Mickey Mantle, on the roster. I analyzed carefully the screen full of statistics, trying to weigh carefully batting averages and running and fielding abilities before naming the starting players and their batting order. I selected a pitcher after another careful check of statistics, and I was ready to play ball!

The game graphics are cheery, but display a limited amount of action, of which little is directly controlled by the player/manager. Hit balls move across the field and fielder figures jump into position to intercept them, but there is not much real animation. Pauses of up to several seconds can occur between hits and the text printout of the results. That was fine, I hadn't expected joystick action. This is a game of strategy, and I was ready to be crafty! But drats!

Somebody named Hodges is on deck in the batter's circle for the Dodgers, and I don't know whether or not to give Campanella an intentional walk to set for a double play. Hodges? How many home runs has he hit? I could see all those lovely statistics when I was setting the batting order. Where are they now? This remains my biggest disappointment with this game. It is a game of strategy, yet after the initial setup, all the vital statistics are unavailable. Why not a command that would let me see the stats during the game? At the end of the game there is a screen dump option for the box scores, why not something similar for the statistics so vital for good managerial decisions during the game?

The only other bug was minor but annoying. Entering an inappropriate character resulted in the standard Commodore error message "extra ignored" being printed right across the batter's box. And it never left. For error handling, this program gets a D!

Overall, the game left me feeling somewhat disappointed. It is too slow to be an action game, and my strategy decisions seemed more like guesswork with no statistics to refer to during play. But the documentation is great! That little seven-page pamphlet ought to be required reading for every Little League coach! As for the game itself, I have a mild desire to play a rematch, but it is not worth staying up for.

COMPUTER FOOTBALL STRATEGY

Avalon Hill
$16.00

Overall Rating	D	Easy	*Challenge*
Creativity	C	D	*Graphics*
Documentation	B	D+	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

Computer Football Strategy is a computer simulation of a complete football game. During the game, you actually have the ability to choose every offensive and defensive play. Play the game against the computer, if you like, or with a friend. The program's computer graphics combined with your own knowledge of football give you a feeling of really being on a football field. As you play, you are racing against a clock which adds to the realism of the game.

During a game, you can choose from ten different defensive plays and twenty-three offensive ones. The program includes penalties, safeties, punts, timeouts,

and field goals. To add to the realism, you must control your use of time as you would in an actual football game. The rules of the game are the same as those of professional football. To keep you completely informed, you can call up a statistics screen that gives you all the information you would expect to get from a TV sports commentator (e.g., the average length of punts, percentage of completed passes, turnovers, and so on).

This game is a computer translation of the famous board game and, except for the automatic controls and statistical calculations, I don't feel that the computer version in any way enhances the board game. To add to my disappointment, I found that the game was not challenging or difficult. Within a few minutes, any player would find himself a fantastic passer, and after a little experience, anybody would do quite well at the running game. When I read the instruction manual, my feelings of disillusionment were compounded; it seems that the Atari version of *Computer Football Strategy* allows you to select a famous Super Bowl champion to play against. The Commodore 64 version doesn't include this option. This is precisely the kind of feature that enhances a simple game by allowing it to make full use of the C-64's numerous and special capabilities. Too bad Avalon Hill didn't make the effort to include this "perk" in the version it came up with for the Commodore.

The chief drawback of this program is its extremely poor graphics. Rather than seeing and controlling the eleven men on both teams, you only see and have control over four players on screen, two per team. When I first started to play the game, I expected to have a graphic display of all eleven players on both teams, and a full football field—exactly what is represented on the program's packaging. As it turns out, this full view of field and playes is only available with the Atari version of *Football Strategy*; the C-64 program uses only the four-player display. I was upset that I didn't get exactly what was advertised on the carton. I was even further distressed when I discovered that the Atari game has a better display, since I'm aware that the Commodore home computer has more memory and more capabilities. The programmers for Avalon Hill obviously were either too lazy or inept when they put together the C-64 version of this entertainment program.

Computer Football Strategy lives up to its name in that it offers you a video football simulation. However, the game it provides is not a difficult or challenging diversion at all, nor does it make good use of the C-64's capabilities. Any way you look at it, this version of the program is a disappointment and inferior to the original.

COMPUTER QUARTERBACK

Strategic Simulations, Inc.
$39.95

Overall Rating	C	Hard	*Challenge*
Creativity	B	D	*Graphics*
Documentation	A	C	*Value for Money*
Game Depth	A	D	*Holds Interest*

Some people just can't get enough football. In the fall, they save Saturdays for college games, Sundays for the NFL, and on Mondays (and sometimes other weekdays) it's more of the same. From about the second week in December through January, we have the "Bowl Game Orgy," which has probably accounted for more broken marriages than alcohol. Come March, when you used to be able to count on a few months' reprieve from the game, the newly-formed USFL begins its season.

Where will all this football madness end? Looking closely at the calendar, I've found that periods of time actually exist when it's *not* possible to attend or watch a football game on TV, anywhere. But all you diehard addicts out there, fear not. Yes, pigskin fanatics, a remedy has arrived.

Computer Quarterback allows you to enjoy the game anytime you like. You can play against a human opponent or against the computer, and I promise you, the differences between a game of *Computer Quarterback* and the real thing are minimal. Read that last sentence as a statement which contains both the good news and bad about this program.

First, the good news. In terms of game play, *Computer Quarterback* is an impressively faithful emulation of the fall classic. While the screen graphics are limited to a small football moving back and forth on an aerial view of a football field, and the players are only represented by stationary Xs and Os (as in a coach's blackboard chalk-talk), your ability to engage in the "mental game" is remarkably true to life. In the "professional" mode of play, you can even draft your team from scratch, balancing the players' asking salaries against their abilities. In this mode, you have thirty-six offensive and twenty-five defensive plays from which to choose. An abbreviated "semi-pro" version of the game is offered to newcomers and folks in a hurry. The manual, which is clearly and concisely written, will even give you a short tutorial on the arcane language of football (crossbuck, draw, action square out, stunt weak zone, key strong zone, etc.).

The program is comprehensive, down to all the whistles, penalties, fumbles, audibles, interceptions, and time outs. It's precisely here—with respect to the time outs—that we finally come to the bad news. The complaint heard most about pro football on TV is the length of the average game. Every year, more commercials

are stuffed into more and more "official" time outs. In my opinion, *Computer Quarterback*'s main flaw (and perhaps its fatal one) involves these annoying delays.

Computer Quarterback's delays aren't to sell beer to yuppies, but instead to allow the program to access different subroutines from the disk drive. Every time the ball is turned over, whether it be a fumble or interception, punt or field goal, the action, such as it is, stops, the drive spins, and you wait. The average wait is only thirty seconds to a minute, but if you are really involved in the game, those forty-five seconds or so become monumentally frustrating as you stare at the screen. I found that after only one ten-minute quarter of play (you determine the length of quarters), I was quite irritated; before half-time (when complete half-time stats are displayed) finally arrived, I had totally lost my interest in the game. I suppose one remedy would be to run back and forth to the fridge during each hiatus, but that would surely necessitate my having to buy a new and larger wardrobe before very long.

A great deal of planning, and intimate knowledge and love of football are evident in *Computer Quarterback*. I don't know how it could have been made any more realistic in terms of play. However, until SSI remedies the major problem of these constant interruptions (and hopefully upgrades the graphics), I just cannot recommend this sports simulation.

DECATHLON

Activision
$31.95

Overall Rating	B	Easy	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	B-	*Value for Money*
Game Depth	B	B-	*Holds Interest*

Decathlon is a computer game that lets one to four players compete in the centerpiece of the Olympics: the ten-event decathlon. The fact that David Crane managed to fit all ten events, plus the Olympic anthem, onto one program disk is a great feat. On the other hand, the competition requiring repetitive joystick motion to move the runner, thrower, or jumper in nearly all ten events becomes very boring way before the contest is even half over. Yet in some ironic way, the hand or wrist fatigue that contestants will experience mirrors the agony of actual competition.

Players compete in ten separate events: the 100 meter dash, long jump, shot put, high jump, 400 meter dash, 110 meter hurdles, discus throw, javelin throw, and the 1,500 meter run. Since performance depends on the speed of left and right joystick movement, it is best to find the softest joystick for this test of endurance. (In my opinion, the Kraft wins hands down for quickness and ease of movement.) It would be best to have a pair of identical joysticks because two players compete simultaneously in the four running events. Each player controls an animated contestant on two scrolling tracks—sort of a split screen with distance markers on the track. Although toggling the joystick isn't too demanding on the 100 meter dash, it takes nearly a minute on the 400 meter dash, and three minutes in the 1,500 meter run. It becomes sheer agony as your hand cramps and you begin to sweat.

My main criticism with the 1,500 meter run is that the runner's top speed is clipped much like a governor on an engine. While it prevents a player from burning out early, the first 1,300 meters is a very dull race, as it doesn't take much effort to run full speed and the runners are usually neck and neck all the way. The real race is the sprint on the last 200 meters of track. The 110 meter hurdles is a fun event. You don't get disqualified for knocking down a hurdle, but it will slow you down.

Most of the other events, during which players compete in turns (one at a time), have much better animation especially in the pole vault and high jump. Again, the starting run is made by moving the joystick rapidly back and forth, but timing is required to plant the pole properly in the box and then let go with a button press after you have gained enough momentum to clear the bar. If the button is pressed too early, the pole slides to the box and momentum is lost—often so much so that the pole doesn't even rotate up to a vertical position. You have three chances to clear a particular height, then the bar is raised. The player spins his man as rapidly as possible before releasing the discus in this competition.

Decathlon's graphics are smoothly animated. The track and background scrolling effectively create the feeling of movement. Sound effects are somewhat lacking, except for the starting gun. While the events themselves are rather repetitive and could use some variety, the fault lies not in the game's design, but rather in the similarity of many of *Decathlon*'s ten events. Although the game can be played in either a one-event practice mode, or a ten-event regular mode by one person who is trying for a "personal best," you will achieve a real sense of accomplishment through competition with friends. I think the notion that the Olympic decathlon is a long and grueling test of skill and strength is conveyed quite well by this game. Your hands will ache and you'll be breathing deep and hard before it's all over.

HES GAMES

HesWare
$34.95

Overall Rating	B	Medium	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	B	A	*Holds Interest*

Hes Games, a refreshingly realistic arcade sports game, lets you compete in six Olympic events based right out of the XXIIIrd Olympiad in Los Angeles. These six events—the 100 meter dash, the 110 meter hurdles, springboard diving, long jump, archery, and weight lifting—are all staged with beautiful color graphics and smooth animation. Either one or two players can compete. I would recommend competition play, since the game is little fun when you are competing only against the computer, even if you're attempting to set personal bests.

Both the 100 meter dash and the 110 meter hurdles require players to jiggle the joystick back and forth as fast as possible to gain speed. You jump hurdles by holding the joystick momentarily to the right as you approach them. You aren't docked for knocking hurdles down, and only stumble (without actually falling) if you forget to jump. This costs you a little time, as your speed is decreased. You never can get very far behind no matter what you do, since runners are never allowed to exit the screen. In fact, the runners continue to run and leap hurdles automatically if you quit. My chief complaint here is that there's little difference in time for barely touching the joystick and jiggling it until you work up a sweat. That's why you should play against another person. The excitement of competition encourages you to surpass your previous personal best.

The long jump is foolproof, even for beginners. You jump the furthest by building up your speed, which is accomplished by jiggling the joystick from right to left. You jump by pushing up on the joystick, then push right with the stick so your body falls forward upon landing. Distance is measured from the closest point of your body. The only trick in this event is to jump closest to the line without defaulting.

The diving event is on the springboard (one meter). Your choice of seven forward or reverse dives are rated by a panel of five judges. It is a difficult event, since it takes considerable practice to master the series of joystick maneuvers necessary to run, spring off the board, tuck for aerial somersaults, and finally straighten out to enter the water vertically. You choose your dive as the event occurs, or pre-program your ten-dive series. If you say you are attempting a forward one and a half dive and miss, you will be docked.

While archery is usually a dull event to watch, it does take practice to master. Four targets are set at distances of thirty meters, fifty meters, seventy meters, and ninety meters. Each competitor gets six shots at each distance and can take them in any order. Wind speed and direction are factors as each player aims his arrows at the target. You draw your bow by pressing the joystick button and holding it, and aim at the target using the joystick. It is difficult to keep the bow steady—an intentional effect that renders the competition more difficult. It also becomes harder to hit the target the longer you take to aim and shoot, since muscle fatigue sets in under the strain. A two-player contest is a pain, since you only have one joystick to pass between you. There is no logical reason for this; the running events allow for two joysticks.

Who would have thought that weight lifting would be a viable sport for computer simulation? Two separate events are offered: two-hand snatch and the clean and jerk. You can start with weights weighing as little as twenty-five kilograms, or try one that's 300 kilograms. The size of the barbells changes as weight is added or removed. The trick in this event is timing (using up and down movements of the joystick). In the two-hand snatch, you reach down, pull up on the barbell, then bend down slightly to split the legs when the weight reaches chest level. Then you steady yourself and thrust the weight up with your arms over your head. You must pause slightly between each of these movements, or your man will drop the weight with a clang and shake his head in disgust with his performance. It takes a lot of practice to master, and it is even worse with the clean and jerk event, since completion requires eight carefully timed up and down joystick moves.

Hes Games' graphics are excellent. The characters are larger and more detailed than *Summer Games*'. *Hes Games* even shows the athletes' reactions to their own performances. You can see an instant replay of your performances, and even save them to a separate disk (in case anyone doubts your world record performances).

Playability is somewhat inferior and unrealistic in several *Hes* events. While your performance will improve if you compete aggressively, the running events, in particular, are canned, and operate automatically whether you take part or not. You aren't even penalized for hitting hurdles. The diving events are particularly complicated, lacking the free-form fun of *Summer Games*. The award ceremonies that add so much enjoyment to *Summer Games* are also missing here. Nevertheless, five of the six events in *Hes Games* are different from those of *Summer Games*, so rabid sports fans will probably want to own both programs.

While *Hes Games* may not offer as many enjoyable events as *Summer Games*, it is pretty high quality. Just keep in mind that the events are most enjoyable when played as one-on-one contests.

INTERNATIONAL SOCCER

Commodore Business Machines
$24.95

Overall Rating	B	Easy	*Challenge*
Creativity	C	B-	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C	B	*Holds Interest*

International Soccer is one of the most realistic soccer simulations available for microcomputers. Commodore combines nice three-dimensional-like, scrolling graphics and animated play action which provide a moderately playable game for one or two players. The seven-minute games, divided into two halves, follow all the sport's rules.

Each team has six players and a goalie. The player graphics are disproportionately large compared to the field, but their slow, awkward gait compensates for their mass. The joystick controls one player at a time. The others follow a zone pattern. Their haphazard action rarely relates to what's happening on the field, and they help little, often just standing around, during defensive play. You can't shift your control to the guy closest to the ball, but, if you deliberately run your player out of bounds, control will shift. The controlled player is always indicated with a lighter colored uniform than the rest of the team.

Since the guy with the ball always runs slower than the defender, you should favor downfield passing plays. The kicked ball bounces nicely, casting a shadow beneath it. Players can even hit it with their heads. You control the goalie when the offense gets close to him. The defender can press the joystick button to attempt a save, making the goalie dive for the ball in the direction indicated. Throw-ins are the norm for balls that go out of bounds. You have a few seconds to aim the throw, otherwise the computer makes the toss automatically.

International Soccer has really impressive graphics. The field, three screens wide, scrolls smoothly to keep the play action in view. Players constantly enter and exit the screen. You view the field from midway up the grandstand, like you see on television. Players march on and off the field at the game's start and at halftime. The winning team even returns to the field at the end to receive a soccer trophy. These nice touches make the game more enjoyable.

The nine play levels range from a lackluster team scrambling in all directions to a championship team with nearly flawless defense and offense. If you enjoy sports simulations, you'll probably have fun with *International Soccer*.

ONE ON ONE

Electronic Arts
$40.00

Overall Rating	A	Hard	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	B+	A	*Value for Money*
Game Depth	B	A	*Holds Interest*

This fabulous sports game simulates a two-player half-court basketball game. Thanks to the insistence and advice of two of the leading forwards in the business, Julius (Dr. J.) Irving and Larry Bird, the game achieves realism. It captures the moves, bearing, and style of the two men. One or two people can play. Two play against each other; one plays against either of the computer-controlled characters. Larry consistently displays his unstoppable jump shot, while Dr. J. likes to perform incredible ball-handling routines with an occasional 360 degree spin-around slam dunk shot. Larry, taller and stronger, blocks many of Dr. J.'s shots and likes to push him around.

A referee adds to the realism, judging fouls such as hacking and intentional interference. Each player can jump and block shots, spin around while performing fancy dribbling, and slam dunk the ball. As in the real game, you must clear the ball beyond the key. You get twenty-four seconds to make the shot. A player who indulges in a lot of fancy footwork becomes fatigued, while if you slam into your opponent on a jump shot near the board, it will probably shatter. You even get an instant replay for some of the more outstanding plays.

You can play this game on a number of levels, ranging from Parks and Recreation to Professional. At the highest level, a computer opponent follows you very closely and frequently steals the ball. Beginners will find it easier to play as Larry Bird on either the Parks and Recreation level or Varsity level set on Loser's Outs. This game has hardly any joystick learning curve. Pressing the button lightly spins the player around, while holding it down makes the shot.

While I can honestly say that I detest basketball because I can rarely make a shot, *One on One* lets me do a credible job of ball handling and shooting. This isn't to say that I have won a game against the computer, but getting half of my opponent's score isn't all that embarrassing. The main difference from reality is that ball handling isn't crucial in this contest and shooting from far away and close up is semi-automatic and based on percentages. You can do a 360 degree spin around from half way out and either make the shot or barely miss. Blocking shots is very important. *One on One* will surely become a hit, because it simulates the game of basketball flawlessly with expertly animated graphics. It even plays well.

PRO GOLF

Canadian Micro Distributors

$34.95

Overall Rating	C	Medium	*Challenge*
Creativity	C	C-	*Graphics*
Documentation	B	C-	*Value for Money*
Game Depth	D	C	*Holds Interest*

Pro Golf is a bland and simple simulation of golf. It will teach the basics to the non-golfer, but lacks the claimed "uncanny realism" for the experienced golfer. It has good documentation and simple controls, but disappointing and essentially two-dimensional text graphics, along with jerky movement. There is only one course to play on (more for a fee) with reasonable hazards, but it is as flat as a prairie. The main challenges lie in estimating the distance and direction to hit the ball (which also teaches vectors) and in how to play the special shots, especially around trees. I found the game only mildly interesting to play.

The fairways are viewed from directly overhead, making distance and direction estimation easy but unrealistic, unless you play golf from a helicopter. Each fairway, from tee to green, is mapped by one screen, and consequently, the (distance) scale changes from hole to hole. The details of the hole (tee, fairway, rough, trees, traps, water, and green) are constructed from text graphics rather than bit-mapped. Additional information on the fairway screens consists of the current player's name and running score for the hole, distance from the ball to the hole in yards, and par for the hole. A cute player sprite moves (jerkily) to wherever the ball is and has several different positions.

The controls for fairway play are clear and fairly simple: Club, Shot, Line, and Swing. Club is selected from your rather heavy bag of two-woods and nine-irons plus putter. Your Shot can be normal (straight), hooked (curved to the player's left), or sliced (curved to the player's right). Line (direction) is entered as a number, 00-59, similar to the minute hand on a clock, i.e., 00 is straight up on the screen, 15 is right on the screen, etc. Club, Shot, and Line can be revised by the F1 key any time before you swing. Swing is displayed as a dial with six marked positions: four underswings (used for chipping), one for a full and perfect swing, and one for overswing (gives you greater distance but less control of direction). Pressing the F7 key starts the swing; releasing it hits the ball (you can't miss it). Swings in between the marked dial positions are possible with your proper timing of release of the F7 key. The resulting ball trajectory in any case is straight and very jerky.

Club and Swing should be selected after estimating the distance, lie of the ball, and any hazards in the way. A table for a full and perfect swing is provided (in the booklet) for all the clubs versus distance. Another table (in two slightly different versions) gives distance for the underswings used for chipping .

The ball will not travel as far when played from the rough or traps. Trees are a major hazard (the ball bounces off of them), but they are all the same size. The documentation gives advice on how to play these special shots. The water splashes when your ball lands in it and an out-of-bounds ball gets you a warning, returns your ball to its original lie, and adjusts your hole score appropriately.

The green(s) have some perspective (as seen from the top of a tree), but are the same for every hole: a fifty-foot radius, same shape, flag dead center, and flat. The ball moves much more smoothly and arcs, bounces, and rolls on initial entry. To putt, you enter distance in feet and direction in clock minutes.

After all players have completed a hole, their scores are displayed on a screen very like an ordinary golf score card. You then have the option to continue to the next hole or start a new game. You cannot exit from the program except by turning off your computer.

One to four players can play; a four-player eighteen-hole game takes about two hours. You can start on any hole. There is only one course on the disk as shipped, but for an additional twenty-five dollars, you can get the courses at Pebble Beach and Augusta on tape or disk.

The Run/Stop key is disabled, so you cannot destroy a game in the middle, but you cannot save the game, either. All values are entered without the Return key and it is impossible to enter an invalid value. However, leading zeros are required to make all entries two-digit numbers (e.g., distance and direction), which is extremely annoying as well as tough on your game if you forget. The start-up time is incredibly slow, nearly three minutes! Sound is limited to clicks when the player sprite moves and when you hit the ball. Incidentally, that sprite is right-handed (it says so in the booklet) but plays on either side of the ball. He must carry a double set of clubs.

The best part of the package is the documentation. It is clear, concise, and easy to read. It gives good advice on strategy and special shots and has a good quick-reference summary, but there are no tutorials either in the booklet or on the disk.

RINGSIDE SEAT

Strategic Simulations, Inc.
$39.95

Overall Rating	A-	Medium	*Challenge*
Creativity	A	B-	*Graphics*
Documentation	B+	B+	*Value for Money*
Game Depth	A	A-	*Holds Interest*

If you have ever drooled over the prospect of managing a championship boxer, or fantasized about sitting front-and-center at the best championship fights of all time, you will probably enjoy *Ringside Seat*. This sports simulation seems geared toward such dreams and even to bringing out the Walter Mitty in the most devoted sports fan.

Ringside Seat is a sophisticated, realistic simulation of professional boxing, which incorporates various statistical parameters to determine the outcome of every bout. Recognizing that boxing is largely a game of strategy, the designer/developers, Carl and Anthony Saracini, allow opposing managers to coach their boxers and instruct them to follow specific strategies during each round, with the object of gaining that special advantage that spells victory.

Ringside Seat includes statistical data on some fifty boxers on the game disk, categorized according to the usual fight divisions: bantamweight, featherweight, junior lightweight, lightweight, welterweight, middleweight, light heavyweight, and heavyweight. The boxers' names, both present-day and past champs, are all familiar ones: Leonard, Duran, La Motta, Graziano, Walcott, Holmes, Spinks, Frazier, Louis, Ali, and so on. This built-in database enables you to play immediately using any of the fighters provided, with little knowledge of boxing. You can have the computer manage either, neither, or both boxers, or you can start off with a demo to familiarize yourself with the program. Matches from three to fifteen rounds are permitted. An option displays the judges' cumulative scores while the fight is in progress, or you can have the scores displayed only at the conclusion of the fight.

Once the preliminary setup has been accomplished, managers select their fighter's strategy for each round. Strategies are keyboard-selected from a list that includes flatfooted, cover up, charge in, stick and move, stay away, go for K.O., or protect cuts. Once the strategy for the round has been selected, the round bell rings and the fighters approach center ring to do battle.

The semi-animated screen display shows the fight's progress blow-by-blow, round-by-round. In addition to the graphics display of the boxing ring, the screen also displays the fighters' names and strategies, round clock and round number, judges' scores, a running fight commentary, a description of each punch, and even cuts, bleeding wounds, and inflicted damage. Also shown are the amount of stamina remaining for each boxer and other important fight information.

A nice feature of *Ringside Seat* is its ability to create (and save to disk) data on fighters of your own design, as well as to edit or revise data on the fighters thus created. More than two dozen statistical parameters can be entered from the start up menu. These include such factors as fighter style and ability as a boxer or slugger; ratings on strength, stamina, quickness, and aggressiveness; and ability to take punishment, to name just a few of the means by which the computer sets up matches. While the fighters pre-set on the game disk may not be changed, you may simply add them to your fighter data disk as new contenders, then alter their parameters for "what if" bouts.

In addition to straightforward championship match play involving two players and managers, a number of interesting variations are possible with *Ringside Seat*. You can set up the match and let the computer do the rest, with your two fighters slugging it out just as they did in the actual, real life bout. If you want to help decide the outcome yourself, you can elect to score the fight as one of the three judges, with the computer acting as the other two judges. You can manage just one of the fighters, if you like, pitting yourself against "Angelo, the comupter boxing manager." Just for fun, you can pit heavyweights against lightweights, or you can create Conan-like super-boxers and let them duel with the all-time boxing greats for some offbeat matches.

Ringside Seat is a sports simulation that's much more than just a computer game. The program's design permits you, as the manager of a fighter, to become involved as much as possible in determining the outcome. Play is smooth, challenging, and diverse. The action is fast, there's negligible waiting time between rounds, and play variations are almost limitless. If you enjoy boxing, it's a good bet that you will appreciate an entertaining simulation such as *Ringside Seat*.

SLALOM

Tronix
$34.95

Overall Rating	C-	Easy	*Challenge*
Creativity	C-	C-	*Graphics*
Documentation	C-	C	*Value for Money*
Game Depth	D+	C-	*Holds Interest*

Snow skiers have a chance to get in some off-season practice with this arcade game. You guide a racer down a slalom course, viewing him from fifty feet behind—a perspective similar to that in *Pole Position*. As your joystick-guided skier moves down the slope toward the

finish line, slalom gates appear one at a time in the distance and become progressively larger as you approach along them. The object, naturally, is to ski the course in the fastest possible time by guiding your skier around the gates, alternating first on one side of one gate, and then on the opposite side of the next gate. Ice patches and rocks appear on the course, but you can jump them using the joystick button.

As in real skiing, quickly moving the skier back and forth in a series of linked turns slows him down. Turning the skis at a complete right angle stops him. However, *Slalom* spoils the game's dynamics by allowing you to pull back on the joystick to slow down your skier. The game thus degenerates from a thrilling ski race course (requiring you to employ reasonably accurate skiing techniques) to an exercise in merely guiding a racing figure past a series of obstacles. The gates aren't even that difficult to negotiate, since they're very widely spaced (a few are even slightly off-center). Now, if two or three appeared at once, and more were off-center, you'd have to carefully plan your ski track. If you miss a gate, you are disqualified, although you continue to ski. The F1 key restarts the game at any time. The five levels of difficulty mostly just vary the slope of the course.

The graphics are medicore. The trees along the sides of the course move toward you in an outward perspective as you ski downhill. When you turn even slightly, the distant mountains and the sky at the top of the screen scroll rapidly to the left or right in stark contrast to the stationary ski village in the distance (at the center of your screen). It is visually a bit confusing since you know you are always skiing nearly straight down the course, as close to each gate as you possibly can to shave precious tenths off your final time. Depth of game play is weak, as the courses look nearly identical, and the only excitement comes from negotiating the course at a reckless pace. In my estimation, there really isn't enough to *Slalom* to justify its fairly high price.

STAR LEAGUE BASEBALL

Gamestar, Inc.

$29.95

Overall Rating	A	Hard	*Challenge*
Creativity	B	A-	*Graphics*
Documentation	B+	A	*Value for Money*
Game Depth	B+	A	*Holds Interest*

Star League Baseball is the best computer baseball simulation that I have ever seen. It has good perspective graphics, simple control, realistic animation and sound, and outstanding playability. You can play the game either against the computer or another person. The single-screen game gives you the perspective of a person sitting high up in the right field stands. This compromise position allows for a good view of hit balls (which throw a shadow), but sacrifices some of the excitement of the pitching and batting action. In particular, the short throwing distance makes it difficult to accurately judge the position of the ball. You need a good eye, a quick trigger finger, and precise timing to score a hit.

The designers chose a simple control system for the game; it is well planned and natural. For example, whenever a ball is thrown to a base, you see the base positions and the infields, as if you were standing on the pitcher's mound. You push the joystick right for second base, up for third, and so forth. To avoid confusion in choosing the player who gets the ball, the one closest to the ball takes it (and turns black).

The real heart of the game is in the pitching. You choose from three pitchers at the start of the game, but you cannot change pitchers until the seventh or eighth inning, even if they begin to tire. One pitcher throws mostly sliders and screwballs, another, curves and sinkers, and the last, good fastballs and knuckleballs. You select one of eight possible pitches by holding the button down and getting the pitcher into postion. Moving the joystick in one direction specifies the pitch and throws the ball. Frankly, I found it a little difficult to tell the pitches apart, except in the broad categories of high and low, and fast and slow. Some of the balls sink and wobble, but in a very short space and not for very long. If you release the button before the pitcher throws the ball, he comes out of pitching mode to pick off a base runner.

The poor batter has even less control. If he hits any pitch across the strike zone he's rewarded with a cracking sound; however, he lacks control of his swing except for the timing. The pitch and the timing of his swing determine the ball's trajectory. If he manages to hit a high pitch, the ball generally becomes a high fly; low balls usually become grounders. Slightly early or late timing usually sends the ball off into the stands, if the batter manages to connect at all. To bunt you press and hold the button as the pitch comes in. Once the batter has hit the ball, joystick control moves the lead runner, the others following perforce.

The authors not only created an enjoyable game for two players (or one against the computer), they also included finishing touches that add realism to the game. The crowd cheers, and music plays whenever tension builds (such as when the bases are loaded). The scoreboard sometimes displays trivia questions, scores for other games in the league, and the paid attendance of the game. You can even practice batting, which is very important, particularly when you play against the

computer. The computer-controlled team fields and tags base runners with smooth skill.

Star League Baseball takes practice to master, especially learning to throw to third base to stop the advancing runner, or throwing to any base to stop a base-stealing runner. I have played many baseball games on various computers and game systems, but this is the best. While Coleco's two-screen version offers better batting and pitching, their game suffers from an overly-complicated control system requiring a joystick, four finger buttons, and a keypad. *Star League Baseball* combines the best features of many games, employs a field perspective suitable for all phases of play, and depends upon a simple control system. The result is a game that a novice can painlessly learn, master, and enjoy. While it lacks the bells and whistles of some of the competition, it certainly ranks as the most playable and enjoyable baseball game on the market today.

SUMMER GAMES

EPYX
$39.95

Overall Rating	A	Easy	*Challenge*
Creativity	A-	A	*Graphics*
Documentation	A	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Summer Games is perhaps the most outstanding sports simulation offered for any home computer to date. The graphics are exceptional, from the stirring opening ceremony (where the colorful torch-bearer gracefully runs up the stairs to light the Olympic flame as white doves fly skyward), to the animated effects in each of the eight events. Backgrounds are beautifully detailed with scrolling grandstands filled with spectators, and lovely, puffy clouds. The sound, too, is superb—from the familiar ABC-TV sports theme music of the opening ceremony, to the national anthems of eighteen countries played during the award ceremonies. EPYX's national anthem naturally is the *Jumpman* theme.

Eight players can compete for gold, silver, and bronze medals in eight events. You can compete in all events, individual competitions, or for the record book that is stored on the disk. Or, you can merely practice in any event. You control the action entirely by joystick. Most of the events require only one joystick, but two players can compete simultaneously in the running and swimming events by using two sticks.

The pole vault competition is a test in timing. The player has to plant the pole in the box by pushing down on the stick as the entrant automatically runs. He must then choose the right moment to kick up and over the bar by pushing up on the stick, finally releasing the pole at the proper time via the button (without, of course, knocking the bar off). Players get three chances and can choose their initial bar heights.

Platform diving is perhaps the most fun. Competition takes place on the ten meter board. This gives you enough time to do a reverse or inward triple somersault. By pushing the stick up, down, right, or left, you control the pike, tuck, or layout position. Form is everything. You can do any combination of moves to increase the dive's difficulty rating, but you must land vertically and fully extended in the water with no splash. Seven picky judges grade you; you don't get many points for a belly flop.

The four-man, four-hundred meter relay race is a test of teamwork and paced running. Each runner is alloted a certain amount of energy, which is displayed at the bottom of the screen. Runners who start too fast out of the blocks become quickly exhausted, then run the end of the race at a snail's pace. The joystick controls the runner's speed. Left is for coasting, right is for fast sprinting. You don't want to be running too slowly when you pass the baton to your team-mate. A computer opponent runs against you in individual competitions.

The one hundred-meter dash is a physical test for the player. It is also known as a joystick buster. You run the race by moving the stick back and forth or up and down as fast as you can. Since the screen doesn't independently scroll for each runner, if one opponent begins to lag too far behind, he becomes "lost" off screen. This is about my only complaint with regard to *Summer Games*.

Gymnastics is another test of critical timing as the player must maneuver a girl on the screen to run, jump on a springboard, hit the pommel horse correctly with her hands, push off, then execute a perfect landing. If you press the button when her hands are on the horse, she can go high enough to perform a single or double somersault. Pushing up on the stick puts her into a tuck position; pressing down makes her straighten up for a landing. She can perform the 180-degree twists if the joystick is to the left or right as she comes off the springboard. The animation is truly unbelievable in this portion of the game.

Two swimming events are offered: free-style relay and one hundred meter competition. They are quite similar, requiring you to push the button just as the swimmer's arms enter the water. This increases the swimmer's speed. The kick turn at the halfway mark is also crucial. Pushing the joystick left at just the proper moment gives you the best head start.

The final event is skeet-shooting. You have to shoot twenty-five clay pigeons from eight different positions arranged in a semi-circle. The fire button releases the

targets from the trap houses. Some are single targets launched from one side, and some are double targets.

Summer Games brings the excitement of Olympic competition into your home in a thoroughly enjoyable fashion. The program offers depth and unbeatable entertainment for a group of players—or just one player competing against himself, the computer, or the record book. If you enjoy sports and want an entertainment program that you won't quickly grow tired of, *Summer Games* takes the gold. Outstanding!

THE WORLD'S GREATEST BASEBALL GAME

EPYX
$32.00

Overall Rating	C+	Medium	*Challenge*
Creativity	C	C+	*Graphics*
Documentation	C+	C+	*Value for Money*
Game Depth	C+	C	*Holds Interest*

What should one expect from a game that bills itself as pretentiously as *The World's Greatest Baseball Game*? First of all, you'd expect to find a game that plays well with an easy-to-use control system. Instead, you get a game that plays lineups from the world's greatest twenty-five baseball teams. Once you get over the initial excitement of seeing Lou Gehrig and Babe Ruth come up to bat with the 1927 Yankees, or Sandy Koufax pitching for the 1959 Dodgers, you have to live with the play mechanics of the game.

Actually, there are two versions of the game: one that's meant for playing (on the front side of the disk), and a statistical game on the back side. In either game, you can change the lineup or change pitchers. But in the statistical one, you can do little more than call for an intentional walk, or move the infield in on defense, and call for a base steal or a sacrifice bunt on offense. Essentially, you merely manage teams whose ability to hit and pitch are determined by past statistics.

The play version is meant for two players, or one person against the computer. It has a joystick control system that's especially confusing on fielding, and is difficult to control. You activate basemen and fielders by pushing the joystick in their relative directions on the field. If you push the joystick up while holding the fire button, you get the third baseman; push again and you get the left fielder. This should work fine if you don't get mixed up and give it another direction part way through the sequence. Inevitably, you'll get the wrong fielder, and out of frustration, run whatever guy is activated out to the outfield to get the ball. I'm sure this system can be mastered with a good deal of practice—and a lot of patience.

The pitching and batting portion is a wonder to behold. The ball is thrown relatively slowly so the defense has plenty of time to do something crazy with the ball. I've seen pitches that look like they've either struck the ground or gone past the foul line called strikes when they end up at the plate! The only thing that counts is whether the ball makes it across the plate; timing is the only thing essential to hitting. Your batter can hit the ball—even if it's at his feet—if you get him to swing while the ball passes over the plate. Most players can make contact about seventy-five percent of the time. Balls and strikes are indicated only after the ball is returned to the pitcher. Since the catcher often misses the catch and has to retrieve the ball before throwing it to the pitcher, a noticeable delay occurs before you can see the results of a questionable pitch.

Although the graphics are good in *The World's Greatest Baseball Game*, game play and controllability leave something to be desired in the play game version. The statistical game will appeal to those who prefer manipulating statistics more than playing the actual game. However, there are not enough options to save this game from being a clunker. Overall, *The World's Greatest Baseball Game* is a mediocre sports computer game, but we have seen better ones . . . much better ones.

War Games

COMBAT LEADER

Strategic Simulations, Inc.
$39.95

Overall Rating	A-	Hard	*Challenge*
Creativity	A	B	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Combat Leader is both a very complex and very versatile strategy/war game. "Versatile" would normally be an odd word to use to describe a computer game, but it is appropriate in this case. Strategic Simulations intended *Combat Leader* to do some extraordinary and exciting things.

In this disk-loaded strategy game you command troops opposed by an enemy of comparable strength. For the most part, you seek and destroy the enemy before he does the same to you. You'll need a joystick to play *Combat Leader*, but you input most of the important commands via the keyboard. The joystick helps you pinpoint seizures and determine the best positions in which to watch for enemy units.

The battlefield occupies several monitor screens. As commander, you'll get a command helicopter's eye view of the landscape. You can use the joystick's "bomber sight" to go scouting. You can inspect the entire battlefield at any time, because your sightseeing doesn't interfere with either your troops or the enemy's action. But be careful not to leave your men for too long while on a sightseeing tour, or you may return to find smoldering scrap metal where you left your tank platoon.

The battlefield combines open fields, light and heavy forests, rocky areas, depressions in the earth, and hills. You can use the forest to conceal your troops (the enemy will do the same). If you take the high ground, you'll get a superior view of the enemy troop movement, as well as a firing advantage. But if the hill is bare of trees, your silhoutte will probably be spotted by the enemy. Watch out!

The enemy comes into view only when one of your units looks at them (troops can only fire at what they can see). Therefore, using the joystick to tell your troops where to look is crucial. You direct your troops as to where to go and how they should get there: mounted, unmounted cautiously, or in a hurry. You always control when they fire and where they look. You can control units as a platoon or as individual tanks or squads.

The complexity of *Combat Leader* at first appears to be overwhelming. But the manual is well-written and you will quickly get the hang of the various commands. To help initiate you into the role of a combat leader, Strategic Simulations includes a novice game. You can probably master the commands you need to enjoy this version of *Combat Leader* in ten to fifteen minutes. You control "Tank Platoon A" in the novice version. Platoon A consists of five tanks that face five enemy tanks. Next is an intermediate game that puts you in command of "D Platoon," composed of four infantry squads: rifle, mortar, anti-tank, and security. The soldiers in each squad are transported to battle in an armored carrier which they mount and dismount at your command.

Beyond the intermediate level, the game gets really interesting as its versatility comes in. *Combat Leader* is the first computer game I've seen that allows you to design the game to suit your own particular tastes. In fact, if you so desire, the computer will assume supreme command of your troops and fight against itself. This allows you to get down in the trenches with your men. While the computer takes care of your army, you can direct the action of an individual platoon. But don't get out of joint if the computer gives you a command or two that you don't like. Until you get used to giving orders, you will appreciate this option. You can, at any time, reassume total control. Or, if you need a breather, just freeze the battle while you wipe your brow and figure out your next move. In designing your own game, you may choose to do battle with any model tank in existence since 1939. Furthermore, you may select the terrain of your choice on which to fight. If you like the open spaces, *Combat Leader* will comply with a desert; if you prefer the jungle, the program will place you deep within a thick forest.

Strategic Simulations designed *Combat Leader* to stay fresh and exciting. With so many options and scenarios, this game should never become boring. Playing time varies from about thirty minutes to a couple of hours. You can select the speed of play, but be forewarned that the fast speed may plunge you into a battle where you will quickly be wiped out.

If *Combat Leader* has any serious weaknesses, they lie in the area of graphics. The complexity of the game combined with the size limitations of the playing screen forced the designers to make the symbol for each unit rather small (a tank is about the size of the Commodore 64's cursor). Now if the tanks are that small, you can imagine how tiny the two infantry squads are. It's hard to cram a huge, detailed battlefield and two armies into a 40-column screen. Strategic Simulations just couldn't get around this dilemma. This flaw really relates to the hardware, though, and not the program. Ideally, I'd like to play *Combat Leader* on one of those new, humongous TV screens. At any rate, in the midst of combat, part of the battlefield might be obscured by the enemy's or your own units' smoke screens. When the battle has ended and the smoke clears, you may experience a strange feeling looking down on the wreckage of what was once two powerful armies. Impressive.

One thing I do fault the program's designers for: their choice of color for friendly units. To make the game realistic, every unit is camouflaged to blend in with the trees on the battlefield. Subsequently, when friendly units are in a forest or moving, I find it very hard to spot them. If all friendly units were displayed in some easily spotted color, such as black, I would enjoy the game much more.

The disk is copy-protected, so you can't make a security backup copy. Strategic Simulations charges $10.00 to replace a defective disk after thirty days.

At $39.95 retail, *Combat Leader* is not a bargain basement special, but it is so much more than a single game. As a collection of several related games, including an option to design your own game, this is an outstanding buy. After spending a good deal of time playing *Combat Leader*, I feel it is definitely the best strategy game on the market for the Commodore 64.

GERMANY 1985

Strategic Simulations, Inc.
$59.95

Overall Rating	B	Medium	*Challenge*
Creativity	B	C	*Graphics*
Documentation	D	C+	*Value for Money*
Game Depth	A	B	*Holds Interest*

Germany 1985 retains the complexity, difficult skill levels, and element of sheer luck involved in the best war games. The program resembles games played on a board of hexagons (hexes). The computer serves as the umpire and never makes a mistake concerning the rules, the outcome of a battle, or the number of hexes you may move. It can also serve as your opponent, or you may play against another person. Unfortunately, you cannot see the entire battlefield at any one time, nor can you easily follow the computer's moves because of the scrolling.

The game provides you with two scenarios to play and three skill levels for each scenario. Both involve NATO forces fighting the Russians. The skill level determines which side gets more reinforcements and which side the computer portrays. The rules are the same for both scenarios, but each has its own map and its own reinforcement table. In the "advance to contact" scenario, the NATO forces enter Germany from the west, while the Russians advance from the east. In the "invasion" scenario, the NATO forces have control of Germany and the Russians invade with their airborne infantry in addition to ground forces. In both games, the winner controls the most cities, towns, and airfields at the end of the game (twenty-one to twenty-three turns for each player).

The game is extremely complex and an inexperienced war games player will not understand what is happening until the first game is nearly over. The demonstration game offers little help. Once you begin to comprehend the rules and the action, it becomes fascinating at last. Every action depends on many factors. For instance, the number of hexes a unit can move depends upon the unit's movement allowance (which varies according to the type of unit and the mode, the type of terrain, how many enemy units can see it, and whether it is day or night). The result of combat between two units depends upon the terrain of the defending side, the types of units involved, the mode of each unit, the strength and efficiency of each unit, the distance to division headquarters, the number and types of visible enemy units and supporting friendly units, what has happened to those units earlier in the same turn, and a random number.

The computer does all of the figuring as far as the game goes, but you have to understand the principles to work out a successful strategy. In my first two games, I kept attacking units that were too strong, or in the Defense mode. The result: I needlessly lost a lot of units. You do not have to openly attack a unit in order to damage or destroy it. You can fire artillery from a distance and avoid the potential losses resulting from an attack. At each turn, you decide the action of every active unit. Your units (the initial number plus whatever reinforcements arrive throughout most of the game) total about fifty. If you have not lost too many, you will be coordinating this number at the end of the game.

Strategic options include bridging of rivers by engineer units, ordering units to fire or attack during your opponent's turn, calling air strikes, reorganizing and hiding units, letting the computer move for you, and

firing smoke shells. The great variey of options plus the various skill levels allow you to decide how seriously you want to take this game. The difficulty level depends not only upon the skill level, but on the particular scenario. I was able to win my second game at the easiest level of "advance to contact," but still got completely wiped out in the "invasion" scenario.

A game takes approximately five to six hours, although the packaging states a playing time of three to four hours. With the save game feature, though, this is not a problem. I usually play over the course of several evenings, quitting when I'm tired and returning refreshed the next night. It is a good idea to make notes of which enemy units are very strong or weakened and which were in Defense mode.

At each move, the display shows the number of enemy units that have sighted the moving unit and the number of enemy units in its sight. It also displays whether or not movement is possible in a particular direction. Although you normally move a unit by entering a direction number (one to six) for each hex you want it to move, you can order a unit to move to a particular sector, or move to the nearest village, capture as many villages as possible, or advance and attack or fire upon the nearest enemy.

Although the computer calculates results, you must set the strategy and timing. I lost my first game by going after cities and towns too soon. The computer deployed its units much better, and ended up with superior forces that took control of the cities and towns away from me. It took several games for me to learn that it is quite important to protect your weakened units and your headquarters.

Playing utilities include scrolling in any direction or directly to a particular sector, looking at the air power display (to see who has air superiority and the number of strikes allowed), highlighting all units in the same division, identifying the headquarters unit, and turning the sound effects off and on. The graphics are adequate, but not at all spectacular. The sound adds rhythm and clarity to the play. All input takes place from the keyboard, which makes it too easy to make mistakes and enter the wrong command. Frequently, I entered "2" to move up and to the right, when I really wanted to move up and to the left. Input via joystick would improve the precision of movement.

The weakest element of this package has to be its documentation. *Germany 1985* is more complicated than chess, and nineteen pages just aren't enough. The manual contains only two examples: one for combat (that figures the losses to each side of a single attack) and one for artillery. The combat example is difficult to follow and neither example has a a diagram illustrating the situation. The manual could use much more information regarding strategy, as well as diagrams and more examples to clarify the instructions. The maps are fair, the reinforcement tables clear, and the card summarizing the commands adequate.

I find it both annoying and frustrating that a single manual covers both the Apple and Commodore 64 versions. This caused an error when I loaded the disk (which an errata sheet compensated for), and other errors related to commands not included in the Commodore version. It irks me that the designers did not implement all of the Apple features for Commodore users.

I recommend this program to folks who are willing to devote a lot of time to learning the rules. You cannot just sit down and immediately start to play *Germany 1985*. You must study the documentation to understand the appropriate options and the best strategy. Your reward, however, will be an entertaining game that offers many hours of fun and satisfaction.

KNIGHTS OF THE DESERT

Strategic Simulations, Inc.
$39.95

Overall Rating	D	Hard	*Challenge*
Creativity	C	D	*Graphics*
Documentation	D+	D-	*Value for Money*
Game Depth	C+	D	*Holds Interest*

Knights of the Desert simulates the North African Campaign of 1941-43. Options include six scenarios covering different periods and game lengths, play against the computer or human opponents, different skill levels, and various degrees of faithfulness to historical facts. Scenarios vary in length from one to twelve turns per player. The game is played on a map of hexagons (hexes), the standard format in war games.

This game carries a 1981 copyright, which may be the reason it's rather dull by today's standards. Although the strategy may be more complex than in SSI's current When Super Powers Collide Series, very little actually seems to happen. Your final score depends on the number of casualty points you inflicted on the enemy, whether you were the side to last occupy each of the four cities in the game, and how far your units have moved from your home base. Your score may then be compared to a chart to determine the level of victory. All in all, the results are unsatisfying.

If you play against the computer, you'll play the Axis side and the computer will play the Allied side. Although the computer has the "home team" advantage, it also gets several extra advantages (such as getting a "luckier by twenty percent" bonus, having units that are easier to supply, experiencing less depletion of supplies in combat, and being harder to eliminate). The game begins with the Axis side's being given the choice

of first or last move. Each turn divides into seven phases for each player. In the first active phase, you determine how your reinforcements and supplies will be apportioned among your units. The units are historically accurate in name, and are judged by the game-makers according to such factors as combat strength and morale. These elements are important when it comes time to distribute your resources.

Next, you can move and/or fortify your units, but you cannot move your depot (supply) units yet, and you can never move your garrison unit, located at El Agheila. During this phase, you may attack enemy units. Your opponent may be eligible for a "limited reaction" which allows him to move or attack. Next comes a resupply phase, during which all units within two hexes of a depot will receive their alloted supplies. Afterward, the depots are allowed to move. There is no explanation regarding their inability to move while the other units are moving, nor why the other units are unable to move at this time. In locating the depot units, you attempt to build a line of depots no more than six hexes apart, to approach within two hexes of combat units at supply and resupply phases.

During the next phase (enemy reaction), the first player may be eligible for a limited reaction. The first player's operation phase follows, whereby the second player may be eligible for a limited reaction. During this phase, the first player receives a full allotment of operation points for movement, fortification, and combat. After another resupply phase and depot movement phase, the first player's turn ends and the second player goes through the same series. When the second player finishes, one turn has been completed and you will get the opportunity to save the game to disk. Even in this simple operation, *Knights of the Desert* does not provide the convenience of SSI's *Germany 1985*. Unlike the latter game, the *Knights*' disk must be formatted in advance; when you recall the saved game, you must remember the name you used.

The documentation for this very complicated game comes in a slick, twenty-eight page book measuring nine by eleven inches. Eleven pages are devoted to an interesting, often poetic account of the North African Campaign from March 1941 through January 1943. Other pages are crammed full of instructions, rules, and tables. The result of an attack depends on the morale of the units, their combat strength, supply points, operation points, terrain, fortification level, levels of intensity of attacker and defender, support of other units, air power points, the level of risk, and a random number. Fortunately, the computer does all of the calculations.

Despite so many tables and words, you get neither a tutorial nor an explanation of the screen showing the results of an attack (to date, I have been unable to figure out the meaning of two numbers on that particular screen). A minor annoyance: the documentation was written for Atari and Apple computers, with only one insert sheet containing the map, map symbols, and specifics concerning the Commodore 64 version of the game. All but three sentences tell you how to load the program, or save a game in progress. On the plus side, the documentation does supply fourteen helpful hints on strategy and tactics, and offers many examples of the calculations.

The game's graphics are unimpressive. Symbols don't necessarily look like the units they represent. Far better symbols are used in SSI's *RDF 1985*. Except for a machine gun sound when an attack occurs, sound effects only indicate that a player has attempted an unacceptable action or that a "limited reaction" is occuring.

An experienced war game player may find this game to his liking, but the typical computer owner/entertainment program consumer will probably be disappointed with and easily bored by *Knights of the Desert*.

NATO COMMANDER

MicroProse Software
$34.95

Overall Rating	B	Hard	*Challenge*
Creativity	A-	B+	*Graphics*
Documentation	C-	B	*Value for Money*
Game Depth	B+	A-	*Holds Interest*

In 1977, a retired British NATO general recruited six of his former colleagues to write a dramatized game plan for the next world war, which would hypothetically begin in Europe. The result was a unique book: *The Third World War*, by General Sir John Hackett (Macmillan Publishing Company and Berkeley Books, 1979).

Quite possibly, Hackett's chilling and dramatic account of this imaginary conflict inspired the authors of *NATO Commander* to produce this extremely challenging war game: a scrolling, real-time computer simulation requiring strategic thinking and fast-paced decision making. You receive, analyze, and react to a barrage of combat reports received from the battlefronts during a Soviet-Warsaw Pact invasion of Europe on May Day in the not-so-distant future.

NATO Commander is not a slow-moving, chess-type wargame; rather, it is an accelerated, real-time simulation of events as they might very well take place in Europe. Designed for solitary play, the program effectively commissions you as a four-star general who must deploy his mechanized and armored units, defensive reserves, and tactical nuclear weapons to stop the Soviet juggernaut. As the Nato commander, you'll

receive continuous radio, teletype, and combat communications updates of the battlefield situation. You must respond to them, devising your own strategy and tactical plans to meet the Soviet onslaught and prevent a Pact victory.

NATO Commander features five possible European conflict scenarios, in addition to a demonstration scenario that automatically begins once the program has loaded. The conflict scenarios include a surprise Warsaw Pact attack against unsuspecting NATO forces; Italian and German battles (two different ones); and a preemptive strike by NATO on the Soviet Block. You may select one of four difficulty levels for each scenario. You may organize and manage your armies in larger division-size, or smaller brigade-size units. The former are more powerful and easy to manage, while the latter give you more tactical flexibility.

You enter commands via the joystick and/or by depressing designated keys on the keyboard (some fifteen keyboard commands are available). A flashing cursor desgnates the unit with which you are communicating. A joystick, as well as several keys, moves forces around the map. You can also freeze game play to study the situation.

The NATO simulation places a premium on the development of a sound overall defense strategy, though offensive opportunities occur as the drama unfolds. You can conduct air and nuclear operations, but, as in real life, the latter must be authorized by the Commander-in-Chief, and permission to employ nukes won't be given unless the battlefield situation is very serious—or if nuclear weapons have already been used by the Russians.

The measure of how successfully you're conducting the war lies in the Victory Points you accumulate. These consist of both political and combat points. Combat points reflect the battle situation, but various political events (which unfold as the game develops) also affect the overall outcome. Eventually, either NATO or the Warsaw Pact will crumble, ending the game and producing a game summary report.

I regard *NATO Commander* as a challenging strategic simulation that provides many hours of creative play. Using your imagination, the possibilities for game play variations are almost unlimited. Save and Load commands allow you to try different strategic simulations and even build a "library" of customized war game variations.

A twelve-page instruction manual, which includes a small area map, comes with the package. The instructions give you excellent military information and tactical tips, but actual game-playing instructions are merely adequate. Most commands are sufficiently explained, except for the Save and Load commands used to store the current game situation for later play. In restoring a saved game, I inadvertently left the "saved game" disk in the drive after restoring the game, causing the program to crash (become unplayable); this mistake forced me to reboot the game. Step-by-step instructions on saving and restoring games, as well as onscreen prompts, are needed to avoid similar mishaps.

NATO Commander is not for the typical quick thrill, shoot-'em-up youngster. However, if you're seeking a novel, graphic computer war game simulation that's not likely to bore even the accomplished strategist, this game may be your chance to hold the fate of Europe in your own two trembling hands—and possibly even to prevent the outbreak of World War III!

OPERATION WHIRLWIND

Broderbund Software
$39.95

Overall Rating	A-	Varies	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B+	B+	*Value for Money*
Game Depth	A-	A-	*Holds Interest*

Operation Whirlwind is a typical simulation wargame successfully translated from board to computer. The computer does the complex bookkeeping, so you don't have papers and little game pieces flying in all directions. You can give your full attention to carrying out your battle plan. This game has superb graphics. The setting is World War II, European theater. You command a tank battalion. If military tactics is your meat, this game is a must.

As the game begins, your pieces are deployed fifteen kilometers from the German-held town which is your objective. You have thirty-five game turns to cross two rivers and much hilly, forested terrain. The bridges over the rivers have been destroyed. Enemy units and land mines defend the road and surrounding areas. Once in the town, you face a hazardous, building-to-building fight. You must eliminate all the enemy units in the town before securing your victory.

Operation Whirlwind offers four levels of difficulty. At the lowest, you fight a rather passive enemy who often runs away when you assault him. At the highest, you have to slug it out for every inch of ground.

You command infantry, artillery, light and heavy tanks, battalion headquarters, engineers, and reconnaissance. You use the joystick to lift and move game pieces across a scrolling map. The joystick also transmits commands and aims your fire.

Each game turn has five phases:

1. Command: you order units to dig in and regroup, or prepare for combat.

2. Movement: you move all the units you want to, provided they are prepared.
3. Combat: you try to eliminate any enemy units within range. They also fire at you.
4. Assault Order: you order assaults, bridge building, overruns.
5. Assault: your units execute your orders from Phase 4.

Each turn, you can skip any phases by hitting the space bar until you reach the next phase or game turn. You can save your game positions at each turn's end.

Each game piece has a certain number of activity points per turn. For example, a tank unit can move farther in a turn than an infantry unit. Movement across rough terrain and unbridged rivers uses up activity points faster. You can approximate a unit's combat readiness by looking at the strength bar on its game piece. Place the cursor over it and you get precise statistics. If you move a unit too far, the cursor flashes red and drops the piece. If you don't dig in a depleted unit for the next game turn, it won't recover enough to move very far.

Even at the lowest skill level, *Operation Whirlwind* emphasizes tactics and strategy. If you move your troops too far and fast, they are exhausted when they encounter the enemy. If you move them too slowly, you may run out of game turns before you take the town. You must consider both the road's dangers and advantages (your troops move much more quickly along it). Lose your reconnaissance unit or the essential engineers before you attack the town, and you may not have a chance at victory.

The simulation takes into account many of the factors present in real battle. You must master the basic theories of military maneuvers before you attempt the highest skill level, or you'll be bogged down miles from your objective.

People inexperienced with wargame simulations may have some trouble following the game instructions at first. However, experienced wargamers will find the documentation good, even excellent. Roger Damon's "Designer's Notes" gives an overview from which you can develop your battle plans. The entire game map (the C-64 screen shows only a small portion at a time) is printed in both the game book and on a poster-sized, color wall map.

Video game lovers may find *Operation Whirlwind* slow. A game can easily take several hours. But if you savor games with intellectual challenge, or delight in designing complex operations, or are a military buff of any kind, this game will give you months of pleasure.

PANZER-JAGD

Avalon Hill Game Company
$30.00

Overall Rating	B+	Medium	*Challenge*
Creativity	B	B+	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	C	B	*Holds Interest*

If you enjoy war games, you'll love *Panzer-Jagd*. Avalon Hill turns the pages of history back to 1943, and puts you in a German uniform on the Russian front.

The German war machine is ready for the big push toward Moscow, and you command the German army's left flank. You are issued eleven new Panther platoons and seven almost obsolete PzKw III tanks. Your orders: attack and seize as much Russian soil as possible.

You are promised nothing. Don't look for reinforcements—there will be none. Don't look for air support—it's reserved for the main push. Your job: raise as much stink as possible to confuse the Russians. If your attempts are impressive, valuable Russian reserves rush to defend the sector you are attacking, weakening their defenses against the main German army.

You are dispensable. Russia is very large, and your chances of ever seeing Moscow and living to tell the story in Berlin are slim. The only support you can expect is more fuel to power your tanks. You get fresh supplies after securing every town and eliminating every enemy in a sector. Be careful of your supply; if a tank runs out of fuel, it becomes a sitting target for the Russians.

As *Panzer-Jagd* begins, your tanks and infantry hide in the forest on the right of the screen. In front of you is a thin forest. To the northeast a stream blocks your advance. In the distance you see a village, your first objective. And somewhere between you and the village is the Russian army.

No, you can't see them, yet! But I assure you they are there waiting for you.

First, you ring up your artillery support. You issue firing orders to the two batteries assigned to your sector. Make a mental note of the target coordinates. You don't want to accidentally position your own troops under a "friendly" barrage. You assign each of your units a primary objective. Then you wait for the artillery to begin its "dance of death."

Listen: artillery shells from Russian guns whiz through the air. First, you hear the shell's scream as it splits the air above. Then the earth trembles with the shell's impact. The sound of the explosion shatters the still of the forest. Smoke rises up from the point of impact. Twice the Russians lob shells into the forest, hoping to hit your troops. But the first time you are lucky and their aim is poor.

Your own batteries answer with a similar blind hunt for hidden Russians. As the sound of the artillery fades, your tanks lurch toward the east. The infantry cautiously follow in the forest's shadow.

Does that sound like a war? Avalon Hill takes you as close as you'll want to get with *Panzer-Jagd*.

Strategy is supreme. If you want to survive, don't hesitate. Once the Russians spot you, you can bet their artillery and tanks will lock their sights on your direction. And, of course, your troops will return the favor.

Once you capture the village, don't take a lunch break. Mop up the remaining Russian units before they escape. Other Russian units wait in the next village, reinforced by anyone who escapes the current screen.

Avalon Hill blends the best of two worlds in *Panzer-Jagd*: board game visuals and computer game complexity. Avalon Hill's earlier computer games (*Midway Campaign, North Atlantic Raider, Strategy Football,* etc.) all stressed strategy at the expense of graphics and sound. At last, Avalon Hill has successfully merged the three.

I've played board versions of war games as long as I can remember, and *Panzer-Jagd* is as playable and complex as some of the best of them. The advantage is that the Commodore 64 keeps track of all the rules and scoring. The manual is a little confusing because it includes the instructions for Atari as well as Commodore 64. But it becomes clear as you experiment with the game.

Written in BASIC, *Panzer-Jagd* is not as fast as an arcade game. But I didn't find the speed restrictive. You cannot save your game to return to play later, so once the battle is on, you have to finish it or lose by default.

The disk version of *Panzer-Jagd* is not copy-protected, so you can make a backup. Avalon Hill's warranty states they will replace any defective software. They mention no time limitation or cost.

If you are a seasoned war gamer, *Panzer-Jagd* is for you. If you have never played a true war game, this is a good one to cut your teeth on.

RDF 1985

Strategic Simulations, Inc.
$34.95

Overall Rating	B	Medium	*Challenge*
Creativity	A-	C	*Graphics*
Documentation	D-	B-	*Value for Money*
Game Depth	A	B	*Holds Interest*

RDF 1985 is the second in SSI's When Super Powers Collide Series (following *Germany 1985* by the same program designer). A war strategy game in the same style as those games played on a board of hexagons (hexes) and extremely complex, it requires much concentration. The result of every movement, battle, or barrage depends on a number of factors. Fortunately, the computer does the actual calculations and displays the results after you decide your action.

In this scenario, the Russians have seized control of an oil-rich area in Saudi Arabia. The 28 by 39 map of hexes includes airfields, towns, villages, oilfields, oases, and even a part of the Persian Gulf. The Rapid Deployment Force (called NATO or U.S. interchangeably) invades with five air drops and later brings in reinforcements using roads, airfields, and a U.S. Navy task force. The game ends after twenty-one to twenty-three turns, at the discretion of the computer. The winner is whoever eliminates the most enemy units and controls the greatest number of oilfields, towns, villages, and airfields. You have the option of continuing the game, but without additional reinforcements.

SSI includes the *Germany 1985* rule books and a rule book supplement for this game. This results in unnecessary confusion since new players have to read both books. Some sections are repeated in the supplement while others are not, leaving you to wonder if the omissions mean there are differences in the rules. Most changes are due to the new topography and the addition of Para and Naval units to the U.S. forces. Counting "enemy units eliminated" as part of the score and the status display are superfluous improvements.

Except for the choice of two scenarios, all the features of *Germany 1985* appear here: two player or solitary play, skill levels, selecting either the NATO or Soviet side, hidden or exposed units, game saving, air power, randomizing the terrain if desired, etc. I enjoy the *RDF 1985* scenario, but it differs little play-wise from the *Germany 1985's* "invasion" scenario. The Para units are the same as the other program's Russian airborne units—and neither is ever in the air during the game! The naval forces merely land combat units. There are, however, new strategic problems involving control of airfields and air superiority. They affect the speed (or delay) of arrival of many Nato reinforcements, plus your control of the shore area when the naval troops arrive in the middle of the game.

The computer displays one-twelfth of the map at a time, but you can scroll to see every sector. Moves made by the computer are rather difficult to follow due to the scrolling. At every turn, a player inputs the actions of every active unit on his side, which could mean as many as fifty units. Your choices might include movement, attacking, firing artillery, changing modes, hiding a unit, and even delaying a unit's action so that it attacks or fires during your opponent's turn. The screen displays values for most of the factors significant to the unit currently marked by the cursor.

Early in the game, the NATO forces seem able to

move, gain control of strategic locations, and destroy enemy units with ease. However, the Russian reinforcements tend to be more concentrated and capable of turning the course of the game. In my worst defeat, the computer kept hiding its forces. Every time I moved a weak unit, two or three enemy units popped up to attack it. After my most decisive victory, I continued the game to see if my impression of relative battle strength was correct. Within five or six turns, my forces were totally destroyed.

RDF 1985's weakest point is its documentation. Besides the two-part rule book, the card that contains the map and reinforcement table is only half the size of the ones in *Germany 1985*, even though the map contains the same number of hexes. Everything is written for both the Apple and Commodore 64 versions, which I found confusing. Moreover, errors exist regarding which options have actually been implemented in the Commodore version.

This game is definitely not for everyone. You must work hard to learn the rules, and harder still to play well. However, I found it very enjoyable after the first few games, with lasting appeal. The variety and combinations of options make *RDF 1985* one of the most intricate games of intellect marketed for the Commodore 64.

Simulations

BARON

Blue Chip Software
$59.95

Overall Rating	A	Hard	*Challenge*
Creativity	A	B+	*Graphics*
Documentation	A	B	*Value for Money*
Game Depth	B+	A-	*Holds Interest*

Like its companion programs, *Tycoon* and *Millionaire*, *Baron*, this real estate simulation employs the computer to its greatest advantage by simulating real life situations within the context of a continually changing environment. These games also instruct. In *Baron* you buy and sell three types of property: residential, commercial, and land. You attempt to make a million dollars speculating in the real estate market. One session of the game consists of sixty months of real estate activity. Every month, the program provides you with exerpts from current real estate journals indicating various market trends, mortgage rates, and changing patterns in geographically differing real estate markets.

You begin as a novice with $35,000 cash. Your net worth changes as you buy, sell, or mortgage your properties. As your net worth increases, so does your ability to take out larger loans, but your closing costs drop. On the other hand, if you fail and your net worth drops below $5,000, you must declare bankruptcy.

Each game session creates a new real estate market environment. Just as in real life, your success or failure depends upon your ability to analyze real estate trends and capitalize upon them. Because of the length of the game, and the amount of information provided each month, you can save your data and start (at a later time) where you left off. The menu selection provides a vast amount of information which you may quickly recall to make decisions. You can display graphs of trends, average property prices, options, loans, news and price changes, real estate descriptions, and your portfolio. Real estate listings are extremely graphic, and often quite amusing. You handle down payment, interest rates on mortgages, monthly income, first and second mortgages, operating expenses, and net cash flow. You may invest in speculative ventures, including limited partnerships and real estate investment trusts. Your transaction reports include closing costs.

While *Baron* loads slowly (five or six minutes), it responds extremely quickly once it's loaded. Like its sister programs, it is beautifully packaged and contains an extremly well-done, well-written, and highly informative manual. *Baron* simulates reality so well, it provides considerable excitement in addition to its educational value. I recommend it highly—in spite of its rather expensive price tag.

CCI SUBWAR 64

Clockwork Computers
$12.00

Overall Rating	C+	Hard	*Challenge*
Creativity	C	B-	*Graphics*
Documentation	D	A	*Value for Money*
Game Depth	B-	C	*Holds Interest*

CCI Subwar 64 is like the little girl with a curl in the old nursery rhyme. When it is good, it is very, very, good; but when it is bad, it is ... boring. *CCI Subwar 64* is kind of a poor man's underwater *Flight Simulator*. It simulates the complex technology of running a submarine and the physics of shooting torpedoes at a moving target. Everything works in real-time, which often is slow motion, too. The documentation is poorly organized and inadequate regarding the information you need to handle a battle between a sub and a surface ship. *Subwar* has some nifty graphics, though, that spice up a generally uninteresting screen display. The simulation is pretty good. You can learn a lot about the physics of motion and military tactics from this program. If *CCI Subwar 64* cost forty dollars, it would only be worth buying if you were fascinated by sea warfare or submarines. At twelve dollars, it's a good buy.

The main program is so complex that you need to work through *three* training programs before you can play even the easiest of three skill levels in the actual game. The user's manual was written for a PET version

on cassette. Everything that applies to using the Commodore 64 version or a disk drive is on the last page of the manual. (The documentation could definitely stand improvement.) I spent several minutes trying to load a program with the wrong file name based on instructions in the book. For all the programs except the most elementary trainer, you must first load an initialization program called Setup 64.

The training programs divide the skills you need into commands, ship handling, and attack maneuvers (in that order of difficulty). The command trainer, Basic 64, doesn't do very much. You press the available commands in turn, but you can't call them in the order of your interest. The program responds only to the command it wants you to practice at that moment.

Ship Control 64 lets you practice flooding and pumping ballast tanks so your sub can sink and float level instead of askew. You also adjust direction vanes called sternplanes and fairwater planes so the ship will descend or ascend. Ship control is a fascinating problem. I wanted more time to work through it than the program gave me. After a certain amount of time, the diving screen disappears amid loud noises. You are told you have succumbed to a depth charge and have sunk. (Unless, of course, you go too deep and are crushed by water pressure first.)

The program's second screen is the subject of Attack 64. This training program helps you practice finding the enemy and firing torpedoes at him with little chance of counterattack. This phase starts with a submarine sprite dancing merrily across the screen to the tune of *Anchors Aweigh*.

The sprite reappears to gloat every time you sink an enemy ship. The attack screen contains all of the interesting graphics in the system. If you sneak a look with your periscope at the enemy, you see the ship bow ahead, stern ahead, turning to the left or right, or broadside. The picture that's shown relates to the position of the ship as it appears on the sonar screen. The best picture, of course, is the sinking ship, which you see only when you score a hit.

Attack presents several realistic "rock-and-a-hard-place" decisions. You can locate the enemy in one of three ways: using active sonar, passive sonar, or the periscope. Active sonar gives you the enemy's range as well as relative position, but it also tells him where you are. Passive sonar lets you run silently, knowing the other ship's position, but not how far away it is. Neither sonar works if the ship is behind you, so you have to turn around to find it. The periscope provides range and bearing, but requires a shallow, fairly vulnerable depth and permits the enemy to spot you.

Firing a torpedo is much more complicated than merely hitting a fire button. You must be aimed in the right direction. You don't fire at the enemy's position, but at where you *estimate* your moving target will be when the torpedo arrives. If it changes course right after you fire a salvo, your torpedoes continue on with no effect. If the enemy counterattacks with depth charges, you may be dumped back to the ship control screen to deal with flooding, loss of power, or loss of propulsion. (You can't fire in ship control mode.)

I confess I never got into the integrated game, although I spent much time with all the trainers. Try as I did, somehow I couldn't find out how to initiate the attack phase in *Subwar 64*. If you manage to get your ship submerged to the proper depth, as suggested by the manual, you apparently have no choice but to await your fate. I never had the patience to wait around for someone to shoot at me, although some members of my family did. As in real life, battle warfare entails doing too many things too quickly without much chance for survival. Practice increases your chances of outliving crises, but doesn't guarantee it.

Ironically, I may have found *CCI Subwar 64* dull because it succeeds *too* well as a simulation. Warfare has often been described as long periods of boredom punctuated by intense periods of fear and chaos. I didn't really like the game, but the problems presented in the ship control trainer and the attack trainer are interesting in and of themselves. People who love the sea will enjoy this simulation, as will war game purists and space ship freaks. *CCI Subwar 64* will never acquire a huge following, but at this economical price, it is worth buying just for the taste of naval operations, a glimpse at the mechanics of submarine warfare, and the exercise in ballistics.

GALACTIC CONQUEST

Victory Software
$19.95

Overall Rating	A	Medium	*Challenge*
Creativity	A	A-	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	A-	A	*Holds Interest*

Now and then, a truly wonderful software product enters the video entertainment market. Although the life expectancy of such products is usually limited, this is not the case with *Galactic Conquest* from Victory Software. *Galactic Conquest* is a "thinker's" strategic simulation/role playing game. Up to six players (referred to as "admirals") can play at once, and because no two players will ever play in exactly the same manner, each game is unique. The goal, like the program's name, is galactic conquest; you use your tactical skills to out maneuver, out think, and destroy your opponents.

As you enter the world of *Galactic Conquest*, a series of questions greet you: How many players are playing?

How many years are desired (meaning the number of turns)? What is the number of inputs (limits to the number of fleets you may send out per turn)? Spaced homeworlds? (Answer "yes", and all homeworlds will be equally distant.) Skill level (numbered from one to five)? Would you like reports of Admiral Badguy? (Respond in the affirmative, and the program will notify you if Admiral Badguy, i.e., the computer, reinforces any of his planets.) Time limit (the number of hours, minutes, and seconds allowed for each player's turn)? Do you want to restart a saved game?

In the next step, you select a star map of the galaxy. Pressing the F1 key generates the star map; hitting any other key means you accept the map, and the actual game commences. Only the shrewdest fleet admiral can rule the galaxy.

You play the game itself on the "status board." You enter the commands to send your glorious fleets to conquer other worlds. Be on the lookout, though, since suns, novas, and supernovas destroy fleets, and photon storms wreak considerable damage. But these catastrophes aren't as bad as having your fleet wander into a black hole and disappear before your very eyes! As you conquer other planets, the status board reflects the changes. It is divided into three columns: the "P" column shows the planet number, the "PN" column states the particular planet's annual production, and "SHP" tells you the number of ships at that location.

During your turn, you may send out ships to their various destinations. Entering F5 terminates your turn. If you are really stumped, you may pass by pressing the F3 button. But the "magic" button still remains F1.

When you hit F1, a menu appears. Your options include: Tactical (the planets' strength according to the ships stationed on them); Strategic (the various empires' strategic positions); Save (fuctions as its name implies); Distances (computes the number of years necessary to reach a destination); Ship's Log (displays the last reported ship strength); Ship Status (reports current ship status, including your most recent orders); Industry Log (records each planet's last known annual production); Evacuate (destroys one of your planets' annual production if one of your opponents stands ready to conquer you), plus about a half dozen more.

When all players complete their turns, a new star map is generated reflecting the changes. Perhaps the simulation's best part, it is done in bit-mapped graphics on the right side of the screen. If photon storms rage, or a black hole engulfs your entire fleet, or you unknowingly enter a skillfully planned trap, these changes (and more) are reported during this phase of game play, complete with sound effects. I found myself eagerly anticipating this masterfully programmed part of the simulation.

When the selected number of years transpires, the game ends. Pressing any key displays the final outcome—each player's total number of conquered worlds, stationed and en-route ships, and total production—and the winner is also displayed. A final keystroke terminates the game.

If you seek a game that tests your strategic planning skills and agility, and provides outstanding value for the money, *Galactic Conquest* is for you. I highly recommend it to all future inter-galactic admirals, but with one emphatic warning: it could very well prove to be addictive. May the greater Empire Rule . . .

M.U.L.E.

Electronic Arts
$40.00

Overall Rating	A	Medium	*Challenge*
Creativity	B+	B	*Graphics*
Documentation	B+	A	*Value for Money*
Game Depth	A-	A	*Holds Interest*

Basically a strategy game, *M.U.L.E.* combines some of the best competitive features of *Monopoly* with economic simulation games like *Kingdom*. Four people can play, or you can play against three computer opponents. As a colonist from a distant planet, your object is to help the colony become self-sufficient in farming, mining, and energy production. To help you with your work, you can buy a M.U.L.E. (multiple-use labor element) at the local store, equip it, and walk it back to your land. During turns (six in the beginner's game, twelve in the regular game), each player chooses or buys at auction one of forty-four plots of land. You produce what you wish for that turn, based on how much food and energy you have. Random events sometimes influence the results. At the end of the month, you can buy or sell goods at an auction, based on whether you face a shortage or surplus. The auction follows the laws of supply and demand and becomes the best part of the game because of its cutthroat nature. For example, miners of Smithore earn a great deal but also pay dearly for their consumption of energy and food. Buyers and sellers control prices by moving their bid and ask lines. When a match results, a transaction takes place. I enjoyed watching players scramble for limited supplies, but you can't get too greedy because the survival of the entire colony is at stake. At the end of the auction, players receive status reports telling who leads.

The game teaches valuable lessons in economics in a fun way. You not only learn the theory of supply and demand, but also that increased size leads to increased production, and increased knowledge leads to increased efficiency. You also observe the law of diminishing returns as you try to establish a monopoly. If you look

out only for yourself, the poorer players can't afford to buy the energy and food that you produce.

Random events also influence the game. Planetquakes halve mining production, space pirates steal Smithore, your M.U.L.E. might run away, the general store may burn down, acid rain can lower food production, and hoarded food spoils. You may even go Wumpus hunting after outfitting your M.U.L.E. If you can catch a Wumpus when he opens his cave door and shines his light, you can hold him for ransom.

The game offers three levels of play. The beginner's level avoids some advanced features and is short-lived. The regular game introduces land auctions, minimum production requirements, and land development. The tournament level adds the chance to prospect for rare Crystite and lets you form cartels. All three levels are extremely well-designed and rival the best of the board games. You can easily play using only a joystick. The graphics are colorful and nicely animated, and even the music is good, with original, toe-tapping tunes. When several people play, the game becomes involved and interactive.

MILLIONAIRE

Blue Chip Software
$60.00

Overall Rating	A-	Hard	*Challenge*
Creativity	A	N/A	*Graphics*
Documentation	B+	A	*Value for Money*
Holds Interest	B	A	*Game Depth*

This complex stock market simulation game for one player doubles as an educational introduction in investment finance. Fortunately, the excellent documentation and menu-driven structure make the game easy to play, but you must sort, analyze, and act on a wealth of information to parlay your original $10,000 venture capital into $1,000,000. You can't reach millionaire status in one game. Instead, you move your investor status and net worth along with you through many games.

Millionaire comes in an impressive black, padded vinyl binder with large gold embossed lettering. The package itself raises expectations which, happily, the game bears out. The enclosed instructions tell you how to load and run the game, but don't mention how to obtain backups or what they cost, if available.

Once you have loaded the game, you choose whether to reenter a saved game or start a new one. If you choose to begin a new game, you can either create a new character or use a saved character (you can save the game status for up to fourteen players on the game disk). After choosing your character, you must wait about nine minutes for the game to initialize itself and create a ninety-one week stock market environment. The first fourteen weeks present a history for you to analyze on your first turn; actual play begins in the fourteenth week and continues until you have completed the full ninety-one weeks. During any given week you can carry out a number of buy/sell transactions using a pool of fifteen securities organized into five industry groups: Computer, Oil and Gas, Retail, Auto, and Heavy Industry. Each week of trading starts with a graph of overall market performance, followed by a graph of one of the industry groups. After you have analyzed these graphs and any others you choose, you get the week's news bulletin, which may or may not reflect future trends. As your profits and net worth increase, you progress into increasingly sophisticated trading, borrowing, and other investment alternatives as your status rises from novice eventually to millionaire.

Millionaire, based on actual stock market trends rather than on random numbers, is truly worth its weight in gold.

SEVEN CITIES OF GOLD

Electronic Arts
$40.00
Not compatible with MSD drive

Overall Rating	A+	Medium	*Challenge*
Creativity	A	B	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

In *Seven Cities of Gold* you can be a benign explorer or a ruthless conquistador exploring the New World. After outfitting a fleet of ships and hiring a crew, you set sail in search of land, riches, and fame.

The game, historically correct, begins in 1492 with your audience to the Spanish king. Once you have obtained funds from him, you stop at the outfitter to purchase ships, food, trade goods, and hire crews. Finally, you embark on your perilous voyage to the unknown.

If you know your geography, you'll have an advantage, at least with the accurate New World portrayed on the map disk. Of course, you could create an entirely new world and save it to another map disk. Either way, the game offers considerable challenge, since you must navigate the seas by latitude and the passage of time. Your joystick-controlled ship sails within a small scrolling window that limits your long-range sight to ten miles, much like a ship at sea with a man stationed in the crow's nest. Storms delay you, blow you far off course, or damage your ships and crews. With a limited food supply, you must reach the New World quickly.

When you sight land, you have a choice of sailing along the coast, automatically mapping as you go, or

finding a safe anchorage to start exploring. You must decide how large to make your landing party, and how much food and trade goods they should carry. Alternatively, you could establish forts or missions near your landing site.

You'll encounter rivers, lakes, forests, plains, and even mountains as you explore. Your traveling speed varies, and rough terrain always costs you additional food. You'll find many native villages, and even small cities, particularly near rivers. Different symbols on the scrolling map indicate size variations. When you enter a city or village, your view zooms in to show the details.

When you enter a native village, you can cautiously offer gifts to their chief, or even trade with him, assuming you brought enough gifts. Don't make any sudden moves as they crowd around you: you can easily injure, or even kill them. You can deliberately engage in wholesale slaughter, like Pisarro did with the Incas. While the latter may seem easiest (despite moderate losses), word quickly spreads throughout the region, and other villages prepare for your arrival. You may even be ambushed in the countryside as you head back to your ship. Conquered villages' wealth is yours if you have enough men and native bearers to transport it back to the fleet. If you leave several men behind, they can establish a fort. Likewise, if you trade in peace, you may leave a few men behind to establish a mission.

A peaceful approach is often best, especially if you intend to learn the locations of the natives' gold mines. Of course, you can set out on long term explorations to find them yourself, but food is always a problem. You have to rely on large numbers of unreliable native bearers who will desert at the slightest provocation. Food is especially scarce in winter, and, if you get lost, starvation almost absolute. Once you've lost your land expedition from battle or attrition, you lose the entire sea expedition, and any information and maps you gathered since setting sail from Spain.

Your goal: bring your fleet back to Spain brimming with treasure. When you arrive, the grateful Queen grants you honors and a title, and helps you assemble an even greater fleet for your next voyage. The Pub displays your maps for posterity, and you see a complete map of all that you've discovered.

Seven Cities of Gold is extraordinarily well conceived, and superbly executed. While the graphics are merely adequate throughout the game (actually, the home port graphics are superb), game play is involving. Time flies when you begin exploring a brand new world. You can even save your game to return to it later—your current position is saved to your map disk. Higher difficulty levels present you with more populous native villages that are harder to deal with. Time also passes quicker, and more random events take place (like storms and the possibility of the crew sailing home without you). In sum, the game is great. It is very engrossing, and once you start playing it you can get hooked for a very long time.

TRAINS

Spinnaker Software
$32.95

Overall Rating	B	Medium	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B-	B-	*Value for Money*
Game Depth	B	B-	*Holds Interest*

Entertainment programs that simulate business enterprises are usually boring—but not so with *Trains*. The authors have taken the old Lionel train set from under the Christmas tree, and combined the mechanics of its operations with the economics of running an actual railroad. Instead of a dull business simulation, they have come up with an engaging visual experience that brings out the kid in all of us.

The object of any business is to make a profit. In the train business, you have to pick up cargo and deliver it to where it's needed, while paying for expenses such as coal for the locomotive and salaries for the staff. If you are fast and efficient, you will turn a profit; otherwise, you won't.

The entire train layout is displayed on a single screen. The tracks connect various factories, mills, markets, and oil refineries with the sources of raw materials, like farms, oil wells, forests, and mines. The track layout (depending on your choice of difficulty level) may be simple, with only a few connecting loops controlled by switches. Or, it can be quite complex with many interloops and railroad sidings. Trains are comprised of a locomotive, coal tender, several assorted cars, and a caboose. The order of the train's cars, including whether you have a tanker, ore, box, or flat cars, is displayed at the bottom of the screen. It is important to know which car is which, for you must align the correct car on the proper loading/unloading zone when you stop.

The train is controlled entirely by the joystick. Pushing forward accelerates it, and pulling back stops it or reverses it if you hold it back long enough. You'll have to slow to zero in order to make a complete stop. You make turns at the switches or junctions by moving left or right. Pressing the joystick button unloads the car when the car is stopped at the unloading zone; otherwise the button just blows the train's whistle. You can tell how full your car is from the boxes above each of the freight cars at the bottom of the screen.

You earn money by making successful pick-ups and deliveries. The trick is to find the most efficient routes for evenly servicing all of the industries. Coal is constantly being used, even when the train is standing still. Heavy loads and fast speeds use up greater amounts of

coal than normal, which you then must replenish at the coal depot. Also, payroll expenses of $200 arise when the appropriate message appears on the screen (every three minutes).

The game contains variables. Sometimes, a message flashes notifying you of a critical industry need. The amount of money you can make from this situation depends on how quickly you meet the demand. If you are too slow, you'll get paid less. You can check the industry display window's bar graphs for the availability of raw materials at the various sites.

Trains is a clever diversion with educational overtones. The game has great graphics and sound effects, too. It is one of the few business games that is actually fun to play, perhaps even more so by children and adults alike who have had the experience of model railroading.

WALL STREET

Timeworks, Inc.
$24.95

Overall Rating	B	Medium	*Challenge*
Creativity	B-	B+	*Graphics*
Documentation	C	A-	*Value for Money*
Game Depth	B-	B	*Holds Interest*

Wall Street simulates the world of high finance for one to four players. Each player begins with a million dollars, and buys and sells stocks, real estate, a mineral exploration company, precious metals, and money market funds. There are also speculative investment opportunities such as movies, business ventures, Broadway plays, and treasure hunts. I reviewed the disk version, but the game also comes on cassette.

Frankly, I was kind of dubious as I opened the game package. I'd seen some pretty unimpressive public domain financial games. But I was pleasantly surprised by *Wall Street*. The game has nice graphics and sound, but, more importantly, a satisfying sense of realism.

While the idea behind *Wall Street* certainly isn't original, this application of the concept deserves high marks. Various investment opportunities exist, and price fluctuations are not purely random. Each item follows upward and downward trends, and some investments are riskier than others. You can view bar charts depicting the trends (of course, you never know when a trend will reverse itself), and you can consult a financial analyst for advice (for a price). The analyst is usually, but not always, right. Your broker (the computer) charges a one and a half percent commission. You have to pay taxes each year, but you can shelter some income through an IRA account or real estate.

Each turn constitutes a quarter, and the game lasts fifteen years, or sixty quarters. For one player, the goal is to accumulate ten million dollars. For multiple players, the goal is to make the most money. You can make up to five transactions each turn. Timeworks says the game takes two to four hours to play; I'd say it takes a bit longer. You can save your game and recall it later, but only one game per disk. However, files from other programs won't be disturbed, so you need not devote a disk exclusively to a saved game.

The documentation for *Wall Street* (a twenty-page booklet) is good, but it does have a few minor problems. It has clear loading instructions, so new players should have no trouble, and four reference cards (one for each player). It clearly explains most game options, but a few items left me confused at first. For example, it took me awhile to figure out that IRA and money market shares cost the same. You can only make one IRA purchase each year, so when I tried to buy more shares than I could afford I lost my chance to buy any at all. Also, a couple of minor program bugs exist. You can't use commas when you enter dollar amounts. And when the program asks for players' names at the beginning of the game, you must enter something. If you just press Return, the game hangs and you have to restart.

One nice thing about this game is that the players control the level of difficulty. If you and your friends are financial nitwits, you can just compare results among yourselves. On the other hand, if ten million seems like peanuts (five and a half million was my best), then simply set your sights higher. You can pursue a multitude of strategies, and you follow no ideal pattern, because the market acts differently each time you play.

Wall Street isn't really a graphics-oriented game, but it does use graphics, and they're pretty impressive. Each round of play begins with a ticker-tape display: the prices scroll across the screen accompanied by a ticker-tape sound effect. The "Big Board" and other investment displays use color to highlight items: investments currently earning over fifteen percent per year are green, while losers are red. But the bar chart has the nicest graphics. You can call an eight-color chart which shows the price trend for any investment. The program is written in compiled BASIC (Petspeed), so the graphics displays are quick. *Wall Street* also has some fun sound effects. When you invest in one of the speculative items (like a Broadway play), you hear a few bars of "We're in the Money" if it was a success. If you lost money on the deal you hear a funeral dirge.

In general, *Wall Street* impressed me very much. It's challenging and sophisticated, yet easy to play. Even if you think you dislike financial simulations, you'd probably enjoy this one. And if this is your type of game, you'll get a bargain.

Gambling, Cards, and Board Games

ADEPT (Archon II)

Electronic Arts
$40.00
Not compatible with MSD drive

Overall Rating	A	Medium	*Challenge*
Creativity	A	A	*Graphics*
Documentation	B	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

In this sequel to *Archon*, the Master of Order struggles against the Mistress of Chaos in an attempt to hold territory in the realm of the four elements: Earth, Water, Air, and Fire. While the game has some of the same play mechanics of the original, magic is the key in *Adept*. Players control five adepts (or magicians) in this head-to-head contest between two human players, or the computer and one player. As in *Archon*, the goal of the game is to control six power points on the board.

The game board is composed of four bands representing the classical elements of Earth, Water, Air, and Fire. These bands radiate outward in the above order from two citadels, the home sqaures of Order and Chaos. There are also two neutral squares that have permanent power points. Four others move from turn to turn through the outermost corners of the four elements.

The game action operates entirely through magic spells cast one per turn by one of the five adepts. Since using magic costs energy, it is important to spend as much time as possible on a power-giving square. It also costs energy to maintain the demons and elementals you conjure up. Though moving adepts between elements is nearly free, they are best used to conjure spells in the element they are aligned to.

Summon is the most useful spell, since you need an army to fight your battles. You have a choice of four powerful demons and four less powerful elementals. The energy bar on the side of the screen shows the amount of energy required to summon each. The more powerful the demon, the more power summoning takes, and these powerful creatures can only be placed on the same element with the adept who summoned it. You have access to an unlimited supply of demons and elementals. You do run out of energy summoning them, especially powerful demons.

Each creature has special abilities, which—like the adepts'—are enhanced when they are on the element they're aligned to. A firebird, for instance, is more powerful when it's on a fire square. This game has some new creatures among them: the Wraith, who is invisible except when it tries to hurt its opponent; the Siren, whose sailing sound brings death; the Juggernaut, who is, in effect, its own missile; and the Oorgon, who does not wound, but slowly paralyzes his opponent.

As in *Archon*, *Adept*'s battles take place in an arena where you maneuver with a joystick. Barriers between the elements have a different effect on both the monsters and missiles. Fire is dangerous, and slowly wounds any creature, while Water and Air barriers only slow them down. Air barriers deflect missiles, while Water (again) only slows them down. You can fire continuously, but after the low pitched bell (for Chaos) sounds. You must stop at the sound of the high pitched Order bell.

Adepts can also conjure up other spells. Some, like Heal, Weaken, and Imprison, cost only a little energy, while spells such as Banish, and especially Apocalypse, cause an enormous energy drain. You should use the latter as a last resort; it always begins the battle that ends the game. In it, your creatures' lifespans, missile power, and missile speed are dependent upon your magical energy, and the number of creatures and Adepts left. While it is intended to put a hopelessly overwhelmed enemy out of his misery, some players use it unfairly to assure victory over an opposing player who has weak hand-eye coordination. Fortunately, badly weakened players don't have enough energy to even dream of using it.

I think *Adept* is a better game than its predecessor because it requires you to come up with more (and cleverer) game strategies to secure your victory. In *Archon*, players just slug away, attacking square after square, until the better player wins. It is not a thinking game. In *Adept*, players must contend with energy drain, and actually conquer territory. It's a much more subtle game. The game's graphics, like those in *Archon*, are good. It is a little easier to identify pieces in this

sequel, as they exhibit more striking differences. Game play is excellent, and the game will hold any player's interest for a long time. *Adept* is an outstanding two-player game; it can, however, become a somewhat frustrating contest against a strong computer opponent.

AIRLINE

Adventure International
$24.95

Overall Rating	D+	Easy	*Challenge*
Creativity	C	C-	*Graphics*
Documentation	C	D+	*Value for Money*
Game Depth	C-	C-	*Holds Interest*

The object of this strategy board game is to build an airline empire by buying landing rights in any of thirty-six major U.S. cities, purchasing planes, then stationing them on routes that will maximize fare revenue. It is a simple, joystick-controlled game that two to four human or computer participants can play on a six by six playing board. The game is easy to control with the joystick. Players start off with $100,000. Each player can either buy the landing rights in one city, buy a plane, or pass on that turn. The costs of the landing rights are preset and are determined by the size of the city.

Since routes are formed by connecting adjacent cities, strategies range from that of consistently buying landing rights in city after city (for the purpose of maximizing potential fare revenue), to that of quickly adding expensive planes in a limited number of cities to generate immediate fare revenue. While the latter approach works in short games, the winner of the game is often decided by whoever is earning the most fare revenue by the last turn. The game, for some arcane reason, adds ten times the amount of fare revenue (equivalent to ten turns) to each player on the last turn alone. It favors the slow starter with the most territory, as long as he hasn't fallen too far behind in accumulated earnings.

Airline, which is written in BASIC, is agonizingly slow, especially when you are playing with several computer opponents. Each decision takes almost fifteen seconds regardless of whether all territory has been bought up, or whether or not there is room to base more aircraft. Forty-move games seem to take forever. The game's graphics are simple, consisting of the six by six centered game board flanked by two lettered menu areas and a status area at the bottom. The whole game is cut and dried. Game play is simplistic with no interaction among players, no element of chance, and nothing to think about. The whole game is cut and dry. All in all, *Airline* is a simple and dull strategy game that's geared more for young players. It lacks the minimal amounts of business risk taking and intricate play mechanics to be of much interest to adults.

ARCHON

Electronic Arts
$40.00
Not compatible with MSD drive

Overall Rating	A	Hard	*Challenge*
Creativity	A	B+	*Graphics*
Documentation	B+	A	*Value for Money*
Game Depth	A	A	*Holds Interest*

Recall those humorous scenes from the movie *Star Wars* in which R2-D2 and Chewbaca are playing a chess-like game aboard the Millennium Falcon. The droid's game piece, projected by hologram as a life-like, goblinesque creature, advances across the board to the square occupied by his opponent's piece and slays it. They must have been playing a futuristic version of *Archon*.

Imagine a strategy board game similar to chess with fantasy-role-playing characters as pieces. The object of the game is to defeat each of your opponent's pieces in battle, or control the five power points on the board. Like chess, each piece has relative strengths and weaknesses, and specific movement characteristics. Unlike chess, the Light and the Dark sides have completely different game pieces that, on the whole, are equal in strength. Each side's game piece has a counterpart with similar strengths and weaknesses, but different fighting styles. For example, the equivalent piece to the pawn in chess is a sword-wielding knight for the Light forces, and a club-wielding goblin for the Dark side. The Light forces have one wizard, two unicorns, two archers, two golems, two valkyries, one djinn, one phoenix, and seven knights. The golems throw boulders while the djinn hurls whirlwinds, and the unicorn fires energy bolts. On the other side, the Dark forces have one sorceress, two basilisks, two maticores, two trolls, one shapeshifter, one dragon, two banshees, and seven goblins. The basilisks attack with an eye beam, the manticores with tail spikes, and so on. Both the Light force's wizard, and the Dark force's sorceress can cast spells in addition to fighting with fireballs and lightning bolts, respectively.

The battlefield is separate from the strategy board screen. When two foes challenge each other by occupying the same light, dark, or neutral colored square, they fight in a combat arena that has barriers carrying you through a luminosity cycle. When the barriers match the color of the background, they disappear. During

the few brief seconds before and after this moment, opponents can walk through the barriers or penetrate them with missiles. The barriers slow them down. Meanwhile, lifelines at either end of the screen indicate the relative strength of each opponent. When one is wounded, its lifeline is reduced in proportion to the severity of the wound. When the lifeline is zero, the icon is "dead," and combat is over. Combat is a combination of strategy and dexterity skills. A weak, club-wielding goblin can sometimes defeat a powerful unicorn who hurls fast energy bolts, if the goblin can corner it and beat it over the head without being hit by the first bolt. The graphics during battle boast excellent, realistic animation.

Both the wizard and the sorceress are powerful pieces that should not be removed from the safety of their power square. These squares are important in that they accelerate the healing of battle wounds. The ability to cast spells by these two icons is important to the game's strategic play. There are seven spells and each can be used only once. Some of the more interesting spells can teleport a given piece to any other place on the board, exchange any two pieces on the strategy board, revive a dead icon, imprison an enemy icon, or summon an elemental spirit. (This latter spell is particularly useful in attacking a very powerful enemy piece.)

The imprisonment spell is useful for keeping an enemy piece on a designated square. During battle on a light square, the Light forces have the advantage; conversely, the Dark forces have an advantage on the black squares. Many of the squares (especially the neutral ones) cycle from light to dark in a set pattern. If a piece is imprisoned on a neutral square, you can more effectively attack it when it turns to the color that would give you the advantage. Another spell (called Shift Time) will reverse the flow of the luminosity cycle.

Archon is one of the most creative and original games that has come along in several years. I'll admit that it has its roots in chess and maze/adventure type games, but it is this brilliant combination that works to make this hybrid such an outstanding strategy and combat program. I tested it on both teens and adults. Both groups, regardless of their interest or lack of interest in chess, found *Archon* a totally fascinating game. Despite its complexity, it can be quickly grasped by players of all ages. *Archon* has terrific graphics and will give you a lifetime of pleasure.

BLACKJACK TUTOR

Briley Software
$19.95

Overall Rating	A-	Hard	*Challenge*
Creativity	A	A	*Graphics*
Documentation	A	A	*Value for Money*
Game Depth	A	B+	*Holds Interest*

Briley's *Blackjack Tutor* really shouldn't be thought of as merely a game. At heart, it is a serious educational program that imparts the ins and outs of blackjack technique. In a sense, it's as if a Las Vegas dealer has come into your home to give you private blackjack lessons.

As an educational program, *Blackjack Tutor* is excellent. It clearly explains every possible blackjack decision, demonstrating relevant points with full card pictures. It covers hitting and standing, doubling down, and splitting.

Its only major drawback is that it doesn't include a blackjack game to test your new expertise. In fact, the first paragraph of the instruction booklet advises buyers to purchase a good computer blackjack program if they don't already own one. (This program would be worth an additional ten or fifteen dollars if it included one.)

This software is an unpretentious aid for those planning to hit the real-life blackjack tables, and is decidedly on par with a number of books touting blackjack technique. *Blackjack Tutor* is geared toward inexperienced players; it advises players to consult the Hoyle or Scarne books if they're unfamiliar with the rules of the game. The instructions begin with a number of assumptions: the object of the game is not to get twenty-one, but to beat the dealer; other players are irrelevant to success; losing sessions will occur; and the skillful will have much better success than those who are merely lucky.

The *Tutor*'s strategy is "considerably influenced by the computer analyses of the early sixties, as fine tuned by modern high computer power and recent changes in the casino version of the game," or so the directions say. The program is written as if it were being played with four decks of cards and a shoe; card counting is not part of the Briley Software strategy.

Blackjack Tutor is easy to handle and pleasant to look at. It loads quickly and easily from cassette, and only requires an economical 9.5K. The BASIC program may be duplicated once as a personal backup, and may also be listed. Technically, sprites are used effectively to depict a stack of chips and the large symbols on the cards.

Regrettably, *Blackjack Tutor* begins with an anticlimactic and unattractive menu screen. You can get to a title screen by choosing "T" for the Tables option. Tables give basic strategy for players to follow—

specifically when to stand on a hand or be hit, depending on the dealer's hand, when to double down, and when to split pairs. Other menu options include Hit-Stand, Double, Split, or Mixed Practice options. A real-time clock on the menu screen reminds you of how long you've been at the tables.

Choose a practice option and your monitor comes alive with the sound of shuffling. In a few seconds, colorful pictoral cards are dealt. The graphics are very pretty. A nine of spades has nine spades and picture cards present bold pictures of the assorted royal figures. A stack of chips on the bottom of your screen moves right or left depending on your decisions.

The function keys can be handily used for quick action. Press F1 to stand, F3 to be hit, F5 to double, and F7 to split. Once your hand is dealt, you are asked for the best play. If you're not sure about what to do, ask the expert: Press F2 for help. The Help option is very handy; it provides a brief synopsis of each specific situation. The same "expert" advises you when you've made a wrong choice.

To clear the screen and return to the menu, press F4, F6, or F8; entering a space and a Return resets your scorecard. Be aware that this is *strictly* a game of practice. You will never see the final outcome of a hand. The dealer's face-down card is never revealed, but the computer tells you whether or not you correctly assessed the situation. The only score *BlackJack Tutor* keeps is of your correct and incorrect choices, clearly shown by category to display your weaknesses. The program addresses you in a conversational tone, substituting "Yep" or "Capital," for "Yes" when it acknowledges a correct decision. It never discourages you, and is always a helpful teacher.

Blackjack Tutor is a capital aid for learning the rules of 21. It is extremely user-friendly and features attractive graphics to give prospective gamblers intensive training in blackjack technique. You may find that it was well worth its price once you try out your new knowledge at the glamorous casino tables around the globe. As I mentioned previously, the one serious flaw of the program is that it doesn't include an equally competent blackjack game.

FEVER BLACKJACK

Metaphase Software
$19.95

Overall Rating	A	Varies	*Challenge*
Creativity	B	B	*Graphics*
Documentation	D	A	*Value for Money*
Game Depth	B	A-	*Holds Interest*

This fine blackjack program should interest casual "21" players and inveterate casino gamblers alike. While it has some minor limitations, *Fever Blackjack* has features lacking in other blackjack programs that cost up to three times as much. As a somewhat bitter veteran of program marketing hype and ripoffs, I find this a refreshing change, to say the least.

The computer deals two cards to you, face up, and two to himself, one face up, the other face down. You press F1 to hit or F3 to stay. F5 splits a pair and F7 doubles down. (The instruction booklet contains a brief, but accurate, overview of blackjack.) You have two betting options: either $1 per hand automatically, or from $1 to $9 before each hand. The bottom of the screen displays your current bankroll (positive or negative).

Fever Blackjack's other features should interest advanced players. You can alter the two built-in card counting systems, then test your new scheme in a special, high-speed, self-play mode. The computer quickly plays itself showing only the game's results (i.e., net wins and losses). You can test various card-counting systems for hundreds or even thousands of games without actually playing them. The program analyzes your system's results as well. You can also experiment with basic strategies in the fast mode—such as when it's best to hit or stand. The normal speed offers a "Learn by Watching" mode in which you watch the computer play itself.

You select the level of play, the number of decks used, and decide when to shuffle the cards. These options let you practice blackjack under conditions resembling your favorite casino's.

On the negative side, only one player can play against the computer at a time. There are programs that permit as many as seven players at once. However, this is a minor drawback, since home computing often isolates the player. The documentation is another minor irritation. It's one of those dot-matrix and photocopy jobs redolent of cottage industry at its cheesiest, with about the usual number of misspellings (rational for rationale, etc.). But what the heck, I like this program—and you can't beat the price.

GO

Hayden Software Co.
$29.95

Overall Rating	B	Medium	*Challenge*
Creativity	B	C-	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	B	B	*Holds Interest*

This Commodore 64 program is an adaptation of the ancient Oriental strategy game. You try to control the most territory on the board, while losing as few of your stones (pieces) as possible to your opponent. You place

stones on the intersecting lines of the 19 by 19 board, in order to surround completely one or more of your opponent's stones, without leaving vacant intersections in the closed areas. Unlike *Othello*, a somewhat similar, but simpler game, you remove captured pieces, rather than give them to the capturer.

You place stones on the board one at a time with the joystick or keyboard. You can move misplaced stones in the Edit mode. You take turns with the computer, or play against another person with the computer as referee. Two players silently play, however, in a one-player game, the computer sounds a warning when it is one stone short of surrounding one or more of your pieces. The word "atari," an equivalent to "check" in chess, flashes on the screen.

The game's concept seems simple, it's difficult to master. The number of stones captured does not indicate how well you are doing, since the final score is based on the number of vacant points surrounded minus the stones captured by your opponent.

Go is not very popular in this country, so I had trouble finding a suitable player to test the two-player game. However, I did find that the computer opponent is not dumb, doesn't fall for traps, and is certainly above the novice level. It is a challenging opponent and teacher for any beginner who has trouble finding other human Go players.

KING CRIBBAGE

Hayden Software Co.
$24.95

Overall Rating	B-	Easy	*Challenge*
Creativity	C	C+	*Graphics*
Documentation	C	B	*Value for Money*
Game Depth	C+	B-	*Holds Interest*

On a straightforward and well-designed playing field, *King Cribbage* plays a good, steady card game. The cards' rank and suit designations are easy to distinguish, but their size is slightly on the small side. The board is the standard rectangular shape, displaying the number of pips that each player has registered on his way to a 121-point game. The board is centered on your screen with numerical representations of each player's score.

The object of this two-player game (you against the computer) is, as you may have already guessed, to score. You accomplish this by playing a card that forms a scoring combination with the cards that have already been played. You score points for pairs, runs, flushes, two cards that total fifteen, and a "nob," where you hold a Jack that is the same suit as the starting card. Players alternate putting down cards until the total face value of the cards reaches thirty-one (for which the player playing the last card receives two points), or until neither can play another card. The crib, consisting of the two cards that each player has discarded at the beginning of play, plus the card turned-up on the undealt part of the deck, is awarded to the dealer, who then receives points for its contents. The deal changes with each hand, so you must develop a strategy to deal with discarding into your own crib in one hand and your opponent's the next.

The game is very easy to play, even for beginners. The computer automatically scores their hands. This makes it a good teaching tool, since it explains the entire complicated scoring procedure. Players can also choose to score themselves in a game called "Muggins."

The computer plays a good, strong game with few weird hands. The player may control the game's pace, since you input all moves via the joystick. In fact, playing the game is practically foolproof, as the computer will not allow you to play a card illegally. The problem is that if you don't bother to read the rules you'll feel left out—the computer will play a strong game regardless of your skill or lack of playing strategy. Of course, this is just the nature of the card game.

MATCHBOXES

Broderbund Software
$29.95

Overall Rating	B-	Medium	*Challenge*
Creativity	C	B	*Graphics*
Documentation	C	B-	*Value for Money*
Game Depth	C+	C+	*Holds Interest*

Matchboxes is a nicely animated and tuneful version of the classic T.V. game *Concentration*. This version has features of the *Concentration* game and several others that require the players to guess the scrambled word hidden behind the blocks.

You are presented with a rectangular grid of thirty-six blank, numbered boxes. Each of the boxes conceals a nicely animated figure and a fragment of a familiar tune such as "Old MacDonald Had a Farm." A duplicate match appears elsewhere in the grid and your job is to find it. Players use joysticks and fire buttons to uncover two boxes at a time, trying to match the identical pairs. A saying or message is also hidden behind the grid and the player who makes out the entire phrase wins the game.

All of these versions can be played against a computer opponent at one of three levels. Naturally, the computer has a very good memory, but at the beginner's level it deliberately misses matches. You get the feeling that the computer is toying with you each time it misses a match. This soon disappears on the upper levels

where the computer becomes a more formidable opponent.

The game is ideally suited for family play, especially for those with young children, but in all cases *Matchboxes* is best played against a human partner. The animation is nicely done, and there are good animated sequences of jumping kangaroos, blasting rockets, moving abstract shapes, and a *Pac-Man* scenario. This, accompanied by familiar tunes, will hold a child's as well as an adult's attention for a long while.

OIL BARONS

EPYX
$52.95

Overall Rating	B	Medium	*Challenge*
Creativity	A-	B	*Graphics*
Documentation	B	B-	*Value for Money*
Game Depth	A	B+	*Holds Interest*

One thing that the purchaser of *Oil Barons* notices immediately—even before the game is out the door of the store—is that this program considerably differs from most other home computer games. A hybrid computer and board game that comes in an oversized package, it contains a four color playing board of fifty by forty squares that resembles *Monopoly*, plus 218 color-coded playing pieces (called markers) for tracking games.

In *Oil Barons*, the advantages of traditional board play are combined with the ease of a computer-based game. It simulates the operations of the oil industry in game form, replete with exploration, drilling, and production activities. One to eight players may participate. Each player controls his or her own company, and begins with over a million dollars of operating cash and four parcels of land. The objective is strictly capitalistic: to see which player can amass the most wealth. After your first try at playing the game, you'll soon see that if you are crafty and smart, you'll probably become filthy rich. Troublesome obstacles, such as natural disasters, government regulations, and well fires often complicate play. And, to add a measure of spice, powerful cartels, shady deals, and high-risk business dealings are all permitted.

As with other EPYX games, *Oil Barons* requires careful thought and skillful strategy while still offering a measure of fast-paced action. In this simulation, a wide range of game play is possible. Two basic game forms are provided: the Classic Game and the Reality Game. The former plays much like a traditional board game with well-defined rules, while the latter is much more complicated, with its realistic simulation of actual oil industry operations. You can play regular-length, as well as quickie versions, of both game forms.

In addition, a special feature, the Customized Game capability, allows you to create your own version of *Oil Barons*, the paramenters of which can be saved on a separate disk for play at a later time. Three Customized Game modes are available: strategic, reality, and gamble modes. The first two modes allow you, in effect, to write your own game rules. The third (gamble) mode randomly scrambles the rules in bizarre ways, requiring players to discover the game parameters through trial and error. Consequently, the resulting games are marked by unexpected twists and turns. You can also select personalized game options to suit your particular preferences.

The game disk is two-sided: Side 1 contains the game setup, while Side 2 contains the main programs. Game setup, using Side 1, involves adjusting the monitor for best color via a "color check," and then responding to prompts that set up such things as the number of players, company names, skill level, victory conditions, desired game version, and other important settings for play. After the computer setup is complete, you insert the game disk (Side 2) and play can commence.

Developing oil properties is the key to winning at *Oil Barons*. For the wise, this means a careful reading of the twelve-page instruction manual, which includes a handy quick reference chart. A glance at the manual shows you that the authors, Tom and Philip Glass, wove a good deal of complexity into the game. There is a Terrain Hierarchy in which your chances of finding oil depend on the particular terrain, an auction to put more parcels of land into play at the start of most turns, and the opportunity for owners to conduct private land sale transactions between companies. There are also royalty payments, stock tickers, bank notes, financial statements, and even the *Oil Street Journal* video newspaper that displays news and government announcements which may affect game play. In-progress games may be saved and restored easily, though you must manually input some game information and write down other data for later play.

Restoring saved Customized Game versions proved rather confusing and erratic, and selection of several menu options within the game reulted in BASIC error messages. Though these did not necessarily crash the program, such problems marred an otherwise smooth-running simulation that's fun to play. Once you get the hang of it, it's not too difficult a game, since the computer helps to keep track of things, acting as banker, scorekeeper, and financial advisor. Still, some players may consider *Oil Barons* much too slow-moving and lacking in sufficient action. Though not all players will appreciate the game, the lively animated graphics and overall challenge of the marketplace transactions make for a game that will not sit on your shelf gathering dust.

REVERSAL

Hayden Software Co.
$29.95

Overall Rating	A-	Varies	*Challenge*
Creativity	B	B	*Graphics*
Documentation	B+	B+	*Value for Money*
Game Depth	B	B+	*Holds Interest*

Reversal offers Othello players a definite challenge. In fact, the Spracklens of Sargon chess fame took a quantum leap beyond other computer versions of Othello. It won the First International manmachine Othello tournament.

In this strategy game, you try to surround your opponent's pieces on a square (8 by 8) board. The coin-shaped pieces have a different color on each side. You turn over trapped pieces, revealing your color on the other side—making them yours. The object is to control the most squares. A simple game, but difficult to master.

The program lets you play against the computer or another person, or arrange the board to play out a specific scenario. The three modes (beginning, intermediate, and advanced) have nine levels each. You can change the play level any time during a game. The computer's response time varies with mode and level from two and a half seconds to three minutes. You can usually see the board, but the F1 key displays a written move-by-move transcript. In the kibitz mode the computer offers mediocre advice. The "take back" feature lets you change your mind, and the F6 key displays or supresses smiling and frowning faces on the counters (they smile when they're winning, of course).

Reversal has a foolproof move entry system. You use the left and right cursor key or the joystick to operate a blinking cursor that performs only legal moves. Pressing the key or moving the joystick displays possible moves one at a time. When you find the move you want to make, press the Return key or joystick button to confirm it. When the computer makes a crucial move, it waits for you to press Return or the joystick button before it actually flips over the surrounded pieces.

I found *Reversal* especially challenging; in fact, embarrassingly so. Since I've beaten similar programs pretty easily, I went straight to the advanced level. After the computer beat me at level four several times by a three to one margin, I swallowed my pride and went to the intermediate level.

SARGON II

Hayden Software Co.
$19.95

Overall Rating	B+	Varies	*Challenge*
Creativity	B	C	*Graphics*
Documentation	B+	B+	*Value for Money*
Game Depth	B+	B+	*Holds Interest*

Sargon II is one of the best and most powerful chess programs available for the Commodore. This game and its earlier version had won most of the microcomputer chess tournaments up until 1981. Only with the appearance of *Chess 7.0* and *Sargon III* has a microcomputer chess game beaten it.

Sargon II offers six levels of play, detailed board display, the ability to set up chess problems, and a kibitz mode (F3 key) for players who need a suggestion for a better move. (Another reviewer found it very difficult to distinguish between the different chess pieces on a standard TV display and was unable to utilize the F3 key to obtain the kibitz mode.) Response time is not exceptionally fast on the higher levels of play. While the first level of play takes only twenty seconds, very advanced levels take an hour or more. However, most advanced players would be humiliated at levels with a response time of from two to six minutes.

The program is very easy to use. All moves are entered by keyboard. The labelling of board position and moves is not standard chess notation; however, it is perhaps simpler for beginners. The board is lettered horizontally (A-G) and vertically (1-8). Moving the king's pawn two spaces is accomplished by entering E2-E4. Mistakes can be easily corrected using the Delete key, but once you press Return, you will have to enter the Change Board editing mode to take back a move. There is no listing of previous moves as in other translations.

Sargon II is a very worthy opponent for any chess enthusiast. It is currently rated at 1400 life points, a very high rating indeed. Because of its style and moderate ease of use, it is one of the better chess programs for the Commodore computer.

TETRAD

Hayden Software Co.
$29.95

Overall Rating	C+	Medium	*Challenge*
Creativity	C	C+	*Graphics*
Documentation	B-	B-	*Value for Money*
Game Depth	C+	B	*Holds Interest*

If you enjoyed tic-tac-toe as a child (before you analyzed the moves and realized you couldn't win), you

will love *Tetrad*, a four by four, three-dimensional, futuristic tic-tac-toe game.

You decide who goes first—you or the computer—and set the difficulty level. *Tetrad* offers novice, intermediate, and professional modes. I did not see any great difference between the levels, however, as the computer was quite a smart player at all three.

The screen display is interesting, and the game is deceptively easy to learn; you try to place four X's in a row, either horizontally on one board, or vertically on each of the four boards, before the computer beats you to it. You select the square you want with the joystick.

Tetrad provides a welcome alternative to the seemingly endless selection of arcade games. It is more of a *computing* game, using your computer as an opponent that will make you think and scheme, rather than merely drawing an assortment of cute aliens for you to zap.

Take heed to a few words of advice from an expert (who has lost several games to *Tetrad*): let the computer go first the first time you sit down to play, and be sure to notice which square it prefers. It may be the one you would have selected, because *Tetrad* and tic-tac-toe are played differently. If *Tetrad* makes a confusing move, study it until you find the logic. Otherwise, you will probably lose on the next move. At the professional level, *Tetrad* takes its time between moves.

The disk is copy-protected, but you can buy a backup copy for $10.00 if you return the registration card. It is challenging to play against the program, but there's no option for playing against another player (I would have preferred this). If *Tetrad* is to become the "ultimate" tic-tac-toe (the tic-tac-toe of the future, as Hayden Software boastfully claims), then it should allow for two players.

Educational Software

Whether you love the idea of computers in schools or dread the thought, you need to keep a few things in mind if you find yourself in the position of buying educational software for school or for home use. Whether you are a professional educator or a concerned parent, don't abandon your professional training and common sense when planning a curriculum or evaluating individual programs. Just because you have a new tool at your disposal, don't try to radically change tried and true concepts. Evaluate software based on its educational design. Educational software should complement your children's formal instruction, not replace it.

Educational software for preschool and elementary school children should differ from educational software for adolescents and adults. *Qualitatively*, children think differently than adults. They think more concretely, and may not handle abstractions as well. For this reason, programs for young children should rely more on graphics than on text.

Educational software, because of its nature, demands clear and unambiguous "directions" on how to use the programs and good error handling. The way the program handles operations errors or incorrect answers is critical. Flaws in these areas can actively interfere with the program's effectiveness as a teaching tool. Children also lack the fine motor skills or typing abilities some programs require, so they have to depend on adults for assistance in entering their answers. A program should follow the logic of its subject. For example, elementary arithmetic programs should allow you to enter digits from right to left rather than left to right, because that's the standard way of solving problems by hand. Furthermore, a program that limits the time you have to answer a question should allow you to modify the timing to accommodate different age and skill levels.

We've divided the educational software in this book into three general categories: Computer Aided Instruction (CAI), Computer Managed Instruction (CMI), and Computer Science and Literacy. Most people think of educational software in terms of computer aided instruction—drills, tutorials, simulations, and problem solving programs, covering such topics as math, science, and reading skills. Simulations help students learn about the "real world," while tutorials may introduce new material, provide individualized instruction for different skill levels, or help students catch up with the rest of the class. Most promising are the problem solving programs, which encourage students to develop logical thinking, powers of observation, and what psychologist Jean Piaget called "formal operational thought." Few such sophisticated programs as exist at this time.

Computer Science and Literacy includes programming skills and computer operations. While many programming languages are too complex for children to understand without structured training, advocates of the educational language LOGO claim that it puts children in charge of their own computer-based learning. PILOT, on the other hand, is a teacher's tool for creating lessons. In addition to programming, Computer Science and Literacy stresses understanding the electronic operations of computers, robotics, and certain types of software. Many computer literacy programs teach general logic, graphics, and word processing. You can even buy simplified computer construction kits to help your child grasp the inner workings of microprocessors.

Computer Managed Instruction identifies software designed to help educators perform their jobs more efficiently. With this kind of program, you can create tests and keep records of test scores and attendance. In other words, the computer helps educators with all phases

of managing the curriculum—from the most basic tasks in the classroom, to the most complicated attendance projections. CMI software, when properly applied, can save educators hundreds of hours of valuable time.

Now comes the hard part. How do you decide which programs to purchase with your limited budget? Set your priorities and look for the software that gives you the most for the money. Which type of CMI program best meets your needs—a simple computerized gradebook or an integrated grading and attendance system? Which of your current tasks would best transfer to the computer? Which CAI programs best complement your current or planned curriculum? Do you want programs that review material, introduce new concepts, or allow for individualized instruction? Make a list of features that are most important to you, then take a close look at the reviews in this section. If you can, try to test in the store any program you're considering buying before you take it home.

Once you invest the time needed to determine your own priorities and thoroughly investigate the available software, you'll begin reaping the educational benefits of a personal computer, at home or in the classroom.

—Mia McCroskey

(based on *The Quick and Easy Guide to Educational Software on the Apple* by Stephen Taffee and Andrew Keogh (Copyright, Arrays, Inc./The Book Division, 1984).

A Note on Grade Levels

The reviews in this section are divided into major educational categories, and arranged within those categories by grade level. The intended grade level for most programs was provided by the vendor. If the vendor stated no grade level on the package, and could not be reached by our staff, we followed the reviewer's suggested grade level. We hope that this arrangement by grade level will help educational software shoppers find the programs that best suit their childrens' age group.

Computer Aided Instruction
General

EARLY LEARNING/ MUSIC

Counterpoint Software
$29.95
Grades Preschool-6

Overall Rating	B	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B-	B	*Value for Money*

Early Learning/MUSIC is a way for beginners to painlessly learn the basics of music. Recommended for ages four through twelve, it tries to involve children in music-making without burdening them with too many facts.

Early Learning/MUSIC has four modules. The first, the Perform/Record/Playback module, lets you play musical notes using the top row of keys on your Commodore 64 keyboard. The computer records melodies you play, saves them to disk, and plays them back. While you're "playing," you can choose a screen displaying a piano keyboard or a staff with either treble or bass clef.

Guido's Quiz (a reference to Guido d'Arezzo, who invented the sol-fa syllables) helps you learn treble and bass clefs notes. The quiz begins at an easy level, and increases in difficulty as you progressively identify the notes. A welcome feature in this mode is the ability to go right to the higher levels, skipping the easiest exercises.

Melody Tutor resembles the game, Simon Says. At the outset, the computer lets you choose a song from the disk's small library of tunes. It begins playing the tune, one note at a time. You must watch the screen display a piano keyboard, and repeat the tune to the computer. The screen's piano keyboard shows the number of the key played by both you and the computer rather than the name of the note. This is a mistake. After all, you're trying to learn music, not the locations of the computer's keys.

The final mode, Kaleidoscope, evokes the old psychedelic light organs. In Kaleidoscope, colorful low-res graphic shapes appear randomly on the screen as you play on the number keys. Or, if you prefer, you can call up a tune from the disk, and just watch.

Early Learning/MUSIC has shortcomings: limited musical capabilities. You can only work in the key of C major; you can't use sharps or flats. Because the program is written in BASIC, the keys respond sluggishly. Finally, the written documentation is not very extensive; however, *Early Learning/MUSIC* has Help screens and instructional menus, only a key press away from anywhere in the program.

Early Learning/MUSIC may help your child learn the letter names of the notes on the treble and bass clefs, but that's about all. Rhythm is barely touched upon. This program is definitely for your family's younger members. Your older child might be better off sitting down at a real piano keyboard, and picking out melodies for himself.

FUN WITH MUSIC

EPYX
$30.00
Grades 1-6
VIC 20

Overall Rating	D	B	*Reliability*
Ease of Use	D	B	*Error Handling*
Documentation	A	D	*Value for Money*

Fun with Music, from EPYX, is a plug-in cartridge for the unexpanded VIC 20 which allows the user to create music and use that music in an arcade-style game. It's supposed to be both educational and entertaining, but I found it lacking in both these areas.

Powering-up the computer results in some razzle-dazzle effects (something this program isn't short on) and a menu, leading either to the Game mode or Compose mode. The piece "Dixie" is present in the program at this point, and it can be either played, edited, or deleted and replaced with your own creation.

Music is written in the Compose mode. You are allowed one voice on a treble staff with a range of

slightly over two octaves, starting on G below middle C. Besides this limited tonal range, the method of inputting notes is awkward, as well. The "easy" way is with the number keys, 1 through 0 (shifting them produces additional notes an octave above). A "Scale-Card" identifying the notes and placed behind the top row of the keyboard is provided to make this easier. These notes, however, are equivalent to the white keys on the piano keyboard. In order to produce sharps and flats (the black keys), you have to use the plus and minus keys, which move what is referred to as the "cursor note" up or down. Actually, you can't even use flats, so these must be enharmonically converted to sharps.

The program doesn't allow the use of sixteenth notes, or dotted notes. Ties and triplets have to be converted to other combinations. The total length of any song can be only 229 notes or rests. There is no provision for memory expansion.

All these restrictions mean the Compose mode is limited to pretty simple tunes, six examples of which are provided in the manual. When music is played, no time signature or bar lines appear. Tempo is controlled by pushing "T" which changes the speed from 1 (fastest) to 9 (slowest).

Although *Fun with Music* is for ages six and up, I can't see it appealing to anyone over twelve. Ironically, the complexity of inputs is such that this junior age group will find it frustrating to have to learn so many commands to produce a simple piece. While most of the commands are on screen above the score, some important ones (like Run/Stop to stop the song while playing) are not.

The game part of *Fun with Music* uses either the embedded "Dixie" or the piece which you've created. Notes are scattered about the screen, and the object is to move a character called a "Bandmaster" along the tune without missing any of the notes. The recommended method for doing this is with paddles, but, with my ancient Atari VCS paddles, it was almost impossible to control the character, except at the slowest speed. Using the keyboard option (again the plus and minus keys for up and down) was not much better. To top all this off, the game lost its appeal after a few rounds.

There are a couple of positive features about *Fun with Music*. The manual is first-class, even down to admitting the program's inadequacies. Also, pieces can be easily saved to tape or disk.

But, on the whole, this program is disappointing. People who want to create music will be frustrated by its limitations, and those who want a game will not find any challenges.

MATCH-WITS

CBS Software
$29.95
Grades 1+

Overall Rating	B	B-	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	A	*Value for Money*

Do you remember the heyday of TV game shows? One of the most popular was *Concentration*, and if I remember correctly, it still holds the record as the longest-running game show. *Match-Wits* uses the *Concentration* format in an educational software package from CBS Software. Any subject that can be taught by matching is fair game for *Match-Wits*.

The screen presents you with a five-by-six grid, with numbered panels. You move the joystick-controlled cursor to a panel and push the button. The "door" opens to reveal a word. For example, the Animal game includes the word "pride." You have to match "pride" with the name of the animal which, when found in a bunch, is called a pride. Each of the two contestants gets to uncover only two panels each move. If no match is made, the words are re-covered and play continues. If a student makes a match, he gets some points and the panels are removed, revealing part of a rebus puzzle. The match-maker has a chance to name the rebus and win the game.

A fascinating feature of *Match-Wits* (and the reason that it can legitimately be classified as educational), is its facility for creating and modifying the data files that make up the game categories. You can refresh the game's contents now and then. It also allows parents or teachers to direct the educational thrust of the program into different areas.

Loading the program is always trouble-free since it has no complicated (and drive-damaging) protection schemes. Go get yourself a snack while it's loading, though, this huge program does a lot of file-handling before it's ready to play. You're forced to sit through the opening credits each time you boot the game, but you can skip the one word onscreen instructions and go directly to the game.

The brief (six-page) manual is clearly written and full of tips for players as well as game creators. The bit-mapped, high-res graphics look good on a color TV. The minimal sound effects may be disabled. *Match-Wits*' weak point is its frequent accessing of the disk drive for data files. If you've turned off the drive or removed the program disk when the program tries to read it, it crashes, and you must reset the system.

All in all, playing *Match-Wits* is a lot of fun. Now, if we can just get Hugh Downs to moderate for us . . .

THE FACTORY

Sunburst Communications
$39.95
Grades 2+

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Remember those aptitude tests you took in high school, where brick figures were rotated three times, and you had to guess what position they would end up in on the fourth rotation? If you did as poorly as most of us, you might have excused it on the grounds that this was a special ability known as "spatial relations" or "visual projection" that seemed to be genetic in a few freaky kids.

Suppose there were a training program which would have enabled you to do better—sort of an SAT prep program for visual and spatial cognitive processes. Would you have used it?

Sunburst Communications has used this concept for the basis of a game, called *The Factory*. You select up to eight machines per assembly line. The machines are of three types: punch, stripe, and rotate. Choosing a machine leads to other choices. The punch machine can be ordered to punch up to three round or square holes. The stripe machine can make thin, medium, or thick stripes. The rotate machine turns the square "product" by various degrees (45, 90, 135, or 180). The final product is whatever combination of stripes, holes, and turns that the machines of the assembly line produce on the product square.

The graphics and sound are excellent. The punch machine looks and moves like one. The stripe machine zips a "striper" over the product square one, two, or three times to achieve the desired thickness. The rotating machine whirls and whirs as it turns the shape. One small oddity: our Commodore executed some of the above choices when we pressed the appropriate number key, rather than using the "<" and ">" keys, as indicated in the Guide.

After designing a product, one option allows you to ask a friend to come in and try to duplicate your product's pattern. In the solitaire version, you generally get to mess around with various configurations of the three machines, seeing what you can make or trying to produce the flag of Greece or a face, etc.

None of this explains to me *The Factory's* mesmerizing qualities. Although designated for ages seven to adult, it fascinates my four-year-old for up to an hour at a time. He can operate the keys, read the simple menu, and make the appropriate choices. This game is interesting, sharpens perceptual skills, and is fun—that's value for money. It clearly deserves the four awards mentioned in its promotional ads.

There is a ninety-day free replacement warranty. The material is attractively packaged and includes a warranty registration card, a Getting Started card, a color ad, and a fourteen-page Program Guide. The disk is write-protected with a tab. A hot-line phone number is on the disk label, with the loading instructions.

From an educational point of view, this program may just be that special combination of intellectual respectability packaged as fun. There are uses for such material in any class where logic, induction, and intuition are valued.

THE POND

Sunburst Communications
$38.95
Grades 2+

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

The Pond is a complex, well-designed problem-solving program, for ages seven through adult. It is centered on the concept of Patterns. Patterns are defined as "the way things repeat themselves over and over." The educational strategies used by *The Pond* to teach pattern recognition involve: (1) the presentation of a frog and lily-pad-hopping problem in a partially visible pond; (2) the inductive discovery of the pattern of the proper route to the "magic lily pad"; and (3) the transfer of this process to other programming and real-world situations.

The Pond is menu-driven. The main menu offers Practice, the Game, Instructions, and End. There are six levels of difficulty. Two-step patterns are in Farmer Jane's Ponds (note the avoidance of stereotyping) and Billy Bob's Ponds. Three-step patterns, such as five right, two down, three right, are in the Puzzle Ponds and the Lost Ponds. Four-steppers are in the Maze and Twister Ponds.

The mechanics of moving the frog are simple. Our four-year-old works the cursor and shift keys easily to move the frog up, down, right, or left. The F1 and F3 keys give a quick glimpse of the entire pond and a flash of the correct pattern, respectively. You enter the pattern in two parts, selecting from four arrows to indicate direction of jump, and numerals up to five to show how many jumps (such as five jumps up). When you think you have guessed the pattern, select "Go" and the frog jumps the pattern repeatedly until it either gets to the magic lily pad, rewarding you with a "whoopie" and a song, or jumps into the pond. You lose if you land in the pond, but you are asked if you want to try again and if you want the same or a different pond.

There are rules for playing a competitive, point-scoring two-person game, but the program's value is not as a variant of *Frogger*. The inductive thinking processes used in getting to the correct pattern are the real value of *The Pond*. The encouragement of experimentation, trial and error, and intuition implicit in the design are vital to doing math, science, and social studies. Thus the program's goal is to develop a reflexive consciousness about thinking. Later, this awareness of pattern formation can be applied to everything from the Fibonacci series and the periodic table to historical cycles.

The graphics are excellent. The frog is smoothly animated, blinks when it lands, and has electronic warts. The magic lily pad shimmers; the water splashes realistically. There are stem and rib patterns on the pads and a two-toned green on the frog!

The documentation is also excellent. Nicely printed on heavy stock, it is a clear and humorous guide to the purposes, and mechanics of the program. The guide includes screens showing what the student sees.

Typical of the unusual attitude the Sunburst people seem to have is the section in the Guide called "Other things to think about...when you are not playing *The Pond*." They devote a page to the applications of pattern recognition in the real world, and give suggestions and tasks for strengthening these skills. This is the kind of help and encouragement not seen in many educational programs.

I liked *The Pond*. It is a rare program, teaching higher-level thinking skills. There is a warranty for ninety days, and the package includes the warranty registration, a Commodore 64 Getting Started card, and the fine Program Guide.

USING MAPS AND DIRECTIONS

Microcomputer Workshops Courseware
$19.95
Grades 3-5

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	C+	B	*Value for Money*

Given its bargain basement price, *Using Maps and Directions* is a very impressive program. Like this vendor's offerings, the program disk comes in a poly bag with a meager page or two of instructions. The "manual" for this package is so skimpy, in fact, that it did not even include loading instructions. Tsk, tsk!

Once you have the program up and running, and have input your name, the main character of the story introduces himself and teaches the four cardinal points of the compass. As the tutorial progresses you move a stick figure around the screen using the N, S, E, and W keys. Once you've completed the demonstration, you manipulate the animated stick figure around a six-block area in response to prompts in the storyline.

Using Maps and Directions is a cleverly-designed instructional tool whose only real flaw is its lack of variety. Although the authors claim the program's level is from grades three to eight, it's probably too simple a program to hold the interest of even an upper elementary student. It has only one story and only one sequence of destinations. This useful, though limited, educational program will probably only engage very young students.

MATCH MAKER U.S. GEOGRAPHY FACTS AND MATCH MAKER WORLD GEOGRAPHY FACTS

American Educational Computer, Inc.
$39.95 each
Grades 4-8

Overall Rating	C	A	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	D	C-	*Value for Money*

Match Maker U.S. Geography Facts and *Match Maker World Geography Facts* are very similar learning drill programs that aim to instruct and reinforce a young student's knowledge of geography. I have reveiwed them in tandem because they have exactly the same structure, are used in the same way, use the same scoring system, have the same arcade game reward format, and contain the same virtues and vices. The only important difference is that *World Geography* (obviously) presents and tests different geographical facts than does *U.S. Geography*.

The kind of information these programs contain is introduced in most schools in fairly predictable patterns. By the fourth grade, kids study American geography. In fifth grade, they concentrate on state and regional geography (though the fourth and fifth grade curricula are often taught in reverse order). In sixth and seventh grades, students study the hemispheres. Usually, the formal study of geography ceases following middle school or junior high, after most pupils at those levels have covered something called "World Cultures" or "World Geography." Both American and World Geography are reviewed as parts of other high school survey courses that focus on history. The *Match Maker* programs best suit upper elementary and junior high grades (kids typically in the age range of nine to four-

teen), where students may actually study formal geography.

Because of the design of the average school curriculum, the *U.S. Geography* program spans subject matter normally covered during one entire school year. By contrast, you would rarely find a school curriculum or textbook that covers in just one year the material surveyed in the *World Geography* program. A teacher or parent must determine whether a program of this type would, in reality, be worthwhile, considering that it would have to be used over a time span of two (or more) years. In all honesty, I don't think this software has that type of staying power.

With regard to the design of the programs, much is lacking. Each contains thirty-six sets of geography questions, ten questions per set. The questions in *Match Maker U.S. Geography Facts* cover the East, Northeast, Great Lakes, Midwest, South, Great Plains, Southwest, Rocky Mountain and Pacific states, plus Alaska and Hawaii. The *World Geography* program reviews terms, Western Europe, Eastern Europe, Russia, the MidEast, North Africa, East Africa, Central Africa, Western Africa, South Africa, Asia, Japan, Oceania, Canada, West Indies, and South America.

Both programs contain a maze game used as a reward for getting a set score (seven tenths, or seventy percent) on two sets of questions. The mazes operate in exactly the same way in each program. The maze does not use or reinforce the geographical information; it neither asks a question based on the lessons, nor does it give a reward for a correct answer. Rather, it simply adds a maze, the navigation of which depends upon arcade skills and no knowledge of geography.

Each disk possesses a question bank editor which allows for the construction of another ten sets of items. This feature, which by all rights *should have been* one of the most attractive elements of the programs, turns out to be the least usable because of the horrendous operating instructions provided. It was never clear, either in the documentation or onscreen during the editing/creating process, where the questions were to be typed in, how long they could be, how the "hint" line was best utilized, and so forth. There are no specific directions for the Commodore 64 version, except those that tell you how to load the disk. The documentation consists of an eight-page booklet, the same in both the *U.S. Geography Facts* and the *World Geography Facts* packages; again, it smacked of an assembly line setup.

There is an art to constructing drill and reinforcement tests. One rule states that the student should not arrive at an appropriate answer through sheer luck. An answer must come from the student's storehouse of knowledge. The violations of this principle in *Match Maker U.S. Geography Facts* and *World Geography Facts* make these packages virtually useless educationally. For example, my six-year-old son scored a 9 out of a possible 10 on Lesson #8 in the *U.S. Geography* program with no prompting. Although this understandably could happen in a true/false format with some luck, the lesson involved was a "choose the correct word" type.

The problem with many of the questions in these two programs is that you see only two possible answers—answers that you can easily guess. In one question, the choices were "bananas" or "sugarcane." To enter an answer, you need not type in the letters in the exact sequence. The program automatically places the letter in its proper position along the answer line. In the bananas/sugarcane example, a student who did not know the right answer could merely type in the letter "a." The program would thus place either two or three a's on the answer line, in the proper locations, therefore tipping the student off as to what the correct answer should be. It seems as if three or four out of every set of ten questions are prey to this gross defect in design. In no time at all, the two *Match Maker Geography Facts* programs rapidly turn into versions of a word game such as Hangman!

Both disks use similar "objective" type questions: recall, definition, choose the correct answer, correct the wrong word, fill in the blank, true/false. As I noted previously, the programs usually present only two answer choices, so sharp kids quickly get wise to the aforementioned letter-entry tactic for guessing the right answers. The odds of getting the right answer through this "uneducated guessing" are about four to one. This diminishes the educational merit of these two packages.

While you answer questions, no onscreen indicators remind you what lesson you are on. This sometimes makes it difficult to remember whether you have or haven't done a particular set of questions before.

The program loads extremely slowly. In a classroom setting, I doubt that the ten minutes it takes to load and finish one set of ten questions could be considered a justifiable use of class time. In addition, the slowness becomes very frustrating for younger pupils.

Finally, I must point out that these two programs, even if they were well-constructed and efficient teaching tools, do not actually teach a blasted thing. They are akin to all other marginally useful drill programs in that they reward children who already know the right answers—or who know how to outguess the test. Why spend $40 per program for this ridiculous approach?

U.S. CONSTITUTION TUTOR

Micro Lab
$30.00
Grades 7+

Overall Rating	C	B	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	B	C	*Value for Money*

U.S. Constitution Tutor is a misleading title: there is very little tutoring involved. It assumes that you have already studied the subject, and tests your knowledge. The program suggests that you "consult your government text book glossary (not included) whenever necessary." Thanks a bunch!

The various sections may be worked on in two modes, Tutorial and Test. Tutorial mode provides brief explanations of why your answers are right or wrong. Many sections contain questions that are found in other sections, giving the program a "stale" aura.

The program warns you that due to screen limitations, the explanations offered must be more succinct than in another format. This is another way of saying that this material would be better presented in a book. In fact, the author suggests making flashcards of the Help screens so that you can review the information when you're away from your computer. The instruction booklet includes fifty student questions, a Teacher's Guide, and answer key. A nice bibliography of a dozen books about the Constitution completes the manual. This also indicates that, if you want to learn about the subject, you're better off going to your local branch library or bookseller.

The program comes on one double-sided disk. Each of the twenty sections takes about an hour to complete. For the program's $30 price tag, this works out to about $1.50 an hour—reasonable enough for a tutor. Of course, you may quit at any time and resume when you please.

The quizzes are organized by subject: Legislative Branch, How a Bill Becomes a Law, Executive Branch, Elections, Judicial Branch, Amendments, Constitution Principles, and Rights. You may select one of three difficulty levels: Beginner, Intermediate, and Advanced. Individual teachers are given permission to reproduce the learning materials for use in their classrooms—and their classrooms only. All in all, *U.S. Constitution Tutor* could benefit from another trip back to the drawing board.

Computer Aided Instruction
Reading and Language Skills

TINK'S ADVENTURE

Mindscape, Inc.
$34.95
Grades Preschool-2

Overall Rating	A-	C+	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

If you're looking for software that strikes an intelligent balance between instruction and entertainment, you've come to the right review. *Tink's Adventure* is a superior educational program. The graphics and sound effects are perfectly matched to the interests of the target audience (children between the ages of four and eight). The main character, Tink, is so engagingly drawn that he actually projects a personality by the time the child has explored the entire package.

Tink's Adventure is actually a medley of interactive educational tutorials woven together in an elementary adventure game scenario. The program begins with Tink inviting the child to accompany him on an adventure. Using only the space bar at first, you move him through brightly drawn screens accompanied by cheerful music. The first menu presents the first options: Tink may travel either by helicopter or boat.

As you progress further into the program, Tink finds new places and things to explore, and the educational games make their entrances. The educational goals of *Tink's Adventure* are: to teach children the alphabet, familiarize them with the computer keyboard, and promote computer literacy. Altogether, they encounter five multi-level games during the adventure.

In one, Go Fishing, the child learns keyboard familiarity by typing letters, numbers, or symbols before they move off the screen.

In another game, Coconut Catch, a smiling monkey in a tree tosses coconuts to the ground. As he does, a three-letter sequence of alphabet letters appears on the screen, but one of the letters is replaced by a blank space. The child must type in the missing letter before the next coconut lands, in order to "catch" the coconut.

Other games, Get Gas, Sinking Boat, and Gork's Treasure, reiterate these exercises on varying levels of difficulty. The game uses positive reinforcement at all times: no insults or intimidating remarks are made for wrong answers. The exercise is simply presented for the child to try once again.

The entertaining documentation helps a lot. *Tink's Adventure* seems to be crash-proof, although it does access the disk drive quite often to load the different games; this means short but frequent delays. A few negative marks go to the programmers for their choice of copy-protection: it is rough on the Commodore drives and should have been left out.

TUK GOES TO TOWN

Mindscape, Inc.
$34.95
Grades Preschool-3

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Tuk Goes to Town is the title program in a software package from Mindscape, emphasizing several different educational areas, including spelling and vocabulary building, computer literacy, and visual discrimination. The series is targeted for children aged four through eight.

I found a good balance in this software between education and entertainment. While playing the interactive adventure that comprises the main body of the program, the child gets to play a number of other extremely appealing and educationally pertinent games.

Using only the keyboard, you help Tuk leave his house, choose transportation, and travel to town. Once

there, you must help him properly cross streets to get to the shops he wants to visit. Once in the shops, you may help him play games. The games are where the educational emphasis comes in, but they are so well crafted, kids will opt to play them over and over. Two examples of the games are Animal Names and Toy Store. Animal Names helps you practice spelling and builds vocabulary by presenting scrambled words on the screen, along with a corresponding picture of an animal. Toy Store shows a shelf of toys—some similar, some different. If the child selects the correct one, he's rewarded with a dancing Tuk and accompanying music. The program uses only positive reinforcement. Sarcasm, negative comment, and intimidating remarks are never given in response to incorrect answers. The game simply offers an opportunity to try again. Excellent approach!

Tuk has stunning graphics, music, and sound effects. If you have a color TV set you'll wish you had a monitor, though, as color bleeding occasionally makes the text difficult to read. The target audience should find the well-done documentation easy to understand.

A potential negative factor is the constant accessing of the disk during the program's operation. The delays between modules are not long, but they are frequent. Also, the method of copy-protection is very rough on Commodore disk drives. Less damaging but equally effective methods of protection are available, and should have been used.

This is educational programming at its best. The fact that you're getting several high-quality programs in *Tuk Goes to Town* makes the package even more attractive. I tip my hat to Mindscape.

WORD FLYER

Electronic Arts
$35.00
Grades Preschool-3

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B	*Value for Money*

Word Flyer instructs children aged four through eight in letter and word recognition. Using a joystick, the child can move letters or words on the screen to match them up with letters that come into view from the background. One or two children can use this multilevel package. Two large birds overlook the action as matches take place. After a correct match, the student receives a twitter and wink from one of the feathered creatures. An incorrect match elicits a "boink," and a negative shake of the bird's head. A longer or shorter color bar at the bottom of the screen represents an increase or decrease in the score. When the student completes each level, the graphics change, then he begins the next phase.

The number of letters, speed of movement, and penalties for incorrect responses determine each level's increase in difficulty. The student may choose the letters which begin the words, and choose four or eight different letter combinations to use when performing matches. Eight choices are possible with the one-player game, and four with the two-player version. It's easy to change levels: the student moves to a nest in the center of the screen, then to a small menu at the bottom of the screen. The program's extensive vocabulary contains over 2,000 words. Try loading this copy-protected program before you get your child into his seat. Loading time on the 1541 disk drive is quite lengthy.

The manufacturer did a good job combining the fun of a game with the benefits of educationally-sound, computer-aided instruction. *Word Flyer*'s five-level difficulty range lets the preschooler, as well as the beginning reader, take advantage of the program. The manual suggests that parental participation is beneficial. In my opinion, it's virtually essential for real learning.

The graphics are interesting and well-done, but too static for a young kid's short attention span. The child gets an interesting visual reward when he completes the program's highest level, but no similar graphics display when he concludes each level. Short musical and color changes take place, but are not outstanding enough for children to sense a genuine pat on the back for their efforts. Kids who are too young to reach the highest level definitely need more encouragement.

This program does fill an important gap in reading programs for preschoolers. To play *Word Flyer*, your child need only use the joystick and recognize similar shapes. In addition, the letters or words just have to touch their matching counterparts; they do not have to fit over them exactly. This makes the whole business much easier for small fingers.

As an educational tool, *Word Flyer* is a lot like the lumberjack's two-handed saw: it works well when your child is positioned at one end, and you (or another patient adult) at the other.

LEARN ABOUT SOUNDS IN READING: GRADES K-3

American Educational Computer, Inc.
$39.95
Grades Kindergarten-3

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	B	*Value for Money*

Learn About Sounds in Reading: Grades K-3 is the first of six programs from American Educational Computer, Inc. which develop elementary phonics, word attack, and comprehension skills. Please consult the reviews of *Learn About Words in Reading 1 and 2* and *Reading Comprehension Skills 1, 2, and 3* (found in the Education section of this book) for a complete analysis of the whole set. *Learn About Sounds in Reading* is a phonics program. There are two double-sided disks containing drill material. Disk one, side one, develops short vowels, while side two shows the long vowels, including "oo." Disk two, side one, has the consonants "b" through "l," and side two "m" through "z." Each set of sounds is presented in a recognition test.

The recognition test for all the vowels is the same. The child is prompted to type in "Y" (yes) or "N" (no) below the words which have the same sound (the "a" in "can" for the short "a" sound, for example). Sketches appear above three words such as "bat," "fan," and "lock." The cursor moves below each word waiting for his response. Nine words are given in each lesson. For example, short "i" uses "bricks, wig, kite"; "bike, fish, hill"; and "pig, top, ship." Each set always has two words with the correct short vowel.

By identifying which two words of the three shown have the target consonant at the beginning, the child practices consonant recognition. Since only six practice words are presented, I am unable to say how this develops much more than recognition of the printed shape. That is not the purpose of a phonics program.

The worst feature is the goal and scoring subprogram. The standard goal is six in a row correct, with no errors. A counter tabulates the number of correct answers, and the Easy Reader Score Board shows the percent correct for each vowel. After the goal of six in a row is met, a graphics, verbal, and/or musical presentation rewards the child. However, because there are so few examples in each lesson, the same words appear over and over in order for the student to make the goal of six straight. Make one mistake, and the score drops back to zero! You get five right and miss number six and it's back to zero and start over. Children, aged six through nine, have a strong sense of fairness, as well as a low frustration level. I cannot believe they will like this excessive penalizing of one wrong answer. I didn't.

The second worst feature is one I have encountered with other AEC programs. The documentation is terrible. Although AEC has added a 4-by 6-inch Addendum Card for the Commodore 64, there is still a deplorable absence of information about what is in the package. For example, there is no list, index, or table of contents telling you what is on each side of each disk. To get a detailed list, I started to select the Score Card option first from the main menu, because that is the only place you can find exactly what is in each lesson. How a buyer is to make a knowledgeable judgment about this potential purchase is beyond me. Teachers, who make up the market for this set, might be reluctant to ask for tight money to buy something they cannot describe in detail and relate to their own classroom activities.

The hints about tutoring young learners are a step in the right direction. They are in the eight-page User's Guide. Considering that five pages repeat an enclosed ad, one page gives generic directions, and the last page is almost blank, the one remaining page on the Tutorial Approach and How to Tutor is minimal indeed. Since a young learner would need adult help, the presumption must be that the adult (teacher) knows how to tutor. The question is, does the teacher know how to tutor from a computer program?

The best features of the program are the graphics, music, and verbal rewards. They are colorful, plentiful, extensive, and unusually witty and amusing. Some are almost graphic operas. Things such as *Batman*, "Chatanooga Choo Choo" ("You deserve a toot"), rebuses, and riddles finish each section. These rewards are droll, hip, and extremely interesting. Overall, *Learn About Sounds in Reading* is probably best used as a supplement to the standard workbook and ditto sheet approach found in nearly all primary classrooms. It would make a good reward after the drill and practice stuff is done.

LEARN ABOUT WORDS IN READING 1

American Educational Computer, Inc.
$39.95
Grades 1-2

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	D	B	*Value for Money*

Every elementary teacher knows how extremely difficult it is to teach the wide range of children in America's schools the skills and attitudes which encourage reading. This review looks at the second of a six-program series which deals with elementary reading

by American Educational Computer, Inc. The set includes *Learn About Sounds in Reading, Learn About Words in Reading 1 and 2,* and *Reading Comprehension Skills 1, 2, and 3.* (Reviews for the other programs can be found in the Education section of this book.)

Learn About Words in Reading 1 is written for grades one to three. The two double-sided disks contain lessons on compound words, contractions, prefixes, suffixes, word roots, syllables, antonyms, synonyms, homonyms, homographs, and possessives. Because the documentation does not tell you exactly what is on each disk (you can get this information by calling Score Card from the main menu), I will include some detail on this to help you make decisions about buying.

The first section (disk one, side one) drills on the formation of compound words. Two lists appear: "fire, sail, sea, sun"; and "flower, boat, weed, and place." The instructions ask the student to combine a word from list one with a word from list two to make a compound word. Thus "sea" plus "weed" equals "seaweed." I got into trouble immediately by combining "fire" and "boat" which was buzzed as wrong, "fireplace" being the preferred answer. I looked up "fireboat" in the dictionary where it was listed, as I well knew, as a boat equipped to fight fires, which fact would be known to thousands of New York City kids. One hidden lesson here is that less-used words or creative combinations ("sailplace," "fireweed") are wrong.

Besides the poor documentation, I must also complain about the paucity of problems and the punitive scoring system. In Compound words there are eight problems, and the goal is to get six correct consecutively. If you get even one wrong, your score reverts to zero! You then get the same eight sets of words to combine until the goal is achieved. This may be OK programming but it is educationally unsound, and raises the question about the point of even having this stuff on disk versus the usual workbook-pages approach, where students draw a line linking the two words into a compound. If there is an advantage in computerizing this type of lesson, it is because computers offer the chance for interaction, individualization, and instant scorekeeping. With this program a student could easily become bored and frustrated.

Contractions asks the student to recognize the contraction which can be made from a word-pair displayed in a box. He sees "do not, I have, you will, she will," and "1. she'll, 2. I've, 3. you'll, 4.don't." As the cursor moves below each word-pair, he types in the number of the proper contraction and if it's correct, the proper score appears in the score box.

Prefixes uses four sentences with blanks to test "un-" combinations. "Re-" words are handled in the same way. "Un" and "re" are tested in an exercise that asks for one or the other to be attached to a root such as "happy" and "heat." Six sentences with blanks complete the "un-re" lessons.

Roots takes a previously used word such as "unkind" and asks that the student type in the root. Nine words are used in this section.

My disk suffered from a "cosmetic blemish." There was no label on side two. Undaunted, I continued on to Suffixes, Roots and more Suffixes. Generally, the suffix lessons are handled similarly to the Prefix lessons, with suffixes added to roots ("slow" plus "ly" equals "slowly"), sentence drills using the root or root plus suffix properly, and root recognition drills.

The comparative and superlative suffixes ("er," "est") are on this disk as well, and there are an adequate number of examples here. Drills in root recognition ("clear" plus "er"), and adding the proper suffix ("That's the sick I've ever been.) are given. The silent "e" is explored using words which have the "e" ending.

Side three of the disks contains Syllables, Antonyms, and Synonyms. The lessons on syllables deal with the number of syllables in a word, and dividing words into syllables using the vowel-consonant/consonant-vowel pattern and the last consonant plus "le" ("bub/ble"). Dividing syllables is done by using the retyped word with a slash ("lit/tle"). The words used for this section are words which were used before, so some reinforcement takes place.

In the Antonyms section, it is assumed that the student knows what antonyms are; no definitions are given. Three types of drill are used: match the words closest in meaning, most different in meaning, and type "S" or "A" if two words are synonyms or antonyms.

Homonyms, Homographs, and Possessives are found on side four. Fill-in-the-blanks, and finding the correct meanings are the typical activities in this section. There are a few problems for each lesson and again no definitions are given.

The rewards at the end of each section are excellent. They offer powerful reinforcement, as well as being sophisticated, wry, and elaborate in design and execution. They are rewards for the adult helper as well as the student.

Although these programs load fairly quickly, you cannot get to any specific lesson without going through all the intervening ones. There is no random access to the lesson parts. This drawback is balanced by the inclusion of a marker for each student that allows the last lesson completed to be accessed on a subsequent use. This saves unnecessary repetition.

There are no provisions for a backup disk. The warranty is for ninety days, and a registration card must be mailed in. The price seems competitive with similar programs.

How would I use this program? In primary grades I would use them for reinforcement and motivation, in special education classes for language development

and self-concept enhancement, and in remedial classes for a non-threatening review. Along with teacher or pupil tutoring and standard workbook activities, this could be an effective learning package.

READING COMPREHENSION SKILLS

American Educational Computer
$39.95
Grades 1-8

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	B	*Value for Money*

Reading Comprehension Skills 1, 2, and 3 are the three programs from the American Educational Computer *Easy Reader* series that deal with comprehension skills. They follow *Learn About Sounds* and *Learn About Words 1 and 2*, which are reviewed elsewhere in the Education section of this book; you can consult these reviews to get a comprehensive view of the AEC approach to computerized reading programs.

Each of the three *Reading Comprehension Skills* packages contains a color ad, a Commodore card, a warranty card, one disk (using two sides for programs one and two), a User's Guide, and a Storybook for programs two and three.

Reading Comprehension Skills 1 contains lessons on Predicting Outcomes, Main Ideas, Details, Sequence, and Evidence to Support Conclusions. Within those lessons, typical learning activities are: to select the right ending, select the right title, identify the main idea, find one or two supporting details, unscramble a sequence, unscramble a paragraph, and project what happens next.

The second side of this disk contains lessons on Similarities and Differences, Cause and Effect, and Classification. Tasks involve identifying which two things belong together, what details differ between similar objects, labelling causes and effects in a given sentence, and recognizing examples of a class.

I found the labelling of the boxes, ads, and disks quite confusing. For example, the end of side two asks for the next disk. There isn't one. Perversely enough, the color ad in the box states that only one side is used. The disk I got was properly labelled on both sides (although I have seen other AEC materials where the disks were mislabelled). Similar discrepancies occurred in *Reading Comprehension Skills 2*. Only *Reading Comprehension Skills 3* was correctly labelled in the ad, on the box, and on the disk.

Reading Comprehension Skills 2 for grades four through six, has fourteen lessons, half of which review the previous program and half which introduce new skills. The review material is on Main Ideas, Sequence, Evidence, and Cause and Effect. The major difference between this program and program one is that here students read short paragraphs and derive their answers to the skills and comprehension questions from the context of a story. The untitled stories are about the ghost ship "Seabird," life in the sea, being scared by a shark, etc.

New skills are introduced in lessons on Analogies, Comparison, Judgments, and Fact/Opinion. These are developed using some Storybook materials such as: "Bears," "Choosing a Job," "The Venus Flytrap," and "Snakes," as well as non-Storybook activities.

Reading Comprehension Skills 3, for grades seven and eight, again reviews some old skills and introduces new ones: Paragraphing, Judgment Making, Classifying, and Purposes. A readability test on the Storybook materials showed a generally accurate placement for the grade level indicated.

I applaud the programmers for the reinforcements at the end of lessons. The songs and animation, the puns and riddles, the droll tag lines are clearly for a special audience. However, I must repeat my complaint about the directions, the labelling, the scoring system, and the limited number of examples. Given the reality that grades seven and eight are usually in a different building from one through six (if not a different school entirely) and that teachers are often unaware of what specific materials are used at the lower level, I wonder how the third package would be effectively integrated with the first two. Also, since grades seven and eight usually have students from different elementary schools in the same class, an assumption must be made that all students would use programs one and two in elementary school.

These programs do *not* teach a student how to read. Their main uses would be in reinforcement, practice, remediation, and learning English as a second language. They are reasonably priced. They are also probably effective aids and motivators when used by a well-organized teacher. The *Easy Reader* series generally, and the *Reading Comprehension Skills 1, 2, and 3* packages particularly, are important evolutionary steps in the development of computer-assisted reading instruction.

LEARN ABOUT WORDS IN READING 2

American Educational Computer, Inc.
$39.95
Grades 2-4

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	B	*Value for Money*

Learn About Words in Reading 2, for grades two to four, is a drill and reinforcement program that deals with prefixes, suffixes, roots, syllables, possessives, homonyms, and homographs. It resembles *Learn About Sounds* and *Learn About Words in Reading 1* in content, graphics, and style of presentation. You can consult these other reviews (found in the Education section of this book) and note the comments about scoring, number of examples, documentation, possible uses, strengths and weaknesses, as these comments also apply to this program.

Side one of the double-sided disk contains lessons on prefixes, suffixes, and roots. Lessons typically contain six to twelve examples or six sentences. The student is asked if a prefix or suffix is present in such words as "discover," "dishes," "disconnect," "disk," and "disobey." A second activity is fill-in-the-blank in a sentence. Students construct prefix and suffix words by adding to a root word. For example, the definition "already cooked" and the root "cooked" produces the word "precooked." "Mis-," "non-," "in-," and "pre-" are used, as are "-able," "-ish," "-ance," and "-ist." Roots are extracted from examples such as "sickness," "dryness," and "judgeship." Variants of roots are shown in an interesting exercise where three forms are presented such as "fairly, infair, fairness." I could not tell if the examples were chosen to include "value words" deliberately, but I would use many of these exercises to begin value clarification and moral development discussions on other words such as "friendship, distrust, disagree, helper, kindness, ownership, family, dishonest," and so on.

Roots are also drilled by tasks involving the construction of real words from lists of roots and prefixes or suffixes or both. Sentences with prefixes and suffixes and endings are shown, with the learner directed to type out three examples found in the sample sentence.

Side two contains lessons on syllables, possessives, homonyms, and homographs. These lessons are expansions of similar material found in the *Learn About Words in Reading 1* program. The syllable lessons test examples of several vowel/consonant patterns and structural patterns. The lessons on the use of the possessive include both plurals and possessive plurals which are tested in "fill in the blank in this sentence" format. The homonyms and homographs both use sentences to test the learner's knowledge. The typical scoring system used in this series of programs is to attain a goal of six in a row correct, before any score is recorded. I found this feature to be frustrating, and I'm sure children would, too.

I approximated the cost of using this program over a two-year period for a class of twenty-five at about two centers per use per child (this is just for the software and assumes maximum effective usage).

Learn About Words in Reading 2 combined with *Learn About Words in Reading 1* would give the elementary, special education, or English-as-a-second-language teacher a nice reinforcement tool to use with a wide range of learners. As one of the end-of-lesson rewards suggested punfully, the teacher might deserve a "pat on the Bach" for using such a program.

VOCABULARY WORD BUILDER Home Version

American Educational Computer, Inc.
$39.95
Grades 2-6

Overall Rating	C-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	D	C-	*Value for Money*

Vocabulary Word Builder, at first, seems to be a cleverly designed educational program for ages eight to twelve. It provides thirty lessons of ten exercises each in common areas of vocabulary drill. Six more lessons cover some special problems in vocabulary, as well as simile and metaphor. Finally, the disk includes a utility for writing up to eight additional lessons at home.

Most of the problems require the student to use knowledge of vocabulary to respond, but in no sense does the program really build vocabulary, since the words used in the lessons all come from a very basic word list. The exercises will help with separating homonyms and with some usage problems, even though no new words are introduced.

The lesson format is based on standard worksheets. The student must choose between two possible answers, or fill in a blank with the correct word. When he types in any letter, the computer prints the letter in its correct position on the response line, regardless of the order of input. An incorrect letter reduces the number of guesses left (usually three). When the number of guesses reaches zero, the answer is displayed by the computer. This input method, combined with a subroutine that ignores any input other than letters, makes

the program crash-proof. However, it can also make it easy to guess the right answer.

After completing two lessons successfully, the student is given the choice of exiting the program or playing a game as a reward. The game is a maze with bonus targets to collect along the way. Scores from the two exercises and the maze are totaled, and the final count is recorded along with the student's name on an "Honor Roll," as in an arcade game. The only problem with this incentive is that only one score is recorded for each name, making it hard to see progress.

In addition to the inadequate manual, there are also problems with the texts of some exercises. For example, the section on metaphor includes personification, making the question of what is being compared difficult to interpret. Some of the antonyms seem very hard to guess. In one exercise, the word "cereal" is misspelled. However, the most serious problem with the program is the lack of variation in the lessons. The allure of the reward game just isn't enough to keep the student interested.

On the positive side, *Vocabulary Word Builder* does provide some useful drilling for students in middle and upper elementary grades. However, its similarity to worksheets and its failure to make use of the computer's capability to add variety to the lessons make it a questionable addition to anyone's library.

M-SS-NG L-NKS

Sunburst Communications
$39.95
Grades 3-6

Overall Rating	C	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	C	*Value for Money*

M-ss-ng L-nks is to *The Pond* and *The Factory* (reviewed elsewhere in the Education section of this book), as tuna salad is to broiled lobster tails stuffed with crabmeat. I guess it is a human failing to expect the same quality from every product a company markets. While I greatly admired Sunburst's *The Pond* and *The Factory*, I found it difficult to justify including *M-ss-ng L-nks* in this Education section, since I could not figure out what it teaches. It certainly does not teach the "thinking skills, school-related skills, or computer-related skills" that the Program Guide claimed.

M-ss-ng L-nks should be taken exactly at face value, i. e., as a game for one or two players in which the player fills in missing letters in passages from famous children's books (which deserve a better fate than inclusion in this program). The whole approach reminded me of having kids do jigsaw puzzles of the Old Masters, and calling it art appreciation.

To consider the excerpts is to deepen the disappointment: *The Wind in the Willows*, *Charlie and the Chocolate Factory*, *The Lion, The Witch and the Wardrobe*, *Little House in the Woods*, and so on. Nine stories are divided into nine passages which can be formatted nine ways: (1) vowels omitted, (2) every second letter omitted, (3) print first letter of each word, (4) print every other word, (5) print only the vowels, (6) print the last letter of each word, (7) print first word of each sentence, (8) print position blanks only (no letters at all), and (9) no clues (no letters or blanks).

First you choose how many guesses you want to have to get the correct letter into the blank, then you choose which excerpt you want, which of the nine passages from that excerpt, and finally which of the nine formats the passage will be presented in. After that, you simply fill in the blanks with the correct letter for each blank. Wrong guesses are recorded in boxes at the bottom of the screen. If you exceed your limit of allowable guesses, you are given the correct letter by the computer and are penalized in the scoring. You may call for the score anytime with F3, end the game anytime with Control-E, or wait until finishing the passage and then see how well you did. The score reflects some combination of wrong guesses, correct first guesses, and computer-supplied answers. The passages I tried typically had about 90 to 120 blanks to fill in.

The graphics are all pretty non-graphic: words and letters and numbers on a gray screen. There is a ninety-day warranty for which you must register. The Program Guide is good and covers five different computers. The disk is protected.

M-ss-ng L-nks for me was another kind of word search puzzle, with only a trivial connection in value to the stories it abused. The only thing it is likely to teach children about *The Cricket in Times Square* and *My Side of the Mountain* is contempt at worst, disdain at best. If you want to teach kids about vowel and consonant patterns and context clues, let them play *Hangman*!

GRAMMAR: WORD USE SKILLS
Home Version

American Educational Computer, Inc.
$39.95
Grades 3-8

Overall Rating	D	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	D	D	*Value for Money*

Grammar: Word Use Skills, like other titles in the series from American Educational Computer, is a drill rather than a true teaching program. As such, it resembles a recycling of old grammar worksheets. This is not necessarily a criticism, but the failure to effectively use the computer's potential as a drill device makes this a less than attractive package.

There are thirty-seven lessons, containing ten problems each, on the disk. These range from identifying subjects through naming the parts of speech and avoiding simple usage errors. Eight more lessons can be written to the disk as well, making an impressive body of drill exercises.

The program, itself, operates well and seems to be virtually crash-proof. I especially liked the use of oversized letters on the screen to make the display more readable. However, there are a few things which detract from its educational value and definitely cause it to fall short of the mark. The most obvious improvement would be to add sound to the program. The inclusion of reward and error tones at appropriate points might increase the learner's motivation. A much more serious shortcoming becomes apparent when the student fails to master a lesson. Instead of taking time out to explain the concept involved, or at least providing a new set of problems, the program goes back to the beginning of the lesson and presents the same material in the same order as before. This approach will alienate learners rather than help them master difficult concepts.

Additionally, some material is treated in a confusing manner. For example, the contraction is handled as a part of speech rather than being shown separated into its components. Coordinating and subordinating conjunctions are lumped together without pointing out the difference in their functions.

The manual, instead of supporting the lessons or explaining their objectives, merely tells you how to load the program, mentions the lesson-writing utility, and promotes other programs from this family of software. The student is expected to know all the terms used in the lessons in advance; no definitions or examples are given on the disk or in the manual. This omission seriously limits the usability of the product.

In order to improve *Grammar: Word Use Skills*, you may take the time to add a series of lessons of your own, tailoring them to a particular grammar book. The number of problems in each exercise should be increased, and the percentage required for a passing grade raised. The lesson-writing utility makes this easy to do, but it's a lot of work, and such an expensive package shouldn't require it. The authors of *Grammar: Word Use Skills* began with a solid idea. However, the program needs more development in order to become a worthwhile educational package.

WORD ATTACK!

Davidson & Associates
$49.95
Grades 4-12

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Word Attack! is a vocabulary development program that possesses the same quality as other Davidson & Associates programs. (Readers should glance at the *Math Blaster* and *Speed Reader II* reviews elsewhere in this book to get a more complete idea of the top notch programs this firm manufactures.) Davidson offers a one-year replacement guarantee for failure or accidental damage. The program disk is protected but a backup copy is available for $10. The data disks are unprotected and may be copied freely.

As an educator interested in language, writing, and semantics, I appreciated the program's introductory remarks. Dr. Janice Davidson, the program's author, condenses several powerful ideas about vocabulary in the section entitled "Building Your Vocabulary." She clearly states the program's limits: no clues to pronunciationare provided, nor explorations of the multiple meanings of many words. She lists all the other things that must be done to master language and meaning. If the program is accepted at face value, it certainly does just what it claims to: helps you to "build and develop some essential communications tools—words."

The manual is well-written with exceptionally straightforward directions. The author anticipated nearly all contingencies and the program explains potential problems whenever they occur. The program loads in about ninety seconds. It prompts you to insert the data disk containing the nine levels of vocabulary development exercises. These sets (containing seventy-five words each) are graded from grades four through twelve. Each set subdivides into twenty-five adjectives, twenty-five nouns, and twenty-five verbs. Several useful hints instruct you on the use of the program at various levels. For example, Levels 4, 5, and 6 provide good drill and review for the SAT exams. Levels 1

through 5 help adults or ESL (English as a Second Language) classes. Levels 7, 8, and 9 add variety and sophistication to the speech of native speakers of English. Davidson offers four other data disks of 500 words each for grades 4 to 5, 6 to 7, and 7 to 8, and for SAT preparation. These cost $19.95 each, plus $3.50 for shipping and handling. Thus you get nine levels on the data disk that comes with the package (corresponding in complexity to grades 4 through 12) and four supplementary data disks available by mail.

You are advised to find the appropriate starting level by completing multiple choice quizzes, starting at Level 1 and taking each successive quiz until your score falls below eighty-four percent. In this fashion, you will avoid repetition of known material. One virtue of computer-based educational materials is this capacity to individualize instruction. People can focus on what they need to learn; they make the decision in this program by meeting the eighty-four percent criterion of mastery. Sound educational strategy!

After you determine your starting level, you will see a four-part menu: Word Display, Multiple Choice Quiz, Sentence Completion, and Word Attack. Word Display introduces each of the twenty-five words in the word list by displaying it along with a brief definition or synonym. This is the drill and practice learning section.

Multiple Choice Quiz is the reinforcement section. You recall information in one of two ways: you may see the word and try to recall the definition (which you type in); or you may see a definition (in the "reverse" mode) and try to recall the vocabulary word that matches it. The program uses the Scoreboard, a feature that appears in other Davidson programs as well. The Scoreboard counts attempts, number of correct responses, and percentage of correct answers. You are encouraged to re-do all missed items until you score 100 percent. The Scoreboard also scores make-up attempts and helps record you or your teacher track your progress.

Sentence Completion presents a new sentence with a blank space where the defined word should be, plus the definition of the entry word displayed at the top of the screen. You must type in the correct response. Additional help is available when you press "H." You see four vocabulary words, one of them the correct response. The intention here is to avoid undue stress and frustration for the user who has weak language skills. For this activity, the Scoreboard counts attempts, successes, and percentage, but does not include "H"-assisted answers. After attaining the eighty-four percent figure, you get to play Word Attack, the arcade-styled game that functions as a further reinforcement and as a reward for good work in the previous three activities.

Word Attack! uses either the K or L keys, or the Port 2 joystick, to move an Iggy-like creature wearing a dunce cap under boxes containing the vocabulary word (whose definition has flashed below). The game sets a target score which you meet by matching one of four boxed words to the definition. Different phases of the game involve higher point values, and you can win bonuses by shooting down creatures that whiz by sporadically. The creatures are tough to nail at regular speed. All in all, the game is well-designed and fun to play.

Word Attack! has an editor that allows student or teacher to create a word bank. To test it, I gleaned five key vocabulary words from a social studies text. Following the detailed format in the User's Guide, I typed in a short synonym or definition, created a sample sentence using the word, and another sentence with the omitted word. Five words are the minimum per file, and twenty-five the maximum. I then loaded the program disk; when prompted for my choice of level, I typed "d" which called up my list. It appeared in exactly the same format (employing the three learning activities) as did the regular lists.

The classroom implications are truly tantalizing. Imagine each child in elementary school being able to choose one vocabulary item a week and putting it onto a disk that's accessible to every pupil. Imagine each social studies and science text with its essential vocabulary on disk. Think of the foreign language applications, and the possibilities for quotations, books and authors, art and artists, and so forth. If used properly, the editor feature might be incredibly powerful. It was so easy to use, in fact, that I could effortlessly key in commands within five minutes.

Additional features include the sounding of melodies when you give a correct answer, plus various onscreen encouragements. If you enter a wrong answer, you are prompted to try again. You can try to answer any missed item repeatedly until you get it right. There are several timers in the program (although the need to time vocabulary development exercises is slight); the game section also has a timer.

You can alter the duration of the word/definition display in the Word Display activity, thereby providing another bit of customization. The F1 key permits an "escape" back to the Main Menu; you can employ it at any time. Finally, *Word Attack!*, just like Davidson's other programs reviewed in this volume, carries the National Education Association (NEA) Teacher Certified seal.

My only reservation regarding this package is its asking price of $49.95. Considering the openly aknowledged limits of the program, it may be a tad overpriced for the average, prudent school system or its employees. As with many other worthy products, its final fate may unfortunately be determined not by merit but by marketability.

SPEED READER II

Davidson and Associates
$69.95
Grades 4+

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Speed Reader II is the Davidson and Associates entry into what you might call the "Speed Reading Sweepstakes." It competes with similarly titled programs to help improve reading efficiency by increasing comprehension and confidence through speed reading techniques. These techniques include exercises which increase eye span and perception; control movement; eliminate eye regressions; use peripheral vision; end vocalization, pointing, and sub-verbal vocalization; and improve reading rate while keeping comprehension high.

This program reflects the prevailing wisdom among reading experts about eye movement, regressions, eye span, and comprehension. Opinions conflict about how relevant these factors are, and seriously disadvantaged readers should work with a competent and trustworthy reading professional.

Adults and students needing reinforcement can use *Speed Reader* profitably. The program does not teach you how to read. It assumes that you can recognize words, phrases, sentences, and vocabulary. Its operating level is around the eighth grade. You get a baseline reading-rate score using a timed reading test and comprehension check, and record scores on the progress charts included in the excellent documentation. Then, you follow the prescribed sequence of activities. You have a recommended time sequence: two sessions per week minimum, but only one thirty-minute session a day. An "applied reading" session should immediately follow the computer session. You must constantly use real paper books and magazines between computer sessions. In a behavior modification strategy proven effective in everything from dieting to stopping smoking, you must keep extensive records on the forms provided. I could not find permission to copy the charts in the documentation, but I assume it is acceptable to make enough photocopies for an entire classroom.

In practice session one, you warm up by identifying two random letters flashed at increasingly fast speeds. If a match occurs, another pair appears a bit more quickly. There are fifteen flash speeds, from slow to next to impossible, and three- and four-letter displays that widen your eye span. Pressing the F1 key gives your score of attempts, percent correct, and final speed level. When you type an incorrect letter, the program repeats it at a slower speed.

The warm-up exercises continue with a word display using the same format as the letter display. Phrases, such as "silly butchers dance easily" test both your eye span and sense of humor. These random phrases make you concentrate on the screen. Both peripheral and subliminal perception come into play. You type in a "guess," and realize, when you get it right, that somehow your eyes and brain perceived a four-word, random phrase accurately!

After the letter and word warm-ups, the eye-movement lessons start. You select a title and a speed (from one through nine) from a list of twenty articles, half on reading techniques and half on general interest items. The screen shows word groups zigzagging from left to right on the screen, sliding toward the bottom. The efficient approach: focus only once on the word group, letting the presumably widened eye span cover the entire group at one glance. You take an optional comprehension quiz after each selection. The manual emphasizes eye control, the object of these exercises. If you move your neck to scan a line or page, the authors advice going "to a gym" to develop your neck muscles.

The column-reading segment further develops this "scanning a word group using one fixation" approach, introduced in practice session six. You must read a column, usually two words wide, centered around an optional, vertical line guide. You can choose a speed and opt for a comprehension quiz. In session three, you start taking the timed reading tests, which generate information about how fast you can effectively survey typical reading material. You select the fastest manageable speed, and a comprehension test checks your understanding. The results and data on the warm-up exercises are recorded on the progress chart for this session.

The real purpose of reading training is to develop the skills needed to read and comprehend regular printed material. In the reading-passage lesson, you read a passage (the authors have not creatively named these exercises). Two factors affect your success: the speed setting, set fifty words faster than the prior timed test, and the window setting, which determines how many lines of text you see at once. Obviously, the faster speed and larger window create more challenge. You should do each successive reading passage more quickly, with more material displayed. The comprehension quiz results are recorded with the speed setting. As your skills develop, a general trend toward adequate, if not increased, comprehension with increased speed should occur.

By the seventh practice session, you do all exercises faster, and read more material. Every session ends with the advice, "Push yourself." You push the most when you turn off the C-64, put the disks away, and rub your eyes a bit before doing the final bit of work: reading a

book or magazine, and practicing what you have learned for the last fifteen or twenty minutes. *Speed Reader II* applies the same Davidson approach found in *Math Blaster* and *Word Attack*: a computer program is an aid, but not an end in itself. Five full pages of the manual talk about reading, providing background and rationale for what the program presents—admirable psychological support not found in many competing programs.

Speed Reader II also has an Editor, which lets you include your own materials and questions. Seventeen pages of instructions take you through this powerful program. Excellent examples cover the steps involved in preliminary materials preparation, disk formatting, accessing the editor, and keying in the new material. The .A command, a special feature, analyzes the number of sentences and syllables in a 150 (or more) word selection. Nearly every educator knows this is a computerized "readability formula."

The program disk is copy-protected. You can buy a backup copy for ten dollars. Davidson and Associates will replace free, within one year, a malfunctioning or damaged program disk, if you registered the warranty card. You can copy the data disk. You can buy four other data disks by mail for $19.95 each from Davidson. Each disk contains twenty eye-movement/column-reading selections, and fifteen reading-passage selections. Grade level ranges from four to six, seven to nine, ten to twelve, to college/adult level.

The editing feature and optional disks give you (as user, parent, or teacher) an almost inexhaustible supply of materials, an important feature, considering the price. The presence of the National Education Association "teacher certified" seal means that concerned professionals have examined *Speed Reader II* thoroughly and found it meritorious. This is an exemplary educational program.

ENGLISH INVADERS

Comm*Data Computer House, Inc.
$27.95
Grade 5

Overall Rating	B	C	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	C	B	*Value for Money*

Know any ten-year-olds who want to blast alien invaders to smithereens while they brush up on English grammar? The *English Invaders* games from Comm*Data are looking for volunteers.

This four-game disk drills students on parts of speech, long and short vowels, and word recognition. A little arcade-type action livens up the learning process. One word of caution is necessary, though. These games are strictly drills, not tutorials. Unless the student can already tell an adverb from a noun, this program won't really help him. You should use these for drill and practice once the student understands the basic concepts.

Of the four games, my favorite is Wordspot. Here, the beginning and ending letters of a word move toward each other from the sides of the screen. The player must decide if they form a real word or nonsense before they meet in the middle. Good word recognition practice for young readers who relish a bit of sport in their learning. I do wish, though, that the computer's responses to wrong and right answers weren't so hard to tell apart. You get a quick gold flash for a correct answer, a red or blue flash for a mistake. But the flashes are very, very fast. It is entirely possible to play a whole game without really knowing how you're doing until the summary at the end of one minute. Still in all, this game presents a fresh approach and is a welcome addition to the selection of language skills and reading practice software that's available for the C-64.

As for the cons, there's one glaring drawback to this package that puzzles me. After loading the disk, you must load a main menu which offers the four learning games and loads your choice automatically. At the end of the game, you're asked "Play again y/n?" If you say "yes," the game starts over. If you say "no," the program quits and presents you with a blank screen. What if you want to stop playing the Vowel Saucers game and give English Smash a try? Well, you're out of luck. You have to reload the main menu. Quite strange—and inexcusable. Why put four games on a single disk and then provide a menu screen that won't let you jump from one game to another?

Lastly, Comm*Data and my disk drive just don't get along very well. Following the instruction on the disk cover, I tried to load the menu and got a load error message. I turned off the computer and tried again; this time out, I got a blank screen—blank except for the message "Copy Protected." Only after loading the backup copy provided on the disk (the instructions made no mention of this) was I able to start using *English Invaders*.

English Invaders isn't bad as grammar drills and practice programs go. It does a decent job of holding a youngster's attention while it reinforces language rules—especially with kids that just adore shooting alien attackers to bits.

MATCH MAKER SPANISH VOCABULARY

American Educational Computer, Inc.

$39.95

Grades 7-12

Overall Rating	C	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	D-	C	*Value for Money*

Match Maker Spanish Vocabulary Skills is an educational program that sharpens Spanish vocabulary skills by means of an interesting and enjoyable format. The program includes thirty-five pre-programmed lessons of ten vocabulary items each. In addition, you may add up to ten lessons of your own creation which also contain ten items each for a maximum total of 450 words.

You will have to decide for yourself whether or not the program's $40 price tag (or almost ten cents a word) represents good value for the money. The following guidelines may prove helpful. If you are on an unlimited corporate expense account, I'd say give it a shot; if, on the other hand, you are forced to use your own funds and are not currently stranded in a remote banana republic or standing before some irate generalissimo's firing squad, I'd think twice about shelling out that much dinero. Finally, if $40 represents a significant chunk of your weekly salary, I'd put aside $38 and with the other two bucks buy some index cards, a couple of good felt markers, and begin making a set of flash cards.

Here's how *Match Maker Spanish Vocabulary Skills* works. You select a lesson: one of the thirty-five already on the disk, or one of the ten lessons custom made by you. An English sentence appears which contains one word or phrase in brackets. For example: The Empire State Building is very [tall]. You would then enter the Spanish equivalent of the bracketed word or phrase. You accomplish this by a kind of modified version of Hangman—letter by letter, with the program permitting only three wrong guesses.

This is certainly more entertaining than a flash card system where you either know the word or you don't; for children (and others with limited enthusiasm and wavering purpose) the game aspect of this program may be its single saving grace. On the other hand, you don't have to actually *know* any Spanish to get many of the words right; you merely have to be good at Hangman, which involves strategies and tricks that have nothing to do with any particular language. Not a terribly sound educational approach! I got better than seventy percent right for many of the lessons despite knowing no more Spanish than what the average person might pick up from reruns of *Chico and the Man*. You can well imagine my shock when the computer praised my accomplishments with exclamations such as "Good, Mike!"; "Excellent, Mike!"; "Geez!"

Still, because I got seventy percent or better in two consecutive lessons, I was rewarded with a maze game. (I believe this procedure falls into the realm of "positive reinforcement.") Resentful of this Skinneresque manipulation, I discovered that one can play the maze game without doing *any* Spanish lessons whatsoever by simply loading "Maze Game" instead of following the normal loading instructions in the User's Guide. Not that the maze game is such a fabulous treat—but it sure beats Spanish Hangman.

Match Maker Spanish Vocabulary Skills is copy-protected and comes with a ninety-day free replacement warranty. The User's Guide covers all of this company's products rather than this single program, plus all the computers on which they run, rather than just the Commodore 64. It is an inadequate and very confusing piece of documentation, particularly the section that deals with making and editing your own lessons. No information is provided on how to make backup disks, and with a copy-protected program, this is a serious ommission. Quite an inferior and poorly designed example of educational software for foreign language instruction.

Computer Aided Instruction Spelling

SPELLBOUND

Timeworks, Inc.
$24.95
Grades Preschool-2

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	C	B	*Value for Money*

Spellbound, a clever, dual-purpose program, provides a novel spelling drill and an exercise in logic in an arcade-game format. It's object: using the joystick, maneuver a bee to each letter of the object word, in the correct order. Since the object word is always displayed at the top of the screen, it's not clear how much of a spelling drill this is, but you do have to plan your path in advance. No time factor exists, except at the top two levels where the bee travels continuously; however, you must plan carefully, or you'll cross your own path and lose a life at these levels.

The package is primarily designed to use your child's own word lists, but includes three demonstration files and a brief, but adequate, manual. Even though this program could have more effective spelling drills, it develops higher-level thinking skills, and makes you spell words in correct sequence.

FLASH SPELL HELICOPTER

Microcomputer Workshops Courseware
$19.95
Grades Kindergarten-9

Overall Rating	C-	B	*Reliability*
Ease of Use	C-	B	*Error Handling*
Documentation	D-	D	*Value for Money*

Though *Flash Spell* is yet another variation of the flashcard type of spelling drill, it boasts the addition of an arcade-style game as an incentive for the student to work at the spelling lessons. While it does have some merit, other programs do the same job better—and less expensively.

My first complaint concerns the user's manual. It has instructions for adding the student's own word list to the program, and for changing the time that a word stays on the screen before the program asks the student to spell it. The instructions for altering the list state that the first one hundred lines of the program are available for data statements to hold the word list. However, the end of the file marker is actually at line eighty and overwriting that marker would render the program useless. The instructions also fail to remind you to resave the program in order to preserve your word lists or time modifications. Those two problems are my only major objections to the spelling section of the program.

Flash Spell Helicopter's approach to spelling drills is a bit different from most of the similar programs I've seen. The word is flashed for one second, then the student is prompted to spell it. If he makes an error, the word is shown again for a slightly longer period of time (and for longer time periods after that if more mistakes are input). This gives the student a greater chance for success and avoids making him feel like a loser. In order to motivate the youngster to spell the word correctly the very first time, he is given bonus credits for a correct response. Each bonus is good for fifteen seconds of game-playing time; the student is also given the choice of playing the game each time he earns points, or saving them until a later point in the drill.

After the work portion of the program, the game is rather a let-down. A video parachutist drops from the top of the screen and the student operates a helicopter to catch the figure and deliver him safely to his base. The main drawback to the game is its use of keyboard controls, which are far too slow and clumsy for the necessary maneuvers. If you know some BASIC, you could easily alter the program to use a joystick instead of (or in addition to) the keyboard. Nevertheless, the keyboard input problem and the program's inferior documentation are serious disappointments in a package as costly as *Flash Spell Helicopter*.

SPELLAKAZAM: THE MAGICAL SPELLING GAME

DesignWare
$39.95
Grades 2-6

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

Spellakazam, like other DesignWare programs, combines an arcade game format with educational content. It's a companion to *Spellicopter*, but derived from the Silver Burdett Spelling Series. All the program's words, lists, and rules come from these textbooks. This may limit the program's potential audience, which would be a shame, since *Spellakazam* is, in my opinion, better than *Spellicopter*.

You are presented with two game options; in both, you compete against the "magician." In game one, the magician races you to the magic hat—a tiny stovepipe befitting a tiny magician. The player sprite zips around the maze, which contains an alphabet. Using the joystick fire button or the space bar, you pick up the proper sequence of letters required to spell the word, which fits the context sentence printed below the maze. The magician moves slowly; you can usually fetch the letters and get to the hat first. If you spell a word correctly (your choices are recorded beneath the maze for reference), a cloud puffs out from the hat, the magician disappears, and a turtle or rabbit moves from the hat to the blank in the context sentence, inserting the correctly spelled word. Points and bonus points are added or subtracted according to speed and accuracy. Logically, the game rewards correct spelling with the most points—even if the magician gets to the hat first.

Twenty-word lists have ten, twenty, or thirty words per game. The lists suit grades two through eight. Lists contain words with short and long vowels, consonant clusters, vowel digraphs, and a special list called Media Mania. Media Mania is important because it exemplifies the sort of specialized list teachers and parents can make with *Spellakazam*'s "Create your own spelling list" option. A statement of the relevant spelling rule, e.g., long "i" is spelled with an "i" and sometimes "y," precedes each game. The program displays the words you'll use, and asks if you wish to use them. If you input "Y" and Return, the program displays the game and play commences.

Game two resembles game one, but now, the magician, an active player, seeks out and places the target word's letters in his own row below the maze. The magician scores points, and usually takes about six or eight of the possible twenty points per game. The exercise sometimes becomes just a game, an unavoidable and distracting dimension of this arcade-styled format. The designers have included some options so you can send the magician back to the starting point. When zapping the magician became more important to me than spelling the words, I realized the program was more a game than a lesson-generating educational program.

Generally, however, the program reinforces spelling ability, not gaming tactics. It rewards accuracy, penalizes errors or hasty responses, and tutors by displaying correct answers after you've made mistakes. The score shows your name and score, the name of the list you used, and a list of "words which you need to practice" (words you missed). Finally, a parade of creatures from the movie *Bambi* hops, crawls, waddles, or flies onto the screen, rewarding you for correct words—one rabbit, turtle, duck, or butterfly for each right answer. Watching the parade of twenty cutesy sprites ambling slowly across the screen is enough sometimes to make attaining a perfect score seem more like a punishment than a victory.

DesignWare includes a thirty-page user's manual, a limited ninety-day warranty, a C-64 information sheet, a warranty registration card, and an advertising brochure. The package includes a free subscription to *Kids' Computer News* (a good deal). The materials are all attractively designed and nicely printed.

Spellakazam is one of the best spelling programs I've ever seen. However, I have two major reservations. The manual is beyond the comprehension of most children younger than eight or nine, so an adult or older student must explain the complex directions to the child. At home, the program requires constant parental supervision to get it up and running correctly.

Secondly, it takes a very long time to boot up and move from one subprogram or option to another. The information sheet ascribes this flaw to the disk drive (meaning the 1541, I suspect). It makes no difference at all which part of the technology slows everything down; *Spellakazam* simply requires extraordinary advance preparation for school use—a serious flaw. I haven't been able to figure out one way to get around this problem. So, I must temper my hearty endorsement of this program. But, all things considered, *Spellakazam* is such a fine piece of software; it's definitely worth buying, despite its problems for a school environment.

SPELLICOPTER: THE ACTION

DesignWare
$39.95
Grades 2-6

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Spellicopter and its companion program *Spellakazam* are DesignWare's double-barrelled courseware for that most difficult area of the English language—spelling. If anything is true about the teaching of spelling, it is that using words in as many different ways as possible is the most effective, albeit eclectic, way for kids to develop spelling accuracy.

The format reflects some conventional features borrowed from the video arcades: hazards, fuel limits, multiple screens, and scoring. The helicopter flies across three screens: the landing field, the mountain hazard, and the word field. Its task is to pick up letters in a correct sequence from the scrambled string below it. The letters come from a ten-word list which the child may see before the flight. Twenty points are scored per word, plus bonus fuel points for quick flights. Penalties involve five point deductions for misspellings and crashes. The hazards are tame; you have to crash into them to be penalized, and all but one are stationary.

A word list generator allows the creation of four new ten-word lists with accompanying context sentences. This option permits the teacher or parent to add and delete words and sentences. The new lists can be saved to disk, and therefore, give parents and teachers the chance to produce customized spelling or sight vocabulary lists.

DesignWare gives you a ninety-day limited warranty. The material is attractively packaged, and the user's manual includes detailed directions including helpful suggestions for the program's use by young children. The word lists are supplied along with scoring tables, keyboard/joystick instructions, and rules for the basic game and the individualized lists version.

The greatest value of *Spellicopter* lies in its adaptability to various subjects and grade or ability levels. The gaming aspects are not strong enough to engage most students for extended periods of time. I'd advise using this program in the classroom as a reinforcement tool for brief time spans. The teacher who invests enough time to customize those optional lists will reap good results in terms of improved student performance. *Spellicopter* is a competent spelling program that will boost any langauge arts teacher's efforts to advance the dying art of spelling.

CRYPTO CUBE

DesignWare
$39.95
Grades 2+

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A	B-	*Value for Money*

Crypto Cube is a word game for one or two players intended for the whole family. It's in crossword puzzle format, but no clues are given. You just start guessing letters of the alphabet at random, with a choice of seeing the word list first. The puzzle appears on four sides of a cube which rotates slowly (with somewhat rough animation) upon command. Recommended for ages eight to adult, *Crypto Cube* comes with fifty puzzles; each puzzle relates to a topic, like animal sounds, comics, physics, composers, and African nations. You can also create your own puzzles with a built-in puzzle generator.

Primarily, *Crypto Cube* is a spelling aid to be used with your child's individual word list, but it is also a vocabulary expander for adults. *Crypto Cube* is presented as a game, but you need more luck than skill; therefore it does not truly reflect spelling ability, particularly when playing against an opponent.

To play, you select any square on any of the four sides of the cube. If it contains no letter, you lose your turn and get no points. If it contains a vowel, the computer shows you the letter, and you get another turn and five points. If it has a consonant, the computer shows a question mark, and you guess a consonant. If you are wrong, you lose both your turn and five points. Random bonuses show you an extra square on the side you're playing, plus one square on the next side. A small, cute creature called a Wuzzle tells you when all the words have been uncovered on a side. The Wuzzle also tells you if you make a mistake, such as entering a number instead of a letter.

This program is entirely menu-driven and is easy to operate without recourse to the documentation. However, an excellent booklet of twenty pages fully explains the program. Children who know the rudiments of using a computer should have no trouble with *Crypto Cube*. Initially, a demonstration game is offered to guide you through the game. Although a joystick can be used, the keyboard is needed anyway, so it is just as convenient to play directly from the keyboard.

Making your own puzzle disk is not difficult, if you follow the instructions, which appear in menu format. The computer will generate a puzzle from your word list, or you may create a puzzle yourself "by hand" indicating where you want each letter. The computer will make each side big enough to hold your longest

word plus one space, giving you some control over size.

When you create your own puzzle disks, *Crypto Cube* initializes them in a unique way, and they cannot be used by other programs on your computer. The program is written in FORTH, an excellent high level language that is unusually fast, although this program is not a good example of speed. The Commodore disk drive is slow compared to other makes, and considerable time is spent accessing the disk while setting up or creating a new game. A small disk symbol flashes on the screen to indicate disk activity. The disk is protected, but one backup copy is available for $12.00 plus shipping. There is free replacement of defective or inoperable disks for ninety days. DesignWare provides a toll-free customer service number to answer questions about any of their products. The operators are helpful and friendly. Also, they offer a free subscription to *Kid's Computer News* when you return the warranty card.

Sound effects and the brief appearance of the Wuzzle add to the enjoyment of *Crypto Cube*. This game is not for every family, but, if you or your children enjoy the crossword puzzle approach, this is a pleasant way to improve spelling and vocabulary. Unfortunately, the game is overpriced. Further, the scores do not indicate true spelling knowledge, since luck is a considerable factor. For some children, this could cause dissatisfaction, disagreement, disharmony, or even disgust. Children are accustomed to some degree of fairness in scoring, especially in school or learning, and high scores due to randomness will upset some children. This will not be a problem with most children, but be warned!

WEBSTER
The Word Game

CBS Software
$29.95
Grades 2+

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Webster, The Word Game is a well-conceived and brilliantly executed program. At one level, a youngster can spend hours painlessly improving his spelling. At its most difficult level, even a gifted adult will find it challenging. With seven levels of difficulty, there must be a stop in there for just about everyone.

The letters of the words are displayed very large, so even small children should be able to recognize them. *Webster* takes full advantage of the Commodore's color capacity. This is not a game to play on a green screen monitor. Don't even try! You'll drive yourself nuts.

Webster is an improved version of the old *Hangman* game. You start with blanks representing the number of letters in the word. *Webster* is kind enough to provide you with a one-letter hint to start you out. The word starts at the top of the screen and gradually descends. Your job is to complete the word before it hits the bottom.

The alphabet is written in small letters across the bottom of the screen. A hand with the index finger extended points down to a letter; at the start of each turn, it is positioned over the letter "A." You can move the finger by using the joystick or two letters on the keyboard. Positioning the finger over the letter that corresponds to your guess, and pressing either the space bar or the fire button on the joystick, indicates your choice. A correct guess illuminates all occurrences of that letter within the word. Incorrect choices fly off the screen and the chosen letter changes to inverse video, so you can tell which letters you've already used.

The more difficult the level, the faster the word falls. The words also get longer and tougher as you go along. When you start a new game, you are given the option to choose your difficulty level. Achieving higher point scores moves you onto the next higher skill level.

This is an excellent game, and I highly recommend it. The various levels of play make it suitable for the whole family. Also, in two-player mode, the players choose their individual skill level. This is great because it gives the players an equal chance at winning as both are playing on a challenging level.

The only limitation of this program is that the vocabulary (700 words) cannot be altered, or added to. However, the game doesn't get too repetitious because a different hint letter is shown each time. Even when I got the same word twice in a row, I missed it both times. Give this one a try!

Computer Aided Instruction Mathematics

THE SWEET SHOPPE

Eric Software Publishing
$29.95
Grades Preschool-2

Overall Rating	C	D	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	D	B	*Value for Money*

The tasks proposed by *The Sweet Shoppe* help youngsters recognize numerals; in addition, the software presents colorful, graphic representations of simple addition and subtraction problems.

A main menu offers the child three modes from which to choose: number recognition, addition, or subtraction. While working in the addition or subtraction modules, the child will be entertained by the large, easy-to-read numbers. Even adults will be charmed by the cute characters that you move around the screen to pick out the correct numbers.

In the number recognition module, Mr. Jelly Bean spills a jar of candy. You must count the pieces, then move him to the appropriate number. In the subtraction module, a popcorn popper rewards correct answers by popping enough kernals to match the answer. While the program offers no help when you give the wrong answer, it doesn't present any negative sounds or images which might discourage the child. The program should use a method of "breaking down" the problem to help young students understand their incorrect answers.

For some reason, *The Sweet Shoppe*'s programmers chose to ignore the diverse sound and music-making capabilities of the Commodore 64. The sound effects throughout the program are merely simple beeps and toots. The documentation is annoyingly sparse. More space is given over to extolling the good intentions of the software's developers than to explaining how to load, run, and use the program.

The program handles errors well; it seems to be crash-proof. The method of copy protection chosen by the people at Eric, however, is very rough on Commodore disk drives. It intentionally embeds read and write errors in the program. I noticed this while booting up the program, and it immediately put me in a disagreeable frame of mind. Sometimes, I had to shut off the entire system two or three times and repeatedly reload to get the program to run.

The program has received endorsement from the NEA. The diligent software shopper, though, will have little trouble finding software of equal or higher quality at a significantly lower price.

ADD/SUB

Boston Educational Computing, Inc.
$24.95
Grades Preschool-3

Overall Rating	C	A	*Reliability*
Ease of Use	B+	C	*Error Handling*
Documentation	C	C	*Value for Money*

Add/Sub is a very friendly addition and subtraction teaching aid for children aged five through nine. The program displays addition and subtraction problems to be solved. Each problem appears with oversized, easy-to-read black numbers. A problem can be either one, two, three, or four digits in length and can include decimal points if you wish.

Like other programs offered by BECi (Boston Educational Computing, Inc.), *Add/Sub* is a no-frill, straightforward educational supplement. The program drills the student in addition and subtraction; it does not entertain. However, the program is very friendly; there are no scolding messages if the answer is incorrect. Any number the student enters first appears in the normal black type, but if it is incorrect, then it slowly turns red and disappears from the screen. The computer then waits quietly for another answer. This cycle continues until the correct answer is given.

There are several useful options available with *Add/Sub*. The first, of course, is whether to practice adding or subtracting. Next, you can select the level of difficulty by picking problems using one, two, three, or four digits.

If you pick one-digit problems, you can then choose whether they will be displayed with or without objects as illustration. This is a real plus for young students. For example, if you choose "one" in response to the prompt "Digits?", then selected "yes" for objects, here's what would happen. First, *Add/Sub* would randomly pick two numbers to add or subtract. Each number would be displayed normally. If the first number were a 4, four small symbols would appear to the left of it. If the number were a 9, nine small symbols would appear to the left of it. Thus, young learners can more readily recognize the relationship between counting and addition and subtraction. Unfortunately, this option is available with single-digit numbers only.

Another option is to practice problems which require numbers to be either "carried to" or "borrowed from" another column. Along with this option is the choice of Hint. Here is another nice feature of *Add/Sub*. If Hint is selected and the problem requires a Carry or a Borrow, the program will display an arrow above the appropriate column to remind the student that their answer will affect the number in the next column.

Problems using decimal points can be selected with the Decimal Points option.

The last option is Pace. The program normally waits seven or eight seconds for the student to answer a prompt. If the student seems stumped, the computer supplies the answer. With Pace, you can either leave the program as it is, set a shorter or longer wait period or choose "wait for an answer." This last option causes the program to wait patiently until the child answers, whether one second or one day.

The Commodore 64 version of *Add/Sub* is a translation of BECi's VIC 20 program. It is a small, tightly written, BASIC program, designed to fit on computers with small memories. If BECi had rewritten *Add/Sub* to use some of the C-64's huge memory to add sounds and rewards, *Add/Sub* would be a much more attractive offering. Small children, used to *Sesame Street's* style of fun and sound-filled learning techniques, may lose interest in quiet numbers. With sound, *Add/Sub* would be an "A-1" educational tool, but without sound, it lost my young son's attention quickly. So my next step is to add sound to *Add/Sub* (the program is written in BASIC, and is not copy-protected), a chore BECi should have done before they marketed an otherwise very good product.

BECi places no time limit on their simple warranty to replace any defective program for a "reasonable charge."

COUNTING

MicroEd
$34.95
Grades Preschool-3

Overall Rating	B	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	B	*Value for Money*

Counting is one of the *Math Four-Pack* series of programs from MicroEd. The *Counting* package gives instruction and practice in counting, number lines, and beginning addition and subtraction for children in kindergarten and the primary grades.

Young children without reading skills will need help using these programs. Even though the learning games themselves are well-designed for kindergarteners, the menu that must be passed through on the way to the games asks many questions and requires too many responses.

The first game in *Counting* is Count Em. The child counts the number of toy locomotives or boxcars, and, if he has counted correctly, the train chugs along the track to the station. If the wrong answer is given, the child is asked to try again. The computer provides answers if the "?" key is pressed.

Next on the menu is What Number is Missing? This game gives the child counting practice for numbers up to 99. A correct answer is rewarded by having a truck dump the number in the appropriate spot on the number line.

Adding with Objects and Subtracting with Objects come next. Groups of houses, sailboats, cars, blocks, or pumpkins are shown, accompanied by the corresponding numeral. The student adds or subtracts, using the objects for reference; if correct, he receives a picture of a smile face. As in the other games, the child must try until he gets the answer or asks the computer for help. The graphics in these two games are not nearly so good as in the first two games of this *Four-Pack*. Even kindergarteners get tired of the same smileface after awhile.

Four games on one disk is a bargain; it also helps teachers who network several computers off a single disk drive. This one set of programs could serve a number of different students at the same time. At home, it could help a parent give his child an educationally sound head start in learning basic math skills.

Programs such as these, for very young children, need excellent error trapping. There is just no telling what keys some little explorer may purposely (or accidentally) push. MicroEd does an almost perfect job in this regard. The only error I could get away with was pressing the Shift and Commodore keys simultaneously, thus changing to cursor-up mode. This made hash out of the screen but, of course, caused no lasting damage.

One other minor criticism I have is with the packaging for this product. It has been made to look like a substantial book from the outside, but once the plastic wrap is off, it is all air and nearly useless, even for storing the disk and documentation. This is certainly deceiving.

As a whole, I am most pleased with this set of programs as an instructionally sound introduction to numbers and math that could effectively lead children on to the higher lessons in the MicroEd *Math Four-Pack* series. (The Education section of this book contains the reviews of the other programs in this series.) Looked at as an isolated purchase, however, I have some reservations. The menu system is too complicated for young children, and single educational games of this quality are available in the public domain.

MICROADDITION

Hayden Software
$29.95
Grades Preschool-5

Overall Rating	B	A	*Reliability*
Ease of Use	A	C	*Error Handling*
Documentation	A	C	*Value for Money*

Microaddition, a mathematical learning program for children from four- to ten-years-old, begins with a simple menu that's numbered one through four. It also has an "S" option which disables the sound. Choice number one graphically teaches numerical values up to nine, using apples falling from a tree. Your child chooses a number, then the computer displays that number and starts to drop one apple at a time until the given number is reached. One by one, you count the apples. The computer displays the corresponding number above each apple. This is one of the only programs I have seen that four-year-olds can actually use. My son, who's a month away from being four, enjoyed it tremendously. It helps number recognition, as well as counting.

Choosing number two lets your child practice counting. The computer selects a number of apples, which fall from the tree, then displays a question mark. Your child counts the apples, and enters the correct number. A pleasant-sounding melody rewards correct answers. Incorrect responses elicit a short series of three deep notes. Your child gets two more chances. The computer displays the correct answer after the third wrong answer. A simple and effective method.

Option three, the program's real addition portion, displays balloons with strings attached. The computer displays groups of balloons above a corresponding number. On either side of a plus sign you see a cluster of balloons followed by an equals sign and a question mark. The compter offers to display the correct number of balloons. This section suits both the younger and intermediate age groups.

Kids in the upper limits of the age range will be challenged more by the next selection: adding numbers, which begins with a "quiz." The student is given an addition problem; subsequent problems increase in difficulty as time goes on. Apples dropping into correct and incorrect baskets record the student's performance. You must give the answer from right to left: the same way you'd do it with paper and pencil. When you move out of this section, the computer writes your score on the screen. Unfortunately, your kids will probably use the other option, recommended as a homework *checker*, to do their work for them. It's a complicated, five-digit adding calculator, but, curiously enough, you must use the space bar rather than plus (+) and equals (=) signs. I'm not sure why the designers avoided using the real keys here.

Microaddition loads well, but I encountered a couple of problems. The Run/Stop key is not disabled. My five-year-old discovered this very quickly. The documentation says you can move from a level to the menu by pressing any key, but the Run/Stop key gives you a break message; you must press Run/Stop and Restore in order to continue. Even though you don't have to reload the program, your child can't easily get out of this predicament. In addition, pressing the Commodore and the Shift keys simultaneously renders the graphics incomprehensible. Speaking of graphics, *Microaddition*'s are below par. If the program didn't tell you the balloons were balloons, you might think they were lollipops. This software is copy-protected and has a ninety-day warranty. You can obtain a replacement disk after the warranty expires for ten dollars. In addition, you can call a toll-free number if you have problems with the program.

Microaddition is a fine mathematics teaching aid that's geared toward the appropriate age group. But it's not worth thirty dollars. Hayden should have done some addition of their own! They should have included *Microsubtraction*, or another one of their math programs, in the same package to give you your money's worth.

MICROSUBTRACTION

Hayden Software
$29.95
Grades Preschool-5

Overall Rating	B+	A	*Reliability*
Ease of Use	A	C	*Error Handling*
Documentation	A	C	*Value for Money*

Can you afford to pay more for a program than it's really worth? Are you willing to overcome a little error handling problem with a new piece of software? If so, then your child can learn number recognition, counting, and subtraction—and enjoy it.

Hayden has come up with a good educational program, *Microsubtraction*, for children aged four to ten. The directions are clearly written and easy to follow. I encountered no problems when I loaded the program, but I did run into some error handling difficulties. The Run/Stop key is not disabled and young children will not be able to get back to the menu. Pressing the Shift and Commodore keys both at once disrupts the graphics. Since these keys are right next to each other, you're very likely to have problems with them.

The menu contains five options. Number one allows your child to pick a number from one to nine. When the key is pressed, birds begin to hatch from eggs on the ground. They fly up one at a time to a tree branch. Each bird is counted, and younger children can count along. This is helpful for teaching youngsters number recognition. This type of lesson works best with kids as young as four and as old as six or seven.

The second menu choice teaches counting, and it accomplishes its task quite well. Birds fly down and land on top of mailboxes, from left to right. This left to right movement helps in reading readiness training. The birds skip boxes when they land, so your child must count the number of birds every time and cannot simply associate each mailbox with a certain number. A correct answer is rewarded with a pleasant tune, such as *London Bridge is Falling Down*. If the answer is wrong, the program sounds a few downbeat notes.

Option three introduces subtraction. Here, the graphics are a bit unacceptable. Balloons and their corresponding numbers are subtracted. The answer may be given with or without showing the balloons. This permits both younger and older kids to take advantage of this section.

Number four turns the program into a five-digit subtraction calculator. The child must give answers from right to left. The problem with this section is that you have to use the space bar for the subtraction (-) and equals (=) signs. Since the computer keyboard has these symbols, and there is plenty of room on the disk, I'm surprised that Hayden opted for this space bar input. Option five on the menu, represented by S;, toggles the sound on and off.

Microsubtraction gives you a ninety-day warranty. After that, ten dollars and the old disk will get you a new copy. The program is copy-protected, and Hayden gives you a toll-free number for customer assistance. Overall, the program is a good math tool, but I feel this program is simply not worth its thirty dollar price tag. If Hayden were to lower the price, *Microsubtraction* would be almost irresistible to parents of kids aged four to ten.

PRIMARY MATH SERIES

Comm*Data Computer House, Inc.
$29.95
Grades Preschool+

Overall Rating	A	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	B	*Value for Money*

Attention, preschoolers! No reading required here! This is because *Primary Math Series* from Comm*Data includes a computer voice (by Votrax). No special add-ons or cartridges are needed. Even very young children can begin to learn the concepts of addition and subtraction with this software.

I was eager to hear my computer speak, and I didn't have to wait long at all. The opening menu is read by a sepulchral voice from the monitor, imploring you to "select A,B,C, or D." My computerized voice could use some speech lessons to improve his pronunciation, but don't get me wrong; I'm not complaining.

This math tutorial is (according to the vendor) geared to "help young children learn single and double digit addition and subtraction through the use of oversized numbers and graphics. Addition 1 and Subtraction 1 teach single digit math processes, while Addition 2 and Subtraction 2 demonstrate double digit math with carrying and borrowing. A choice of two levels is offered for each program." The graphics and well-written voice prompts help youngsters grasp what those little number symbols really mean. Each numeral is accompanied by an equivalent number of small colored blocks that actually move to demonstrate each math process.

Primary Math Series is much better than Comm* Data's other programs, *Math Tutor* or *English Invaders*. *Primary Math's* error trapping is much better, and simply pressing the Run/Stop key returns you to the main menu. At the end of each ten-question lesson you see a performance summary and have the option of playing again. A "no" returns you to the main menu,

rather than shutting down the program entirely (as in *Math Tutor* and *English Invaders*).

For an introduction to the arithmetic concepts of addition and subtraction, *Primary Math Series* is an excellent package. The computerized voice is definitely a plus for capturing kids' interest, and would be even better if it had a bit more "personality." A *potpourri* of compliments, a droll comment here and there, even a "tsk! tsk!" now and then, when the user inputs errors, would raise the program's voice a couple of notches above the purely mechanical, and effectively jazz up the program.

THE GRABIT FACTORY

Eric Software Publishing
$29.95
Grades Kindergarten-3

Overall Rating	C	D	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	D	B	*Value for Money*

The Grabit Factory, a package of math tutorials, introduces number recognition and elementary addition and subtraction problems to young math students. The hi-res graphics have vivid colors, and the numerals are clearly defined—even on a color TV.

You enter *The Grabit Factory* and go to work on an assembly line, either recognizing the numbers or working simple addition or subtraction problems. With the keyboard or joystick, you make a mechanical claw descend and pick up a numbered block. The problem appears at the top of the screen and remains there until you pick up the appropriate number. Next, you carry the block over to a hopper where the computer decides if you made the right choice. When you enter a correct answer, a block with a smiling face on it travels down the assembly line. Every now and then, the block even stands up and waves at you! You also get to advance to the next problem.

The program offers no help when you miss a problem, but at least there are no intimidating punishments; you must simply do the problem over. A method of breaking down the problem in order to explain an error should have been included to help students understand their mistakes.

Error handling is excellent, and the program seems to be crash-proof. Unfortunately, it is very unreliable, due to Eric Software's method of copy-protection. Read and write errors are intentionally embedded in the program loader—they're very rough on Commodore disk drives. I had to shut the entire system off and repeatedly reload it to get the program running.

Though *The Grabit Factory* adequately teaches its subject matter, I feel it's a bit overpriced compared with other vendors' similar math programs. It boasts, however, the approval of the National Education Association.

FLOWER POWER

Softwave
$39.95
Grades 1-3

Overall Rating	C-	A	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	D	D	*Value for Money*

Flower Power teaches the basics of arithmetic. It claims to have thirteen games in one, but it's really just a series of drills.

Flower Power's format is familiar to users of educational software. A series of menus lets you choose math exercises (whole numbers, fractions, decimals, or fraction/decimal conversion), then addition, subtraction, multiplication, or division. Incidentally, *Flower Power*'s documentation consists mainly of onscreen menus with two pages of widely spaced written instructions.

The program decides the difficulty level after you answer a series of questions. You cannot skip to the appropriate difficulty level when first using the program. Like other math tutorials, the program advances until it gets a wrong answer; then it either stays at that level, or repeats easier exercises until you are proficient enough.

The program rewards correct answers with flowers, which appear in a "field" on the screen. Wrong answers make a weed grow. The program has unremarkable graphics and sound; you wouldn't expect lo-res graphics, and simple beeps and toots, at this price. This leads me to my main beef with this software: the huge library of public domain software for the Commodore 64 has all *Flower Power*'s good features combined with public domain prices! *Flower Power's* drive-damaging copy-protection scheme simply rubs salt in the wound.

Flower Power, however, has excellent error-handling, and prints reports of students' scores. The report feature also lets you edit/delete students' records, kept on a data file on the master disk.

MATH BLASTER!

Davidson and Associates
$49.95
Grades 1-3

Overall Rating	B	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Math Blaster is a basic math skills tutorial, drill, and testing package. It covers addition for grades one through three, subtraction for grades two and three, multiplication for grades three and four, division for grades three and four, and fractions/decimals for grades five and

Math Blaster offers a number of activities to teach its five subjects:

Look and Learn: a tutorial with twenty-five to thirty examples that suit the specified grade level. The standard four-second screen display time can be increased or decreased, and you can escape any sequence via the F1 key.

Build Your Skill: presents problems in horizontal, vertical, or mixed forms. This feature challenges students to recognize the arithmetic operation in several different spatial formats. The elapsed time indicator allows speed drills. The scoreboard tells how long the student took, how many items he or she missed on the first try (two allowed), how many items he or she completed, and the percent of correct answers. Students can retake any and all missed items until they have answered them all correctly.

Challenge Yourself: unlike the previous option, which emphasizes recall, this fosters numeric reasoning. Each problem has a part missing. The student types in the missing number. As before, the scoreboard records student performance. This option also allows you to retake a set of problems.

Math Blaster Game: a problem appears at the bottom of the screen, with four possible answers appearing in boxes above that. A cannon lies directly below each box. Using either a joystick or the keyboard, you position an animated human figure between the correct answer box and its cannon. The fire button or the Z key drops the figure into a cannon, which then fires it up to the answer box. The box explodes if it contains the correct answer, and you win points. Two timers complicate the game. When each problem first appears, a seal tosses a ball; you must solve the problem before the ball comes down. Simultaneously, a balloon descends toward a pin; if it breaks on the pin, the game ends. You must flip the balloon up occasionally to continue play. The manual doesn't clearly specify how you should do this, and it took two adults a bit of time to figure it out.

Primary school children would probably have difficulty coordinating the different elements of the game well enough to enjoy and learn at the same time. Older children and special education or remedial students might have the physical skills or the mastery of arithmetic needed, yet be unable to meet the game's demands. In fact, any child might have mastery of the math, yet not be able to use the game effectively. Because of Math Blaster's inexorable demand for correct answers, speed, and coordination, its usefulness may well be limited to bright and adept students. Many children will find it frustrating rather than rewarding. The game needs an option allowing you to change the difficulty and speed to accommodate a wide range of interest, ability, and coordination.

The editor function raises *Math Blaster* above the competition. On a formatted disk, the parent or teacher can write up to five sets of twenty-five problems, for each of the topics. Twelve pages of the well-thought-out user's manual discuss the editor and give step-by-step instructions for entering directions and examples. This part of the program employs the following commands: save, select by number, edit, list by line or file, delete, insert, get (load), print, clear, quit, and help! Any teacher or parent with access to grade level math sources can copy the readymade examples into the editor's files. This guarantees enough examples to reinforce or test student mastery of basic arithmetic skills.

Math Blaster also contains a number recognition file for preschoolers.

We have one major suggestion for *Math Blaster* users: remember the F1 key. It gets you out of those boring level one tutorials fast. The power of this package lies in the drill, reasoning, and game segments.

Math Blaster loads quickly and has 600 problems on disk, plus whatever you add through the editor feature. The problems are grouped by math function in five levels of difficulty. Even the number displays are large—an inch high—to help younger learners. Sound, color, and animation add life to the displays and reward every ten and twenty correct answers. Moreover, the program has been teacher-tested in the classroom. We give *Math Blaster* honor roll grades as a good example of an educational program that uses the unique powers of the computer.

ADDING AND SUBTRACTING WHOLE NUMBERS

MicroEd
$34.95
Grades 1-4

Overall Rating	B	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	B	*Value for Money*

Adding and Subtracting Whole Numbers, from MicroEd's *Math Four-Pack* series, contains drills for practice in basic number facts. Recommended for grades one and up, it consists of four learning games covering adding and subtracting by column, comparing quantities as greater than and less than, and story problems.

Of the four games, Slam Dunk is the best graphically. Your correct answers are immediately rewarded by seeing your basketball player score for two points. Five correct answers in a row, and he leaps into the air for a slam-dunk! Incorrect answers send the ball soaring over the backstop. Neither the Column Right nor the Give and Take Stories use any graphics, and the only graphics in the Greater Than/Less Than game consists of a smile face that rewards a correct answer.

All four of the learning games conclude with a score sheet that shows you the number of problems attempted, correct responses, errors, time used, etc. The Slam Dunk score sheet even lists the number facts you missed. This helps a teacher or parent to see which facts the student still needs help with.

At the end of each game, the student may choose to play again or return to the menu. I do wish, however, that the menu didn't have to be loaded from disk each time. It takes twenty-five seconds to reload the menu and then forty-five seconds to load a new game from the disk. The menu is simple enough that it could be held in memory and thus eliminate much delay. Because there are four games on one disk, a teacher can keep several students occupied with one disk drive.

Overall, this math package benefits from a solid, coordinated approach to learning, but the quality of the four games is roughly equivalent to the better educational programs available in the public domain. Graphics and sound, when present, are only mildly motivating. Still, *Adding and Subtracting Whole Numbers* is an instructionally sound drill and practice program for addition and subtraction.

SUCCESS WITH MATH: ADDITION AND SUBTRACTION

CBS Software
$24.95
Grades 1-4

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

Addition and Subtraction, the most elementary component in CBS Software's series of math tutorials, provides drill and practice in a wide range of math topics. Targeted for students in grades one through four, it presents problems in addition with carrying, and subtraction with or without borrowing. You may select a difficulty level by choosing the number of rows and columns with addition, or the number of digits with subtraction. (Naturally, subtraction problems that don't involve borrowing are easier than those that do.)

Instructions for the operation of the program are supplied on the screen. They are easy to understand and make additional documentation virtually unnecessary, though a brief user's manual accompanies the software.

The program is menu-driven and all necessary operations require single keystrokes only. Error trapping is good—it's nearly impossible to accidentally strike the wrong key and crash the system. All problems are randomly generated so that you never see the same set of problems twice. And upon completion of any group of problems, you are given a summary of your performance, which includes both the number and type of errors.

You are asked to solve each problem in a step-by-step manner, and before you can continue, the program addresses any errors you made. After you make two mistakes at any point in the problem, the program supplies the correct answer and an explanation of your mistakes. This reduces both the possibility of the young student feeling frustrated and the likelihood that he'll make similar mistakes in the future.

You may select the size of your addition problems, up to nine times nine, or nine rows by nine columns. A white cursor locates the position of your next keyboard entry. You enter each digit, one at a time, along with a "carry value" after each entry, even if it is zero.

You can choose subtraction problems of up to five digits across. Subtraction without borrowing is much like the format for addition, with each subsequent digit entered at the cursor. Subtraction problems with borrowing are a little more complex. When a given computation requires borrowing, you must enter the letter "B." The cursor then appears above the digit to be borrowed from, and you are asked to enter that digit's

new value after borrowing (minus 1, that is). Then the cursor moves right a bit, and you are asked for the amount borrowed (which is always a 1). You perform the appropriate subtraction, and the cursor moves left to the next column. This process continues until the problem is completed.

The greatest strength of all the programs in the *Success with Math* series is the emphasis on successful completion of each step along the way; errors are identified immediately and fully explained before the student is allowed to proceed. In addition, the programs are straightforward, uncluttered, and easy-to-use.

Unfortunately, one glaring exception crops up here. When you have to do subtraction that involves borrowing, and must also borrow from zero, the procedure becomes somewhat foggy. When the cursor moves over the zero, the program asks you for the "new value" for this digit. Taken literally, the correct answer is "9," which must eventually replace the zero after you've done additional borrowing from the next column to the left. But "9" is an incorrect response; you are told that you must type in a "B," for "Borrow." Once you do this, you are asked for the "new value" of the next digit to the left (or its present value minus 1). This accomplished, the cursor oddly positions itself above the original villain—the zero—and you are prompted for the "amount carried," which has always been (and actually still is) a "1." But in fact, the program now wants you to enter the "9," the new digit in that position, and you are told that the "1" is wrong. After you dutifully enter the "9," the standard request for a carry value of "1" occurs and the problem solving continues until the problem is completed.

This particular procedure is handled very poorly by *Addition and Subtraction*, both in terms of the misleading prompts and the inconsistency of this particular method, compared with all other program procedures (not to mention standard elementary level curriculum). Yes, it is a quirk that you can get used to; but it's an unnecessary flaw that the designers could have eliminated and it threatens to cause persistent difficulties for the younger students in the target age group.

For most consumers, though, CBS's *Success with Math: Addition and Subtraction* program will provide your young mathematician with many hours of solid drill and practice at a very reasonable cost. (You may be interested in noting that the software is not copy-protected and the vendor authorizes making archival copies under certain stated conditions.)

MATH MAZE: THE AMAZING MATH GAME

DesignWare
$39.95
Grades 1-6

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B	*Value for Money*

Math Maze is a basic math operations program from DesignWare and D.C. Heath Publishers for students from six to eleven. It comes in an attractive package that containins the program disk, a twenty-two-page manual, a Commodore information card, an ad brochure, and a registration card that provides limited warranty of the program for ninety days.

The manual and information card allowed me to load the program and begin playing as quickly as my 1541 drive could boot it up—two full minutes! This and other relatively long and frequent loading periods are disclaimed on the information card as being the fault of the disk drive. However, knowing just what thing to blame did not make the loading time any more bearable. The program loads a useful, but lengthy, demo.

Math Maze provides students with practice in math facts (in the style of other popular math instruction programs, such as *Math Blaster*). Its forty mazes have digits from zero to nine scattered throughout. The game presents a math facts problem, the timer begins, and you must maneuver a cute, flying sprite to the digits that comprise the answer to the problem. The faster you snag the answer digits, the more points you score. A scorer keeps track and displays your score after ten problems.

You can personalize the game with the maze generator. Although this offers intriguing possibilities, there's almost no chance for a normal student to exhaust all the possible, ready-made combinations of forty mazes, four levels (novice, master, expert, pro), five operations (addition, subtraction, division, multiplication, mental math), with three to twenty complexity levels. Since it takes five pages of the manual to explain the design option, I wonder how useful it really is when the basic facts program itself has 2,400 to 16,000 theoretical variants.

The game is fun to play at higher levels, when the spider and the invisible maze walls frustrate your race against the timer. But I do have my doubts about how well it holds the student's interest, and I wonder how much staying power *Math Maze* really has.

My overall feeling is that this package would be better marketed as two separate programs—the math drill mazes and the maze generator—retailing at $19.95 each. As it stands now, I think the package is over-

priced and "over designed" for what it's likely to accomplish. Simply put, *Math Maze* misses the boat.

CHALLENGE MATH

Sunburst Communications
$35.95
Grades 1-8

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B+	*Value for Money*

What makes *Challenge Math* distinctive? It deals with the four basic math operations (addition, subtraction, multiplication, and division) using game formats, graphics, and sound to increase student interest. Sunburst recommends this package for grade levels one through eight, although my impression is that grades two through six would benefit the most. The program randomly generates problems, which means that, in theory, each student gets an extensively varied assortment of problems to help develop his operational skills.

The disk includes three games: Alien Intruder, which seeks to develop quick recall; Digitosaurus, involving estimating and judging; and Math Mansion, which requires completing a missing element in a problem. The last two games have Spache reading levels of 2.8 and 3.2. These reading levels approximate the grade level in which the math skill might be introduced. The skills include adding or subtracting up to two digits, and equally simple multiplication and division.

In Alien Intruder, the student competes with an alien that whirs after the correct answer in a race with the player's red dot marker. The first one to reach the correct answer scores. In Digitosaurus, the reward is helping your friend, the dinosaur, get older and wiser. In Math Mansion, you escape haunted house by acquiring tools to overcome obstacles. Math Mansion borrows heavily from fantasy and maze games, with the moves determined by correctly answering math problems.

An option allows the teacher to pre-set certain speed and number variables before students use the program. These remain in effect until changed again.

The most likely uses for *Challenge Math* are in the middle and upper grades of elementary school. These programs make nice reinforcers for initial learning lessons and units. Their paceable speeds mean remedial students can cope with them. Math Mansion has especially attractive graphics.

My overall impression is favorable. The price is competetive; the documentation is good. The teacher option and randomization features insure flexibility. For the computer-oriented elementary teacher charged with introducing the four basic math operations, *Challenge Math* is a valuable supplement.

MATH MILEAGE

CBS Software
$30.00
Grades 1+

Overall Rating	B	A	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	B	B	*Value for Money*

Math Mileage combines the intrigue of a maze with the action of an arcade game to produce a finely crafted drill of addition and multiplication facts. The idea of this game (for one to four players) is to maneuver a race car through a series of forks in the road with different mathematical values in order to reach a numerical goal in the shortest amount of time. A display at the bottom of the screen and billboards along the way keep the driver posted on his or her progress toward the goal.

Children in early elementary grades should be able to compete evenly with their parents on the first level. The third level is difficult enough to keep adults on their toes.

The program seems to be completely error-proof; it provides for stopping the action and reducing totals greater than the goal so that every driver can complete the race. In addition, the game has an outstanding musical theme and offers exceptional graphics and sound effects for the action. In order to reinforce the educational objectives, each driver is required to make two runs over the same course in each round. This is not as tedious as it sounds, and it usually improves the score quite a bit. The only real difficulty with *Math Mileage* appears when using a monochrome monitor, since some numbers do not show up well in this format.

By carefully limiting their teaching objectives, and emphasizing the game aspect of the program, the authors of *Math Mileage* have turned out an excellent product that successfully bridges the gap between arcade and education. The clever premise and the excellent sound and graphics give this program a much higher level of interest than most of its competitors.

MULT-BECi

Boston Educational Computing, Inc.
$24.95
Grades 2-4

Overall Rating	B	A	*Reliability*
Ease of Use	B+	C	*Error Handling*
Documentation	C-	C	*Value for Money*

MULT-BECi is the best of a series of math programs offered by Boston Educational Computing, Inc. (BECi). The program offers randomly picked multiplication problems to solve.

There are three options. The first simply lets the computer solve the problem. This is done slowly, one step at a time, so you can view each step taken to arrive at a correct answer. This is a good passive way to introduce new multiplication students to the steps of problem solving. They can sit back and watch and learn.

The next option allows you to attempt to solve the problem. A problem is displayed, and the computer waits. A friendly pulsating arrow points to the column the computer wants you to work with. When you enter a number, it is first displayed as black just like the problem numbers. But if the answer is wrong, the incorrect number changes to red and disappears. The friendly arrow reappears and waits until you enter another number. This cycle continues until the problem is solved.

The third option is to set a timer for you to beat. The program progresses as before, but after the allotted time clicks off, the computer solves the problem for you.

You (or a teacher) can input how many digits each multiplicand and multiplier will have and the timer (called "Pace" in the program) is set in the same manner. To change any of these parameters, the program must be stopped by pressing the Run/Stop key and restarted by entering Run again.

No special knowledge of computers is necessary to use *MULT-BECi.* Merely Load and Run. The program, except for the Run/Stop key, is well protected from children (who will be the prime users of this program) accidentally entering faulty information. For example, if you enter a letter instead of a number the program pretends nothing happened and waits for a proper entry.

The ease of using the program will be appreciated by anyone trying to read the instructions. An eight-page manual comes with the disk, but it refers almost entirely to either the VIC 20 or Atari computers. All instructions packed with the disk copy I have refer only to tape users. So if you buy *MULT-BECi* and your disk drive both on the same day, expect to use the disk manual instead of the program manual to figure out how to get started.

MULT-BECi is a straightforward, no-frills, educational program. It is great for children, aged seven through twelve, to use to practice multiplication. It is not a game. There is no scoring, no funny little creatures, no noise, and no end. *MULT-BECi* will practice multiplication as long as you want. The only fun is in getting the problem correct.

The numbers displayed are large and easy to read. The screen is colorful and appealing, but dull. Children will not pick *MULT-BECi* for excitement or adventure. This lack of creative graphics or sound is a real disappointment. None of that wonderful sound packed inside each Commodore 64 is allowed out. In a classroom this silence may be a plus where other children would be distracted by noise or music, but in the home, this omission is a factor you may want to consider. However, because *MULT-BECi* is written in BASIC and not protected, sound can be added (that is, provided you know BASIC or have a friend who does). *MULT-BECi* was originally written for the tiny VIC 20 where memory space was precious. Unfortunately, when it was translated for the Commodore 64, it was translated literally and all that machine's extra memory lies quiet and unused.

Educationally, this is a good buy, if you are willing to spend some time at the computer with your child. But if you expect your eight-year-old to pick *MULT-BECi* over *Pac-man*, you're in for an education yourself.

1-2-3 DIGIT MULTIPLICATION

Microcomputer Workshops Courseware
$24.95
Grades 2-6

Overall Rating	B	B	*Reliability*
Ease of Use	A	C	*Error Handling*
Documentation	C	B-	*Value for Money*

This computerized multiplication tutor helps children in grades two through six develop multiplication skills. Each problem has a three-digit multiplicand; however, the student may select multipliers of one, two, or three places. The program presents the problem on the screen, and moves the cursor to the ones column of the product. Then, the student types in the correct digit. If he gives an incorrect response, the program prompts him to try again. If his second response is also wrong, the program supplies the correct answer, and prompts him to study before he continues. Once the student answers correctly, the cursor

moves to the top of the tens column, and waits for the student to enter the value to be carried over, even if it is zero. Input throughout the program is by means of Get statements, so the student doesn't have to hit a carriage return after each of his responses.

On the whole, *1-2-3 Digit Multiplication* is a fast-moving drill. I especially like the fact that the student must think about carrying during each and every operation. This reinforces the procedure, and helps develop the student's multiplication accuracy. My only complaint: the program uses white letters on a black background. If my child used the program regularly, I would alter this setting (an easy matter, since the program is written in unprotected BASIC and the screen Pokes are at the top of the program). You will get your educational software dollar's worth if you invest in *1-2-3 Digit Multiplication*.

AREA OF A RECTANGLE

Microcomputer Workshops Courseware
$29.95
Grades 2-6

Overall Rating	B-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B+	B-	*Value for Money*

Area of a Rectangle gives young students concrete experience with the meaning of the area of a rectangle. It also encourages them to discover their own algorithm for finding the area.

The program is menu-driven and supplies both instruction and practice via three distinct instructional modules. The first module introduces the student to the concepts of rectangles, square units, and area by presenting random geometric figures on the screen. Students use the S key to fill the figures with a series of blocks or squares. The young pupil is encouraged to count as each block fills the rectangle. When the figure is completely filled, the total number of blocks used is displayed, along with the area of the figure. (The observant student will eventually notice that these two numbers are always the same.)

The second instructional module explores the concepts of rows and columns, along with their relationship to the given values for height and base of the rectangle. Once again, the student is asked to fill the rectangle with squares, this time focusing on the number of squares it takes to fill each row. The student presumably will recognize the relationship between the row and base numbers. He is encouraged to discover a method for determining the area without counting (either by addition or multiplication, depending upon his previously entered ability level). If he cannot successfully discover the area algorithm, the program provides an explanation.

The menu reappears; the student chooses to either view the instructions again, or to move on to the third module, the practice unit. Here, five random rectangles are presented, with the height and base values labeled. The program requests the correct area, and a variety of appropriate messages appear after each attempt. Only two errors are allowed for each problem before the correct answer is given. If the student's answer is within five units of the correct one, he's told that he is close. And each five-problem session is followed by a performance summary which includes the number and percentage of correct responses.

Area of a Rectangle has been well-designed for use by the early learner (ages seven through eleven). I do question, however, the vendor's suggestion that this program is valuable for kids who are in elementary school and higher. The lessons encourage a "discovery" approach to learning the concept of area and square units—by far the preferred method in all concept formation. A well-planned program, such as this, simplifies input and prevents accidental keystrokes via a good system of error trapping. You may operate the program with or without sound—an important consideration in a self-contained classroom setting. The feedback in response to errors is good, but on the whole, it's a bit too general in nature.

This courseware is better for school, rather than home use, as it requires a teacher's input and guidance. In addition, I imagine its best classroom application would be as a demonstration in front of an entire class—at least for instructional modules one and two.

The greatest difficulty I encountered with *Area of a Rectangle* involved the underlying premise itself: teaching these mathematical concepts to rather young kids. The program's format targets the early learner, while the topic itself is usually introduced to older students. For this very reason, I'd advise using this software in an accelerated learning situation, rather than in a normal classroom consisting of students at various achievement levels.

Area of a Rectangle is an educationally-sound package that I recommend highly (keeping in mind the above qualifications as to its ultimate target audience).

MATH TUTOR

Comm*Data Computer House, Inc.
$27.95

Grades 2-6

Overall Rating	C	C	*Reliability*
Ease of Use	C	D-	*Error Handling*
Documentation	D	C	*Value for Money*

This collection of four tutorial programs teaches elementary school children the four basic arithmetic operations: addition, subtraction, multiplication, and division. Unfortunately, it is only slightly better than dozens of similar public domain programs. If there is a Commodore 64 User's Group in your vicinity, I'd recommend spending your twenty-eight bucks on a User's Group membership.

However, if no C-64 User's Group exists in your area, and you want software to drill your children in basic math skills, then this disk may fit the bill.

Math Tutor does make much better use of the C-64's sound and color capabilities than many of the old Commodore PET programs. The best part of this package is its graphic representation of the arithmetic process. Colored dots show the quantities involved in each problem, as well as a visual display of the actual derivation of the answers. This feature might help a child who really doesn't understand the concept of division or multiplication. The Level two mode offers straight drill without the graphic representation.

Still, the rest of the package doesn't even reach this modest level of quality. The short documentation does not mention how to load the program; you must find this information on the disk sleeve. The instructions neglect to explain that there's a backup copy of the program on the disk. I discovered this when the first copy wouldn't load, and I checked the disk directory.

Math Tutor's greatest weakness is its error trapping. Untrained users will have many problems by pressing letter or graphics keys instead of numbers. At one point, I even got the standard Commodore error message "Redo from Start," which is meaningless to a child (the average child, that is). Kids should not have to be BASIC programmers just to keep the ball rolling in this—or any—educational program.

SPEED MATH

MicroEd
$34.95

Grades 2-7

Overall Rating	B+	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	B	*Value for Money*

Speed Math is one in a series of *Math Four-Packs* from MicroEd. Each package contains four learning games covering one area of mathematics. (For reviews of the other programs in this series, see the Education section of this book.) The *Speed Math* package gives you a chance to practice "basic facts, finding graduated sums that sometimes involve identical addends, adding an increasing series of numbers with limited viewing time, and successive subtractions to zero." As in all the MicroEd programs, there are graphics and sound. This package is recommended for grades two and up.

Math Shootout, the first of the four programs on this disk, provides drills on addition, subtraction, division, and multiplication. The player controls the operation, the size of the numbers, and the response time. Regrettably, the graphic action shows two cowboys in a shoot-out. A little more imagination could have provided a less violent but equally motivating game.

The second program, Sum-it Mountain, asks the player to find cumulative sums. Each correct answer raises a flag one step higher toward the summit of a mountain. A wrong answer sends you back to the bottom. An excellent feature of this game is the choice to add the same number each time to your cumulative total. This is a good way to learn the concept of multiplication.

Number Jumper is also another addition drill; this time the player is a broad jumper who must add a series of numbers to clear the hurdles. The series gets longer each time the answer is correct. The player can control the length of time the series is visible on the screen.

The last program is Two-Minute Warning. This game takes the player to the gridiron. Each successful subtraction moves the player closer to his goal. Any mistake gives the other team a fumble and a touchdown for seven points. Students may select from three levels of play: high school, college, or pro-ball!

If a parent or teacher were to buy only one of the *Math Four-Packs* from MicroEd, this is the one I would recommend. Each of the four learning games on this disk are well-designed. Students can make several choices regarding level of difficulty, time limits, and number families to be practiced. Also, the "game" element provides strong motivation for success.

SUCCESS WITH MATH: MULTIPLICATION AND DIVISION

CBS Software
$24.95
Grades 2-8

Overall Rating	B	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B+	B	*Value for Money*

This program provides drill and practice (for students in grades two through eight) in solving multiplication and long division problems using necessary addition and subtraction operations. Problems are generated randomly so that new problems are supplied each time you run the program. The screen displays easy-to-understand instructions; therefore, the documentation is limited to a brief user's manual. You respond with single keystrokes, and a well-planned system of error trapping makes it impossible to crash the program accidentally.

When you select multiplication problems, you can choose the number of digits in the multiplier—one, two, or three. As each problem is presented, a white cursor locates the position of the next digit to be placed. Just as if you were doing the work with a pencil and paper, you enter the correct digit and are prompted for the value to be carried—even if it's zero. If you make two errors at any point, the program provides the correct value for you, eliminating endless frustration. When you finish all the multiplication, you then do the necessary addition, again entering the carry values each time.

With long division, you choose either one, two, or three digit divisors. The cursor then locates the first division required, eliminating the process of estimating and deciding where to begin working (whether this is desirable or not depends primarily on each student's ability level). You type a digit into the cursor area of the quotient and are prompted to perform the necessary multiplication, again providing a carry value after each step. Next comes the subtraction portion of your problem, but it is precisely here where the courseware's consistency is lost. No longer are you led, step by step, though the processes of borrowing, carrying, and subtracting, as you are in other units of the program (and, I should add, as taught in the *Subtraction* tutorial program distributed by CBS). Suddenly, you're on your own, and expected to carry out all the subtraction and perform all the necessary computations by yourself.

I got the impression that the long division segment of the software was "rushed to press." After all the other procedures in this and the other tutorials in the *Success with Math* series have consistently espoused a step-by-step method (even to the point of "carrying" unnecessary zeroes), the student suddenly is cast adrift. The ability level presumed in all other areas of the tutorial makes this flaw unforgivable.

To its credit, *Multiplication and Division* still offers a reasonably-priced means of practice in multiplication and long division with whole numbers, including error analysis following each set of problems. But be advised that students at the lower end of the grade-level range will find it difficult to switch gears when they face the inconsistencies of the long division unit. This software is unprotected, and the publisher authorizes making archival copies under stated conditions.

FRACTION FACTORY

Counterpoint Software
$29.95
Grades 2-9

Overall Rating	B	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	C	B+	*Value for Money*

Fraction Factory is a well-developed and well-executed introduction to the basic elements of fractions. It is recommended for ages seven through fifteen. It sports sound effects, bold, brightly colored graphics, and a delightful sense of humor. The material presented and reinforced by *Fraction Factory* is real-world stuff—hard-core learning.

The first of the four games is called Fractions and Sets. Here, any number of objects between two and one hundred appear on the screen. A box is drawn around some of the objects. The student describes the objects in the box as a fraction of all the objects.

In Equivalent Fractions, colored bars represent fractions, which are also printed on the screen. Students must examine a bar that has as many sections as the denominator of the fraction, then decide how to divide an undivided bar representing a different fraction.

Game three is called Fractions of a Number. Again, any number of objects from two to one hundred appear on the screen. A box is drawn around some of the objects. The game provides what fraction of the total is in the box. The student must figure out the number of objects inside the box.

The last game, Subtracting Fractions, displays two simple fractions between 0 and 1. Parts of two number lines showing the two fractions appear on the screen. Between them, a third number line shows equivalent fractions the student can use to subtract the smaller fraction from the larger one. The answer will always be another fraction. As in some of the other games, answers can be reduced to their lowest terms. The

student can earn extra rewards after he answers incorrectly. Each problem is presented up to three times, with increasing degrees of help in the form of sound, color, and animation. The hints given are logical, and should help the child develop more general problem-solving routines. *Fraction Factory* handles errors well. Even a sixteen-month-old key-pounder was unable to crash the program!

The documentation is weak. The brief instructions in the slim manual are confusing. Fotunately, the demo will get most kids on the right track. *Fraction Factory* takes on a big job in teaching fractions via the microcomputer, and is fairly successful at it.

FRACTION FEVER

Spinnaker
$34.95
Grades 3-5

Overall Rating	C	A	*Reliability*
Ease of Use	D	A	*Error Handling*
Documentation	B-	C	*Value for Money*

Fraction Fever teaches the concept of fractions by presenting it in the guise of an arcade game. Here's how. A fraction—say 2/5—appears at the top of the screen. Using a joystick, you direct a fellow on a pogo stick back and forth on a sidewalk, searching for a graphic equivalent of 2/5. For the first ten levels, you must look for colored balls and/or circles. For instance, my bouncing character approached a set of seven circles, four of them filled in. That's the equivalent of four sevenths (4/7), and certainly not 2/5, so off I hopped, still in search of five circles, two of them filled in.

When you find the correct representation, you position your man above it, press the joystick button, and bingo, you're transported up to the next level by an "elevator." At the eleventh level, it becomes very difficult to distinguish the fractions since they are not shown as single bar graphs. Imagine looking at an unmarked thermometer and trying to guess if it is reading seventy-five, eighty, or one hundred degrees. You would be forced to guess—and that's precisely what happens here.

A clock has been ticking off the seconds while you've been progressing up through the different levels. If you advance to the top level (the twentieth) before time runs out, you get a dollop of unspectacular praise, plus an invitation to start all over again (big wow).

Be prepared to encounter some hazards on your way to the top. Be careful not to pick the wrong graph, or the wrong combination of circles/balls. Instead of an elevator ride upward, a trap door will open and you'll drop down a level. These situations can be easily handled by any self-respecting, seven-year-old joystick jockey.

Cartridge software has well-known advantages, such as no waiting during loading and ease of use, but cartridges are limited as to how much programming information they can hold (usually only 8 to 16K). This liability crops up in *Fraction Fever* regarding the lack of self-documentation (onscreen instructions) and limitations in sound/music sophistication. The sound effects are quite simple and unimpressive when compared to Spinnaker's disk-based offerings.

I'm not convinced that this program helps kids learn a whole lot about fractions (the visual scheme is confusing in terms of numbers and is of questionable value in teaching fractions), but they probably will have fun bouncing along on their pogo sticks, riding up the elevators, and tumbling down through gaps.

I give *Fraction Fever* good marks for its ingenuity of design, smooth animation, and pleasant graphics. I have to criticize it, however, for its dubious educational merits and lack of depth. Finally, I have serious doubts as to its power to lure kids back for repeated game play.

SIMPLE MACHINES

MicroEd
$34.95
Grades 3-7

Overall Rating	D	B	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	B	D	*Value for Money*

Simple Machines, one of the *Math Four-Packs* from MicroEd, is recommended for grades three and up. It gives instruction and practice in calculating the mechanical advantage of all classes of levers and of inclined planes. These concepts are presented in the form of games.

Of all the packages in the MicroEd series (please see the reviews for the other programs in the Education section of this book), this is the most disappointing. The stated purpose is "to show the function of each of these levers and how they can be used." This goal is not achieved; the programs are actually math exercises accompanied by very weak explanations and graphics. There is nothing to actually show how these simple machines might be used.

For example, Balance Beam is concerned with first-class levers. The fulcrum supposedly changes for each problem and the student is asked to calculate whether Effort is greater than, less than, or equal to the Resist-

ance. The graphic depiction of the lever in the problem always shows the fulcrum in the same place and the Effort and Resistance as little boxes of identical size. This is confusing and certainly does not work toward the stated goal of the program.

The other two simulations involving levers suffer from the same sort of poor design. The graphics illustrating the problems are more likely to be confusing than illuminating. Correct responses are rewarded by arrows and cannonballs instead of some appropriate motion of the lever. In the printed documentation for these simulations, wheelbarrows, cranes, and pry bars are used as examples. Why not use them in the actual program as well?

Lest everything appear gloomy, I should comment on one piece of good design. In all the MicroEd series of programs, one can elect to turn sound effects on or off. This is a great feature for a teacher in a crowded classroom or a parent who wants a quiet evening without computer beeps and whistles.

TRAP-A-ZOID: A NEW ANGLE

DesignWare
$39.95
Grades 4-6

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

Trap-a-zoid is interesting in three ways: DesignWare and D.C. Heath Publishers, the textbook giant, collaborated to create it; it teaches pre-geometric and geometric material beyond the basic shapes; and its model design and packaging of good educational materials reaches its objectives, and entertain at the same time.

DesignWare's strategy starts with the package; it looks like there's a great game in there, with planets, lunar landers, sweet-potato-shaped aliens, and a net trapping the Zoid! Inside the box, the quality continues in the twnety-two-page manual. Attractively printed in blues on glossy stock, its table of contents lists a Note to Parents, an introduction to the game format, Getting Started, Playing the game, Using the Dictionary, Game Strategies, Changing Game Settings, Trap-A-Zoid Terms, Joystick-Keyboard Guide, and Customer Support information.

The main menu offers four options: Play the Game, See a Demonstration, Change the Settings (Zoid speed, sound, bonus questions, background color, name), and See the Dictionary (thirty-seven geometric terms). The game's general play involves selecting one or two levels, differentiated by the shapes they use. You are given a list of shapes you must draw, with keys or a joystick, around a Zoid moving on the field. You score if you entrap the Zoid with an appropriate shape, and answer bonus questions correctly. The skill level is not difficult; the joystick's speed beats the Zoid even at "zippy" speeds. The real test: remember how many sides a pentagon and octagon have, and what a polygon or scalene is.

The game loads reasonably fast, and uses a disk-like sprite in the lower right corner to indicate loading. The game board's graphics are OK, but somewhat cluttered. The prompts appear on the upper part of the screen, the score board on the right, vertically. The shapes you must make, such as three squares, or two rectangles, are listed horizontally across the base. Tucked in among all this is the game board, a 14 by 12 "dot" field. A sprite, Zoid, wanders, across the board trying to get off the field at the right margin (scoring a point if it does). The game has five levels of play; the last four include bonus questions displayed in a box on top of the field, and the possible answer shapes in a three-part rectangle at the bottom. All this may confuse younger players.

An optional demo introduces the material. Combined with the manual's directions and screens, the demo gives all the main instructions effectively. You play the with the I,J,K, and M keys or the joystick.

DesignWare offers a ninety-day limited warranty and a free one-year subscription to *Kids' Computer News*.

Trap-a-zoid is more useful at home than many other educational programs. It's excellent for review and reinforcement. It's well worth the price, a desirable addition to math-minded students' libraries.

PIECE OF CAKE

Springboard
$29.95
Grades 4-9

Overall Rating	A-	B	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	B	*Value for Money*

Piece of Cake, Springboard's math tutoring package for kids in the middle grades through junior high, is a dandy. Five separate modules comprise the package. The instructional games, Bakery, Multicake, and Dividacake teach and reinforce conceptual understanding of mathematics. Flashcards tests recall of math facts in each of the basic math functions at different difficulty

levels. In Catchacake, a speed recall game for up to four players, a falling cake *splats* on the "floor" if you don't give the correct answer to a math problem in time.

Piece of Cake makes math drills interesting—no small feat. Programs presenting problems like "34 × 21 = ?" flood the educational software market. Most kids (and adults) need paper and pencil handy to solve such problems. *Piece of Cake's* Flashcard mode goes the extra distance: it presents the problem in the format that the child normally uses to solve it, allowing him to "step through" the problem, putting the digits in the proper positions, with the computer calmly rejecting any wrong answers with a "beep." All four math function modes—addition, subtraction, multiplication, and division—realistically present the problem. The program presents each problem up to four times, increasing and varying the help. It always gives the correct answer and method for obtaining it. Unfortunately, Springboard's copy-protection method is rough on the Commodore drive, sending many a disk drive to the repairman's bench for realignment.

Adults and older children, who understand the documentation, must explain it to younger children. However, you can easily manipulate the onscreen menus, which ameliorates this shortcoming.

ORDER OF OPERATIONS

Microcomputer Workshops Courseware
$29.95
Grade 4-10

Overall Rating	C+	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C	*Value for Money*

This computer tutorial drills the student on the order of operations in simplifying a mathematical expression. It is appropriate for students in upper elementary grades and higher who are having difficulty with the concept.

Once into the problem solving portion of the program, the student is presented with a complex expression and a menu of steps to follow in order to solve it. The items listed on the menu are presented in the correct order, and it's rather a simple matter for the student to work through the menu and solve the expression one step at a time. If he makes an error, either in selecting a step or in computation, a prompt appears to redirect his efforts. If he makes a computing error twice, the program gives the correct answer to keep him from becoming frustrated and to emphasize finding the correct operation.

While the price of *Order of Operations* is rather high, it offers computational drill and constant reinforcement of the correct method through prompts, as well as the basic menu. Students who are weak in this area of mathematics may very well find the help they need from this software.

DIVIDING FRACTIONS

Microcomputer Workshops Courseware
$29.95
Grades 5-8

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A	*Value for Money*

This tutorial program provides fifth through eighth graders practice in dividing fractions. *Dividing Fractions* emphasizes how to reciprocate the divisor fraction, and the skills you need to reduce and simplify.

The format resembles that of Microcomputer Workshops' *Multiplying Fractions* program. You may select onscreen instructions presenting a mini-tutorial on using the courseware and correctly performing fraction division. The written documentation simply repeats these instructions, adding a "Notes to Teachers" section highlighting the types of specific feedback included in certain error situations.

You select the number of problems you wish to tackle before beginning each session. You then see a screen divided into three separate areas: the original problem at the top, a work area in the middle, and a message/instruction area at the bottom. As each random problem is displayed, you must choose among three procedures: 1) reciprocate divisor, 2) cancel or reduce, and 3) multiply. You should first change the divisor into its reciprocal form, which the instructions (and your fourth grade math teacher!) explained. If you try to reciprocate the first fraction (the dividend), or choose another option first, a specific error message explains your mistake.

Next, you must tackle a multiplication problem, displayed in the work area. You should select option 2 (cancel or reduce). Again, if you don't make this choice, you'll get a message encouraging you to follow the prescribed sequence of procedures. You may now choose two values to be cancelled or reduced, highlighted on the screen's work area. Then, you must enter the simplified value for each of these. If you slip up, the program explains how to find the greatest common factor (GCF).

When you've completed all simplifications, you tackle option 3 (multiplication), and find the product of numerators, then, the product of denominators. If you don't get a correct product for either after two tries, the program displays the correct multiplication. When the resulting fraction is greater than one, the program prompts you for the mixed numeral that correctly replaces it. It prompts you for the whole number portion first, then the numerator and denominator. The program also addresses mistakes at this stage, according to the exact error you've made. For example, suppose you must convert the improper fraction, 22/7, to a mixed numeral. When prompted for the whole number portion, you enter "2." The program informs you that you are mistaken, because 7 goes into 22 three full times, with a remainder. You then go back and make the correct choice before you may proceed.

Following each problem in the set, the program gives you a performance summary, which categorizes errors as either computational or procedural. A supportive statement might also encourage you to "be more careful on rules . . . your computation is great!" A similar summary appears at the end of each problem set, presenting the total number of right and wrong responses.

A tutorial approach emphasizing the successful comprehension of each step makes this an educationally-sound program. The program's diagnostic capabilities allow specific error messages and explanations. I cannot stress too much the value of this feature. Most drill-and-practice programs point out errors and correct solutions, but do not explain the reasons for your errors. (They neglect to do so because, for the most part, they're not sophisticated enough to consider the nature of your error.) *Dividing Fractions* has this capability, which enhances its worth as a math program.

Keyboard entries are simple to perform, and a good system of error trapping neutralizes most accidental keystrokes. The program lacks sound and graphics, but its strengths far outweigh these omissions.

Dividing Fractions, a well-planned program, competently instructs the young student in fraction division, a rather difficult arithmetic area. Whether you're a parent or an educator, you will find this courseware a necessary addition to your mathematics software library. And I'd also suggest that its value extends beyond the eighth grade level; it's great for remedial learning and practice in this troublesome subject.

MULTIPLYING FRACTIONS

Microcomputer Workshops Courseware
$29.95
Grades 5-8

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

This excellent, well-planned program from Microcomputer Workshops offers students practice in multiplying fractions to produce simplified solutions, emphasizing reducing and cancelling. It is targeted for fifth to eighth graders, but would be of value throughout the secondary school level for remediation or practice. The brief, two-page instruction sheet is virtually reproduced in the optional onscreen instructions. These written instructions do, however, contain a brief "Notes to Teachers" section which highlights the nature of specific types of program feedback.

All problems are randomly generated. The screen area is divided into three sections: the original problem, the work area, and the instruction/message area. As each problem is presented, you are asked to select between two options: 1) cancel or reduce, and 2) multiply. The program emphasizes performing all possible simplification prior to multiplication, and reminds you of this if you select the multiply option prematurely.

When you select the cancel/reduce option, the message area asks for the numbers to be cancelled, which you may enter in any order. These are then highlighted in the work area. If you make a mistake at this stage, the program fully explains them. Examples of errors resulting in specific feedback include: attempts to cancel other than vertically or diagonally, attempts to cancel numbers whose only common factor is 1, trying to cancel by an incorrect GCF (greater common factor), and any attempt to begin multiplying before all cancellations are complete.

When you correctly choose the multiply option, the program prompts for the "product of the numerators" and then the "product of the denominators." If you enter two incorrect responses the program displays the correct multiplication and asks you to press Return and answer correctly.

A performance summary follows successful completion of each problem, reporting both the number and type of errors (either procedural or computational). You may then choose another program. If you choose to end, the program displays an overall summary of your performance for that complete session (number right, number wrong, and an error analysis).

Emphasis on success at each step makes this an educationally sound program. It is personalized, in that it's capable of responding to specific types of errors and

offers appropriate explanations (for instance, the process of finding the GCF is outlined after the software detects a problem with it. Feedback is constructive and personalized ("Sorry, Ken, there is nothing to cancel"), and the performance summary helps teachers or parents pinpoint the nature of any of the student's difficulties.

The program has a few shortcomings. You cannot select a difficulty level, which impedes flexibility. No graphics or sound capabilities are available. In a business-only, drill-and-practice situation, this would be irrelevant; but in a program used primarily at home to enrich younger children's education, it leaves something to be desired.

For many middle school-aged students, multiplication of fractions is a persistently troublesome area of study. This easy-to-use program provides accurate, solid practice in this tricky topic. It lives up to its claims well.

YOU CAN DO MATH

Microtechnic Solutions, Inc.
$49.95
Grades 5-9

Overall Rating	A	A-	*Reliability*
Ease of Use	A	A-	*Error Handling*
Documentation	A	B+	*Value for Money*

You Can Do Math, a spare but well-designed tutorial, shows real insight into the needs of math-phobic students. While it lacks sparkling graphics and high-tech sound effects, it effectively helps junior high and high school students who have problems with basic math and elementary algebra.

The authors enhance their program and extensive manual with a practical understanding of their material and audience. The eleven individual lessons on the disk include mastering basic math facts, handling fractions, ratios, percents, and solving single-variable equations. They are well-conceived, and avoid the flash card concept that is so prevalent in similar programs. In the addition facts routine, for instance, the program gives the "answer" and asks the student for pairs of numbers that add up to that figure; it handles subtraction and multiplication in the same way. In other cases, the solution is broken down into several steps, first finding the sign, then the value, and finally reducing the value to its lowest terms. The program lacks scorekeeping and buzzes for wrong answers, so the student can relax and the patient computer encourages experimenting and hypothesizing, since you aren't penalized for errors.

The manual's first seventeen pages help, advise, and encourage. Topics like "The Five Secrets of Mathematical Thinking," "How to Feel Self-Confident," and "How to Do Math Under Pressure" cover material that fosters success in the classroom. The rest of the manual explains the various tutorials, and, along the way, passes on hints and tricks to help build proficiency and confidence.

You Can Do Math is rather expensive, but it offers more hope for the remedial math student than its competitors. It is certainly the best combination of the art of teaching with the technology of the computer that I have seen.

SUCCESS WITH MATH: QUADRATIC EQUATIONS

CBS Software
$24.95
Grades 7-9

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Quadratic Equations, one of a series of *Success with Math* tutorials, provides drill and practice for students learning to solve quadratic equations. It emphasizes the factoring process, and how to set each binomial factor equal to zero and solve each separate equation. On-screen instructions and a mini-tutorial on program operation make additional documentation unnecessary (although a brief pamphlet accompanies the software).

The program presents randomly generated equations of the form $Ax2 = Bx = C = 0$, where A, B, and C are integer values. You may select either easy or difficult equations. Easy ones always have the quadratic (A) term's coefficient equal to 1; the difficult equations have a quadratic coefficient of 2 or 3.

The screen is divided into three areas at all times: original equation, work space, and message/instruction. When a new problem is first presented, you must select from three options, which appear in the message/instructions area. They are: 1) Divide both sides by a number, 2) Factor the left side of the equation, or 3) Set each binomial factor equal to zero and solve separately.

If any coefficients in the original equation have a common factor, you must select option one to "divide out" the common factor. If you don't, an error message explains the problems you'll encounter. Once your error is corrected, the program asks what number should be divided into each term. If you enter the right number, it shows the resulting simplified version; if you enter the wrong one, it explains your mistake. You must enter the correct answer to continue.

Once you've simplified the equation (unnecessary, if you select easy problems in the first place), you must

choose option two, or Factor the left side. You are prompted to enter each binomial factor, one at a time. If either is incorrect, an error message appears, plus the incorrect product that occurred. You may try again, but if you make a second mistake, the program gives you a brief tutorial on finding the proper factors for a quadratic expression.

When you've entered the right factors, you must select option three, Set each factor to zero and solve. The program traps incorrect responses, and a new menu appears in the message area. This list of options includes the steps necessary to solve a simple equation: 1) Add a number to both sides, 2) Subtract a number from both sides, 3) Multiply both sides by the same number, and 4) Divide both sides by the same number. You choose which steps to take to solve the two simple equations in a step-by-step manner.

If you make errors in this final stage of the solution, the program tells you immediately what you did wrong. When you find correct solutions, it tells you how many errors you made and what type: procedural or computational—important information when you're trying to diagnose or remedy a persistent problem.

Success with Math: Quadratic Equations emphasizes succeeding at every step of the problem-solving process—its greatest strength. You know where you went wrong, and it explains the correct method. The quality of the error messages is educationally sound—never critical, always positive and supportive.

If the software has any negatives, you'd find them in its graphics-free, "business only" presentation. Don't try to turn up the sound to hear those bells and whistles, or audible prompts; there aren't any. Also, though you're offered a selection of difficulty levels, it's an empty offer.

But this package does what it sets out to do quite well: it provides a comprehensive program of drill and practice for solving quadratic equations. Its educationally sound, no-frills format, and $24.95 price tag, make it a smart buy!

ALGEBRA ARCADE

Edu-Ware/Peachtree Software
$49.95
Grades 7-9

Overall Rating	B	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B-	D	*Value for Money*

Algebra Arcade takes the guise of a game called Algebroids, but don't let that put you off, since it doesn't compromise its educational value in the least. In terms of arcade fun, the program rates pretty low. Aliens appear randomly on an X,Y graph. You must form or create an equation that, when plotted, will intersect as many aliens as possible and thus knock them off the graph. Every player has ten turns and scores increasingly higher points for hitting more aliens on a single turn. The catch: a Graph Gobbler also lurks on the graph. If your equation intersects its position, it eats your graph. Worse yet, you must go before the committee which can penalize you one to three turns. They even penalize you for creating a curve that's too long, such as a sine curve with a short period that oscillates all over the graph.

The program simplifies entry of equations, letting you use either the keyboard or a joystick. The right side of the screen displays a menu of numbers and symbols, including +, -, /, *, =, and single letters for Tan, Sin, Cos, Atn, aBs, sQr, Int, Log, Exp, and Pi. Thus you can easily enter simple or even complex equations, effortlessly correcting errors with the back arrow key. The program immediately flags obviously impossible equations, or those that are beyond its capabilities. You can make entries from a particular family of equations. Joystick entry looks simple, but actually is frustrating, and fosters errors.

Operate the program in practice mode if you just want to experiment with equations without scoring points. *Algebra Arcade* really shines here, because it's an excellent plotting program. You can easily change the default axis parameters of plus and minus five to whatever you wish. It has one drawback, though, in this area: the plotted equations overlay each other for purposes of comparison, rather than appearing singly as you do them.

Clear and precise documentation accompanies the program. The most useful section carefully explains the procedure for forming equations based on the straight line slope method. This can help you a great deal to win the game.

While *Algebra Arcade* would ideally benefit a classroom (actively encouraging children to improve their understanding of algebra), most children would not pursue this game on their own. At the very least, it's an excellent graph-plotting program. Unfortunately, its steep price will most likely discourage the average school and family from buying it.

SUCCESS WITH MATH: LINEAR EQUATIONS

CBS Software
$24.95
Grades 7-11

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B+	*Value for Money*

Linear Equations is the third in a series of four *Success with Math* disk-based tutorials. It uses drill-and-practice to teach students the necessary algebraic principles for solving linear equations. Complete instructions for proper program operation are provided on the screen, making separate documentation superfluous.

Once the program is loaded you follow the (optional) instructions to a linear equation of the form "AX + B = C." You solve the equation in a step-by-step fashion. You're shown five operations you can use to begin formulating your answer; you choose the one you'd like to use first. The options are: 1) add a term to both sides, 2) subtract a term from both sides, 3) multiply both sides by a term, 4) divide both sides by a term, or 5) simplify by combining like terms. With all but the last selection, the program asks what term to use. If at any time you select the incorrect procedure or the wrong numerical value, the program stops, explains your error to you, and shows you the appropriate move.

You must perform all the necessary addition and subtraction before any multiplication or division. This standard, textbook approach is best, and leads beginners to far fewer pitfalls. The program displays your score after you've completed the number of problems you selected. It also says how many of your errors were either of the procedural or computational type. This is an extremely helpful feature, and provides important information for students who are trying to diagnose and remedy their persistent problems.

I found *Success with Math: Linear Equations* reliable and easy-to-understand for students learning to solve linear equations and anyone (teachers, parents, etc.) reviewing this algebraic process. The program generates random problems each time you run it, so students cannot memorize repetitive sequences. In addition, the program gives immediate feedback on any kind of error, and the correct procedure is explained before going on. Error trapping is good, preventing program-crashing keystrokes.

What this program really lacks is an option for selecting a difficulty level. Fraction and decimal numbers are ignored, and the randomly-selected problems are always presented in the very neat "AX = B = C" format; this somewhat limits its potential audience. Note, too, that the overall presentation is very readable, but is strictly "all business," with no sound or graphics support.

Overall, this edition of the *Success with Math* series admirably lives up to its claims. It offers educationally sound drill and practice in basic equation solving. And its reasonable price tag makes it a winner in my eyes.

EQUATIONS

Microcomputer Workshops Courseware
$29.95
Grades 8-11

Overall Rating	B	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	B	*Value for Money*

Microcomputer Workshops Courseware designed *Equations* to help students develop the skills needed to solve single variable algebraic equations of the form 3x + 6 = 12. It lets the student choose whether or not to incorporate negative numbers (all solutions are always integers), in order to focus his attention on finding the answer, rather than expressing it perfectly.

After the opening instructions and inputs for name and inclusion of negative numbers, the first problem is printed on the screen along with a five-item menu of operations. The student can choose to add or subtract a number from each side of the equation, or multiply or divide both sides by the same value. The fifth option on the menu is for simplifying the expressions generated by any of the first four.

In the simplification process, *Equations* also checks the accuracy of computations, and again, offers a prompt if the student made an error. If the student errs again, the program gives the correct response to minimize the student's frustration and speed up the process. However, incorrectly entering an operator triggers the same prompt, which can cause some difficulty in finding the actual mistake. At the end of the problem, the screen displays a summary of the steps to the solution, plus a scorecard giving the number of procedural and computational errors. The latter is quite a nice feature, and one that should motivate students to minimize their mistakes

The program has a few drawbacks, aside from the misleading prompt and the harsh, onscreen contrast of the black and white display (although you can easily alter this since the program is written in unprotected BASIC). Overall, *Equations* is very helpful for beginning algebra students when you consider its patient methodology and its emphasis on correct procedure.

Computer Aided Instruction Science

ENERGY AND POWER

Micro-Ed, Inc.
$34.95
Grades 3+

Overall Rating	B	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	C	*Value for Money*

Energy and Power, a collection of four programs plus a menu, totals about 68K bytes of programming on a single disk. The third in a group of five packages comprising the *MicroEd Science Four Pack Series,* its programs teach the concepts of energy, power, and mass.

Its four programs are Hay Day (energy/power), Demolition Derby (mass), Watts Up (energy/power), and River Run (power). The package suits grade levels three and up. It is menu-driven and requires single keystrokes for entries (except for answers to problems, which require only numeric input). Each program is basically a simple game illustrating a single concept. The games use very simple Commodore sound and graphics. The menu-driven system provides a uniform presentation from one package to another throughout the series.

Demolition Derby and Watts Up are excellent programs, with specific subjects, and simple, incisive text. The "games" present the concepts very well. River Run does too, but really requires a calculator, which third graders don't usually carry in their pencil cases. Hay Day is of poor quality and offers a simple multiplication problem rather than illustrating the topics of energy and power. However, Hay Day has an adequate companion text.

One drawback of this package may frustrate youngsters. The games' scores depend on how fast the student solves the problems. However, the slow input routine sometimes drops entry digits, causing incorrect answers. One advantage: the input routine accepts only the right number of digits. For example, it won't accept the fifth digit if the answer only requires four digits.

Another frustrating difficulty: the cursor occasionally jumps to the left side of the screen during entry. The program still accepts answers, but this certainly stumps novice users.

The graphics and sound features, carryovers from the older Commodore (PET) routines, do not take full advantage of the C-64's superb graphics and sound capabilities. With almost four hundrd blocks left on the disk, the vendor could have included additional graphics and sound without much effort.

The package bored my third-grader after about twenty minutes. On the other hand, it fascinated my older child, a high school sophomore. Both could explain energy, power, and mass after using the software; and, after all, that's the bottom line for an educational program.

Energy and Power fulfills its expressed purpose and is fun to use. But when you compare it with other educational software, the $34.95 price tag seems a bit steep.

SCIENCE CHALLENGES

MicroEd
$34.95
Grades 3+

Overall Rating	D	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	D	*Value for Money*

Science Challenges is a collection of four programs plus a menu on a single disk. It is the second in a series of five packages called *MicroEd Science Four Pack Series*. According to the jacket, the programs "investigate a variety of science topics." "Investigate" is used very loosely here.

The four programs in this package are Torpedo Alley (radar), Earthquake, Alfalfa Millionaire, and Light Five (Ohm's Law). The package is menu-driven with single keystroke entries (except for answers to problems, which require only numeric input). Each program is basically a simple game illustrating a single

formula of science. The games employ very rudimentary sound and graphics. The package is recommended for grade levels three and up.

The menu and keystroke requirements are the same for all the packages in the series, which provides uniformity from one package to another. Unfortunately, that's the end of the good points about this program.

Rather than "investigating" a topic, the presentation is usually an extremely brief, all-too-simple explanation of a single formula. For example, in Torpedo Alley, the formula is presented as "distance equals one-half echo time multiplied by the speed." The program then proceeds immediately to the game where you only have to multiply two numbers to get the answer. Instead of "investigating a variety of science topics," the programs all boil down to multiplication and division-type problems, the majority of which are beyond third grade level.

The programs were designed for the Commodore PET series of computers and have been upgraded to be compatible with the Commodore by adding color and very simple sounds. The magnificent color graphics and sound capabilities of the Commodore are completely ignored.

The text portion of the programs is very poorly written: it dwells on the formula, not on explaining the concept; uses words far beyond the third grade vocabulary without suitable definitions or explanations; and is extremely brief. Almost four hundred blocks of empty space are left on the disk, so why couldn't additional text material be included along with graphics and sound enhancements?

The programs are uncopyable and no information is provided on obtaining backup copies. Neither the disk jacket, the disk label, nor the packaging give instructions concerning how to load the programs. If the single instruction sheet is lost, only an experienced Commodore user could load them.

This package was tested on a third grader, a high school sophomore, a high school senior, and an adult; all are moderately-experienced computer users. The longest time required to go through the entire package was twenty-two minutes (the sophomore). Not one of them could explain the basics of radar after the session!

In summary, the programs do not fulfill their stated purpose: to teach selected science topics. At $34.95, this software is grossly over-priced.

VISIBLE SOLAR SYSTEM

Commodore Business Machines, Inc.
$20.95
Grades 4+

Overall Rating	C-	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	C-	*Value for Money*

Visible Solar System is an educational program designed to familiarize students with that part of the solar system that is visible to the naked eye. This includes the planets Mercury, Venus, Earth, Mars, Jupiter, and Saturn. Why did the authors omit the outer three planets? Most probably because they couldn't fit all nine planets into an 8K cartridge.

The chief highlight of this program is that you can view the orbiting planets in three-dimensional perspective from your choice of location and viewing angle. You need only pick a position on the control panel using the joystick, adjust your camera angle, or the angle at which you view the orbital plane, and "go there." Each planet orbits the sun relative to its real distance from it, and at speeds that are proportional to their actual orbiting velocities. It is very easy to see that the inner planets orbit the sun much faster than those further from the sun. The orbits only go out as far as Jupiter instead of Saturn, probably due to scaling problems.

If the students' curiosity is piqued (if not, then this whole program is a flop), they can look at individual pictures of the first six planets and learn many basic facts, including radius, number of moons, rotational and orbital rates, escape velocity, and temperatures of both their atmospheres and their surfaces. The program also has an Astrocalc mode that compares pertinent facts about any two planets. For example, if you choose Earth and Jupiter, you will find that Jupiter is five times farther from the Sun than Earth, and that Jupiter's year is twelve and seven tenths times as long as Earth's year.

I often wonder if textbook facts are worth presenting in the more expensive computer format. While it is true that the computer represents animated orbital mechanics better, this is not the case with regard to dry facts. When all is said and done, *Visible Solar System* seriously lacks educational depth. Its deficiencies are glaring; at the very least, it should have included data on the entire solar system.

SCIENCE IV

Commodore Business Machines, Inc./
Public Domain Series
$9.95
Grades 9+

Overall Rating	A	A	*Reliability*
Ease of Use	A-	B+	*Error Handling*
Documentation	B-	A	*Value for Money*

Science IV is one of a series of twenty-seven Commodore Public Domain Software disks. You may find them in discount stores for as little as $5.95, though they usually retail for $9.95. Each disk contains four to sixteen programs (the average is thirteen) in selected broad categories, such as games, mathematics, science, English, history, and technology. They are bound in sturdy cardboard folders, with a single, posterboard instruction sheet enclosed.

The categories are fairly selective, but the range of programs is very broad within each individual category. For instance, *Science IV* contains four chemistry programs, three biology programs, four physics programs, and one program about electricity. The rudimentary graphics do not take advantage of the C-64's superb graphics capabilities, but they are effectively employed. The programs use no sound at all.

Each program is menu-driven with a uniform menu format: 1) text/problems, 2) student instructions, 3) teacher instructions, and often, 4) how to modify the program. You input all selections using single keystrokes, though answers to problems may be fairly complicated alphanumeric entries. One disadvantage: the responses are case sensitive, i.e., "K" is not the same as "k," "Na" is not the same as "na." Usually, however, the text clarifies this.

Science IV contains the following programs:

1. Titrate—Explains and simulates an acid/base titration experiment. Uses graphics execellently, but the text does not clarify what to expect in the "experiment" (high school chemistry level).
2. pH Problems—Explains pH, pOH, [H+], [OH-], and logarithms. It has the most clear and concise text explanation I've ever seen, even in textbooks, as well as complex and enlightening problems. A superlative program (high school senior and college level chemistry).
3. Photosynthesis—Demonstrates, through text and graphs, how carbon dioxide and light intensity affect photosynthesis and plant growth. A good try, but it has limited educational value (high school level biology).
4. Pollution—What happens to lakes and rivers when wastes are dumped into them? This program will show you; however, the text is too brief, the graphics too rudimentary. It's illustrative, but its simple presentation makes it an ineffective learning tool (high school level biology).
5. Regulated Power Supply—Reasonably good graphics here. Gives schematics and component values from design criteria, which the user inputs for various power supply designs. It also displays design parameters. It'd be a worthwhile program if it selected "standard" component values for best performance (college level electricity).
6. Remedial Nomenclature—An excellent program on chemistry nomenclature for the advanced high schooler or college freshman. This program, the largest on the disk, is easily worth the price of the entire package. Excellent input/output routines print chemical formulas with sub- and superscripts.
7. S. I. Conversions—A good drill and practice program for the high school student on how to use metric prefixes.
8. Specific Heat—Helps teachers grade lab reports on calorimetry. An excellent program for the instructor, but doesn't explain concepts to the student.
9. Stoichiometric Calculations—A good program which helps students learn typical stoichiometric calculations in chemistry. Works with mass, volume, or both. Assumes fairly broad prior knowledge of what these types of calculations require (high school and college level chemistry).
10. Temperature Conversions—Converts Celsius to Kelvin, and vice versa. Straightforward and helps beginners just learning these temperature scales (high school level).
11. U. S. Population—Uses the Huntington II population simulation to predict U. S. population for any year, based on mortality, fertility, birth rate, sex ratio, and population distribution. You may vary all these parameters, and display the results in graphic or tabular form. An excellent program for the demographic researcher or social scientist, but also an interesting simulation for the layman.
12. Young's Experiment—An excellent simulation of Young's double slit interference experiment. Graphics output is somewhat crude, but adequate. You can vary slit width, slit separation, and viewing distance individually or in combination.

This package has a narrow target audience; however, if you need one or more of these programs, *Science IV* is an excellent software bargain. You can easily copy or back up the disk.

Computer Aided Instruction Preschool

BIG BIRD'S SPECIAL DELIVERY

CBS Software
$29.95

Overall Rating	B+	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B	*Value for Money*

Any software package that has a *Sesame Street* character on its cover has a leg up on its competition. I believe that, shown a stack of assorted software packages, the average six-year-old American will probably want to see the one with Big Bird on the cover first. My theory was confirmed in my own household the other day, when just such a stack of educational software arrived for review.

Big Bird's Special Delivery is an object recognition game. When playing it, kids help Big Bird and Little Bird deliver packages to all the correct places on *Sesame Street.*

Loading the software is made more difficult than usual by requiring the user to type "SYS 8 * 4096" instead of Run, once the program is loaded. A simple BASIC loader program would have avoided this problem and made the program less intimidating to new users. Quirks like this are sometimes a sign of the software developer's haste in translating a piece of software from one computer to another.

The opening menu lists two games to choose from. In the Same Game, the child must make exact picture matches. For instance, a pear must be delivered to the address showing another pear above it. In the Right Kind game, the pear could be delivered to an address displaying a pumpkin, or an ice cream cone, or a glass of milk.

Game manipulation is made easy by limiting keyboard input to four keys. With these keys, the child moves Little Bird back and forth as he carries packages to their destinations. There are nine categories of objects to deliver, each category having seven items. The categories include such diverse and contrasting topics as: clothes, ways to travel, musical instruments, and animals. This large inventory of graphic items should help maintain interest in the game.

And, speaking of graphics, those in *Big Bird's Special Delivery* are all high-resolution and attractively drawn; unfortunately, they are very difficult to see on a color TV, even a high quality one. A monitor is almost a necessity for *Big Bird's Special Delivery* and makes the difference between a C and an A rating for graphics.

The documentation is well-written and intended to be read verbatim to the child. Several pages of the brief manual are given over to encouraging non-computer related activities. These games and activities follow the software's intended purpose (to teach object recognition) and add a touch of class to an already fine educational package.

DISCOVER!

Daybreak Software
$29.95

Overall Rating	B-	B-	*Reliability*
Ease of Use	C	B-	*Error Handling*
Documentation	B-	C	*Value for Money*

Discover! is an educational program (sort of) for ages three to five. More specifically, it is a tool for you, the parent, to use to illustrate such things as: top and bottom, up and down, right and left, over and under, counting from one to twelve, etc. Other than to give it a very sharp logo screen and a fancy package, Daybreak Software doesn't seem to have added any enhancements to this bland program for preschoolers.

Discover! was written by a teacher, not a programmer, and its idea is pretty good. It is based on assimilation: the ability to relate what is to be learned to what is already known. But the implementation of the idea is not good. The graphics are unimaginative, there is very little use of color, and no use of sound at all. It does not use the full capabilities of the Commodore 64 and would be better suited to the VIC 20.

My own son, while under three, is always entertained by other educational programs, but not this one. My five-year-old nephew had a little trouble learning to use this program, even with his two older brothers helping. Once he got the hang of it though, he liked it, until he had done everything once. Then he was bored and anxious to get back to some other programs we had been trying.

After the logo and title screens, a meager menu screen appears. The only three options are: Happy, Rabbits, and Blocks. Displayed with these are a happy face, a bunny, and a block respectively. These are made from Commodore's own graphic characters, which are crude at best. If these were custom-made characters or just a little larger, they would be more recognizable. In a box to the right, you type in your choice. The program doesn't ask you to, it just assumes that you read the instructions first. Although the manual and the advertisements claim your child need not know how to read or type, he is expected to type in these words. With your help, this is supposed to teach your child to read.

The most disappointing part of this program is that all three choices are the same with very little variation. In Happy, for instance, you start with a happy face in the middle of the screen (this Happy is not as crude as his menu option). You s-l-o-w-l-y move Happy's face to somewhere else on the screen using "U," "D," "L," and "R" for up, down, left, and right. You can't even use a joystick to move the characters. Since most preschoolers will have a little trouble picking out the right sixteen or seventeen keys from the entire keyboard, the use of a joystick would be a welcome addition.

When you have Happy where you want him, you press "A" for another fragment to appear. This produces an arm (that's what the instructions call it) in the center. Stick it on Happy and press "A" again. Another arm appears. When you're ready, press "A" again, and this time you will get two legs and a body. When you are finished, you will have a stick figure with a happy face. Press "A" once more to start the cycle again. The idea is to learn the earlier mentioned objectives along with building people with both left and right sides.

The other two choices are similar, with the same learning objectives. You move twelve rabbits or blocks around the screen the same way, with the added attraction of choosing among three colors— white, green, or purple. The blocks are used to build things and the rabbits just sit there. They don't even need assembly.

There are three nearly identical reference cards, one for each menu option. These are called Cue Cards and, according to the manual, must be used with this program. These simple instructions could have been placed at the top or bottom of the screen for easier reference.

Other improvements this package could use are better, faster, and more colorful graphics; some sort of sound implementation; and a challenge or goal to accomplish. In other words, what is really needed is a complete re-working of the whole program.

There are also a couple of actual bugs in the program. The first occurred when I placed an object such as Happy about one inch away from the right border. When I hit "A" for another piece, Happy disappeared from the right side and reappeared on the left. This was aggravating.

The other bug in *Discover!* is the fact that it doesn't lock out the Stop/Run key. When my son punched this key while playing with the keyboard, the program locked up. There was no way, short of powering down the computer, to get out of it. Of course, the manual doesn't have any solutions to these problems.

The manual gives the basic information on how to run the program, but not much on how to put it to educational use. It is also small—eight pages in a five-by-seven inch format. It contains no table of contents or index. It doesn't even include the loading instructions. These are on a separate sheet, as is warranty information. You can get a backup copy of this program for ten dollars, if you include Daybreak's invoice number with your request. Otherwise, if damaged, Daybreak will replace it for free within thirty days, or for five dollars after that.

For about half the price, this program might be worth it. Even at that, the features are still limited. All the time and money seem to have gone into the packaging. You, as the parent, must supply all of the instructions and all of the positive reinforcement. The program by itself won't teach your child anything and probably won't hold his attention either.

EARLY GAMES FOR YOUNG CHILDREN

Counterpoint Software, Inc.

$29.95

Overall Rating	B	C	*Reliability*
Ease of Use	A-	N/A	*Error Handling*
Documentation	A-	B	*Value for Money*

Early Games for Young Children is a part of the *Early Games* series of software produced by CSI (Counterpoint Software, Inc.). *Early Games for Young Children* is a collection of games and exercises that exposes the young child to the home computer with a positive educational experience. Like other CSI programs, it nurtures the youngster's developing mind and motor skills.

Utilizing a unique "picture menu," *Early Games for Young Children* presents in pictorial (rather than written) form the menu of the games on the disk. By striking any key on the keyboard as the menu displays the available games in sequence, you load the various programs from the disk. The function keys return you to the picture menu.

The following games are included on the disk. Match Numbers displays large numbers at random. The child's task is to strike the corresponding number on the keyboard. Count displays colorful blocks in various numbers, and the task is to count them and enter the correct answer. Add features two groups of random numbers of blocks. These are separated by an add sign and followed by an equals sign. The child is to add the total and enter the answer from the keyboard. Subtract is the same as Add, but the aim is subtraction; Match Letters is the same as Match Numbers, but uses letters.

The Alphabet game encourages the child to learn the letter sequence of the alphabet by displaying the letter "A" and asking what letter comes next. After a correct response, the computer moves to the next letter. The game is self-correcting and uses cues to assist the child. In Names, an adult enters the child's name, and the computer aids the child in learning to spell it. Draw Picture permits him to make rough drawings on the screen. They can be saved to disk, named, and recovered.

As with other CSI software, *Early Games for Young Children* is well-developed and presented. I was dismayed that one of the games, Compare Shapes, would not load in my computer. However, such a misfortune is covered by the CSI warranty which accompanies each disk.

Early Games for Young Children provides on one disk a varied assortment of early childhood games, which are sure to stimulate and benefit any youngster, aged two through eight. It is a solid piece of software that can be purchased with confidence.

ERNIE'S MAGIC SHAPES

CBS Software

$39.95

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

The *Sesame Street* gang at Children's Television Workshop have gotten together with CBS Software to create some good preschool learning programs. *Ernie's Magic Shapes* is one of the first ones out. It features Ernie, a Muppet regular of the TV show, designed for children aged three to six. A challenging little game with enough variations to keep a small child occupied and learning for a long while.

The idea is to match the shapes and/or colors above Ernie's hat with the ones on the table. It has colorful and sharp graphics, not the best I've seen, but better than most. It has pretty good sound effects, but no music. The action, not extremely fast, suits my two-year-old son. You have only two keys to learn: the up arrow (a "yes" answer), and the down arrow (a "no").

You start with a menu screen, with options to match both colors and shapes, and more complicated multiple shapes and colors. At all levels, Ernie stands on the left of the screen on a stage with curtains on both sides and above. At right, a table displays various shapes.

At the first level, Ernie points his magic wand up and puts a shape on the screen above him. He then points to the table and places another shape there. If the shapes don't match, your child should press the down arrow. Ernie points at the table to remove the shape and replace it with another. This time, if they match, your child pushes the up arrow. Ernie looks at the shape above his head, then at the one on the table. If the child was correct, Ernie nods his head and makes the shape jump above the table. A bouncing bunny hops around the table to reward your child. If, on the other hand, the player is wrong, Ernie shakes his head, and your child can try again. The other levels are the same, but have harder shapes, or multiple shapes which combine to create sail boats, houses, etc.

The program loads fine and works great, but I don't like the loading procedure. You must type in "Ernie" and then "SYS 28672," instead of Run, to start the game. Not many four-year-olds can handle that, so an adult must load the program. Furthermore, the manual does not include loading instructions; they are explained on a small, separate sheet of paper. What happens if you lose that paper? Will you remember those numbers? It's a good idea to write the instructions on the disk label.

The fourteen-page instruction manual includes five pages covering other activities about shapes. The program has a ninety-day warranty: CBS Software will replace a damaged disk (no charge). After ninety days, they charge five dollars.

You'll enjoy watching and helping your child use *Ernie's Magic Shapes*, a good, useful, educational program.

MATCHMAKER

Counterpoint Software, Inc.

$29.95

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A-	A-	*Value for Money*

Matchmaker is from the *Early Games* series by Counterpoint Software, Inc. It is a bright and stimulating collection of childhood educational programs. Neatly packaged, *Matchmaker* comes with ample instructions and a catalog of other CSI *Early Games* programs.

I like *Matchmaker*. Unlike some other early childhood educational programs, it is quite user-friendly. Once the disk is inserted into the drive and *Matchmaker* is loaded, no further written commands are needed. *Matchmaker* uses a unique "picture menu" to enable you to select which program is to be presented by hitting any key on the keyboard as the various games are displayed in sequence on the screen. The manufacturer claims that "even two-year-olds do not require any adult assistance" to use *Matchmaker*. This claim is overstated, but not by very much!

Matchmaker is clearly thought out, developed, and written. By use of bold and bright geometric shapes, coupled with vivid color and ample sound effects, *Matchmaker* presents the child with a variety of matching, grouping, and discrimination tasks. Young minds and fingers are sure to be delighted with this package! All exercises are immediately self-correcting, with visual and audible cues and reinforcement. Control commands allow the adult supervisor to increase or decrease the level of difficulty on each segment, or bypass the easiest portion of each segment entirely.

Matchmaker is most appropriate for advanced two-year-olds on up to early elementary-school children. However, educators who work with the developmentally disabled child should take a look at this most worthwhile program. Parents and educators alike should look over the entire CSI selection of fine educational software.

A limited warranty accompanies the disk.

NUMER-BECi

Boston Educational Computing, Inc.

$24.95

Overall Rating	C	A	*Reliability*
Ease of Use	B+	C	*Error Handling*
Documentation	B	C	*Value for Money*

NUMER-BECi introduces very young children to counting, numbers, and more. It is the first of a series of math development programs by BECi (Boston Educational Computing, Inc.). The program displays different shapes and colors for children, aged two through six, to count. There are two modes of using the program. Either the child watches while the program counts and displays the answer, or he counts and inputs the answer.

"Free-running" displays the shapes and after a short pause, the correct numerical equivalent. For example, the screen displays five red circles and two green triangles. Then after a pause to allow the child to study the display, a large black seven appears. This establishes an association between the numeral "7" and seven objects. Here the child just watches and learns.

But *NUMER-BECi* also allows him to count the objects and press the keys to identify the count. If his answer is incorrect, the message "Whoops!" appears; the child's answer disappears and the correct answer is displayed. After another pause for him to study the correct response, the whole cycle repeats.

NUMER-BECi includes several counting options. The child can count: (1) Like Things (all objects displayed are of the same color and shape); (2) Unlike Things (objects displayed are a mixture of different shapes and colors); (3) Shapes (many different objects are displayed, but the child counts only the objects of the same shape); (4) Colors (a mixture of differently colored objects are displayed, but the child counts only objects that have the same color); (5) Colors and Shapes (again the screen displays differently colored objects, but the child counts only objects of the same color and same shape).

For more of a challenge, the child can compete against a clock. A "Pace" option leaves the objects on the screen for a predetermined time before the answer is given. The child can beat the computer by inputting the correct answer before the clock runs out.

However, *NUMER-BECi* is more than a counting program. Important associations and identification of shapes and colors are reinforced by asking the child to identify "like things" and "like colors." To count all the circles, the child must first identify what a circle looks like. To count all the green shapes, he must know what "green" means. Learning these two concepts is an important step in early development.

On the other hand, *NUMER-BECi* is not a replacement for the parent or teacher. BECi suggests an adult stay with the child, to explain things and offer rewards for correct answers. This is not a program to start and leave the child alone to "play." Without the reinforcement of an adult, *NUMER-BECi* is of limited educational value.

The version of *NUMER-BECi* I have is not perfect. BECi committed two sins of omission. The Stop/Run key on the Commodore 64 is not switched off by the program. Small children who like to press all the keys to see what happens, quickly find they can stop the whole program by pressing this key. Secondly, like all the other programs in BECi's math series for the Commodore, the computer's great sound capabilities are ignored. *NUMER-BECi* runs smoothly, but silently. My children want to hear a response when they do something right. The only reward in this program is a modest "correct" if the response is accurate. My two-year-old doesn't have the slightest idea what that string of characters on the screen means unless I tell him. If the speaker were to explode with sound when he answered correctly, he would immediately know he had done well and enjoy the experience.

Basically, *NUMER-BECi* is a good program. It is written in BASIC and is unprotected, so if you have the skills, you can correct these problems yourself. When you spend twenty-five dollars on a program, you shouldn't have to change it, but if you want sound on *NUMER-BECi* that's what you'll have to do. Maybe BECi will take note and update their whole silent series for the Commodore 64.

BECi's warranty states they will replace a defective program for a "reasonable charge." No time limitations are placed on this offer.

PICTURE BLOCKS

PDI

$24.95

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Picture Blocks is a shape and pattern recognition program, which can be used in either a free-form or a structured lesson mode. In the free-form mode, the child uses shapes provided by the computer to create his own picture. The program developers suggest that the Free Form mode be used as an introduction to the Patterns portion of the software.

Choosing Free Form from the two-item opening menu presents you with a black screen displaying ten different geometric shapes at the bottom. The shapes are flanked by the letters "E" and "N." Moving the joystick right or left lights up each of the shapes. By pressing the joystick button while a shape is lit, you "choose" that shape. The nine other shapes disappear and the chosen shape can now be maneuvered around the screen until it is where you want it. Pressing the button again locks that shape in place and brings back the ten original shapes at the bottom. This selection and placement routine is repeated until you're finished with your creation. By moving the cursor over the large "E" (erase) at the bottom, you can erase any shape that you're dissatisfied with. A large "E block" is moved over the offending shape, and a press of the button erases both the "E" and the shape. At any time, you can scrap the creation on the screen by placing the cursor over the large "N" (New) and pressing the button. The screen blanks out and you may start over.

The Patterns mode, when chosen from the opening menu, presents you with another menu. Six categories of patterns are displayed, including such topics as "Living Things," "People and Places," and "Up and Away." In each category, there are two levels: easy and hard. The procedure is the same as for Free Forms—that is, you use the joystick to light up the desired shape and move it to the correct position on the screen. Now, however, the screen is split in two, and it is your task to duplicate on the left side of the screen the same picture or design that the computer has placed on the right side. On the Easy level, the pieces of the pattern appear one at a time. You must choose and "set" the proper piece on your side of the screen before the computer will show the next piece. The computer will not let you choose the wrong piece from the bottom, nor will it allow improper placement of the correct piece. When you complete the picture, the name of the object appears at the bottom, and you are prompted to either "continue" or "end."

On the Hard level of Patterns, the *entire* pattern appears on the right side of the screen. You may choose and place shapes in any order you wish, as long as you place the right shape in the correct position. Again, the "E" and "N" prompts are present, should you wish to change your mind or quit. Select "N" and the computer will finish the pattern for you and name it.

Picture Blocks eschews the use of fancy high-resolution graphics in favor of highly contrasted, easily recognized basic shapes. I applaud the programmer for this decision because it makes the program more accessible to preschoolers who are just learning the basic shapes. The use of large basic shapes did not decrease its allure for older kids. I had assumed that most kids would choose the Free Form mode over the structured Patterns mode, but was proven wrong immediately by my nine-year-old. After having read the five pages of instructions and running *Picture Blocks* through both

its modes, he ended up spending nearly an hour going through the library

Better use of sound would add greatly to the attraction of *Picture Blocks*. The effects are limited to simple beeps, which is probably a result of the program's being written originally for microcomputers with less sophisticated sound capabilities than the Commodore. Still, this is well-written, enjoyable software at a good price.

SEAHORSE HIDE 'N SEEK

CBS Software
$29.95

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Searching for a way to teach youngsters color matching and how to understand size and spatial relationships? Well, *Seahorse Hide 'n Seek* will do just that, and provide important lessons in natural science.

On a colorful, low-res background simulating an undersea coral reef, you must maneuver your seahorse from open water to the creature's home in a sunken boat. As in nature, you will encounter hungry predatory fish who'd like nothing better than to make your little seahorse their first course at lunch.

You must use your critter's natural color-changing abilities to avoid capture. By pushing the joystick button repeatedly, your seahorse will change colors, much like real-life seahorses do. This feature lets you camouflage your underwater pal by resting on an area of coral or vegetation of the same color. If you choose the wrong color, though, the lagoon fish won't be fooled, and will quickly gobble you up. If you let the fish get too close before pushing your color-altering device, the fish will find you, so you must take refuge in one of the many caves among the coral. Even then, you may not be safe, since some caves are already occupied by a mischievous octopus, who tickles you, forcing you out of the cave. The octopus provides a random factor that adds an extra, welcomed diversion to the game.

As in all other software I've seen from CBS, *Seahorse Hide 'n Seek* has superlative documentaion, plus learning materials encouraging children to venture forth, beyond the computer, into the real world in search of other examples of camouflaging.

One caution to owners of less-than-monitor quality TV sets: the colors used for onscreen text make the characters "bleed" badly. Owners of computer monitors won't experience this problem.

Seahorse Hide 'n Seek comes in a cartridge format, so the program loads fast and starts easily. I encountered no errors, glitches, or bugs.

Three rousing cheers to CBS Software for presenting young children with entertaining, nonviolent, and truly educational software, such as *Seahorse Hide 'n Seek*.

TODDLER TUTOR

Comm*data Computer House, Inc.
$27.95

Overall Rating	B-	B	*Reliability*
Ease of Use	C-	B	*Error Handling*
Documentation	D	B	*Value for Money*

Parents of young children are frequently unhappy that their children's experience with the family computer is limited to entertainment-only games. Fighting aliens and destroying solar systems have their place, but they deny the child a world of education that lies at his very fingertips. *Toddler Tutor* is an example of an educational package that is designed to assist the youngest computer user in learning the alphabet and numbers. The multi-program package is presented in a simple and direct game-like format.

Toddler Tutor contains four major programs: Alphabet Tutor, Number Tutor, Match Em, and Rainbow Run. Alphabet Tutor has three subprograms that help the child learn and use the letters of the alphabet. Sadly, Alphabet Tutor does not use the Commodore's excellent graphic or audio capabilities very well. The screen and sound are too boring at times to hold attention. The program does, however, give useful performance summaries after each segment.

Number Tutor likewise monitors the performance of the child, as he learns numbers by counting familiar objects and identifying the numeral that equals the number of objects.

Match Em is the high point of the *Toddler Tutor* program for me. One to three players attempt to match pairs of objects hidden behind a board of blocks. Objects can be letters, numbers, colors, or toys. If the player matches an object, play continues until he misses. Play then moves to the next person until all objects are identified. This game is fun and challenging for all ages, and is an excellent family game.

Rainbow Run requires the player to match colors, letters, or numbers below a rainbow on the monitor. This program really requires a joystick (although it can be operated from the keyboard) and even then isn't very much fun.

Toddler Tutor is a moderately priced, early childhood educational package. It is also very useful to

parents or schools who deal with learning disabilities. While *Toddler Tutor* is not very friendly and has several design problems, I do recommend it due to the number and variety of programs on the disk. Operator instructions are not very useful, and the disk does not have a warranty with it. Since the disk is copy-protected (eliminating backup copies) and meant to be used by children, particular care must be exercised by the adult supervisor. Nevertheless, *Toddler Tutor* is a lot of value for the price. I enjoyed it and recommend it to both parents and educators.

Computer Aided Instruction Entrance Examinations

MASTERING THE SAT

CBS Software
$150.00

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

The Scholastic Aptitude Test (SAT) is used by colleges and universities across the country as a predictor of a student's academic performance in college. Good SAT scores can favorably influence a person's acceptance at the school of his choice, especially at those institutions of higher education where the competition for admission is keenest.

So, how does one go about attaining high SAT scores? While nothing will substitute for years of solid classroom work, *Mastering the SAT* can help by evaluating certain areas of your academic knowledge that may be weak, and by supplying examples of SAT-type questions for practice. Becoming familiar with the SAT format may also improve your scores.

The package includes four disks and a 142-page booklet. You cannot whiz through this program in a few hours and expect to magically master the SAT. The program expects you to be serious-minded—and to work hard! It was developed in cooperation with the National Association of Secondary Schools Principals and systematically prepares you for taking the SAT.

Mastering the SAT uses the following seven-step method:

1) You take five sections of a pre-test simulating the SAT: two verbal, two mathematical, and one test of standard written English.
2) Your performance is analyzed. The C-64 scores and analyzes how you've done in each section of the test. The results help you determine which areas of knowledge need to be strengthened.
3) Study "Test-Taking Strategies" in the booklet.
4) Complete the "Skill-Builder Exercises" on the program disks.
5) Take two simulated SATs in the booklet. You must calculate your own results on these.
6) Complete the five sections of post-tests.
7) Use "Vocabulary Builder" to beef-up and refresh your skills.

These seven steps require a considerable investment on your part, in terms of time, energy, and concentration. Unlike some other SAT preparatory programs, *Mastering the SAT* uses written exercises as well as the computer exercises. The actual SAT is given on paper with a distinctively formatted answer sheet that has caused some confusion in past years. Working through the examples with pencil and paper gives you useful experience with the answer sheet form that can eliminate some confusion on test taking day.

The high resolution drawings of the geometry problems impressed me. The crisp, concise style moves swiftly along at the proper pace, encouraging you to stick with it. Another SAT preparatory program I used (that I won't mention by name), is shorter than *Mastering*, but much more boring.

This software contains no unpleasant surprises. All sections load and function as you would expect them to. Make your choices via the menu, but be prepared for onscreen messages that are not always clear. A quick glance at the booklet will erase any confusion.

The four disks are labeled one through four, but do not indicate what each contains. A chart in the booklet describes each disk, but you may forget which page contains the chart, and unfortunately, the booklet has no index. All this information would be presented best on individual disk labels.

I was quite disappointed to see misspelled words throughout the program. It's not unreasonable for the consumer to expect a certain degree of accuracy in $150 software. Such mistakes may be shrugged off when you find them in less serious programs; however, when the National Association of Secondary School Principals endorses a program that purports to help students get higher scores on the SAT, one has a right to expect better quality control (i.e., decent proofreading).

My daughter, a high school senior, worked through this program with minimal encouragement. She received a printout of her score, as well as an analysis of the various sections of the test. I could see right away that she needed a slightly sharper approach to the analogies

section. A minor adjustment in her test-taking strategy based on the analysis most likely will improve her SAT score.

The program tracks three students' progress through the course at once. Their progress reports can be erased to make room for three more. It seems like a prudent investment for a high school to spend $150 to help their graduating students to properly prepare for the SATs.

But what about the legions of parents who want their Johnnys and Jennys to receive thick acceptance envelopes from Harvard, Yale, and UCLA? Does it make sense for them to spend almost as much for a software program as for the computer itself? Personally, I consider the price for *Mastering the SAT* to be a small portion of the overall cost of sending a kid to college in the eighties. If the price tag still seems too steep, you could split the cost with your child's friends' parents. If it sounds like I'm trying to peddle this product, it's just because I think that *Mastering the SAT* is an excellent program, and I'm sold on its worth.

SAT ENGLISH I

Micro Lab
$30.00

Overall Rating	C	B	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	F	C	*Value for Money*

SAT English I by Micro Lab helps you achieve higher SAT scores by increasing your vocabulary and reasoning skills. As you become familiar with SAT-type questions, your self-confidence grows and you have less anxiety about taking the test. Not a bad scheme for thirty dollars!

You choose either Test mode or Tutorial mode. In the Tutorial mode, your wrong answers will prompt an explanation of why they are wrong. By deliberately entering wrong answers, you can gain insights that will help you select right answers.

The multiple choice answers require careful consideration. Several answers may appear to be right, but it's necessary to select the best of the possibilities. Consequently,you have to consider every possible answer and weigh the results before making your choice. This format slows down even quick-witted students, so that the delay in loading the next question is not quite as objectionable as in *SAT Math I* reviewed elsewhere in the Education section of this book.

The disk has two sides covering grammar and usage, sentence completion, analogies, and reading comprehension. The sparse documentation merely points you to the program; the menus lead you through it.

The program lacks imagination and makes no use of the various features of the Commodore that could help to break the monotony. While I would not ask it to zap aliens, I would have preferred a more attractive, interesting display. You are supposed to work the questions in the Test mode to see how much you know, then work the same questions again after the Tutorial mode "to track your progress." I'd suggest that "progress" may just turn out to be familiarity with the limited number of questions on the disk. A replacement disk is offered for $5.00.

SAT MATH I

Micro Lab
$30.00

Overall Rating	C-	B	*Reliability*
Ease of Use	C-	A	*Error Handling*
Documentation	F	C	*Value for Money*

SAT Math I by Micro Lab claims to be a fast, effective way to improve your math SAT score. For the low cost of thirty dollars, you get one disk with material on both sides, and very skimpy documentation. Four sections are presented on side one: Pretest, Varied Topics, Math Skills, and Algebra. You then select either Test mode or Tutorial mode. The Tutorial mode provides explanations for right or wrong answers.

The same format continues onto side two, which also contains four sections: Varied Topics, Algebra, Geometry, and Post-Test. Because many questions are repeated in several sections, the number of different questions is much less than the 145 total promised.

SAT Math I is sloppily presented. The obvious misprints weakened my confidence in the program. One question even gave inaccurate instructions that would only confuse a student. Due to a misprint, another problem presented only wrong answers. Imagine trying to select the right answer when it is not even listed! Most of these inaccuracies could have been prevented by quality proofreading.

A greater problem is the fact that *SAT Math I* is not time efficient. The slow 1541 disk drive contributes to the problem, but the program constantly loaded questions and recorded answers while I SAT (pun intended) impatiently waiting to input an answer to a question I'd already solved. *SAT* drags along at such a slow pace that it became a big bore. Time is a crucial factor when taking the actual SAT, so this constant stalling may be detrimental training.

After all is said and done, will *SAT Math I* really improve SAT Math scores? Probably. At the very least, it provides additional experience in solving SAT-type

questions. But is this the best way to prepare for the SAT? Probably not. Better students will spend two-thirds of their time waiting for the program to accept their answer after they have made their choice. Weaker students will benefit most from the tutorial responses which attempt to lead them to the correct method of solving the problem without giving away the answer.

There are some good conventional study guides (books) that offer more math help in less time for about the same cost. If you insist upon using your Commodore 64 to help your teenager prepare for the math portion of the SAT, why not buy one of his favorite games and a book on the SAT, then use the game as a bribe to motivate him to complete the book? This may be one of the few areas where the computer offers no real improvement over traditional study methods.

Computer Managed Instruction

CLAS

Touch Technologies

$89.95

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	D	*Value for Money*

This "Computerized Lesson Authoring System" from Touch Technologies provides you with a set of twenty-four special commands for preparing computerized lessons. You can give information on any subject followed by a test with the following types of questions: matching, short answer, multiple choice, true or false, and fill-in-the-blank.

The *CLAS* package includes an author disk, a student disk, and a ninety-page instruction manual. You prepare lessons with the author disk, then store them on regular formatted blank "lesson" disks. Students access lessons with the student disks, which prevents them altering the lessons or sneaking a peek at the answers.

After you load the author program, a Procedures menu appears. To make up a new lesson, you select Edit from this menu, give a ten-character name to your new file, enter the Add command, and then type "$Course" and a twenty-character title for this course. At this point, you can jump right in by typing "$Lesson," or use special commands such as "$Author" or "$Copyright" to further title your work.

You can begin lessons with an introductory paragraph, such as "Columbus sailed for America in 1492. . ." and follow that with various questions of the types listed earlier. The most powerful aspect of *CLAS* is the relative ease with which you can prepare questions and have the computer check the students' answers. For example, you might follow your introductory paragraph with this fill-in-the-blank question: "Columbus discovered America in <1492>." The computer displays a blank line in the place of "1492," and the student enters the correct date. Incorrect entries do not appear on the screen, and the student cannot go on until he provides the correct answer. Pressing the F7 key for Help displays the correct answer. Before continuing, however, the student has to press the space bar, blanking the space once again, and then type in the correct answer.

There you have it in a nutshell. You can use the angle brackets at any point in your text. They enclose the information you want the student to provide. The computer places a blank there and checks the students' responses against the answer you specified. However, you can only have one correct answer. The computer cannot be programmed to accept two or three similar answers. The other special editing commands are Top, Bottom, and Replace, which help you review and edit your lesson.

Other features on the Procedures menu include: Prepare, which automatically formats your lessons to be saved on disk; CLAS, which lets you view the lessons you are preparing as they will be in their final form; Copy, which saves the lesson on a disk; Delete, which removes files from the disk; and Print, which prints hard copy of lesson files.

The manual, which reads easily and clearly, was not written for the Commodre 64. The C-64 keyboard lacks an important command key used in *CLAS*, and discussed in the manual: the Tilde key. I don't know whether an alternate key may be used or if the command is unavailable to C-64 users.

While typing the lessons into a computer is no easier than typing them onto a ditto master, computers can do things that a ditto sheet never dreamed of. They can be interactive, animate pictures, and play sound. *CLAS* falls down some in this category. Lessons written with *CLAS* are interactive; the student must answer correctly before he can continue. However, that isn't really very interactive. If a student misses five questions in a row, the computer should recognize that he needs review and return to the beginning of the lesson, or even offer a special tutorial section. There is no provision within *CLAS* for that kind of interaction. There is also no way to include graphics within your lesson. *CLAS* does have two built-in sound effects: a little tune that follows every correct answer, and a beep that signals a wrong key press. That's fine, but there is no way a more creative (or more musical) teacher can add anything.

Changing a ditto master means re-typing the whole thing. Here is an area where *CLAS* really shines. The full range of commands and menu choices let you

easily add, delete, and edit lessons. For some teachers, this feature alone might make it worth the purchase price.

Unfortunately, *CLAS* does not simplify record-keeping. It gives an end-of-lesson report that tells how many questions have been presented to the student, and how many were answered correctly without help. It also gives an onscreen review of all these questions the student missed. That's good as far as it goes, but a computer can do so much more! Using *CLAS*, you might build up a whole library of history lessons. The computer should be able to keep track of where each student is in the sequence of lessons, record his scores, and print hard copy of at least his grades and perhaps the questions he needs to review.

CLAS's major sin is one of omission. Including the missing details would make *CLAS* more complicated, to be sure. The ninety-page manual might swell to one hundred ninety pages, but it would be worth it. *CLAS* just isn't very deep. I recommend using *Pilot* (reviewed in the Utility section of this book) for authoring lessons over this program.

MASTER GRADES

Midwest Software

$39.50

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

If you've ever considered using a computerized record-keeping system—and even if you haven't—take a good hard look at *Master Grades*, a teacher's grade- and attendance-keeping utility. It is easy to use, is loaded with features, and will save you time!

Master Grades is a complete system for recording and reporting attendance and grades. It is fully menu-driven, requiring single-key entry of most options. This program is not just user-friendly, it is "teacher-friendly," written and documented by teachers, for teachers. And you need never have touched a computer before!

You do not keep a record of individual grades or assignments for each student; rather, you maintain a cumulative total of "total points" compared to "possible points." Averages are calculated, and a letter grade is assigned, based on a grading scale you design.

A copy-protected master disk contains the main program. You'll keep all student information on a separate data disk (not included). Backup and replacement copies of the master disk are available from the manufacturer for just $4.00. (If only more software houses could see clear to make this offer!) Unfortunately, you'll wait a good minute for your data disk to be formatted the first time you use it. This is a bothersome quirk of the Commodore Disk Operating System.

The Sample File included on the master disk provides you with a solid tutorial on all facets of program operation. The manufacturer felt that complete written instructions would be cumbersome, and chose to use a briefer manual, along with a Sample File on which you can practice all the program features. I was skeptical at first but am now convinced that this method is a superior style of documentation for the *Master Grades* system.

After the data disk is formatted for you by the master disk, you begin operation by selecting the Enter Names option that lets you establish each class file. With each student's name, you assign a simple code (instructions on this are clear). This code adds to the amount of information you can provide in future reporting.

You select the Enter Score option each time you update grades. You must give a numerical score for all marking purposes. Letter grades cannot be given, nor can a check-minus/check-plus system be used. The manual suggests (and I agree) that you will probably tolerate the number-only policy after you experience the program's benefits.

At the end of any grading period (quarter, progress report, etc.), you can use the Attendance option to record the number of student absences. You can easily delete names and make any needed corrections by simple jumps from the main menu.

Particularly impressive is the number of lists and reports that you can generate with *Master Grades*' Print options. Each of these features is accessed via a separate Print menu.

You can check the progress of any class (or all classes) with the Screen Class List. This displays—on the screen only—the class hour, attendance, total points, possible points, average, and letter grade earned. Listing can be alphabetical or by current percentile ranking. You choose Printer Class List to get a hard copy of the same information.

Because few teachers can be bothered to update student records after each quiz, test, or assignment, the Gradebook Page option provides a fifteen-day, class-by-class, class list which you might use to keep records between data entries. (Of course, you may choose to use your own gradebook for this purpose, but the option is available.)

The Progress Report feature, though, is my favorite. There are three categories here: "congratulatory," "standard," and "unsatisfactory" progress reports. You choose the range for each category and then *Master Grades* issues a completely personalized progress report for each student. Information on each report can include school name, your name, school telephone number, current average, and possible areas of improve-

ment for the student. You can choose to send only unsatisfactory, or only congratulatory, messages; the tone and wording change to suit the category. Conferences are even suggested in cases of unsatisfactory performance.

The Report Card List option prints just that: an alphabetical list, by student grade, of all your students with their period number and subject. You can choose to print grade received, percentage earned, and/or number of absences.

As far as I can determine, the program's error-trapping is faultless. Positive verifications are required for all important entries, making it nearly impossible to record incorrect data. You'd really have to try. However, the maximum number of students that *Master Grades* can handle is 200. If you have more, the manufacturer invites you to contact them for a solution to the problem.

In closing, it is difficult for me to find fault with this program. After thirty minutes with the Sample File, I knew I'd be using the program myself. I had always feared that "electronic gradebooks" had to mean double work; the school administration already requires enough grade and attendance paper work. This may be true with lesser programs, but not with *Master Grades*. It offers such strong report-generating features that the extra data entry time is more than worthwhile. The simplicity of sending even weekly progress messages to students who bear special monitoring (all with no number-crunching), and the ease with which you will generate the figures you need for your school's own reports, make this a valuable recordkeeping tool.

PILOT

Commodore Business Machines
$59.00

PILOT is a CAI (computer aided instructional) language designed to help teachers create educational software as effortlessly as possible. For a complete description of this language and its features, please refer to the review of this program in the Utilities section of this book.

SUNDAY SCHOOL MASTER WRITER

UHL Research Associates, Inc.
$99.95

Sunday School Master Writer is a comprehensive record keeping system for Sunday school teachers and administrators. You can compile personal data on your students, keep track of their absences, create quarterly reports, and log dates of the most recent in-home visits to the student by staff members. (For a complete description of this program, please refer to the review of it in the Business section of this book.)

TESTMASTER

Midwest Software
$35.00

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A-	*Value for Money*

Every teacher knows the amount of time required to create effective quizzes and tests. *Testmaster: Test Authoring and Administration System* is a reasonably priced, professional program which allows your Commodore 64 to become an "electronic teacher." With it, you can create, edit, and save a pool of questions on any subject or area of interest. Then, at any time, you can tap that pool to generate a quiz or test, either on the screen or printer.

With *Testmaster*, you establish disk files of test items that can include true-false, multiple choice, completion, and short answer questions. Each test may have up to one hundred questions and may utilize up to ten different data files. Also, you can produce answer keys and student response sheets on your printer at the touch of a single key.

You will have little difficulty getting used to *Testmaster*, since it is a fully menu-driven program offering single-key selections. In addition, the editing features are comparable to those of some word processors.

The accompanying documentation does its job well, with a table of contents (but no index) and a step-by-step tutorial that instructs you in all the important operations. The manual was obviously written for teachers, too, with suggestions for producing multiple versions of tests to avoid classroom cheating. This usually time-consuming process is made easy with *Testmaster*.

There are two things I'd like to warn you about. The first time you set up a data disk, you are forced to wait up to a full minute, twice, while the disk operating system does its "housework." Be patient, this only happens the very first time you format a disk or establish a file!

Also, when generating a test on your computer, you are asked whether you have a "Commodore" or "non-Commodore" printer. Be careful answering this question, if you have a non-Commodore printer and a "smart interface" (such as the Cardco +G): your printer may in fact have been "tricked" into acting like a Commodore printer. If you find peculiarities on your

printed copies (especially with underlines for completion-type questions), try answering that you have a Commodore printer.

Be advised that this is a copy-protected disk. Midwest Software does, however, offer backup and replacement copies for four dollars each to registered owners. (A registration card is included with the disk.)

Elementary or secondary level, no matter what your area of concentration, *Testmaster* can save you valuable time. I recommend it highly to all teachers.

Computer Science & Literacy

COMMODORE 64 BASIC PROGRAMS

Howard W. Sams and Co., Inc.
$16.95
Grades: All

Overall Rating	A	A	*Reliability*
Ease of Use	A	N/A	*Error Handling*
Documentation	A	A	*Value for Money*

Commodore 64 BASIC Programs is a 112-page book that includes listings of twenty-nine BASIC programs. The book includes a tape of the programs, so you don't have to waste time typing them into your computer. The program categories include games, education, graphics, personal, sound, and utilities.

The purpose of the book is to create an interest in learning more about how to use and program the computer. Each program has an introduction that explains how to use the program and what it does. Each of the lines of the program are explained, and many of the programs have hints to help you modify the program in any manner you desire.

I was surprised at the versatility of some of the programs. One of the most interesting chapters in the book is "The Computer Tutor." The two programs in this chapter turn your computer into a teacher that will teach you about computers. Who should be more capable of instructing you about computers than your own computer? The programs show you the range of the Commodore 64's features. You are offered a menu of different demonstrations that will guide you through subjects such as sound, graphics, and concepts of the BASIC language.

Commodore 64 BASIC Programs offers something for everyone in your family. The chapter, "Programs for the Home," contains a checkbook manager, a recipe converter, and a mortgage amortization program. The chapter on utility programs helps you develop sound routines, sprites, and musical compositions. The game chapter explains simple games and teaches you how to develop your own.

This package is a must as a companion to the guide to BASIC that comes with your Commodore. Because the greatest knowledge comes from experience, you can use the information in this book to help you experiment to learn more about your computer. At under seventeen dollars, this package is one of the best values I have seen for the Commodore 64.

LOGO: A LANGUAGE FOR LEARNING

Commodore Business Machines, Inc.
$60.00
Grades: All

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	A	*Value for Money*

Commodore's version of the popular LOGO programming language is an attractive package for the money. It contains a LOGO language disk and (that rarest of creatures) a backup disk, a utilities disk containing demonstration and utility programs, and a hefty tutorial.

The instruction manual is extremely clear and jargon-free; since LOGO is aimed at a wide audience, including kids, the instructions assume no prior knowledge of computer languages or technology. In fact, I was a bit taken aback to see a section of the book entitled "Instant" for non-readers! Was this, I wondered, some base concession to the present-day illiteracy problem. Not in the least; this section is for very young children who have not learned to read yet. But don't be fooled by this. The beauty of LOGO lies in its versatility, and there are plenty of programming challenges here, even for the relatively advanced enthusiast. I expect to go back to this program again and again.

As with any programming language, learning LOGO takes a thoroughly serious investment of time. Nevertheless, unlike many languages, LOGO offers the computerized equivalent of instant gratification with its renowned graphics capabilities. This proves especially important for children, who will be encouraged

to see some tangible—and often lovely—results upon their first encounter with LOGO. As many people know, the turtle (a small, triangular cursor) can be driven around the screen with relatively simple commands to form designs and drawings of startling complexity. Easily chosen "pencolors" and background hues add to the effect.

It would be a mistake, though, to dismiss *LOGO: A Language for Learning* as some kind of electronic *Etch-a-Sketch*. All of Commodore's capabilities can be utilized: sprites, music, mathematical calculations, random numbers, and so forth. I found the LOGO disk commands, in particular, much simpler and easier to use than the normal Commodore BASIC commands.

Of course, the main point of a computer language is programming, and LOGO is very interesting in this respect. Over one hundred commands, called Primitives, are built into LOGO. You can use these to build more complicated commands called Procedures, which, once you define them, may be used exactly like built-in commands. You construct a network of procedures which you can use and combine into various structures with the Primitives to accomplish the desired goal of the program. By storing these Procedures, you retain a base of usable information which can expand along with your programming capabilities and interests.

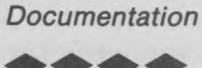
Special mention should be made of the fine utilities disk included in *LOGO: A Language for Learning*. It contains eighteen utility programs, ten demonstration programs, and many other programs on such topics as LOGO/Assembler interfacing, sprites, and music. The tutorial has an appendix which thoroughly explains each of the programs on the utilities disk. This is a welcome addition, to which any owner of the infamous 1541 disk drive will attest.

To summarize, I believe the Commodore Logo package to be a more than worthwhile program. It will hold a young person's interest from the start, yet will support many more complex applications than its reputation might suggest.

CREATURE CREATOR

DesignWare
$39.95
Grades Preschool-3

Overall Rating	B	C	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	C	*Value for Money*



Creature Creator is a gentle introduction to programming. The program's layout and operation would lead you to believe it's a game. It has high-resolution graphics, animation, and sound effects, which are used to sugar-coat a tutorial on elementary programming structure. It is menu-driven, and the introductory screens and activities are all controlled by only two keys, making it easily accessible to the new computer user.

Here's how it works.... I'm sure you've heard of the "Identi-kits" used by police departments to reconstruct faces from witnesses' descriptions. *Creature Creator* is an Identi-kit for creating monsters. Prompted by simple questions and commands (and using only two keys), you can create composite cartoon-like characters. Combining heads, bodies, arms, and legs from seven selections in each body area, hundreds of combinations are possible. Having constructed a creepy critter on the screen, you can then make it "dance" by commanding it to wave, hop, stomp, turn its head, or even roar.

Sooner or later, a child will press the key which selects Game, and *Creature Creator* will begin doing its intended job of teaching the rudiments of programming logic. The Game board shows two monsters side by side on the screen. At the bottom of the screen is a grid of boxes. The monster on the left is the computer's, and the one on the right is yours. The computer will make its monster go through a set of "dancing" motions, and it's your job to give your creature the correct commands to duplicate the motions of the other creature. The grid at the bottom of the screen records your commands and is easily edited should you make errors. Multiple difficulty levels are available in the Game portion of *Creature Creator*, allowing a measure of additional challenge.

Creature Creator is an engaging, colorful, and well-designed educational program. It is perhaps overpriced, compared to some of the low-priced educational software for the Commodore 64.

Creature Creator also suffers from too much copy-protection. It is sometimes necessary to reload the program two or three times before it will run correctly, and the wear and tear on the drive (caused by this protection scheme) is an annoying factor.

KIDS ON KEYS

Spinnaker
$34.95
Grades Preschool-3

Overall Rating	B	D	*Reliability*
Ease of Use	A-	A	*Error Handling*
Documentation	A	B+	*Value for Money*

Perhaps the largest obstacle to overcome when convincing kids to change from wiggling a joystick to using a keyboard is that until you are familiar with the keyboard, you can't manipulate the computer with the same speed and facility that you're used to with a joystick. It's all tedious hunt and peck stuff—and to the average kid, boring as mud.

A growing body of software for the Commodore 64 tries to tackle this problem. I'm referring to the "keyboard familiarity" programs. *Kids on Keys* is Spinnaker's entry into this market. It is a typing tutor for children that offers the child three separate arcade-style games which he can play using the computer keyboard.

Game 1 requires you to type in the letter you see falling slowly from the top of the screen. If you hit the proper key before the letter reaches the bottom, the letter explodes and is displayed at the top of the screen as a "trophy." This continues until fifteen letters in all have been popped. You then get a bonus round in which a child in a balloon slowly descends toward the bottom of the screen. On the balloon is written a three-letter word; if you can type in the word before the balloon reaches the bottom of the screen, festive music plays, the animated child in the balloon waves, and the balloon again takes to the "sky." Success in the bonus round prompts the computer to ask you if you want to go to the next level of difficulty or back to the main menu.

Games 2 and 3 require you to identify different objects on the screen within a given time limit, the duration of which is determined by the particular difficulty level. It was in games 2 and 3 that I found a serious problem. *Kids on Keys* contains files of objects that the main program loads. These files contain the graphics routines that create the objects that you must identify. The authors of *Kids on Keys* wisely realized that if the program is played too often by the same children, the challenge of typing in the names of the objects will soon disappear. Thus, they supplied an option to create and name new objects and then save them to a separate disk. The program gave me easy-to-understand prompts for the formatting of the data disk, and the joystick-driven drawing routine worked fine. However, when I tried to save my new file of objects to the data disk, nothing happened. Try as I might, I couldn't save any new files at all. Quite a frustrating predicament!

If the Make Pictures options were never used in *Kids on Keys*, the program would still be quite impressive. The graphics are bright and colorful, and the music and sound effects, while not as sophisticated as other offerings by Spinnaker, are more than adequate. The program can be operated quite easily by kids in the recommended age bracket (three to nine years old.) What with all the prompts and excellent error-trapping, it seems to be quite crash-proof. Too bad my copy doesn't live up to the claims made for it in its own manual.

DELTA DRAWING

Spinnaker Software
$39.95
Grades: Pre-school+
Save Data to Cassette

Overall Rating	A-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	A	*Value for Money*

I heard about *Delta Drawing* long before I had a chance to use it. It was described to me as "LOGO turned upside down." Having used the program for several weeks now, I think this is an apt description. The program appeals to, and can be easily employed by, users within a wide age range (from four-year-olds to adults).

LOGO was developed as an *introductory* computer language and was meant to be used by younger, first-time computerists. *Delta Drawing*, like LOGO, simplifies the creation of drawings and designs on the computer monitor, while at the same time establishing the principles of computer logic in the mind of the student. In LOGO, the user employs a special series of commands to lay out a program, which is then presented onscreen.

The main facility shared by LOGO and *Delta Drawing* is *recursion*. Recursion (sometimes called "macro") is the ability to save a discrete set of commands as a named routine. You subsequently can call up this routine, or procedure, at any time during the creation of a drawing. You can assemble combinations of routines and save them as still another routine. With *Delta Drawing*, though, the creative process is turned upside down. Instead of the program leading to the drawing, the drawing leads to the program.

After you insert the *Delta Drawing* cartridge, a title screen is displayed for a few seconds and then is replaced by a black screen with a white "delta" at its center. A fleeting glance at the first few pages of the

manual, and you can begin to draw in a jiffy. Even without the benefit of the manual, most kids quickly find that the D key makes the delta move ahead one space. Hold down the D, and the delta moves up to the top of the screen, reappears at the bottom, and keeps going until you remove your finger from the key. The delta also leaves a white line behind it. The M key also moves the delta, but without leaving a line. Hitting the R key makes the delta turn thirty degrees to the right; hit the R key three times, and the delta has made a right angle turn (ninety degrees). Using R and D, you can quickly produce a square onscreen.

The T key takes you to the Text screen, where your experimentation has been recorded, move by move. In other words, you have been creating a program.

Having gotten this far on my own, my interest was piqued enough to examine the manual more thoroughly. (I was searching for a command to erase my meandering experiments, which, by now, were a program). Perusing the manual, I found the command I was seeking (Shift-Q)—plus much more.

The *Delta Drawing* manual is a joy; it should be compulsory reading for all writers of software documentation. For both first-time and experienced users, the guide is terrific. The manual contains ninety-five ring-bound pages and has an index. The layout helps you to follow the clearly written tutorial. Furthermore, it encourages you to try the commands and create the sample drawings.

As you go through the manual, the rest of *Delta Drawing's* numerous capabilities are introduced. Drawings may be made in any of eight different colors, and any enclosed areas may be filled in with another color. The K ("Kaleidoscope") command provides a "mirrored" effect to any command. Altogether, the program offers over fifty graphics commands.

Delta Drawing's flaws are minimal. There's a command that dumps the text screen to a printer, giving you a printout of your favorite creations, but there's no way to reproduce the graphics screen (the drawing itself) on a printer. This inability is due to the limitations of cartridge memory. A greater failing is *Delta Drawing's* lack of disk compatibility. Your drawing programs can be saved to cassette only. Since it's been estimated that almost three-fourths of all Commodore 64 owners have disk drives, this oversight is rather serious.

When all is said and done, *Delta Drawing* represents a significant breakthrough in making computers and programming less intimidating to the novice. It also is an awful lot of fun, for kids and grown-ups alike.

KIDWRITER

Spinnaker Software
$34.95
Grades 1-5

Overall Rating	A-	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	A	A	*Value for Money*

At various times, I've approached my kids with different versions of children's word processing programs.

"Look," I say, "You can do your homework on the 64 and then print it out. Won't your teacher be impressed?"

Well, maybe their teacher would be impressed, but that's not enough of an incentive to engage them in hunt-and-peck keyboard combat—not to mention the dreary task of memorizing all the formatting commands. Homework is something that kids just want to get over with. Especially if you're only nine and are still working on getting your hands to do what your eyes/mind tell them to.

Enter *Kidwriter*.

"Hey guys, here's a new word processor for kids!"

"Oh," they say, edging toward the door.

"Yes, and this one is different. You can make illustrations for your stories with sprites," I announce, gaining confidence as they come closer to peer over my shoulder.

To cut a short story even shorter, within half an hour my nine-year-old completed a three-page, illustrated story of a fisherman whose boat overturns and is subsequently rescued by a helicopter. All of this was accomplished without once looking at the manual, thanks to lots of prompts, excellent error trapping, and the comprehensive self-running demo integral to the program.

By following the simple, ever-present prompts provided by *Kidwriter*, the child is first shown how to create an illustration describing his or her story on the upper half of the screen. To accomplish this, a simple graphics editor permits you to choose from a ninety-nine item list of characters and objects. Up to eight of these are arranged by the child on one of many different backgrounds. When the illustration is finished, the child hits the D key (for "done"). Now *Kidwriter's* word processing system is activated and the child is encouraged to describe the illustration he has just made. Eight lines are available per "page" for text. When the text area is full, the child is asked if he is finished with the story. If so, the program asks whether he wants to save it to disk. If the child is not finished yet, another blank "page" is presented for him to illustrate again and describe with text. Until he declares his work completed, all the "pages" are considered to be part of a "book"

and will be filed on disk under the same name. When the child wants to show the book to Mom or Dad, he merely has to call up the book's title from the disk and all the pages of his story will be displayed sequentially, complete with a cute musical sound track.

The perfect educational software package hasn't crossed my disk drive as yet, but *Kidwriter* is the current contender for first place. I would like to see an enhanced version of *Kidwriter* with a printout option and perhaps a more sophisticated high resolution drawing routine (a Machine language, joystick-driven one would be ideal). All things considered—in the here and now—*Kidwriter* is really a first-class piece of software.

TURTLE TOYLAND JR.

HesWare
$29.95
Grades 2+

Overall Rating	B	C	*Reliability*
Ease of Use	C	B	*Error Handling*
Documentation	D	A	*Value for Money*

Turtle Toyland Jr. ambitiously tries to integrate entertainment and educational software for ages seven to adult. *Turtle Toyland Jr.* has individual modules which let you create music, graphics screens, and sprites. You can save any of your creations to disk for later recall. It even has a sophisticated training area, which teaches the principles of turtle graphics (first introduced in the language, LOGO). You manipulate all these functions and activities with a joystick. The *coup* of the entire unit is the ability to consolidate all of these activities/creations into a "filmstrip," or movie, which can also be saved as a unit and brought back to be viewed or modified again and again. All this may be too ambitious for one program.

I felt helpless and confused when I first ran the program. You can easily get lost, especially in the training mode. I wandered for quite a while before I accidentally got back to the Crossroads. The documentation is woefully inadequate compared to the complex, sophisticated program. Much more attention should have been given to fully explaining each of *Turtle Toyland Jr.'s* areas of activity. Also, using the joystick for everything really slows you down. You have to go back to a submenu to do the simplest things. And, finally, other music programs, sprite editors, or screen-drawing routines are easier to use and can do more.

Turtle Toyland Jr. is the first of a series. The next product, *Turtle Toyland*, will suit children ages ten and up.

INSIDE BASIC SERIES

Sim Computer Products
$14.95 to $24.95
Grades 4+
Commodore 64 and VIC 20 with 8K expansion

Overall Rating	B	A	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	B	*Value for Money*

Many people find the BASIC language easy to learn but hard to apply. Even if you have a working knowledge of BASIC, you may find it difficult to design programs and develop style. Most of the BASIC language books merely skim the surface and leave the novice to his own devices. One way to develop good style and design skills is by example. By studying other people's programs, you can learn about structured programming, subroutines, error checking, and efficiency or speed.

This is just what the *Inside BASIC Series* attempts to do. The series is a collection of programs for the Commodore 64 (and VIC 20 with 8K expansion) that delves into the creation of a program. With each program, you are given a program overview, suggested changes, user instructions, and other details to help you see how a BASIC program is constructed.

This review discusses three programs in the series: Kentucky Derby, a race game considered to be an advanced BASIC program; Quiz Me, an educational program which allows you to develop quizzes and to store them on tape or disk for later use; and Number Jotto, a mastermind-like game which is a good program for beginners.

The Kentucky Derby program is by far the best of the series. This program includs good graphics, sound, and music, as well as a complex scoring routine. You are given a choice of six horses, and the computer displays the odds for each horse. You then can spend ten dollars of your bank account to ask a "tout" his opinion on a hot tip. (The "tout" is a slimy character who always has a stinky cigar in his mouth.) After placing your bet (or bets), the computer plays the "call at the gate," and the horses are off. The numbers of the horses in the first four positions are displayed in the upper left-hand corner of the screen. As in a real race, these position numbers blank out when the horses near the finish line. This adds to the anticipation. When the race is over, the results appear and payoffs are made.

Quiz Me is a very interesting educational program that allows you to develop a quiz and then save this quiz to disk or tape. It is literally a quiz-maker data manager. Much of the main menu reminded me of a database program. You are given options to enter or

edit a quiz, make a new quiz, print a quiz, take a test, or save and load quizzes.

Even though I have seen many versions on the *Mastermind* theme, it is interesting to see the way a BASIC program is developed to play this kind of game. Number Jotto selects four numbers and you have to try to guess the number combination. Then, as you make your guesses, the computer gives you clues as to whether the choices are correct or not. It took me nine or more guesses to discover the secret numbers.

While these programs are educational and fun, I must say I was disappointed on one point. On the package it says, "BASIC programs with the works," but inside, the documentation of the code was not included. There are no program listings, no variable charts, and no line by line description. I did send away for these notes (there is a coupon for this inside the package), and I even mentioned that I was reviewing these programs. Yet, at this writing (four weeks later), I have not received them. I would think that, if this is a look "inside BASIC," the program listings would be inside the package. I recommend that, in the future, Sim Computer include the complete program notes in the same package as the program.

I really like a program which not only brings me pleasure, but also helps me better understand what goes on inside my computer. The *Inside BASIC Series*, from Sim Computer Products, does just that. The *Inside BASIC Series* will increase your knowledge of BASIC, help you gain facility with the language, and give you some fun, too.

TURTLE GRAPHICS II

Human Engineered Software

$59.95

Grades 4+

Overall Rating	B	B	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	B	B	*Value for Money*

Turtle Graphics II, which I will call *Turtle* for short, is an implementation of Seymour Papert's LOGO, a programming language designed for children. LOGO is a programming language that can be learned in the same way that children learn spoken language, by using language to manipulate their environment. LOGO programs start with one- or two-word statements, and these short statements, or primitives, can be combined into more complex sentences, called procedures. By defining procedures, you can create a dialogue with the computer, called a program.

Turtle has over sixty different commands, including commands for color, sound, motion, sprites, input, and output. By using *Turtle's* simple commands, the beginning programmer can paint colorful graphic designs on the screen, create and move sprites, and program high-resolution lines and curves. Turtle is menu-driven and has an optional trace mode to aid in debugging and logic following.

The version I reviewed came on a disk that included several sample *Turtle* programs. There is also a manual, divided into two sections: a tutorial written for someone who has never worked in any kind of computer programming activity, and a reference guide for the more experienced programmer or for use after you have finished the tutorial. The manual is well laid out and is suitable for children over ten years old. My only complaint about the manual is that it is bound, not loose-leaf, and will not lie flat. This makes it hard to use the keyboard and read the manual at the same time.

Turtle is aimed at children. The manual is written for children, with small cartoons, and a simple format. This is not to say that it is not usable by adults. In fact, more manuals should be written in this easy-to-follow, no-jargon style.

The program is copy-protected, and no backup disk is included, nor can you obtain one. However, the program is covered by a 180-day limited warranty, which allows for replacement if the disk is found defective during that time. If the program "malfunctions" after that time, you may get a replacement by sending the disk and two dollars to HES. There is also a technical assistance hot line with a toll-free telephone number.

In general, this is a good version of LOGO. The manual is excellent, all the commands work as they should, and the sample programs are well thought out. There is a loader program in the manual for using LOGO-designed sprites in BASIC programs, but HES neglected to put it on the disk. You have to type it in yourself.

I don't use LOGO myself because I find it too slow (there's a good reason that it's called *Turtle*); but it is a good introduction into computer programming, much better than BASIC. If you have never done programming, or your children want to learn, LOGO would be a good beginning.

TYPE 'N WRITE

HesWare
$29.95
Grades 6-9

Overall Rating	A	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A	B	*Value for Money*

The promise made for word processing is that it will help a person to write. . . write more easily, more quickly, more fluently. For children to realize these benefits, they need keyboard skills and a simple-to-use word processing program. Well, this is it! If you want your child to learn word processing, and you can only afford one software package, then HesWare's *Type 'n Write* is for you. You get two programs integrated into one package, a typing tutor and a simple, beginners' word processor.

The *Type 'n Write* main menu offers different practice levels: First Time, Home Row, Top Row, Bottom Row, Numbers, Shift Keys, four- and five-Letter Combinations, and four- and five-Letter Words. For each level, you copy a line of characters, and if you've made less than five errors, you pass to a new line. The program displays errors and words per minute speed at the bottom of the screen. To advance to a new difficulty level, press the Restore key to return to the menu.

The First Time level uses a picture of hands to indicate which fingers to use, but higher levels do not have this feature. That's too bad because when you start reaching around the keyboard, you need help. I don't think a child could learn to type using this tutorial alone.

Type 'n Write's simplicity suits a young beginner. A special Function Key Menu is always on display at the top of the screen. The F7 key calls up a Help screen. That's all there is, and that's enough. Unlike other software, *Type 'n Write* has only one menu, and every key always performs the same function.

The program has excellent error trapping. An example is the Save procedure. If your child tries to write a title longer than the sixteen-character maximum, the cursor "sticks" and won't permit any additional characters.

That's the whole picture of *Type 'n Write*: a clean, simple design for a child beginning word processing. As an elementary school teacher, I tried several programs with young students; *Type 'n Write* is my new choice for beginning students.

COLOR CRAFT

Sim Computer Products, Inc.
$24.95

This animation program is billed as an "entertainment and educational software package," but its entertaining features by far outshine its educational potential. The student does learn how the computer turns individual drawings into animated sequences, but he spends considerably more time creating the drawings to be animated. Teachers may find the finished cartoons useful for illustrating lessons. For a complete review of *Color Craft* look in the Utilities section of this book.

SIMULATED COMPUTER

Edu-Soft
$29.95
Grades 7+

Overall Rating	A	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	A	*Value for Money*

Some people buy a computer and never wonder how it works, but other people have a nagging, unanswered question, "Just what, exactly, is going on in there?"

Simulated Computer attempts to partially demystify the inner workings of a theoretical computer. The major parts of a computer are shown on screen. There is a keyboard, a CPU, memory locations, and a printer. As various commands are used, animated graphics will show the flow of data from register to register. Previously vague ideas quickly become concrete concepts as you become an eyewitness to a running program.

Simulated Computer keeps things simple by defining only twenty-four locations, using only eleven types of instructions, and operating at the absurdly slow speed of only two instructions per second. The advantage of all this is that now, even slow-witted humans like me can follow along.

It is fascinating to watch the programs run. I found myself thinking along with the commands, "OK, now he's going to Store the Accumulator over in location 17... right... Now he's going to ..." Without making any real effort, I was beginning to think in the same terms as my Commodore 64. The machine language instructions are introduced clearly and logically, and executed graphically. The brief thirty-three-page booklet will guide you, but the real action is on the screen.

Edu-Soft claims that *Simulated Computer* is for ages twelve to adult. I tested it on my thirteen-year-old daughter and in a short while she was loading the accumulator (LDA), adding values from various loca-

locations (STA), and doing other machine language routines that I had been struggling for some weeks to learn.

A simple form of Turtle Graphics is used along with Sound Commands to keep the proper level of fun in the education process. For example, you will be asked to draw square spirals and a twelve-point star using the simulated computer.

Simulated Computer does an excellent job of introducing and demonstrating how computers work, as well as laying a good foundation for understanding machine language. I only wish it had gone further into machine language and Commodore's 6510. If the rest of machine language had been explained and demonstrated with the same style as these introductory concepts, my machine language struggles would soon be over.

Computing beginners of all ages will benefit from *Simulated Computer*, and even experienced users will find it interesting. Educators may take advantage of Edu-Soft's Site License which will authorize them to make one copy of the program for each computer to be used at their school site. Additional copies of documentation will be provided to show the students that the software was not "pirated."

COMPUTER SCIENCE

Commodore Business Machines, Inc./
Public Domain Software
$9.95
Grades 8+

Overall Rating	B+	B+	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	B+	A-	*Value for Money*

Computer Science contains thirteen programs varying from a very simple hexadecimal/decimal converter to a very informative graphics simulation of computer operations. The only real problem with this disk: the range of difficulty levels is far too broad. Computer Concepts suits totally inexperienced users, while Print-Sort and Graphsubroutine suit experienced programmers. Disk CMD is specifically for Commodore BASIC 4.0 computers (not the C-64), but valuable to Dos Wedge users. Features simply explains basic keyboarding on the C-64. Hex/Dec and Hex/Demo are redundant programs for converting numbers from hexadecimal to decimal, and vice versa. History is a rather useless, though interesting, quiz on the history of computers. RND very competently illustrates how to generate random numbers in a specific range from BASIC.

The disk includes two particularly impressive programs. Hypo simulates a hypothetical microprocessor. It has a small instruction set, which lets you create machine language programs on this computer. It then illustrates how the programs work—a very handy introduction for the novice machine language programmer. A printer would be a useful, but not essential, peripheral. Finally, Strings elucidates string operations on the C-64 in a very well-written manner. Unfortunately, it's a "passive" program: it only allows you to flip through "pages" of text on the screen. It uses exceptional screen manipulations to illustrate the concepts, however.

Computer Science is not one of my favorite packages in Commodore's Public Domain Series of twenty-seven disks, but it's a good buy for the money.

COMMODORE 64 GRAPHICS AND SOUNDS

Howard W. Sams & Co.
$19.95
Grades 10+

Overall Rating	C-	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	C	*Value for Money*

I'm very interested in learning about graphics and music for the Commodore 64, so I jump at the chance to review any new tutorial for the C-64. *Commodore 64 Graphics and Sounds* combines text and sample programs that introduce the Commodore's various capabilities. This package covers topics such as low-res, hi-res, and bit-mapped graphics, sprites, sound effects, and three voice-music.

Graphics and Sounds comes in a slick plastic case containing a book, disk, and tape. This is the first time I've seen a software publisher include *both* the cassette and disk versions of a program; this might solve some software availability problems for those of you using Commodore's Datassette. Since I use a disk drive, I based my comments on the disk version only, although the tape and disk contain the same information. The book combines a tutorial guide and program listing. I like this a lot; it helps to refer back to the program listings from time to time without having to print them out myself. The disk contains a menu program that will load and run each program for you, and get you back to the menu after you have finished. Definitely a nice touch.

The disk is not copy-protected; I recommend that you put a write-protect tab on the disk first thing, since the copy I received had none. I also advise that you make a backup before you begin using the disk as a

precaution (a practice that's recommended for all commercial software that does not come with a backup copy). The nice thing about these unprotected programs is that you can use them as subroutines in your own programs. The publisher provides only a ninety-day warranty for replacement, and does not supply a phone number for customer support.

So far, it sounds pretty good, huh? So why don't I like *Graphics and Sounds*? Well, first of all, this is *not* a tutorial for the beginner. The author assumes you already have a good grasp of BASIC. The assumed level of your knowledge changes throughout the book. The tutorials, far from easy to follow, explain only a few of the programs line-by-line. Unfortunately, the programs have no REM statements explaining what each piece of coding does. A few factual errors crop up in the text that may confuse you. One of the programs stores information in a part of memory that may interfere with using the Datassette. You must have a copy of the *Commodore 64 Programmer's Reference Guide* (a good idea, in any case) to fully use the tutorials.

If you're like me, you'll want to try every program on the disk when you first get it. Don't be alarmed if you get an "Out of Memory" error message by the time you get to the last program (which is entitled "Brahms"). The Commodore collects a lot of garbage when it creates space in memory for storing variables, and this last program uses a huge amount of space for variable memory. If you encounter this problem, just turn your computer off, then back on again, and reload the menu. You can take advantage of several other ways to solve this problem, but this method is the simplest.

I would also like to see a bibliography for suggested reading included, and at least some mention of other software utilities that make life easier when working with sound and graphics on the C-64. Several sprite editors are available that make creating sprites a snap, as well as music editors to simplify calculating high/low byte data.

C-64 users who like to puzzle their way through learning programming will find this package useful, but I personally would prefer a tutorial that is considerably easier to follow. Though the price is tempting, I don't recommend *Commodore Graphics and Sounds* as the most effective way to learn programming on the C-64.

General

BASKETBALL STATS

Midwest Software
$39.50

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A	*Value for Money*

If you're looking for a program which maintains basketball statistics, consider Midwest Software's *Basketball Stats,* an exceptionally well-prepared and menu-driven one. Every sports fan, who knows the Blue Jays' road record in night games on Astroturf against left-handed pitchers, can tell you that statistics are the life-blood of sports. However, compiling stats is usually an unbelievably tedious manual task—even using a calculator. *Basketball Stats* lets a coach (or an administrator, dedicated fan, etc.) keep detailed records for a team with up to eighteen players, for a maximum of thirty games per season. While thirty games is inadequate for an NBA team, it should suffice for most high school, college, and amateur leagues. Each player can maintain the following categories of performance: quarters played, field goals made, field goals attempted, free throws made, free throws attempted, offensive rebounds, defensive rebounds, turnovers, assists, steals, and blocked shots. In addition, you may add up to four extra categories, if you can think of any (perhaps fouls and technical fouls, shattered backboards, light beer commercials, and so forth). You can print out a stat worksheet to use during the actual game to help you compile the necessary raw data to enter in the computer—quite a handy feature.

You don't need any prior computer knowledge to use this program. The menus guide you through the options, and directions and a final check are almost always available. In fact, it even becomes a little tedious when the screeen always asks, "Is this correct?" You may easily change incorrect entries at any time during the program, and you can even add players during the season if you haven't already reached the eighteen-player limit. (However, you cannot delete players during the season.)

For each game, the user enters the stats for each player and category. As the season progresses, the figures are compiled and averages automatically kept, including shooting percentages from the floor and free throw line, total points, average points per game, average rebounds, and so on. The coach may review the stats for any given game or player at any point in the season, and may print out reports of his team's season record at any time. An option lets you distinguish between league and nonleague games to generate separate reports of league totals.

Basketball Stats involves some disk swapping, since you save the stats on a separate data disk; however, I did not find this excessively cumbersome, and it did not occur frequently. The clear, user-friendly documentation includes a customer assistance number (not toll-free) for queries. The warranty covers the standard thirty days, after which time the company will replace the disk for four dollars. The program is copy-protected, but registered owners can purchase backups at any time for four dollars.

BIORHYTHM+

New Leaf, Inc.
$14.50

Overall Rating	A-	A	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	A	*Value for Money*

Biorhythm+ is an amusing, entertaining, and educational piece of home-personal software for Commodore users. Whether or not you place credence in the theory of life cycles, charting biorhythms is a task well-suited for personal computers.

The biorhythm theory says that all people are governed by three metabolic cycles. These inner clocks begin at birth and continue unbroken throughout our lives. The physical cycle is twenty-three days, the emotional cycle is twenty-eight days, and the intellectual cycle is thirty-three days according to this theory. A person will have the most energy, highest spirits, and keenest sense of alertness at the peak of each cycle. Low periods should be construed as recuperative times (according to the instructions), and one's performance will be unstable when a cycle crosses the middle (critical) chart line.

The accompanying literature notes that some persons believe that knowing biorythyms will help them control their lives. New Leaf does not, however, vali-

date the theory; they simply desire to inform users. The documentation for this program is good. The theory is simply explained, although any nagging questions must be answered at your local library. (I'm still not sure if a situation where intellectual, emotional, and physical cycles cross at the lowest graph point is worse than three cycles which cross at the middle, critical line.)

Biorhythm+ is, in some broad sense, an educational program. It is certainly a conversation piece, as my friends and relatives and I compared our day-to-day lives with the charts and debated the accuracy of the theory.

The program comes on cassette and loads quickly since it uses only 6,665 bytes. It runs automatically, but you cannot stop it while in progress and run it again. If you've made a serious error, you must reload the program.

After the title screen and some cute computer-generated music, you are offered a brief explanation of the biorhythm theory. Following the explanation, you must choose whether you want the chart to be displayed onscreen, or as hard copy. If you choose the printer option, and the printer is not connected or turned on, the program will end and "self-destruct" (meaning you must load it again).

Biorhythm+ does not handle errors well. First you are asked the starting date of the particular biorhythm. You must answer in the correct format or you will be greeted with an invalid date message and asked once again to enter the correct date. If you refer to the instructions, you will avoid frustrating errors.

Subsequently, you are asked to input a birthdate, and here the program shows how smart it is: you cannot chart a person before he was born. The program also has logical limits on the age of a subject and won't let you live to be 150 years old. If you've entered an incorrect start date or date of birth, you must let the program produce one chart before you can correct your error. It would have been most helpful if the programmer had provided "Correct y or n?" prompts after each input.

Whether you prefer a screen or printed copy of the biorhythm, the graphs are easy to read. A three-week period will be printed out vertically on the screen; different colored letters represent the three cycles. If you elect to use the printer, you receive a nice-looking chart which is good for a full month. The hard copy chart contains name, birthday, and the length of the cycles on the top of the page for easy identification.

Biorhythm+ also allows you to compare two birthdays for the percentage of intellectual, emotional, and physical compatibility. If you've elected to use the printer to compare two birthdates, the compatibility will appear at the bottom of the chart. If you're using the screen, then compatibility percentages are provided after an appropriate prompt.

When one biorhythm has been completed, you have the option of charting the subsequent or preceding months, changing any of the data, or ending the program. If you choose the end prompt, you're asked whether you'd like to run the program again. This prompt allows you to change from onscreen display to printout, or vice versa.

New Leaf, Inc. will replace damaged cassettes for three dollars and is willing to assist users with any problems. The cassette is copy-protected and cannot be duplicated. All in all, the few handling difficulties I encountered using *Biorhythm+* are easy enough to overcome. It is an enjoyable program that makes good use of the computer's ability to do mathematical projections. The program is geared for use by everyone; it even incorporates audible blips during the screen display to help you indentify whether a cycle is nearing its high or low point.

Biorhythm+ didn't particularly convince me of the accuracy of biorhythms, but then again it does not claim to. What it did accomplish was to teach me an interesting idea that stimulated my curiosity. Of course, I may be totally wrong about all of this since my intelligence cycle is nearing a low today.

CUT & PASTE

Electronic Arts
$50.00

Cut & Paste is an easy-to-learn, user-friendly word processing program. It has been specifically designed with the home market in mind and is aimed at the casual, infrequent word processor. Consequently, creating various formatted forms (envelopes, resumes, etc.) only requires a few keystrokes. In order to write, edit, and print with ease, the designers left out rarely used options (the very features that most full-featured word processing programs pride themselves on including). Still, the program retains a great deal of power in the face of all this streamlining. For a complete review of *Cut & Paste*, please see the review in the Word Processing section of this book.

DATA BASE 64

Entech
$59.95

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	C	*Value for Money*

With *Data Base 64*, a simple, easy-to-use program, even a novice user can create mailing lists, directories,

and other files. The easy-to-follow documentation belies its crude printed appearance and carefully leads you, step-by-step, through the creation of files, data entry, and subsequent retrieval or printing.

It's possible to create as many as twenty fields for each file, with a maximum of 250 upper- and lowercase characters. While this may not sound like much data, it is more than adequate for mailing lists, indeces, and the like. I wouldn't try to file recipes, however. Careful advance planning is essential; as with most data management programs, once a file is created, you cannot alter it significantly. This program does, however, provide the ability to rename fields at any time.

Data Base 64 will also create sequential disk files which the manufacturer claims are compatible with most popular word processing programs. You can use an optional second disk drive to speed up this operation, which is designed primarily to provide names and addresses to be integrated into form letters.

Because portions of the program have been compiled to machine code, *Data Base 64* runs quickly despite the relative slowness of the 1541 disk drive. Data entry and searches involved no unexpected delays. I also like the fact that you may store several different files on a single disk (in fact, I made a backup copy of the program and used the remaining disk space for data files).

This program cannot do any math functions. It has serious limitations regarding the creation of reports requiring even simple arithmetic or the maintenance of financial records. The program is disk-based, and uses random files. Since data is written to the disk every time a file entry is completed, there is little risk of a major catastrophe if your computer loses power or crashes. While I appreciate its ability to perform a "wildcard" search for a name or title whose spelling I'm unsure of, I missed having the ability to call any disk handling commands from within the program. It's a real nuisance to have to exit and then reboot the entire program just because you've forgotten the title of a file. Also, be warned that you must use names with fewer than ten characters for each file you create.

Data Base 64 is a straightforward and uncomplicated program that anyone can learn quickly. If your needs are limited to just maintaining lists and sorting data, and you aren't comfortable digging through lists of printer escape codes and formulas, then this program merits your attention.

FAMILY PAK 64—3 IN 1

Entech
$59.95

Overall Rating	B-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	B-	*Value for Money*

Family Pak 64, a trio of programs, helps you with the family checkbook, meal planning and recipe filing, plus educating and entertaining youngsters.

I think Entech latched onto a good idea by creating a single package that appeals to the whole family, but they fell short of hitting the mark. Let me describe this package, program by program.

Checkbook Ease 64 is the best program on the disk. It lets you record all bill-paying transactions, from making deposits to reconciling checks. It will even write checks for you, provided you buy those expensive, pre-printed, computer-feed checks. But even if you just use the program to record all your check transactions, you can get a lot out of it. For instance, you create up to forty different payment categories, and at the touch of a key, the program totals up each category individually (car loan, department store purchases, grocery store, gasoline charges, etc.). This takes the guesswork out of knowing just how much you pay each month or year, for items like heat, food, dental bills, and computer software. (On second thought, maybe you'd rather not know all that!) This program formats a disk for all your transactions. After listing your checks, it will, when you command, print a statement showing all checks, or checks from any day (or days) you wish. Each disk holds over 1,200 transactions, probably enough to handle an entire year for most families.

I liked working with this program, and have only three complaints about it. First, viewing the balance is a little slow. Second, like the other programs on the disk, you cannot make a backup (although Entech will mail you a backup for about five dollars and your old disk). Lastly, if you occasionally use an automatic cash machine at your bank to withdraw money from your checking account, you will make withdrawals but have no check numbers to enter. In order to enter a cash withdrawal, you must go back to the main menu, access "Deposits, Charges, Interest," then input the cash withdrawal as a charge. This takes more time than it should, but it's not a serious nuisance. Despite the flaws mentioned above, this program has a great deal going for it. The documentation (each of the three programs has its own separate instruction book) is straightforward and very easy to understand. In fact, you may wind up doing nothing more than taking quick glances at the book, since the program is completely menu-driven and logical.

The second program, *Recipe Keeper*, is menu-driven, and lets you type in your favorite recipes, then call them up by recipe name, or whatever category you listed them under. You can create up to fifteen categories with any names you desire: meat, poultry, low-calorie, quick meals, and so forth. Recipe Keeper comes with fifteen categories already listed. Use these, or modify them to fit your own needs.

After typing in your recipes, you can find whichever one you need by recipe name or category, then have the program adjust the ingredient amounts for as many or as few persons as you'd like to serve. This can be fun—especially when you see the recipe calling for "two-thirds of a dash of pepper," or "seven-eighths of a pinch of salt." If you decide to switch your split pea soup recipe from the "Soup" category to the "Lunch" one, or find a better recipe for it, Recipe Keeper is ready and able. You can easily change recipes or categories, and rename recipes. With the touch of a key, Recipe Keeper prints out any recipe in any one of your categories. Recipe Keeper is not as extensive—or expensive—as other recipe programs now on the market, but it does offer a completely adequate system.

Recipe Keeper's instruction book has one main problem: it assumes too much and too little at the same time. Written in an almost condescending tone, it even explains what a cursor is; yet it does not explain that you need a formatted disk on which to keep your recipes, like the checkbook program. Someone who knows next to nothing about the family computer may waste a lot of time trying to put recipes on a blank, unformatted disk continually spinning inside a chattering disk drive. The checkbook program has a menu number to format a disk; the recipe program should have one also.

You will hardly ever use Space Math, the third program on the disk. The packaging promises this program will provide "fun and entertainment," and claims it will test the math skills of kids from six to ninety-six. Don't hold your breath! Instead of twelve levels of play (as the box claims), it has only three: cadet, starflyer, and space commander. Each level is supposed to be progressively more difficult, but they all seem to suit first to fifth grade levels. The categories on each level are "add," "subtract," "multiply," and "divide." The toughest problems in any of the categories are, for instance, 12 times 12, and 10 divided by 1. Each time you answer correctly, an adorable space character moves to the right of the screen. After the eighth right answer, he blasts off to the top of the screen, then does a short dance across your monitor to a tune that really bored me after the third time. Its only challenging aspect (other than the simple math) is the time element. You select how fast you must complete all eight problems. The speed ranges from 1 to 6; if you choose 2 through 6 (6 being the fastest), you get to see the "show"—the little space man doing his dance. Most kids want to do something else after a few minutes using this program; something a little more fun . . . like homework!

As I mentioned earlier, Entech was onto something with this concept of a well-rounded, "family" software package with something for everyone. If you are looking for a good checkbook program, and/or one that adequately handles recipe filing, you could do much worse than choose *Family Pak 64—3 in 1.*

THE HOME CATALOGER

Arrays, Inc./Continental Software

$49.95

Overall Rating	A-	B	*Reliability*
Ease of Use	A-	B	*Error Handling*
Documentation	A	B	*Value for Money*

You probably own far more than you realize. Trying to catalog your belongings, even just your valuables, is probably a chore beyond your patience and time constraints. Perhaps you need to keep track of important dates, or your kid's softball team roster. You could organize all these bits of information with index cards in a file. But why should you, when your efficient, flexible home computer is excellent at just this sort of task. *The Home Cataloger* from Arrays, Inc./Continental Software is an easy, powerful piece of software that keeps track of any information you used to store on a card file.

You can use the program's ten pre-designed cataloging templates, or design your own. The ready-to-use formats include telephone lists, inventory, travel planner, restaurants, insurance policies, coins, growth (height and weight), jogging, studies, and book lists. Each format has ten different data fields. All you need do is plug in the information to create your own records.

To design your own templates, you simply redefine the fields in any one of the pre-designed templates. For example, you can customize the fields in the inventory template to keep track of your wine cellar. The program stores both your new template and the original, so you can reuse either whenever you wish.

For most applications, the 132 characters allotted per record is plenty. In some cases, you may have to abbreviate lengthy descriptions or comments. The program allows only one list per disk, and handles up to 650 individual entries. You can keep longer lists on any number of disks.

The Home Cataloger can sort and print out any of your lists, either entirely or by selected fields. For instance, you can print out a list of your insured valuables or a list of just your science fiction novels. You can

also design and print your own labels, including addresses if you've stored a mailing list. The program can total any numeric field as it prints. This is excellent for determining the value of your collections or possessions.

The Home Cataloger is easy to use and comes with a simple instruction guide. Think of all the things you can catalog with it: the PTA membership roster, your car's service history, friend's addresses and phone numbers, your medical appointments in the past year, dinner menus and guests, Christmas card lists, your fishing lure collection...

HOMEWORD

Sierra On-Line
$70.00

Homeword is a menu-driven word processing program that employs icons (symbols) to represent available choices. Thus the need to memorize complex control commands for formatting and printing documents is eliminated, and using the program is greatly simplified. The package can handle the needs of most home users, though it would benefit from the inclusion of some additional features (such as a spelling checker). For a complete review of *Homeword*, please refer to the review in the Word Processing section of this book.

THE HYPNOTIST

Psychom Software International
$87.95 (disk) $79.95 (cassette)
Biofeedback device included with program

Overall Rating	B+	B	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	C	A	*Value for Money*

Will *The Hypnotist* actually hypnotize you? Yes. Can *The Hypnotist* help you with habit modification, deep relaxation, and memorization? Yes. Is *The Hypnotist* safe to use? Yes, with minor reservations.

The Hypnotist, a combination hardware/software package, uses a pulse-monitoring biofeedback device which plugs into the C-64's joystick port #1. The program offers four options; all use standard hypnotism techniques to induce relaxation and trance. The biofeedback device monitors your interaction with the program. Program options include: habit modification, regression, superlearning, and biofeedback stress control. The program documentation is adequate, though mediocre. *The Hypnotist* is not flexible or easily tailored to personal peculiarities; however, its inflexibility protects the unwary, who may not realize just how powerful hypnosis can be.

Make no mistake—The Hypnotist is *not* a party game, but a serious program that uses proven techniques to hypnotize, so you can plug into your subconscious. It uses standard psychological techniques that can affect anyone who submits to the process. These techniques are general enough, so they should not disturb healthy, balanced people. The strobing techniques may adversely affect persons with a history of epilepsy.

The Hypnotist is not a passive experience. Making the program work and learning to use the heart monitor require concentration and effort. Hypnotists have long known that subjects actually hypnotize themselves. This program clearly demonstrates that principle; you will never feel out of control.

The Hypnotist begins with a portrait of your Egyptian hypnotist. His mouth moves as the screen displays his words. The software employs effective graphics and sound. After you tell Kurian (the Egyptian) your name, you choose which of four options you prefer. For habit modification, you choose three words for the habit you want to eliminate or reinforce. You may choose positive or negative methods, and Kurian's words or your own. If you choose your own, you must list six words you want associated with the habit.

All options share the next sequence. You are led through several modes of hypnotic induction using words, graphics, and music. You can see how well the heartbeat monitor functions. The documentation supplies good instructions for adjusting the monitor if it gives erratic readings. The monitor is a small box that you strap to your wrist. One cable goes to the joystick port, the other attaches to a sensor strapped to one of your fingers.

This arrangement is slightly uncomfortable when you type on the keyboard, but you can wait to put on the device when you're prompted. The program will not continue beyond the prompt unless the device is present. Many sections of the program reassuringly echo the sound of your heartbeat.

Once you have had ample time to relax and move into a trance, *The Hypnotist* starts flashing the words you chose on the screen. The strobing effect drives the words and their associations into your mind. Kurian's positive words are fairly neutral (such as "dancing" and "playing"). Kurian's negative words are negative-to-repulsive (words like "bloody" and "pus"). Most people succeed faster if they choose words tailored to their own personalities, but Kurian's words work, too.

Ordinarily, I consider regression a dangerous hypnotic technique, except under a trained professional's strict guidance. However, *The Hypnotist*'s regression is quite benign, and probably won't emotionally disturb. Essentially, you experience a pleasant trip down memory lane. The most beautiful graphics of the entire program conclude the regression session.

Superlearning offers good possibilities, especially since you can build your own information files for memorization purposes. Students can use this feature to facilitate faster memorization. *The Hypnotist* has sample files, so you can see how the option works. You may have short lines flashed at nearly subliminal speeds, either in sequence (memorizing a speech), or with two alternating lines (learning a word and its definition).

The biofeedback stress control section is very simple. You see your pulse rate on the screen (as a number and waveform on a graph), and you try decreasing it. When your heart rate slows down, your body relaxes.

For what it attempts, *The Hypnotist* is credible and competent. However, I have several minor quibbles. I wish the documentation had more information on how to choose effective words in the habit modification section. Also, I would like more detailed information on the Superlearning module, which could be adapted easily to a personalized habit modification program. Finally, I wish the program enabled you to quit uncomfortable or boring sections of the program. I did not like Kurian's negative words—some downright gross—bombarding me. When I tried the "Gettysburg" file in Superlearning, I discovered that the Gettysburg Address is twice as long as I remembered it to be! Consequently, I vowed to use very short files for memorization.

Because the computer is a non-threatening hypnotist, this program effectively uses the powerful techniques of suggestion, and repeated strobing of information for habit modification and stress control. Persons who have emotional problems associated with undesirable habits probably should see a professional therapist. But for those of us, only mildly neurotic, who just want a little help to quit smoking or stay on our diets, *The Hypnotist* can effectively and inexpensively help us meet our goals.

INSTA-SCHED

Cimarron Software
$61.95

Overall Rating	C-	C	*Reliability*
Ease of Use	C	C-	*Error Handling*
Documentation	C-	D	*Value for Money*

Insta-Sched is a menu-driven personal scheduling and calendar program. It allows you to schedule your daily life from 7:00 AM to 6:30 PM. You may keep track of an entire year's worth of important dates and times on one disk. You can also create disks to schedule your time in upcoming years—for any date in this century! You can search by week for specific appointments, or search, too, for free blocks of time. A built-in alarm feature alerts you to special dates up to 200 days in advance.

Insta-Sched lets you create printouts of either the day shown onscreen, the week in which the displayed day occurs, or the month in which that day falls. The program works with several of the most well known combinations of Commodore-compatible printers and interfaces. If you don't have any of the equipment listed during printer setup, you should still try each one of the choices; one of them just might work. All in all, *Insta-Sched* is a rather frivolous piece of software, which is why I can neither award it top grades nor recommend its purchase.

KEYWORD CROSS REFERENCE —Research Assistant 2.0

TOTL Software, Inc.
$39.00

Overall Rating	D	C	*Reliability*
Ease of Use	D+	C	*Error Handling*
Documentation	F	D	*Value for Money*

Research Assistant 2.0 promises to "allow you to keep track of reference data from books and/or periodicals and to create cross reference lists by keyword to help you locate the right reference when you need it." I think it probably does this, but the documentation is so poor and unclear that I (for one) may never know! The key questions the prospective software buyer must ask himself are: "Will it save me time and effort?" and "Will it do the task better than my current method?" So often, the magical computer medium itself excites us, so we forget the message. If you take hours figuring out how to make the program work, and researching is secondary to using the software, do you really have a better program?

In the case of *Research Assistant 2.0*, the documentation is so seriously flawed and the process so crude that I see no practical use for it whatsoever. Like so many programs you might get free at a local user's group meeting, this one expects the user to have a good working knowledge of programming. The manual suggests you should make a backup copy of the disk, and save your data on it. All well and good if you know how, and own a backup program. The brief documentation continues this general hacker's approach, containing a section on error handling advising you to find various program lines in the program, and change them to suit the situation. I really question how many researchers can "list" and rewrite a program. I suppose TOTL justifies this bare bones approach, since they've priced

the package at only $39.00. But if it does not do what you want it to, it's not worth a cent!

Two basic programs create the program's format. First, the reference program, RA.BUILD, sets up a source numbering system and reference numbers you use for dates, page numbers, author and title, and 1,020 characters' worth of comments. You may then list up to twelve keywords for each reference. It all sounds simple enough, and does work fairly well.

You will probably feel insecure when you create your first file because the instructions, so annoyingly poor and unclear, simply tell you to name the "output file." Guessing, I named it after the subject matter, and forged ahead. All went well, until I got to the "update/append file" option, where the whole program falls apart. The impossibly vague directions instruct you to name an input file, written to an output file you'll use to add or update material. While experimenting, I realized, after a few "File Not Found" messages, that the file you once named as an output file is now your input file. What you name your new output file is anybody's guess. No matter what you do to save your newly added material, it will go back to disk under the new output file name, separated from your original material, defeating the whole purpose of updating/appending. I suppose manipulating different names and scratching old files will eventually straighten things out—but by that time, who cares?

The cross reference program operates more smoothly, but the first time I ran the inquiry option, it didn't list the source and reference numbers after I gave it a keyword. With no Help screens available, I just had to quit the program and start over again. The second time, it did indeed work. Error handling is not a strong point of this package, either.

It really makes you wonder about a company like TOTL. Don't consumers test their software? I am certain that anyone who didn't actually write the program would be awfully confused by the entire input/output file fiasco. There is no excuse at all for this crude package when you look at competing software, like *CPA* from Futurehouse, which offers you color-enhanced screens and menu-controlled Format, Save, and Load options. Little things like the ability to read the directory of your data disk from within the program make a program work *for* and not *against* you. Programs such as *Keyword Cross Reference—Research Assistant 2.0* are the reason many software consumers end up feeling totally frustrated—and in some cases, put their computers away in a corner of the attic.

MORE THAN 32 BASIC PROGRAMS FOR THE COMMODORE 64 COMPUTER/FOR THE VIC 20 COMPUTER

dilithium Press
$39.95
Commodore 64 or VIC 20 (with 3K or 8K expansion)

Overall Rating	B-/B	C-/B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	A/A-	B	*Value for Money*

More than 32 BASIC Programs for the Commodore 64 Computer and *More than 32 BASIC Programs for the VIC 20 Computer* are interesting book/software combinations. They contain, in the case of the C-64 package, thirty-nine programs for home use, and thirty-eight for the VIC 20. The software for the C-64 version is available on disk or cassette, and on cassette only for the VIC. The packages respectively include eight C-64 and nine VIC 20 home applications programs (loan calculation, gas mileage, checkbook, biorhythm charts, etc.), seven educational drills, seven games, four graphics demos, six math programs, and several that fall into the "miscellaneous" category.

My first impression of the C-64 package was positive. However, after looking at the VIC 20 set, I realized that the Commodore 64 software is just a hasty conversion that doesn't do justice to the C64's capabilities. More careful attention to some minor programming details on the part of the programmers and vendor would have made these programs for the C-64 much more attractive.

Overall, none of the programs (in either package) is truly outstanding. However, about a half a dozen in each version caught my eye. Among them is a numbers game for preschoolers (mine really loved it), a program that creates custom flash cards and offers practice with them, a speed reading drill, decision analyzer, and a program to graph functions.

Detailed, clearly-written instructions are supplied with the packages which help beginners get the programs up and running. The book's introduction also offers information on dealing with syntax errors and so forth. But the software itself doesn't provide any help. A "Hello" program would have been a nice addition. The vendors include a toll-free number for technical assistance.

The book serves as excellent documentation for the software. An average of about eight pages is devoted to each program. You'll find an explanation of how to use the program, a sample run with several sample screens, the program listing, lists of main routines and variables used, suggestions for minor changes, and possible major modifications. A useful bibliography is included, as well as a table of contents.

In general, the programs seemed reliable, but I did encounter a few bugs. There were a couple of typos (faithfully reproduced in the sample screens in the book), and two legitimate bugs. In the C-64 version of the drill program Metric, I was told that six kilometers per hour equals forty-two miles per hour! In the Arithmetic program, I ran into difficulties with both versions. The program did not Poke color memory when Poking a character to the screen. (This was not necessary with the older C-64s, but must be done on the newer ones.) In the VIC 20 package, one of the programs will run only with the 3K RAM expansion; five others require 3K or 8K of expansion; nine programs run on the unexpanded VIC. So expect to swap your memory cartridges if you purchase the VIC 20 version. The book pays insufficient attention to relocation of screen and color memory when 8K or more of RAM is plugged in.

I was also disappointed that the two programs in the C-64 package that write data files don't support the disk drive—even though the software I used was disk-based. I see this as a major reliability problem in that any consumer has the right to expect consistency in the supported mass storage media. It would have been quite simple to add the appropriate routines for the disk version. On the positive side, the software is copyable, and a replacement disk or cassette is available for five dollars when you return the old one.

The program's error handling is rather hit-and-miss. A few user errors are trapped, but for the most part, mistakes take you back to BASIC. Sophisticated error handling would make the programs harder to understand, though, and would probably undermine their educational value. Therefore, I don't wish to complain too vigorously about this issue.

Although this package doesn't really fit into the education category, some educational programs are included. They're adequate, but are nothing to write home about. The real educational value of this package lies in its presentation of working BASIC programs that you can modify and tinker with. It's a good way for a beginner to learn to use his computer, but it's just too bad the programs don't demonstrate more of the computer's capabilities.

As far as the games and graphics demos are concerned, I found them disappointing. In fact, fewer than one-third of the thirty-nine programs for the C-64 use the verstaile color and graphics capabilities of this computer *at all* (the rest use the default colors), and only two use sound. For instance, one program, Walloons, is supposed to demonstrate animation, but it doesn't even use sprites! As for the VIC 20, almost all the program use the VIC colors, but some of the color combinations are poor, even on a color monitor. Only five of the programs use sound, and the music demo program hits one extremely sour note. But all in all, the programs do a fairly good job of showing off the VIC 20's capabilities.

Despite these drawbacks, I think *More than 32 BASIC Programs for the Commodore 64 Computer* and *for the VIC 20 Computer* offer you reasonable value for the cost (after all, it works out to about a dollar per program). These sets are best suited as introductions to assist beginners in learning some of the capabilities of their C-64s and VIC 20s, and to help de-mystify BASIC programming.

PERSONALITY ANALYZER

Psycom Software International
$32.92 (disk) $27.95 (cassette)

Overall Rating	B	C	*Reliability*
Ease of Use	A	N/A	*Error Handling*
Documentation	D	B	*Value for Money*

If you don't take it too seriously, *Personality Analyzer* is a lot of fun. You make a series of value judgments which the computer translates into a personality profile. While the process can enlighten if you make honest choices, the results are too general to use as serious guidelines. The program is a terrific party game, with enough relevance for engaging fun, but without the sharp barbs that might hurt someone's feelings.

The program is easy to use, a fortunate break because the documentation is far from adequate. The accompanying instructions do not tell you to put the joystick in port #2, nor does it mention printer operations. The program has a printer option, but I couldn't make it work. I assume this was because I do not have a Commodore printer, and the programmers wrote the program for full Commodore systems only. The manual and program include instructions for using the joystick. They are a bit confusing, but easy to figure out as you use the program more.

Aside from the poor documentation, *Personality Analyzer* is a complicated version of the kind of personality questionnaire you find in women's magazines—the ones that tell you whether you are sexy, a good parent, or compatible with your mate. You first tell the computer your name and birthdate. I experimented with the birthdate category; overall, I think it's totally irrelevant to the program. Whether I claimed to be twenty or seventy-five years of age, I got exactly the same results when I entered the same answers!

You can answer twenty-two, forty-four, or all eighty-eight possible questions. Each one occupies a separate screen. You see a graph offering seven positions on each side of zero, in the center. You decide where you fit on the scale, each side representing a different, and

usually opposite, quality. The program asks questions such as: Do you like people who are more sensible/imaginative? Are you more leisurely/punctual? Do you act more from your heart/head? Which do you like more, libraries/lounges? Do you like architecture/psychology more?

You must use the joystick to move to the point on the scale which you feel best describes you. The fire button signals your choice. If you don't know how to answer, press the fire button while the pointer is on zero to skip the question. If you feel both sides of the scale apply to you, you can record a point on each side. If you select an answer and change your mind, you can go back and choose again.

The program does not ask any embarrassing or personal questions. The final evaluations sometimes discuss sex a bit, but only offend the most prudish. They seem to be a series of profiles stored in memory. The computer apparently picks the one most closely matching the results, and lifts it out whole. In several experimental sessions, I found that subtly weighing the opposite ends of each question didn't seem to change the evaluation. If the personality type matching most closely happened to be scientist, journalist, artist, or whatever, you got the same general analysis, although the chart of statistics differed.

The test is based, according to the vendor's press release, on behavioral patterns conceived by noted psychoanalyst C. Jung. Numbers are given for particular personality characteristics. If two opposing qualities too closely balance on the scale, the program may advise you to take the test again. This chart assesses the psychological functions of thinking, feeling, sensing, and intuition, evaluated against extroversion or introversion, and your need to make judgments or become more aware.

The written evaluation following the charts has several sections. The first screen displays a central personality type and lists characteristics (mostly in positive terms). Next, you see possible career choices and what kind of mate you're likely to be. Finally, the program tells you what qualities you value, and what psychological areas will cause trouble for you. You can go back and read the analysis as often as you wish. If you have a Commodore printer, you may be able to print it out (though I could not test this program capability).

While some people may experience invaluable self-revelation using *Personality Analyzer*, I doubt most people will find it much more profound than the self-illumination you read in horoscopes. A program that tells me a person who's all emotion and no intellect (one of my experiments) is a born journalist, or an artist is necessarily hypersensitive and retiring, or someone with no feeling/perceiving qualities makes an admirable trustee must be taken with a grain of salt and a chuckle.

As a party game or grade school carnival-booth fund raiser, *Personality Analyzer* is good, clean fun that won't do any harm. As a tool for counseling and personnel screening (as Psycom's press release suggests), it could be downright dangerous, especially with its poor documentation. The instructions accompanying *Personality Analyzer* warn against using it as part of serious therapy—a point that should be well taken.

PROSPORTS STATS

Eastern Computer Consulting Associates, Inc.
$89.95

Overall Rating	B	B	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	C	B	*Value for Money*

Here is a program that's a perfect example of the kind of thing computers do much better than people: crunch numbers. *ProSports Stats,* a very specialized database program, analyzes football statistics. The database ranges from the 1970 to 1983 seasons, and includes the NFL and USFL. The package contains three disks: the program disk, a database disk starting from 1970, and a disk with statistics starting from 1974.

The twenty-page manual is extensive and pretty thorough. My only major complaint is that it's a generic manual, the user's guide for all computers for which the vendor produces versions of this program. It confused me. I finally called the company for help, and they answered all my questions immediately. (One hint: if you do buy this software and need assistance, call the phone number on page nineteen of the manual. The number on the cover is just the answering service.)

The manual sometimes confused me, especially when it explained how to change and update the database. The manual would have you believe you cannot update the data disk using a single disk drive on a C-64. However, a customer rep at ECCA told me that the "1974 and after" disk is small enough to permit updates, and can hold another year's worth of info. Also, copying the disk, then deleting the USFL (assuming you just want to work with the NFL), gives you even more space. Also, ECCA provides an automatic updating service, which lets you download information weekly, and add it to your database. It's not included in the purchase price, and costs twenty-five dollars per month to use.

Considering the size of the database the program employs, it is fairly fast. Unfortunately, you cannot print the data—a huge drawback.

ProSports Stats is a very interesting program, but I'm not sure how many C-64 users really need software to analyze football. If you are heavily into football pools,

or owe your bookie a bundle, maybe you do. It might help a high school math teacher who wants to devise interesting examples to use for instructional purposes. However, I don't think the average person would find this rather expensive program much more than a curiosity. It's fun watching the program cough up customized statistics on your favorite team, but I wonder how many folks would willingly shell out almost ninety dollars for this amusement. If you actually need this kind of program, *ProSports Stats* performs well.

RELAX: THE STRESS REDUCTION SYSTEM

Synapse Software
$99.95

Overall Rating	B+	A	*Reliability*
Ease of Use	B+	A	*Error Handling*
Documentation	B	B	*Value for Money*

This innovative hardware/software combination teaches you how to reduce your everyday tension level and enter a state of deep relaxation. The unit is actually a biological feedback device, an electromyograph unit (EMG) that measures the electrical muscle activity in your forehead. When the muscle is tensed, electrical activity increases. Sensors in a headband pick up these electrical signals, send them to the "relax unit," which amplifies them, then to the computer using the joystick port.

You wear a blue corduroy headband containing three disk-like metal sensors that make contact with your forehead just above the eyes. It fastens snugly with velcro fasteners, and plugs into the main unit through an eight-foot cord. Four AA batteries power the main unit, which is isolated from the computer. The unit has coarse and fine slider-type adjustments that control the output range going to the computer.

Three programs come on disk or cassette for the C-64. The first produces a simple scrolling graph, like those from a paper chart recorder, that monitors your relative muscle tension level—"relative" since absolute tension levels vary among individuals. First, you set the graph at approximately 450, midway on the upper end of the vertical scale (350-500). You can select a sample rate between 30 and .25 seconds. Slower sample rates give you a better idea of your progress, since the graph displays a much longer time period. Initially, you can test the unit by clearing your mind for a few seconds, then tensing up by clenching your teeth. The graph should fall, then rise, respectively. Once you've observed the effect and made sure you have good contact with the sensors, you can make yourself comfortable and begin.

The unit comes with a voice cassette tape that talks to you in a soothing voice. It has instructions and demonstrations that show you what happens when you tense your shoulders, or even sit in an uncomfortable position. Even a simple swallow sends the graph gyrating toward the top, but it soon returns to its previous level. It shows you what happens when you perform deep breathing exercises. Then, it tries bringing your tension down with the sounds of ocean surf and birds chirping in a forest. You will see your tension level steadily decline. Sometimes you get immediate results, but some people require daily sessions, fifteen to twenty minutes over the course of many weeks, before they learn to relax and become aware of their bodies.

For some, the second program, Kaleidoscope, mesmerizes more and increases mental relaxation. Different patterns are formed on the screen: high tension levels produce bright, spaced patterns, while low tension ones produce muted-colored patterns closer to the center. When you sufficiently reduce your tension, the kaleidoscope splits, and the two halves move toward the screen's top and bottom. Another pattern emerges in the center, indicating you've entered a lower tension level plateau. If you tense up again, the process reverses, and the two halves join into one once more—a nice effect, but many people prefer using a graph to monitor their tension levels.

Once you learn to control tension effectively, you can play the balloon game. You control a floating balloon's altitude by tensing and relaxing your forehead muscles. You must catch bubbles entering from the right of the screen, while avoiding pins entering from the left. Since these objects remain at a constant altitude, you need only adjust your muscle tension to make the balloon rise and fall to intercept them as they scroll past. Playing even a simple game with no hands fascinates me.

The *Relax* unit actually provides two separate benefits. First, it might be the ideal system for the physically handicapped who want to get the most out of stress reduction techniques. Synapse thoughtfully opted not to protect their software, so programmers can learn how to write their own programs or games. Second, it can reduce tension in everyday life. Many people work in very stressful office environments, then come home and unwind by drowning their jangled nerves in alcohol. Perhaps a program like *Relax* would benefit these same folks, since it eventually increases self-awareness and reduces stress—and perhaps even improves time-management. (Those readers seriously interested in this subject can refer to a book, *Relaxing with your Computer*, by Martha Davis, Ph.D. Synapse offers you a five dollar rebate when you buy it.)

ROADSEARCH

Columbia Software
$34.95

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	B	*Value for Money*

This program helps you plot roads between major cities and highway intersections in the United States and Canada. The database contains information on over 400 points in the U.S. and Canada for planning routes. If you travel a lot, you'll find this a very useful program.

I found the program simple and interesting. You can list the cities in the database, list the road connections for specific cities, plot your own route, or let the computer plot a route for you. Additionally, you can change the average speed and miles per gallon figures used in the calculations. You also can change the distances in the database if new roads are constructed in the future. The manual lists all points in the database. Every city or junction is assigned a number. When using the program, you can use either the number or the city name. The program always asks you to confirm that it has called up the right place.

I found the "compute shortest route" function the most useful. This computes the shortest distance between the two points you enter. You can then check a roadmap and see if you like the route. If you do not like it, you can delete some of the routes and ask for the next shortest route. For example, I asked for a route from Los Angeles to Minneapolis. The route plotted did not use freeways, and as I was also looking for the fastest way, I asked for a re-plot. When it did this, it routed me over freeways. The total distance was only twenty-one miles greater.

After a route is plotted, you can get printed reports. Three print formats exist. The first, a route summary, does not list any cities passed through if you do not have a route change. This comes in forty-column format, easily readable on the screen. It gives you the routes taken and the time required. The route listing also comes in forty columns, giving all cities and intersections encountered, and the times between each, in addition to the total time. The detailed route listing comes in eighty columns, and is hard to read on the screen. This not only gives you everything the forty-column listing gives you, but also tells you how much gasoline will be used between points, and lists both elapsed and remaining values. Gasoline consumption is figured using twenty miles per gallon, and speed using fifty-two miles per hour. You can change these parameters and have the route figured again.

Overall, this enjoyable, easy-to-use program helps travelers.

S.A.M.

Tronix
$59.95

Overall Rating	A	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	A	*Value for Money*

S.A.M. is a unique new voice synthesizer for the Commodore 64. *S.A.M.* stands for Software Automated Mouth. As the name implies, it is all software, no hardware, and is the only software voice synthesizer on the market at this time.

S.A.M. comes in the form of a Wedge and several sample BASIC programs. (Wedges change BASIC modifying commands or add new ones.) The S.A.M. Wedge gives you ten new BASIC commands that allow you to access speech from BASIC. If you program in machine language, you can still access all of the functions of *S.A.M.* while not using the Wedge. You also save a lot of memory that way. BASIC programmers who are memory-conscious can also access all controls through POKE and SYS commands.

There are basically two ways to accomplish voice synthesis. One is to have certain words and sentences in memory and call them back when needed. This method limits vocabulary and requires large amounts of memory. The second way is to program in the forty or so sounds of the English language, known as "phonemes." By mixing these up, any English word can be made. *S.A.M.* uses the latter method; unfortunately, the sound quality of the former is better. (Though certain sounds may be missing, foreign languages can also be synthesized.) While *S.A.M.* is not unintelligible, do not expect *S.A.M.* to sound like a person. The Commodore is probably the smallest, and least expensive machine on which speech synthesis has been successfully achieved. Naturally, large, sophisticated computers, dedicated to voice synthesis, produce better sound, but the quality of *S.A.M.* on the Commodore is very good.

On the plus side, *S.A.M.* has to be the easiest voice synthesizer to use. The Reciter option makes *S.A.M.* talk directly from English words, or you can opt to have *S.A.M.* use phonemes. You get slightly better sound quality with the phonetic method, but it is a little harder to use. You have to look up each sound in the table in the manual, and spell out each syllable phonetically. For example, to say, "I am a computer," you must input, "AY4 AEM AH KUMPYUW4TER." One advantage to *S.A.M.* is that you can put stresses where you want them. Using the Wedge commands, or the POKE and SYS commands, you control the speed, pitch, throat, and mouth of *S.A.M.* The latter settings let you change the size of *S.A.M.*'s "throat" and "mouth" to make completely different voices. By experimenting

with these settings, you can make *S.A.M.* sound like anything from an elf to *E.T.*

S.A.M. is very versatile; conceivably, you could use it in your business programs, a game, etc. It is also the least expensive voice synthesizer out today. There are a few drawbacks, however. First, if you use the Wedge, it slows down the computer operations a little. Second, when *S.A.M.* talks, it takes over and blanks the screen. You can't make a graphic face move to the speech. And lastly, *S.A.M.* is slow in booting, but well worth the wait.

TOTL TIME MANAGER 2.6

TOTL Software, Inc.
$39.00

TOTL Time Manager 2.6 is a very simple but effective tool for planning and scheduling business or home activities. It allows you to create checklists of activities, calendars of events, and personal or business schedules. (For a complete description of this program, please refer to the review of *TOTL Time Manager 2.6* in the business section of this book.)

WORD PROCESSOR, PERSONAL VERSION

Mirage Concepts
$39.95

If you're merely interested in writing memos, letters, or occassionally using a word processing program for short writing tasks, then this easy-to-use program will interest you. *Word Processor, Personal Version* is a low-priced, stripped-down version of Mirage's *Word Processor, Professional Version*. It still retains the latter's powerful editor, while omitting most of the formatting frills that aren't necessarily appropriate to the home market. For a complete review, please refer to the Word Processing section of this book.

THE WORD

Biblical Research Systems, Inc.
$199.00

Overall Rating	B	B	*Reliability*
Ease of Use	B+	B	*Error Handling*
Documentation	B+	B	*Value for Money*

The Word places the entire Biblical text on a series of floppy disks. This monumental task has been accomplished by two individuals at Biblical Research Systems of Austin, Texas. The text is accessible from a variety of perspectives and avenues. You can scan the disks for any verse or section, or for key words, phrases, and subjects with electronic speed. Once located, the material of interest can be sent to the screen or printer with ease.

I found *The Word* friendlier than I had expected and operationally flawless. However, I was able to examine only one disk and would have preferred to have seen the entire package. Also, *The Word* uses the text of the King James version of the Bible, complete with the colorful and sometimes difficult to understand language of the sixteenth century. The King James version is in the public domain and available for use by anyone, but it is frequently not the translation of choice for serious scholarship since it does not reflect more recent manuscript discoveries. This version is, of course, much-loved,but its poetic style seems a bit ill at ease yoked to the computer.

Biblical Research grants permission to make a backup copy of the software, but disclaims all warranties and liability for *The Word*.

The Word no doubt has a useful place in scholarship and serious study work. However, its usefulness in every home (even ones with computers) is less certain.

64 PAK

Practicorp International
$24.95

Overall Rating	C	B	*Reliability*
Ease of Use	A	C	*Error Handling*
Documentation	A	D+	*Value for Money*

64 Pak is a compilation of public domain programs covering a wide range of interests. The disk includes:

Flash Cards—a program that creates a library of flash cards which you can revise or update. As you review the cards, the program keeps track of how many it has shown, and maintains a score of your answers. You determine the topics covered by Flash Cards.

Speed Reading—phrases appear on the screen; you type in exactly what you've seen. The program offers a choice of nine speeds and you can create your own phrases.

Sign Talk—graphically represents the hand configurations used in American Sign Language (ASL). The program presents the different signs at your command. When you feel confident enough, you can then ask the computer to quiz you and keep score of your performance.

Cash Register—an educational program for kids that teaches them, in a simulated retail environment, how to make change.

States and Capitals—an instructional program that teaches you about states and their capitals. You may opt for either a multiple choice or fill-in-the-blank format, and you can guess either the states or capitals.

Perpetual Calendar—for anyone who's ever wondered what day of the week his birthday will fall on fifteen years hence. You can relax now 'cause you've got the means for answering this burning question.

World Clock—"Say, old chap, you don't happen to have the correct time in Sydney, Australia, do you?" Absolutely! Just give me a minute to boot up World Clock.

Mortgage Calc—enter the priciple and terms of mortgage and this program figures out the monthly payments for you. Provides an amortization table, too.

Life Expectancy—the program poses a series of questions; it then takes your answers and derives a "guestimate" of your probable life expectancy.

Big Time—turns your monitor or TV into a large digital clock. Simply input the correct time when prompted, and watch the seconds of your life tick away. That's all folks!

The first *64 Pak* that I received contained several formatting errors which prevented most of the program from running. A subsequent replacement disk ran fine. The documentation is short, but adequate.

You access each program from a main menu, which can be reentered from any of the individual programs. Two of the programs on *64 Pak* require using a separate data disk which you must prepare in advance.

You can find all the programs on *64 Pak* in Commodore's *Public Domain Software* series released by the company in 1982. Be it known, however, that anyone can find these disks in the libraries of most Commodore user's groups. Subsequently, you may obtain them for the price of membership in one of these groups. But if you do not live in the vicinity of such an organization, check out Practicorp's *64 Pak* for a sampling of the various tasks that your C-64 can handle.

Finances

BILL WRITER/SUMMARY

UHL Research Associates, Inc.
$34.95

Overall Rating	D	C	*Reliability*
Ease of Use	D	C	*Error Handling*
Documentation	F	C	*Value for Money*

Bill Writer/Summary, a home accounting package, prints checks to pay your household bills and produces summary information for tax purposes. You can print on your existing checks by purchasing a "tractor check form" from UHL for $8.00. I was very disappointed with this program and cannot, in all honesty, recommend it. The documentation is terrible, file handling is marginal, and the program requires too many repetitive keystrokes.

The documentation states that the program is user-friendly, but I heartily disagree. For example, there is no way to switch from one module to the other short of turning off your computer and turning it back on. In addition, many of *Bill Writer/Summary*'s user instructions are far too vague.

You must maintain a log of your disk files and the last record written in each file. No Help screens are available. What's more, I found myself typing many items more than once to set up the initial data files. Now, why can't the program get the computer to read the first file in order to facilitate setting up the second, which contains nearly identical information? Why can't it keep track of the last record written for you? This frustrating program overlooks such matters.

The documentation—all five pages of it—is totally inadequate. Many items are not explained at all, while others are explained poorly. Getting the program up and running properly is a trial-and-error process. I doubt that the novice computer owner would ever get this copy-protected software to work correctly.

On the positive side, the program does work in a reliable fashion. But there's a serious flaw regarding how easy it is to destroy data files. At one point, I accidentally reformatted a data disk, with no "Are you sure?" query to save me. I also destroyed data one time by using a file name I'd already assigned. You cannot call up the disk directory to check for the file names you've already used. Ridiculous!

I also ran into some error handling difficulties. Disk errors are usually detected and reported, but at those points, program execution ends. More than once, the program left a file open. (When this occurs, you have to enter a command, Close 1, and re-run the program.) On one occasion, after a "File Not Found" error flashed, I loaded the disk directory to check the file names, then reloaded the program. When I entered Run, the system locked up. Other user errors also dump you out of the program; once again, you are compelled to re-run it.

To sum up this tale of woe, I was greatly disappointed with *Bill Writer/Summary* and I don't recommend that anyone purchase it. If the documentation were better, it might be okay for certain applications. As it stands now, though, run fast and far from this one.

CHECKEASE!

T & F Software Co.
$24.95
VIC 20 (8K expansion required)

Overall Rating	A-	A-	*Reliability*
Ease of Use	B+	A-	*Error Handling*
Documentation	A-	A	*Value for Money*

Checkease! is a competent home management program that allows you to use your VIC 20 to manage and maintain your checking account. The software is menu-driven and requires at least an 8K expander. It handles 99 checks with the extra 8K, 266 checks with a 16K expander, and 437 checks with 24K expansion.

Checkease! resembles other checking account programs; however, the inclusion of Printease! (which prints out a hard copy of your checking account) and an option to format your financial files to be compatible with Commodore's *Personal Finance Package* make for a superior software package.

Checkease! is relatively easy to use, relying upon single keystroke commands. It is accompanied by a twelve-page instruction manual that you should read before attempting to enter checks. Failure to read the

instructions can make first use a frustrating experience. The manual is comprehensive and simple to understand, although full of misspellings.

After loading the *Checkease!* cassette, you face nine options. It would have been quite helpful if a tenth option—exit—were added. Currently, the only way to exit the program is to save data or turn off the computer altogether. The Run/Stop and Restore keys of the VIC 20 are disabled during program use, which means that you cannot list the program to make backup copies or to see how it is written.

Menu options include loading files, adding checks, reviewing checks (backward, forward, or by number), posting checks, saving files, formatting data to be compatible with Commodore's *Personal Finance* programs, and print/reconcile.

You may load existing data files for updating, or create new files by selecting the "add checks" option. *Checkease!* functions like an electronic spreadsheet; if you make an adjustment to one check, the program automatically updates all balances.

When entering new checks, you are asked for a beginning balance, the number, amount, and description of the check, and a deposit amount. Each listing includes a category for miscellaneous deductions, such as checking fees, and a flag that alerts the program to voided or cancelled checks. In addition, the program allows you to earmark checks if they are tax deductible, and includes expense classifications, such as "AU" for auto, or "MR" for mortgage/rent. The categories are identical to those found in the Commodore *Personal Finance* programs, so you can analyze your spending properly or adhere to a budget. *Checkease!* provides a constant balance, conveniently displayed in green for positive or red for negative amounts.

The program is check-oriented and all transactions are addressable by check number only. This method can frustrate those who make automatic transfers or withdrawals from their bank accounts. I routinely use an automatic teller for withdrawals and payments to my credit card, so I have to include these transactions under the numbers of voided checks, or hidden away in the "miscellaneous deductible" category of the nearest check. Lack of an automatic withdrawal/payment option makes this program somewhat imprecise.

Checkease! accepts checks numbered from one to 9999, which should suit all checking accounts. You can maintain more than one account by merely saving each as a separate file.

The review and update functions for this program are easy to use. You may begin with any check number and peruse your account by flipping forward or backward. Flagging a check allows you to purge voided or posted checks from the final printout if you so desire.

The check posting option is handy, especially since it allows you to easily reconcile your balance with your monthly bank statement. During the Post option, the computer will inform you if the amount of a posted check differs from the original entry.

You may save your data to either cassette or disk. I especially like the option which formats data for Commodore's *Personal Finance Package*. This allows you to graph out financial information by expense category, and compare expenditures with your own budget. During this option, the computer compiles all checks for the desired month and creates a *PF*-compatible file. I had no problems using this data with the Commodore spending analyses.

The print option allows you to print hard copy of your entire account, or of selected checks. To use the print feature, you must first save your data file, then load Printease! (which follows *Checkease!* on the cassette), then reload your data.

Printease! lets you use a serial printer, such as Commodore models 1525 or 801, or a RS-232 printer. You may also use the program without a printer, in which case you can reconcile your account by means of the display. The program allows you to set variable page lengths and choose checks by category, flags, or by whether or not they are tax deductible.

The reconcile feature is extremely handy. It asks for your statement balance, provides a total of unposted checks, and then asks you for an adjustment. It will calculate a file balance and the difference between the *Checkease!* totals and your bank statement. There is one drawback to the reconciliation option: whether you want the reconciliation printed out or not, you must save your data, load Printease!, and then reload your data.

The quality of the printouts is excellent. They are easy to read whether you request hard copy of your total statement or of selected expenditures.

A few imperfections mar *Checkease!*, but none significantly. The program handles most user errors flawlessly, but it stopped with an error statement when I switched off my printer during printing. (My 1525 paper got jammed as my account was being printed, and I found no way to stop the program. When I switched off the printer, I received an error message.) Finally, I was forced to reload *Checkease!*, Printease!, and my data once again.

Overall, *Checkease!* is a useful, comprehensive program well worth its price. It relieves you of the tedium of constantly adding and subtracting, as well as reconciling statements every month. I've found only two major problems after using *Checkease!*. The first involves what to do with the manual check register that I've been using all these years. The second still plagues me: I've been trying to figure out how to bring my VIC 20 and *Checkease!* program along with me when I go shopping.

If you are interested in using your expanded VIC 20 to manage your checking acoount, I enthusiastically recommend *Checkease!*.

COMP-U-CHECK

Hot Data Software Development
$64.95

Overall Rating	D	C	*Reliability*
Ease of Use	D	D	*Error Handling*
Documentation	F	D	*Value for Money*

Comp-U-Check is a personal finance and check writing system. It promises to make check writing, account balancing, tax and budget tracking, net worth statements, and a variety of other accounting chores easier and less complicated. Due to a bunch of design flaws within the program, these claims are questionable.

Comp-U-Check is designed to handle check and letter writing, report generating, and credit card tracking. You cannot do these things without a printer, and I highly recommend that you get one if you plan to use this program. The package is 100 percent menu-driven, and uses a "failsafe" method of saving data on disk. You do not need special knowledge of accounting to make full use of *Comp-U-Check;* however, some knowledge of accounting principles will help you understand some of the instructions in the manual.

Comp-U-Check comes on a copy-protected disk, but the documentation gives no information about obtaining a backup. A serious oversight. A one-year warranty is provided, though, and a customer support number is included which is not toll-free. (I called twice over a two-day period and talked to a receptionist who promised to have a technical support person get in touch with me. I'm still waiting.)

The program claims to support dual disk drives, though there's no provision for changing the device number within the program, and no information in the manual pertaining to how this is accomplished. I guess they assume that if you have two drives, you understand how to change one to drive #9.

To use *Comp-U-Check*, you must first format two data disks, one for keeping track of your accounts (the "account" disk), and one as a register for tracking your transactions (the "register" disk). Once you do this, you can enter information on your data disks. *Comp-U-Check* can keep track of several checking accounts; however, you have to create a separate set of account and register disks for each. The manual also recommends that a separate accounts disk be used for storing data regarding credit card accounts.

Configuring your printer is a complex operation. I suggest that you review your printer manual before you take this step since some of the questions are quite technical. I would prefer a menu of pre-configured printer types from which I could make my selection, as is the case in many similar programs.

Although *Comp-U-Check* claims to be 100 percent menu-driven, I had to memorize several sets of special commands and data input routines, or else the program either refuses to respond, or crashes. I also found several discrepancies between the manual and the program with regard to its operation and format. Despite repeated tries, my printer refuses to produce anything except uppercase letters. Since the program is written mostly in BASIC, it is rather long, requiring the use of modules. This means that every time I wish to move from one section of the program to another, I have to insert my program disk and wait while the new module is loaded into memory. This takes a while and quickly becomes tedious.

I came across several other bugs. Each time I go from one module to another, I have to tell the program how many disk drives I'm using. If I'm not careful of how I input data, I get error messages on the screen with no explanations either in the manual or on the screen concerning what to do next. There is also an inconsistency in the menus from one module to the next which resulted in my crashing the program once again.

I like using my Commodore and enjoy running well-written programs. I also admire the enormous skill and craft that goes into designing one. Unfortunately, *Comp-U-Check* is not one of the chosen. Time and time again, I run into bugs that often cause the program to crash. The manual is poorly written and lacks an index (very inconvenient). I wouldn't recommend *Comp-U-Check* to anyone, unless he enjoys crossword puzzles.

GET RICH! Insurance

Arrays, Inc./Continental Software
$49.99

Overall Rating	A-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A	A	*Value for Money*

Get Rich!: Insurance is the third in Arrays/Continental's series of personal financial planning programs. It helps you analyze your insurance needs, the prices of different policies, and to keep insurance records.

The program is as easy to use as *Strategies*, the first volume of the series. It prompts you for information about you, your family, and your lifestyle in plain English. Its help messages are clear and, indeed, helpful. The two-part documentation is both easy to use and informative. The larger (paperback-size) guide tho-

roughly discusses each type of insurance the program covers, including tips on how to buy them. The smaller reference manual tells you how to boot up the disk and supplies Commodore 64-specific information that you'll need to use the program.

The program covers Social Security, life insurance, disability insurance, property and casualty insurance, automobile insurance, and health insurance. It records your information, then provides calculations to show you how much insurance you need, and to compare the cost of your present policies with other policies you may be considering.

If you're a babe in the insurance woods, or if you just want to save time selecting policies, *Get Rich!: Insurance* is for you. This package is not only very informative, but also serves as a useful insurance record-keeper and planner.

GET RICH! Strategies

Arrays, Inc./Continental Software

$49.99

Overall Rating	B+	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	A	A	*Value for Money*

This first volume in a series of personal financial planning programs helps you organize your assets and liabilities, and use the information to establish realistic financial goals. Once you've used it to get your finances in order, you can move on to the more specialized packages in the series, such as *Get Rich!: Insurance.*

Get Rich!: Strategies is very easy to use. It prompts you in plain English, and displays detailed explanations of each question at a touch of the H key. The excellent documentation comes in two parts; the main guide provides invaluable financial tips and explains how to customize your financial plan with the program, while the second, Commodore 64-specific guide works as a reference section. This division makes information easy to find. You read the main guide, printed in the form of a paperback book, first. Then, everything you really need to know as you run the program is in the smaller reference guide.

Get Rich!: Strategies incorporates three major financial planning tools. Worksheets enable you to set goals, as well as determine net worth and discretionary income; calculations are provided for solving a variety of problems involving money, time, and interest; and graphs analyze the performance of investments, interest rates, and other related matters over a long period of time. You can print out all the results in a convenient form.

The worksheets included in the package are: Savings Goals, Assets, Liabilities, Income, and Expenses. The program allows you to move easily among them. A function menu at the bottom of the screen always displays the actions you can take from any point in the program.

This program is a great place to start if you are new to the financial planning game. Its record-keeping and calculating potential should keep it useful long after you've gotten a firm grip on your financial situation.

THE HOME ACCOUNTANT

Arrays, Inc./Continental Software

$74.95

Overall Rating	A	A	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	B	A	*Value for Money*

The Home Accountant is one of the most comprehensive home financial programs available. It is compatible with a wide range of printers, and it can be set up for one or two disks.

The documentation is extensive and well-written. To set up the system, just follow the examples presented. You do not need to know a particular accounting system, or be an expert accountant yourself.

You select one of the ten modules of the program through a main menu. First you set-up up to 100 budget categories, divided into five broad areas: assets, credit cards, liabilities, income, and expenses. You can enter a maximum of ten digits in any totals column.

The system keeps track of five checkbooks. Entries into the checkbook accounts can be divided into any of the established categories. For example, you can divide a loan payment into principal and interest, or a paycheck deposit into tax, retirement, and dues. When you enter checks, the program assumes they have not cleared the bank. After you receive a bank statement, note the outstanding checks as cleared, to complete the reconciliation. You can also print checks, but you must purchase special formatted checks for this purpose.

The Home Accountant has an extensive search and edit capability. You can search through entries from the checkbook, cash account, or credit card accounts. The search criteria offers a combination of information (for instance, date, check number, or amount). When the search matches up to the information you want, the program presents it on the screen for editing.

The graphics module is good. You can select any category for a graph, and you can compare both expenditures and budgeted amounts on bar graphs only. Presentations, on screen only, can be in the form of bar, line, or trend analysis graphs. If you need

copies, you must save the graph on a separate disk and use some other program to print it.

The Home Accountant has extensive reports. For example, you can produce reports by category with budgeted and actual amounts. Other choices include a personal balance sheet summarizing assets and liabilities, or net worth statements. These summarize from one month up to twelve. You can print a summary of all entries, or you can specify specific criteria to limit the number of entries. For example, you can print a list of all checks written that are tax deductible, or print all entries to a credit card. All reports are available in 80-column format. The reports cannot be printed on the screen for examination. Therefore, browsing through a few categories can use a lot of paper in a short time.

From personal experience, I can say that Arrays, Inc./Continental Software wants you to be satisfied with the program. The warranty states that they may make changes without notice, but you can enroll in the software support group at a nominal fee and thus be kept informed of any changes. A phone call to the customer support group is always helpful. If you want a home financial program, I recommend that you consider buying *The Home Accountant*. Some programs offer different features, but few are as comprehensive.

HOME CALC

Sim Computer Products

$29.95

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	A-	A	*Value for Money*

Home Calc, a simple spreadsheet program, is easy to learn, but very limited when compared to its competitors. *Home Calc* introduces the concept of spreadsheets very skillfully. The tone of the excellent documentation is warm, helpful, and friendly. The booklet even mentions how to connect your TV, in case you are really new to computing. In a short while, you will be using *Home Calc* to track your budget or stock transactions.

Home Calc allows for twenty-six columns and ninety-nine rows, or a total capacity of over 2500 cells. Numerical entries may be in decimal or scientific notation. Copy protection is by dongle (a key) which you insert into the joystick port #1. I was concerned about losing this key until I found that the program would still run if I plugged my paddles—not joysticks—into port #1. You receive a quick-reference card, the dongle, one disk, the user's manual, and a zip-lock bag to store it all in. The F7 key calls up a Help screen to remind you of *Home Calc* conventions. The screen even informs you of the memory remaining.

Home Calc does not have a search or sort routine. A sum function is present, but many other useful functions are not included, such as average, maximum, minimum, or count. You must enter all formulas in the strict left-to-right order in which they will be read. No parentheses are allowed. For example, 5 - 4 * 20 will not yield -75 as you would expect, but rather 20.

The format of the spreadsheet cannot exceed twenty-six columns. If you were preparing an annual budget spreadsheet, this would barely allow for one Label column, twelve Budget columns, twelve Actual columns, and one Total column. If you wanted additional Quarterly Subtotal columns, you would find *Home Calc* inadequate.

However, *Home Calc* is very low priced; the demo program alone is worth the cost. It scrolls smoothly, almost like a movie. Unfortunately, the documentation fails to mention that this excellent demo is on the disk, so that many users may not even know it exists.

Even though *Home Calc* lacks several features provided by the better spreadsheets, it can help calculate finances and expenses around the home. For the non-professional user, *Home Calc* offers a low cost, easy-to-use, spreadsheet package.

THE ELECTRONIC CHECKBOOK

Timeworks, Inc.

$25.95

Overall Rating	B+	A	*Reliability*
Ease of Use	B	B+	*Error Handling*
Documentation	C	A	*Value for Money*

The Electronic Checkbook is a menu-driven financial resource aid. It helps you keep track of where your money is, where it's going, and perhaps helps you hold onto it a little longer. The use of the word "checkbook" in the title is misleading; *The Electronic Checkbook* keeps track of cash transactions, as well as check payments and bank deposits.

The program is essentially set up like a database. You input your financial records and *The Electronic Checkbook* sorts, compiles, and manipulates the information according to your needs. It will balance your checkbook at the end of each month—and more. This program could very well be a time and money saver each year 'round about the fifteenth of April. *The Electronic Checkbook* sorts and keeps track of up to ninety-nine different categories. Sample categories include income, education and medical expenses, savings, and tax deductions.

Finding information requires only a few simple keystrokes. Remember the last time you received a bill you

thought you had already paid? If you had been using *The Electronic Checkbook*, the program would have searched through your records and located every check or cash payment you made to the billing party. And it would have performed this task very quickly. *The Electronic Checkbook* sure beats flipping through stacks of old checks any day. After the program locates your payment, it will print the information to either screen, or printer, or both.

You can use the same procedure at tax time to dig up those deductions you've forgotten—and maybe even to save enough money to cover the cost of *The Electronic Checkbook*. At $24.95, this is an outstanding software buy. The program will store up to 2,500 transactions per disk. One disk should be plenty for the average household, and a few disks would suffice for a small business.

In addition to tracking all your checks, deposits, and cash transactions, the program keeps a record of their reference numbers (when appropriate), dates, categories, and amounts. A running total of your checkbook balance is automatically computed.

You can retrieve needed information by selected categories. If you need to know all of your charitable contributions, *The Electronic Checkbook* will provide them quickly. An option to create a printout of every screen is supplied, in the event you need hard copy of a file.

Timeworks, which markets this program, also markets a program called *Money Manager*; the two programs interface with each other. The information in *The Electronic Checkbook* can be used by the management program to help you manage your budget and personal finances. (Look for a review of *Money Manager* elsewhere in this section.)

The biggest problem I encountered using *The Electronic Checkbook* involves the time necessary to input the basic information. The first session is the most time consuming. Writing checks is bad enough, but doing it twice (once for the payment and once again to enter the information into the program) is a real nuisance. However, *The Electronic Checkbook* keeps the chore as painless as possible via logical prompts and friendly methods of checking for user errors. Once the information is in its proper place, *The Electronic Checkbook* repays your labor with handy file searching and convenient manipulation procedures.

You can locate transactions by description, amount, date, index number, or range of amount. For instance, you could locate all transactions you made on a particular date; then you could further search those transactions for all matches in a user-defined amount range.

In addition, *The Electronic Checkbook* will help you analyze your records. If you need to know what your electric bill averages for the year, this program will locate all your paid electric bills and calculate the average monthly payment for you. Needless to say, *The Electronic Checkbook* will aid you in balancing your checkbook and keeping it balanced.

An option allowing you to make a backup copy of your data exists, just in case the original should become damaged. The time it takes to back up the information onto another disk is definitely time well spent.

I found the program both fast and easy to use. The twenty-page manual was a little hard to understand the first time I read it through, but after using the program once, the instructions became clear. The quality of the program is evident in its speed and error handling features. I tried to make the program break down or drop data, but *The Electronic Checkbook* took my worst abuse without complaining or losing a single byte.

One thing does bug me: I found no reference to a warranty or replacement agreement from Timeworks. Since the original disk is copy-protected, you cannot make a security backup of *The Electronic Checkbook*. Without a replacement agreement, you may have to buy an entirely new program at full price should the original ever become damaged—a somewhat risky situation.

HOME FINANCE MANAGER

Virginia Micro Systems

$49.95

Overall Rating	B-	C	*Reliability*
Ease of Use	B+	B+	*Error Handling*
Documentation	A-	B	*Value for Money*

Virginia Micro Systems designed *Home Finance Manager* for the budget-conscious computerist. A product of the Center for Advanced Sciences and Computers, this simple, user-friendly financial program allows you to record up to 200 files per month.

The seventeen-page instruction manual is clear and brief. It describes each of the three elements that comprise the *Home Finance Manager* system. The first is the initialization and record set-up portion of the program. This allows you to enter the months involved, select a password to protect your files, enter the beginning balances on your various accounts, and decide what expense categories (there are sixty to choose from) pertain to you. All this information is used to prepare a Financial Statement page.

The Annual option arranges your monthly Statement records to provide you with an overview of your transactions. The Sort option describes how to use *Home Finance Manager* files with Sort. This spreadsheet/data collection program is sold separately.

The program was unable to print out any of my records. Even with my interface in the 1525 emulation mode (as the program requires), nothing happened with all three modules. You can't change the screen colors, and, for some reason, the blinking cursor seems especially distracting.

If all you need is a simple, no-frills, home-money-management program, the *Home Finance Manager* may be one to consider, but make sure it works with your printer before you buy.

HOME MANAGER

Abrasco, Ltd.
$29.95

Overall Rating	B-	A	*Reliability*
Ease of Use	A	B+	*Error Handling*
Documentation	C	B-	*Value for Money*

Home Manager offers you five separate programs on one disk: Address Manager, Diary Manager, Expense Manager, Bank Manager, and Loan Calc. The programs are not graphically attractive, but they are competent. They have a British "personality" to them that may seem a little strange to Americans. The programs are slow, but offer a variety of useful functions that you select from multiple menus. Documentation is scanty, but adequate. If you want to computerize your address book, your calendar, your expense log, and your checkbook, *Home Manager* is a solid choice.

All the programs have certain features in common. They all employ text-only formats, with the blue-on-blue initial screens. Each program has a main menu that includes loading and saving data, making new entries, searching, correcting, deleting data, and printing reports. Several of these options have menus of their own, and, of course, some of the programs have additional functions.

You must confirm almost every choice, which is fine for error control, but is rather a nuisance. You must also accept or reject each record after you enter it. If you reject it, it is not posted, and you must reenter all the fields again. Data is saved or loaded as any sequential file. The program does not have disk operations, such as formatting a disk or viewing the directory.

The Address Manager is a good utility for printing mailing labels. The print options let you choose the number of line feeds between addresses and you can print a selection or your entire file. An average file holds about 250 addresses. You can search through the file only by surnames. Aside from printing mailing labels, I don't think this program is an improvement over my alphabetized address card file.

The Diary Manager is a calendar. It has only one feature that makes it superior to a paper calendar: a file called "Days to Remember." You may carry this file of noteworthy birthdays and anniversaries forward from year to year. One inconvenience in this, and subsequent programs, is that dates are entered DDMM (day, day, month, month), in the European manner, rather than in the American way of MMDD (month, month, day, day).

I like Expense Manager best of all *Home Manager*'s programs. Again, it's essentially a database in which you record type of expense, date, amount, and whether you paid by cash, check (or, as the program spells it, "cheque"), or credit card. You are given fifteen categories for expenses, including five user-defined headings. The program lets you analyze your expenses by month and year, or by category. I keep a daily log of expenditures, but seldom have time to classify my data to find out exactly how much I spend at the grocery store or on the car. This program makes it easy to turn my records into handy, easily accessible information.

Bank Manager, the check recording program, records deposits and withdrawals (by check or other means) via transaction number. (Americans can use their check numbers in place of transaction numbers.) One snag, though, is that the program permits duplicate transaction numbers. You can find the duplicate only by browsing through the entire file; the Search function will find only the first record. This program doesn't work like familiar check balancing programs. If you want balance information, you must print out a statement; the report prints overdrafts in reverse characters.

Loan Calc is a simple utility just like many public domain programs. You enter the amount of your loan, interest rate, and the duration (in years). It returns (in decimal British pounds) the total interest and the monthly payment. Since the documentation doesn't supply the formula used, you would be wise to check the results of this program with another source.

The functions provided by *Home Manager* are only marginally improved by computerization. However, if you really want to computerize these functions, *Home Manager* is easy to use and competently designed. Its strongest quality is the variety and usefulness of its printouts. My non-Commodore printer churned them out effortlessly. The printouts take advantage of features such as enlarged print, making them easy to read. Even if you don't give a hoot about having an electronic address book, you might consider purchasing *Home Manager* just to get the handy reports.

HOME MATH/ ANALYZER

UHL Research Associates, Inc.
$24.95

Overall Rating	C	C	*Reliability*
Ease of Use	B	C-	*Error Handling*
Documentation	C	C	*Value for Money*

The *Home Math/Analyzer* analyzes home loans, short as well as long term investments, and simple statistical computations. It also generates a variety of reports on loans and investments. After the initial menu, you get the Math Options Menu, which includes Loan Analyzer, Investment Analyzer, and Statistics. Loan Analyzer determines payment, total loan cost, principal, and amortization schedule. Investment Analysis determines growth projections from simple interest or investments from an IRA. The last option, Statistics, determines the mean and variance of a set number. Let's cover the two major options in more detail.

The first option, Loan Analysis, lets you compute the total cost of a loan amount, including the total cost of the loan, from the standpoint of the payments you can afford. The third selection computes the number of payments and total loan cost from the loan amount. The reports, sent either to the screen or the printer (this program has no provision to save your data to a disk), are (1) basic loan data, (2) the status of your loan at the nth payment, and (3) an amortization schedule.

The second option, Investment Analysis, contains two categories. The first deals specifically with investments at fixed interest over a specific time period (for example, a savings account). The second deals with periodic investments over a specified time period (for example, investments in an IRA). Reports available are (1) basic investment data, (2) investment value at any payment, and (3) an investment growth schedule:

The screen layout, though usually unimportant, appears to be designed for the VIC 20. Menus use only half the screen columns available. Furthermore, when you start the program you must enter Text mode (uppercase and lowercase), which you shouldn't have to do yourself. You must also specify the special printer code for Text mode when running the program. Rather than doing this every time, you should be able to set the printer option from the main menu. The program should also work interactively with the 1525 or MPA-801 printers by default.

I hit another problem while executing the statistical operation. The program crashed and flashed the BASIC error message "Division by Zero." *Home Math/Analyzer* has no traps to prevent this from happening and no explanation as to what number the prompt expects you to enter in order to avoid this error. The documentation also lacks examples of how to use the program, although it is relatively easy to understand otherwise. You are dealing with numbers in this program, which means that if you enter an alphanumeric character for any reason, the BASIC error "Redo from Start" appears. No prompt explains this rather cryptic message.

The value of this program is strictly limited to computations. It won't save your information, which means that you must reenter it every time. For planning purposes, it should save loan or investment data for later use. Obviously, it has limited applications and lacks versatility. The reports are formatted well, but lack automatic forwarding to the start of the next page. In addition, it won't skip perfs. All in all, *Home Math/Analyzer* does what it says it will, but lacks some of the features, such as the ability to save to disk the results of your calculations, that would make the program more usable.

THE MONEY MANAGER

Timeworks, Inc.
$24.95

The Money Manager is an exceptionally priced, worthwhile, and reliable budgeting aid for home or small business use. For a complete description of this program, please refer to the review in the Business section of this book.

MULTI FUNCTION CASH CONTROLLER

3R Import and Export
$24.95

Overall Rating	C	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	D	B	*Value for Money*

Cash Controller is an affordable, reliable, and fast home budgeting aid with one curiosity—it uses the English pound symbol instead of the American dollar symbol. 3R Import and Export, who distributes *Cash Controller,* imports it from the United Kingdom. The accuracy isn't affected, but it does give your printouts a curious, foreign look. At $24.95, this is by far the most modestly-priced, serious, computer-budgeting aid available for the Commodore 64.

Cash Controller is menu-driven and contains three programs: Budget, Bank Account, and Mortgage/Loan Calculator. The first program allows you to set up a target budget and then enter actual expenses in order to compare the two. You can include sixteen different expense headings, such as mortgage, utilities, phone, gas, car payment, credit card, groceries, etc. *Cash Con-*

troller calculates the total or the average of any of these expenses. You can shift funds around to move any excess money to areas that need shoring up in your planned budget. Finally, you can print all the information out if you need hard copy.

Bank Account is the real world of your finances, while Budget is your financial plan. If the two are not similar, *Cash Controller* helps you to spot problems while they are small and manageable. In Bank Account, you enter income and expenses. This data is used in comparison with your Budget in order to analyze your financial condition. Again the program shows a European bias. When you search for information using dates, you must enter day/month/year instead of month/day/year.

The last program is Mortgage/Loan Calculator. Here you enter bits of information about proposed loans. For example, if you want to borrow $5000, and pay it back at the rate of $50 per week at fourteen percent annually, Mortgage/Loan tells you how many months you will be making payments. Or, if you want to pay the loan off in two years, it tells you what your monthly payment will be. You supply three of the four conditions, and Mortgage/Loan calculates the fourth. This is one of *Cash Controller's* most useful features.

You can save your file to a disk with a user-selected password. This keeps any prying eyes from sneaking a peek at your finances. But you must remember the password and its exact spelling or you won't be able to retrieve the information.

The four-page manual contains abbreviated information which serves well as a handy reference card, but as a manual, it is far too small. You are forced to learn by doing and testing. A more serious drawback is the fact that the screen is nearly unreadable: the Bank Account screen is orange with red type! No warranty is included, and no number is given to call for assistance with problems.

SMART

Double E Electronics

$79.95

Overall Rating	B+	B+	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	B+	A-	*Value for Money*

SMART is an acronym for Simplified word processing, Money management, Amortizations, Record keeping, and Time management. This package provides both the novice and expert computer user with a group of programs aimed at making home and personal management easier. *SMART* contains six interconnected modules (programs): M'Writer, Personal Finance, Personal Inventory, Personal Schedule, Loans/Savings, and Personal Mail List. Many of these are interactive so you have your own secretary and accountant in one program. Despite the lack of a general, user-definable database, I found that the *SMART* package, in itself, proved to be more than adequate for most home and personal needs. Even those of us with small home businesses may find *SMART* satisfactory.

The forty-one-page manual is written in a clear and personal style and comes in a compact ring binder. A brief introduction prepares the first-time computer user by listing loading procedures and directions for keyboard. *SMART* makes extensive use of menus, with the exception of M'Writer, so you can easily learn to use *SMART* with only an occasional glance at the manual.

M'Writer, the word processing module, resembles *EasyScript* in its use of embedded English commands and allows you to take advantage of your printer's capabilities. Despite the reference to its being a "simplified" word processor, M'Writer is a powerful, full-featured program. While the lack of wordwrap and side scrolling makes reading text quickly somewhat difficult, it scrolls vertically very well. A "merge text" command allows you to add fields/records from the mailing list, personal inventory, and personal schedule to M'Writer text.

The Personal Finance module consists of the main Finance program and a Finance Setup program, which involves the creation of a chart of accounts, such as expenses and deposits. From these, you can set up a budget, maintain a computerized "check register," keep track of bank service charges, and even plot a graph based on all your financial information. Records from the Personal Finance module must be stored on their own disk and can be printed out. As is the case with the other modules, you may edit your records before saving them to a disk.

If maintaining a record of your belongings is important, there is a Personal Inventory program that does just that. You create files of up to 200 items with such pre-defined fields as Item Number, Date Purchased, Brand Name, etc. To access your inventory records, you can search by field values or "browse," record by record.

For those who need to keep track of appointments and special occasions, the Personal Schedule module is a blessing. Operating on the same principle as the Personal Finance and Inventory modules, this program organizes your plans by Date, Time, Appointment, Comments, and Miscellaneous. A dynamic calendar enables you to view any month from the year 1400 to 2200!

Loans/Savings, the next module, consists of two programs that will help you maintain a savings account, a loan record, and the interest involved in each. For the Savings program, you enter information for your initial deposit, term, compounding periods, interest rate and

more. The Loan operates in a similar manner, as well as enabling you to print an amortization schedule.

The Personal Mailing List can be useful in small businesses, as well as in the home. Again, each file handles up to 200 items. You can print labels for all of your mailing list files or select certain addresses before printing. A file must be in the computer's memory before it can be printed.

In order to be able to print out hard copies of your data, you may have to experiment with various printer settings if you do not own a 1525E or MPS-801 printer. You can also change the border, background, and character colors to suit your needs. The sort function in the Personal Inventory, Schedule, and Mailing List modules enables you to alphabetize or sort a file by any of your listed fields.

The *SMART* system, with its use of menus, is a clever and well-prepared package. You have to try very hard to lose a file in memory since there are double-checking menu questions. A registration card is included so that owners of the *SMART* system can be notified of any updates. Separate programs would each cost at least half as much as this package, so *SMART* is a great bargain. Its simplicity should attract many new computer users, while its versatility and power will catch the attention of more seasoned individuals.

STOCK ANALYZER

Orbyte
$59.95

Overall Rating	B	B	*Reliability*
Ease of Use	A	D	*Error Handling*
Documentation	B	B	*Value for Money*

Orbyte Software's *Stock Analyzer* monitors a stock portfolio by presenting you, the investor, with up-to-the-minute reports on the value of your holdings, and reminders that particular investments may be approaching preset limits. The program is menu-driven and adequately documented, so I put it to full use in less than an hour. Once you format and prepare a data disk, the main program is loaded into memory. From then on, things happen pretty fast.

You select a password to access your data disk, insuring private financial records (or mayhem, if you forget it). The menu prompts lead you through entry of purchases, sales, and splits. Carefully enter all transactions in the order they occur. I entered the sale of some shares, and later discovered that a split had occurred. Entering the information on the split after the sale was recorded produced erroneous results. Unfortunately, you cannot change data in individual transaction records once you have written it to disk.

Assuming you enter transaction data in the proper order, you just need to update current selling prices for the stocks and mutual funds in your portfolio, and *Stock Analyzer* analyzes your holdings. *Stock Analyzer* provides average cost per share and cost basis, and calculates each holding's unrealized gain or loss. It also separates gains and losses into long and short term. Unfortunately, the IRS changed the holding period for long term capital gains from one year to six months in 1984; the program version I have follows the 1983 rules.

If you have more than a few stocks to keep track of, you'll find this program's fast, simple operation very useful; however, you will run up against a few limitations. *Stock Analyzer* will not allow you to sell short, and you can't easily review the titles under which inactive stocks (no longer in your portfolio) were recorded. Since each data disk handles a maximum of 250 sales transactions, you must eventually use a new data disk. The documentation gives no hints about how you can carry forward active stock files, and how you operate *Stock Analyzer* when data is spread over several disks.

As I used the program, I noticed one blatant bug, which occurs because the C-64 cannot handle any math function that calls for division by zero. In some cases, *Stock Analyzer* requires you to enter a return, when the figure requested might logically be zero. The program doesn't prevent you from entering a zero, and if you do it crashes. The only way to recover is with the Run command and a new start. Fortunately, most data is written to disk upon entry, so no catastrophic loss results.

Stock Analyzer allows hard copy printouts of reports displayed on screen; however, you get only a "print-screen" routine—forty characters in the middle of an eighty-column page with black lines. You must call reports to the screen one at a time, then you may employ the screendump function to print them.

Before I started using *Stock Analyzer*, I constructed my own portfolio manager using a sophisticated database program. I prefer sorting files and printing reports with more flexibility than this program allows, but wish my database could switch between stocks as fast as *Stock Analyzer* can, and provide reports on the screen like the *Analyzer* does. For the investor who barely has time to keep track of his holdings—let alone configure database programs for assistance—*Stock Analyzer* is probably a worthwhile investment. By the way, call your accountant; the cost of the program might even be tax deductible.

THE TAX ADVANTAGE

Arrays, Inc./Continental Software
$69.95

Overall Rating	A	A	*Reliability*
Ease of Use	A	B-	*Error Handling*
Documentation	B	A	*Value for Money*

This program will help you through the maze of tax forms and schedules while saving wear and tear on your calculator, your eraser, and your patience. *The Tax Advantage* prepares Form 1040, schedules A, B, C, D, E, G, W, and SE, Form 2106, 2441, 4562, 4563, and 6251. Form 1040 is divided into several screens, with line numbers matching those on the form. The screens are clear and easy to read, with a function menu at the bottom, noting the available commands. Helpful descriptions for most lines may be displayed in the function window. This nice feature keeps the form uncluttered. Paging through the screens and lines is a breeze, and all entries are easy to add to, change, or delete. No warning message is displayed for invalid entries or commands, which could cause some confusion. However, the documentation is very clear, and should ease you through any difficulties.

The real power of the program is in the way it handles itemizations and calculations. Itemizing certain lines taks you to the appropriate tax schedule. When you are finished with your entries, the total from the itemization is placed on the correct 1040 line along with an "I" (showing that the line is itemized). The linking of schedules with form 1040 eliminates much of the confusion about when each is used. All calculations are made after each line entry, so you can see the effect of each entry on your tax at any point. The tax, the amount you owe, and your tax bracket appear at the bottom of any 1040 screen at the touch of a key. You can even vary your entries or override them momentarily in order to see the effect on your tax, or to estimate next year's tax liability.

You can send all the actual forms and itemizations that the program prints directly to the IRS, except the main 1040. The program prints out a worksheet of this that you can copy onto the real form. (IBM, Epson, NEC and Centronics printers are supported, or you may specify your own printer's control codes.) You will still need to have your tax instructions on hand for reference.

A $10.00 warranty registration fee is required, which entitles the purchaser to one year of software support and program updates, as well as half off the purchase price of next year's program revision. The cost of the program is tax deductible if you file schedule A.

The Tax Advantage is a joy to use. It takes away much of the drudgery of preparing results while giving you a good measure of control over them.

TAX PLANNER

Micca Enterprises
$49.95

Overall Rating	B	A	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	A	A	*Value for Money*

Would you like to know your income tax liability at any time during the year, and be able to see how certain choices will affect the amount you must pay? The *Tax Planner* by Micca Enterprises can be used to plan your tax position and estimate your quarterly tax payments.

You create a projection by answering all the prompts regarding your income and deductions. This projection can then be saved to disk for later reference. The results of the projection may be displayed onscreen, or you may select the Hard Copy option and print out the results.

To see how a certain decision will affect your tax liability, you may load a saved projection, then elect the Change option. Just enter a different set of data, and a different result will be produced. Perhaps the most worthwhile feature of *Tax Planner* is its Income Averaging Projection. When you first use this feature, you'll see at once whether or not you will benefit from income averaging. This one particular feature alone may justify the cost of the program.

The documentation is concise and easy to understand, but you will find that the onscreen prompts are sufficient to work the program. The manual states that a charge is made for replacing a disk that becomes damaged, but doesn't say what this charge is. No backup disk is supplied and the original is copy-protected.

A major concern of mine (and the average consumer) is that tax tables change from year to year. Therefore, the possibility exists that *Tax Planner* may become obsolete. We are told that registered owners will be able to buy this program for future years at a discount, but again, no specific price is mentioned. The program has been compiled using the *Blitz* compiler from Skyles Electric Works, so none but the very top programmers will be able to update their own programs.

Tax Planner is exceptionally friendly. You'll have no problem following and implementing the program—except for one quirk. The program will ask a series of questions that require yes or no for an answer. The correct answers should be input as "Y" or "N." If you answer "yes" instead of "Y," the program reads it as a "N," and processes this as your answer instead of asking you the question again. This is the only instance I encountered where a simple human error might lead to incorrect results. The other prompts require an answer

within certain parameters, so blatantly wrong answers cause the program to ask you the question again.

I highly recommend this program. I've mentioned the negative points to serve as warnings that may help you achieve greater success with your *Tax Planner*. Don't construe them as criticisms meant to disuade you from purchasing the program. On the positive side, *Tax Planner* can help you make wise decisions throughout the year regarding the tax impact of buying a new home, contributing to an IRA, buying a rental property, taking on an additional job, or any other financial activity. Given all these points, *Tax Planner* is a valuable tool for a mere $49.95.

TOTL. MONEYMINDER Version 3.6

TOTL Software, Inc.

$39.95

Overall Rating	C	B	*Reliability*
Ease of Use	B	C	*Error Handling*
Documentation	C	C	*Value for Money*

TOTL. Moneyminder meets the accounting needs of the average household, where money management centers on the checkbook and charge card. If your needs coincide with *TOTL. Moneyminder's* design, the program is easy to use and has several handy features. However, you may run into trouble if you don't know the basics of double-entry bookkeeping. *Totl. Moneyminder's* documentation doesn't explain the principles of its system well enough for an accounting novice to shape the program to his personal need—and the program is unsuitable for business use.

The heart of the program, as in any accounting system, is the Chart of Accounts. You can set up as many as 110 accounts in six "type" categories: income, bank accounts, charge accounts, expenses, assets, and liabilities. One disk can contain up to 700 transactions, and you can add new accounts any time you wish. These parameters let you record financial activity in great detail.

Each transaction requires a source account and a destination account. For example, suppose you record your paycheck in an income account named "Salary." This is a source account. The destination may be a bank account (checking or other). When you record paying your bills, the checking account is the source, and an expense account the destination. You can divide a single check into three different expense accounts. With your charge account, you may list your VISA account as the "from" account, and expense accounts as the "to" accounts. *TOTL. Moneyminder* automatically understands when to add and when to subtract. However, the source and destination must be of different types.

Each transaction holds a lot of information: date, the amounts, and a memo in both "from" and "to" accounts. Checking accounts ask for the check number. You can define your expense accounts as tax deductible or not when you create the account, and taxable and nontaxable income can be separated in the same way.

In addition to bank and charge transactions, you can list your fixed assets and keep track of your major liabilities, such as mortgages and car loans. The asset and liability accounts are used to create a net worth report. While this is fun, it is of limited use, because *TOTL. Moneyminder* doesn't let you manipulate nonfixed values. You can't enter a formula to incorporate depreciation of floating interest rates into the picture.

Once your accounts are set up, you can create a budget plan keyed to those accounts. The Budget program lets you define fixed or variable amounts for each expense category. These payments may differ for each month. You can create a label file to print address labels for your bills, but you need *TOTL. Label* to print them out.

TOTL. Moneyminder creates many reports from its data. If you don't have a printer, you can output reports to the screen. One of the problems with *TOTL. Moneyminder* is that the configuration program that interfaces the printer to the software is not grouped with the Report programs. I had to stop printing, load the utility programs, and reconfigure for printer defaults *three times* before I got readable hard copy.

Reports cover all functions of *TOTL. Moneyminder*, but there are gaps. You can get printouts of your Chart of Accounts, transactions, assets and liabilities, current income/expense balances, and checking account. You can get a screen dump of the transactions in a particular account, but you have to ask for them one at a time. You can get a statement on a checking account, but not on a savings account. If you have more than one charge account, you will have to add the individual accounts by hand. The "Budget vs. Actual" report is useful. It compares your planned expenses to actual expenditure for a particular month and shows the results with numbers or with a bar graph (the graph outputs to the screen only).

TOTL. Moneyminder also offers several special features, such as programs on investment return and loan amortization. These appear to be similar to programs available in the public domain. You can ask for a checkbook statement, a reminder of upcoming bills by month, or a year-end statement with all your tax-deductible expenses totaled. Disk utilities let you format a data disk, back it up, or close it out at the end of an accounting period.

TOTL. Moneyminder is menu-driven, but you have so many chances to double-check your entries and correct errors, that the program pokes along at an agonizing pace. Each transaction is updated as it is entered. Since

TOTL. Moneyminder is a collection of several programs, moving from one program to another also slows down the process.

Error trapping is good, but the program doesn't tell you what your error is. You know you've made a mistake when the program refuses to accept an entry. If you happen to know what you did wrong, great. Otherwise, you're stuck. The documentation has no trouble-shooting guide, no index, and no general discussion explaining the underlying principles of the program.

The information in the manual is well-written and easy to understand. Its sins are all omissions. Small print, reduced from a computer printout, make the manual hard to read and find topics. The disk has sample files with which you can practice, but the manual doesn't provide guidance on using them.

If your home money management is fairly standard, *TOTL. Moneyminder* may meet your needs. If you have an unusual monetary profile, you need a program with more flexibility and better documentation.

WALLSTREET MICROSCOPE

Double E Electronics

$99.95

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B	A	*Value for Money*

As a powerful financial planning tool, *Wallstreet Microscope* is top-notch. If you are a serious stock market investor, you owe it to yourself to examine *Wallstreet Microscope* before you get bullish on the Big Board.

Wallstreet Microscope lets you research, analyze, and compare hundreds of stocks. Analyzing a stock's history lets you spot an investment that has a good chance of turning out sweet, rather than rotten. This software uses a conservative test to appraise common stocks. Ten criteria, used to judge each stock, help you find and purchase undervalued stock which should, with time, reap a heady profit for you.

The program quickly compares stocks, according to ten separate criteria, and assigns a passing or failing grade—a valuable feature. A stock is a good buy if it passes at least six of the ten following criteria:

1) The stock's earning power compared with AAA Bond yield. (You can find the AAA Bond quotes in the Tuesday and Friday issues of the *Wallstreet Journal.*)
2) Analysis of the stock's price earning ratio in the past five years.
3) If the stock is paying a dividend of at least two-thirds the AAA Bond yield, it passes test three.
4) The stock's price must be down to two-thirds the net ready liquidating value.
5) If a stock's price falls to two-thirds its tangible book value, it passes test five.
6) A stock's debt per share must be less than book value to pass this test.
7) If a stock's total debt per share is less than twice the net ready liquidating value, it might be a good buy.
8) The stock's earnings have had an average annual earning growth of ten percent in the most recent ten-year period.
9) A good stock should not have more than two earnings declines of five percent or more, relative to the preceding year, in the most recent ten years.
10) If the company's current assets are at least twice its current liabilities, the company should have no trouble satisfying its obligations.

Wallstreet Microscope's manual concedes that a stock rarely passes all ten criteria. However, a stock is a good buy if it passes at least three of criteria one through five, and three of criteria six through ten. The user-friendly and thorough manual explains why these ten criteria are so crucial, and how you should interpret them.

The series of programs stored on disk lets you analyze a stock's history and reasonably predict its future. To analyze a stock, first input the current selling price (found in most daily newspapers). Next, input the current AAA Bond Yield (also found in the Tuesday and Friday *Journal*). Finally, input the date. It's easy to operate *Wallstreet Microscope*, but hard to obtain the mass of information it requires to reach its final analysis. To get an accurate analysis of a stock, you need a file containing records of its rise and fall for the past ten years. You should either create or in some way obtain this mass of necessary information.

The program disk includes an option to create your own data file using stock of your own choice. But Double E Electronics also offers data disks containing the history of either Fortune 500 companies, 500 large service companies and second-tier industrial firms, or a mixture of industrial and service companies. You may purchase updated versions of these data disks annually, twice annually, or quarterly. The information on each disk resembles information found in publications such as *Dow Theory Forecast*. A quarterly updated file disk subscription costs $119.95.

Because an individual requires lots of time to create accurate records of a company's performance over extended time, serious investors should subscribe to Double E Electronics' file disk service. Once you buy or create a data disk, analyzing stock requires only a few keystrokes. *Wallstreet Microscope* and your Commodore 64 can quickly help you decide when to be bullish or bearish on Wall Street.

The program includes options to print either to the screen or printer. The ten criteria which select good buys are tested and scored using words, numbers, and graphics displays. This software's speed makes analyzing or comparing hundreds of stocks a quick, and hopefully profitable, afternoon's investment of time and effort.

Wallstreet Microscope's only drawback (and a hypothetical one at that) is that it makes understanding and getting involved with the stockmarket a tad too easy. The manual not only advises you when to buy, but also suggests how to judge when a stock peaks (and, consequently, you should sell). You may be tempted to quit your nine-to-five job, and try your hand as a Wall Street speculative wizard—an implicit danger.

No matter how hard I try, I can't fault the program in any major area. Compared with the cost of published forecasts, *Wallstreet Microscope* is a bargain. The manual has two sections. The first explains, in easy-to-understand terms, how to evaluate a stock, predict its future growth, and wisely choose which stocks to sell and when—extremely valuable. The second has instructions for using the program.

To top it all off, Double E Electronics gives you a "no charge" replacement warranty with no time limit, and promises free updates of the program if they ever revise it. A company spokesperson informed me that you pay only the shipping cost when you buy a replacement or an updated disk. All things considered, *Wallstreet Microscope* gives you your money's worth—and more—as a reliable, computerized stock manager and forecaster.

YOUR PERSONAL NET WORTH

Scarborough Systems

$79.95

Overall Rating	A-	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B+	A	*Value for Money*

Your Personal Net Worth is a complete home accounting program, though its title belies this. The program structure is arranged into five categories: money management, tax records, personal property, stock portfolio, and maintenance.

The money management category, really the heart of *Your Personal Net Worth,* lets you set up and manipulate accounts, set up budgets, track activities, write checks, and make reports based on various financial statements, whose formats follow general accounting practices. (Your Personal Net Worth derives its name from one of these reports.)

The tax records category provides all the figures required to complete tax forms. Data for these figures is derived from entries made in the other categories. Personal property tracks up to 250 personal items per disk. The entries you make here will appear in the net worth statement. You can organize and keep stock records in the stock portfolio category. You can also print them in report form. Finally, the maintenance category, the program's utility portion, lets you create new accounting systems, load old ones, and make various hardware adjustments.

The package comes with two disks: the program disk and another containing a previously-created accounting system, which suits most individual needs. The accounts have been assigned numbers, and, initially, have a zero balance. Each disk's back side contains the Atari version of the program.

Using *Net Worth* is relatively simple. A series of Help screens provides a tutorial; however, as the tutorial itself points out, the manual is much more handy. The program uses sound as a cue, which helps you journalize transactions. The screen displays could be more professional looking; a few contained misplaced bars or format irregularities.

The accuracy of any program, especially one for accounting applications, depends upon accurate input. This program makes correcting errors easy. The usual "Are you sure y/n?" prompts let you remedy mistakes before you actually make them. After you make the entries, and before you post them, you can change them. If your data still has errors, the program tells you how to make a "reversing entry." The program checks for mistakes, and prompts you with messages when the wrong disk is present. (Some accounting packages omit this error-correcting safety net, which frustrates users.)

A spiral-bound user's manual comes with *Your Personal Net Worth.* An alphabetically-arranged index in the back of the manual helps guide you to your desired topic. In addition, a table of contents outlines the 130-page booklet. The manual explains general accounting techniques, and discusses the subjects in a logical, well-planned sequence that helps even beginners use the program immediately. The manual's screen dumps provide good visual examples of the concepts, and its glossary of accounting terms provides quick reference.

Many main program categories are broken into subprograms, which are divided into more subprograms. A flow-chart-type diagram helps beginners keep track of the many options available.

In addition to the instruction manual's tutorials, Scarborough Systems includes a complementary copy of Sylvia Porter's *New Money Book for the 80s,* which gives even more background information on financial management. The disk is copy-protected, but you can purchase a replacement for five dollars when you return the damaged original to the vendor.

Overall, *Your Personal New Worth* is a worthwhile addition to anyone's software collection. It capably handles almost all the accounting needs of the average small business. The $79.95 retail price is certainly reasonable when you consider what you're getting: a well-designed, user-friendly financial mangement program that takes care of all your personal bookkeeping needs.

Typing

9 TO 5 TYPING

EPYX
$29.95

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A	A	*Value for Money*

This recent release by EPYX software is a refreshing addition to a large group of typing instruction programs available for the Commodore 64. This tutor's easy-going, entertaining qualities are a far cry from the cosmic shoot-'em-ups frequently associated with typing tutorials.

9 to 5 Typing offers three different animation sequences involving six preset typing games, a hand position tutorial, and a game editor for modifying existing exercises or creating entirely new ones. All exercises and options are totally menu-driven, making this program a breeze to operate.

Exercises begin with typing single letters on the home row (the starting points for each finger), and progress through words and phrases, into whole paragraphs. The graphics that accompany the exercises feature characters from the Twentieth Century Fox feature film *9 to 5*. Scenes involving Mr. Hart chasing Dora Lee, Judy in an imaginary shooting gallery with Mr. Hart as her target, and Dora Lee's fantasy of lassoing Mr. Hart, re-enact the film's storyline of exploited women workers who take revenge upon their chauvinistic boss. For those whose concentration is easily broken, or whose machismo is easily bruised, a "movie off" option blanks out the animation.

The game menu presents seven choices: a beginner's tutorial, three progressive sets of exercises, followed by three sets of typing games. The tutorial merely shows which fingers hit which keys. This is a very helpful section if you happen to be starting out with no knowledge whatsoever of touch typing.

The player option menu lets you turn the movie animation on or off, play exercises in random or sequential order, set the difficulty level (zero to nine), or choose between standard and customized games.

Customizing your own games and exercises is ridiculously easy using the main menu. The built-in editor lets you type in whatever you want to (names of friends or relatives, personal information, humorous verses, etc.), up to eight lines, or "rounds," and then stores it away on a separate, pre-formatted disk. Up to twenty-four different exercise/games can be saved (eight for each of the three game scenarios) and played at any time. The typing speed gauge registers as high as ninety-five words per minute, but is accurate only in the zero-to-fifty-five-words-per-minute range. Keeping track of your progress is easy, since the average of words per minute and your total number of errors are displayed after each typing round. A game score, produced by calculating both accuracy and speed together, is also displayed. Switching between custom and standard game modes during play is permitted, but your score will be automatically reset to zero. You save neither high scores to disk, nor have more than one player.

The music that plays between exercises (the *Theme from 9 to 5*, of course), is exceptionally well done, and I found the instruction manual both complete and easy to understand.

9 to 5 Typing concentrates mainly on developing and improving typing speed and accuracy on what the authors feel are the thirty most basic strokes in keyboarding. The program skips typing techniques involving shifted keys, numbers, or any punctuation (other than periods, commas, semicolons, and colons). As a programmer, I wish numbers had been included so I could practice typing in line numbers, Poke locations, and values for variables. Still in all, *9 to 5 Typing* professes to be a beginning tutorial, and should be regarded as such. A pity though; because with a little more effort, it could have been develped into a comprehensive master tutor.

From cold-start beginners, to experienced secretaries, this program helps your typing become faster, more accurate, and very enjoyable to practice. Despite some minor shortcomings, *9 to 5 Typing* is possibly the best C-64 educational program of its kind—and in its price range—currently on the market.

HI-RES MASTERTYPE

Scarborough Systems
$39.95

Overall Rating	A-	A-	*Reliability*
Ease of Use	A-	A-	*Error Handling*
Documentation	A-	B+	*Value for Money*

Hi-Res MasterType is yet another progressive typing program, but with a difference: it incorporates an *Invaders*-type of game which lets students hone their typing skills.

You command the spaceship in the center of the screen. In its four corners, letters, words, numbers and/or other combinations appear. You must quickly enter them to head off their slow, but constant, movement toward the ship. If you fail, they collide with your shields and eventually destroy you. You earn points for zapping the aliens, and lose them for pressing a key that's not indicated by the letter (or group of letters) in the four corners. A sequence of ten trials occurs before a message appears reporting on your ship's status and the your speed in words per minute.

The disk provides eighteeen lessons. Lesson one starts with the letters A, S, D, F, J, K, and L; each letter in this home row is "enemy" word. Lesson two presents two- or three-letter words comprised of letters from that row. The third lesson uses three-, four-, and five-letter words from the same row. The fourth lesson moves to the third row, with the letters Q, W, E, R, T, Y, U, I, O, and P. Lesson five provides short words using the home and third rows together—and so forth, up to lesson seventeen, which offers practice with difficult numbers and symbols. The disk's handy "make lesson" feature lets you create lessons.

Although the instructions specify that, in any mode other than beginners, you press the space bar when you've completed input, you should actually press Return. To correct typing mistakes, the manual also states, "press the space bar and try again. You will be penalized a few points for making a mistake, but you should have enough time to type the word again." It then states, "another way to correct your mistakes is to use the left arrow key to backspace over your mistake and retype it." In word processing, the power of the computer simplifies making corrections. You should use the backspace key to correct errors.

This package's advertising implies that this form of play/teaching is effective, if not downright addictive. I have seen a typing teacher and students become addicted. For this reason, I highly recommend *Hi-Res MasterType*.

HOW FAST CAN YOU TYPE RIGHT

Barron Enterprises
$39.95

Overall Rating	F	F	*Reliability*
Ease of Use	F	F	*Error Handling*
Documentation	F	F	*Value for Money*

How Fast Can You Type Right is a typing instruction program that aims to increase typing speed and accuracy while also presenting informative writings about some careers and occupations. There are four items on the main menu: (1) Introduction to These Programs; (2) Word Practice; (3) One Minute Sentence Drills; (4) 3 Minute or 5 Minute Time Writings (which contain the career information).

Naturally, since the program contains no documentation, I chose the introduction. This in turn brought up other menu choices: (1) Purpose of these Programs; (2) How to use Programs; (3) Additional Information. mation.

By pressing the first choice, I learned that these programs are meant for people who already know how to type. (It might have been nice, I thought, to mention this fact somewhere on the program's packaging. I was then given an address where I might purchase a book on how to type if I didn't know how. After some more general information about the program, I was eager to proceed and therefore pressed the second choice: How to use these programs. What happened? "Undefined Statement: Error in 2150" appeared on the screen. "Well," I said to myself, "who needs instruction anyway?" I reloaded the disk, and pressed choice number three on the main menu: One Minute Sentence Drills. Something happened! A program loaded. A list of occupations appeared as if by magic on the screen: Lawyer, Engineer, Dietitian. Feeling myself on the threshold of a great adventure in learning, I picked an occupation, though not at random. (This is too important to leave to mere chance.) After much soul-searching, I lit upon Waiter/Waitress. Aaaaaugh! (as Charlie Brown used to say)—"Undefined Statement." So near, and yet so far!

As a reviewer of software, I'm shocked that this sort of shoddy, obviously untested product should be on the market—or even presented for review in this condition. Certainly, it is not the buyer's responsibility to debug the program that he buys. Some other parts of this program did actually work, and I examine those below (if anyone is interested).

I was able to use items two and four on the main menu. In Word Practice, you again choose an occupation and are presented with individual words taken from the timed writings on that occupation which are

used in item four. A word appears on the screen and you type the word directly under it. A word must be typed three times without an error in order for the program to move on to the next word. Under the category of Lawyer, for example, were such words as "admitted," "graduates," examination"; under Engineer I found "engineers," "twenty," "opportunities." This section is, I suppose, useful preparation for the later writings, but I found it far too boring to use for more than just a few minutes at a time.

In the three and five minute timed writings, you choose an occupation and select a three or five minute test. A short, descriptive article on the selected occupation appears on the screen, one line at a time. (It seemed bizarrely appropriate to me that the careers listed had little or nothing to do with typing, while an obvious choice like a secretary was not included.) You type the line below the original. Each mistake is illuminated; backspacing and correcting are not possible. At the end of the three or five minutes, the number of errors are shown and the number of words per minute are calculated. One big problem I had with this section was the split-second delay at the end of each line of text, which forces you to stop momentarily and wait for the next line to appear. For a typist of even minimal accomplishment this delay is ruinous, since one's fingers, having achieved a certain tempo, tend to keep going, anticipating the next word. This flaw might cause many errors. Moreover, the entire premise behind the "educational" value of this program is specious. Typing and reading are distinct acts, each requiring its own special kind of concentration. I don't think it's possible to sneak some kind of watered-down vocational counseling into a typing instruction program. There is a bit of relevant information, however, in the writing on Systems Analyst:

"Computer programmers write detailed instructions for computers. They list the steps computers must follow to solve a problem. The detailed steps must be followed in logical order..." The creators of *How Fast Can You Type* need to reread this. They also need to debug and improve this package. Until they do, my advice is to stay away from this one.

LEARN TO TYPE

Arrays, Inc./Continental Software

$49.95

Overall Rating	A-	B	*Reliability*
Ease of Use	A	B	*Error Handling*
Documentation	B	A	*Value for Money*

Knowing how to type is an essential skill for the 80s. Some kinds of documents, such as cover letters or recommendations, are only presentable in a correctly typed format.

Learn To Type can teach your fingers to fly over the keyboard. Even if you already know how to type, this program can help you improve your speed and accuracy. You can even use it to compose formal documents right on your Commodore.

Learn To Type has five main parts: the Student level, the Graduate level, the Professor level, the Eraser Man game, and Text Editor. Each level is designed to progressively improve your typing ability.

The Student level is for beginners, or anyone who types less than twenty-five WPM (that's typing talk for Word Per Minute). The lessons, each consisting of short pieces of text to be typed, familiarize you with the keyboard and teach you to touch-type accurately. You move up to the Graduate level when you reach twenty-five WPM with eighty percent accuracy. The Graduate lessons are more difficult, but if you type accurately, you can quickly increase your typing speed.

At the end of each lesson, *Learn To Type* displays a Report Card, showing how well you did. The Report Card identifies your speed in WPM, the number of mistakes you made, your fast keys, your slow keys, and which lesson to do next, and makes comments on your performance.

Playing the game Eraser Man is a fun way to test your typing skills. You select a lesson or text for the game, hit the space bar, then type as quickly and accurately as you can. All you have to do is stay ahead of Eraser Man and he won't gobble up what you've typed. The default typing speed for the game is the WPM you achieved on the last lesson you did, but the lowest it goes is twenty-five.

The Professor level makes *Learn To Type* ideal for classroom use. The program can record the progress of up to thirty users. It allows a knowledgeable user (like a teacher) to create a password for each student to protect his work and lessons, to add or delete users, and to check their progress. The documentation doesn't mention whether you're allowed to photocopy parts of it for your students, although the copyright notice does prohibit duplication of any part of the manual without prior written permission from Arrays, Inc./Continental Software. If you're not in a classroom situation, you probably don't need to use the Professor level.

Learn To Type's Text Editor is a unique, special feature that lets you create your own lessons to use in the Student and Graduate levels, and in the game, Eraser Man. You can also create and save memos, letters, and reports with it. This limited word processor gives *Learn to Type* lasting value—you can use it long after you've perfected your typing skills. Use it to create, insert, and delete text, and print any documents you create. If your word processing needs are not great, *Learn To Type* is all you need. In fact, some of the lesson texts tell you how to write business letters and reports, and give you pointers on spelling and punctuation. The

program includes system commands to load, save, rename, and delete the lessons and documents you create.

As an added plus, *Learn To Type* can teach you to type on both the standard QWERTY keyboard (see the first five letters in the second row of your Commodore 64 keyboard) and the innovative Dvorak keyboard. The Dvorak keyboard places the five vowels under the fingers of your left hand and the most used consonants under the fingers of your right hand. This new arrangement has helped typists increase their speed and accuracy by reducing their number of errors and typing fatigue.

Learn To Type is very easy to use, simulating a typewriter very well. For example, you must hit the Return key at the end of each line in the lessons, just like you would a carriage Return key on a typewriter. The Text Editor has normal wrap-around capabilities. The program also uses sound effects and graphics effectively during the lessons. The documentation is quite clear, with a handy reference guide to the Commodore 64's keys and their functions.

TYPING STRATEGY

Behavioral Engineering

$34.95

Overall Rating	B-	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	D	C-	*Value for Money*

Typing Strategy consists of a number of related programs to teach or improve keyboard skills. Choose beginning or advanced drills, or an option in which the computer will test and measure your typing skill, and then set the level of difficulty for you. The program also includes two typing games, Drag Race and Time Bomb, plus a feature that allows you to "author" your own practice lessons. As a somewhat proficient typist, I found the package generally useful, as did a friend who is just learning to type. However, I have some reservations about *Typing Strategy* which I'll elaborate upon.

The first problem I encountered concerned the documentation. How seriously can you take a pamphlet which states, "One day the ability to type will be as common and necessary as the ability to speak"? This sort of wild hyperbole does not inspire my confidence in a product. And do they really believe that anyone can learn to type with this program "as quickly and accurately as a professional typist (eighty to 120 WPM with ninety-five percent accuracy) in a way that is both easy and entertaining"? Such a statement goes beyond mere exaggeration to outright dishonesty; anyone believing that a high skill level can be *easily* obtained is in for some major frustration and disappointment. Still, I don't want to harp on these statements. What is extraordinary about this documentation, however, is its patina of pseudo-scientific gobbledy-gook. For example, the instruction booklet contains a list of Reference Books on Neuro-Linguistic Programming (NLP), including such necessary volumes as *Frogs into Princes* and *The Structure of Magic*. Gimme a break!

Like several other typing programs, *Typing Strategy* includes an onscreen keyboard on which the key to be struck is highlighted. Also, in the beginner's lessons, hands are shown on the screen and the proper finger for the desired key is lit up. Apparently, the idea is that you won't have to look down at the actual keyboard to find the letter or symbol you want, but rather, will learn to keep your eyes on the screen. I have doubts about the onscreen keyboard; it seems to me that it just puts another barrier between the student and the actual typing situation.

There is one practice lesson included with the program which consists of about ten short phrases that you quickly tire of. You can write additional lessons and store them on a separate disk or on the virtually empty (578 blocks free) program disk. One drawback is that these lessons are restricted, like the original lesson, to ten groups of nineteen letters each, which makes for choppy going. The longest continuous typing you can do in *Typing Strategy* consists of three of these phrases combined into a test. After each test, or lesson, or game, the program gives you your score, consisting of the percentage of letters you typed correctly, the average words per minute, and a rating or score combining the previous two.

The games are quite simple and, frankly, boring. In Time Bomb, a letter or symbol appears inside a bomb. You must type the letter or symbol before the fuse reaches the bomb and it explodes. The length of the fuse can be preset depending on your typing speed. In Drag Race, a phrase appears above two cars on a runway. At the starting signal, you type the phrase and your car moves ahead with each correct letter. The other car moves at a WPM speed preset before the race.

Typing Strategy is a protected disk, but can be copied fairly easily. The manufacturer will replace damaged disks for "a nominal $7.00 charge."

In summation, I found *Typing Strategy* somewhat useful, with a few annoying or questionable aspects. But at $34.95, I don't think it is a particularly good value.

TYPING TUTOR III

Simon & Schuster
$49.95

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	A	B+	*Value for Money*

This is unquestionably the Cadillac of typing tutorials. You name it, and *Typing Tutor III*'s got it—which means this package is at the powerfully complex end of the "power versus simplicity" continuum.

Kriya Systems has packaged two excellent touch-typing programs onto this disk. The first, Typing Tutor, is a graduated series of lessons that help you master your keyboard. Secondly, you may play the Letter Invaders game, zapping alien letters that drop onto your native land. It's apparent that intelligent folks thought out the design of both these programs, and the game complements the more structured tutorial lessons excellently.

An outstanding feature of this whole package is the time response monitoring system, which constantly measures your response speed for individual letters, then uses this information to tailor the following exercises to your needs. Letters you type slowly show up more often; letters you type quickly are used less frequently.

Other features include Help screens which get you past indecisive moments, menu prompts, a comprehensive instruction manual, and graphs that visually depict your accuracy and speed levels. The main menu provides these lesson choices: alphabet keys, number keys, word test, numbers test, standard speed test, status report, introduction, help, and graphs.

As for support, there's good news here, too. You can call a toll-free number when you need additional help. Kriya Systems also permits you to make one free backup copy, and offers a replacement disk policy in case of total disk wipeout.

To date, I have used five or six other typing tutor programs, but *none* of them match *Typing Tutor III* in terms of design, effectiveness, complexity, or cost. At $49.95, the price is a little steep, but when you buy instructional software, you should always get the best you can possibly afford. *Typing Tutor III* is definitely the top of the line.

TYPING TUTOR; WORD INVADERS

Academy Software
$24.95

Overall Rating	B+	A	*Reliability*
Ease of Use	A	A	*Error Handling*
Documentation	B-	B+	*Value for Money*

Academy Software sells the two programs *Typing Tutor* and *Word Invaders* together. The combined package makes a good typing course. You start by reading the short instruction booklet, which introduces you to the programs and tells you how the course works. More importantly, it teaches you the home keys, finger positions, and correct posture. After booting the program, the first level presents three rows of f's and j's (two of the home keys) and spaces in a box located in the upper half of the screen. You must type the same rows (including spaces) and hit Return at the end of each line. The program counts your errors and displays your words per minute (w.p.m.). If you didn't take overly long and made no more than a reasonable amount of errors, you automatically advance to the next page of that level. The program asks you to repeat any page that you don't satisfactorily complete.

Each level has ten pages. Each subsequent page either adds new letters or mixes them up more thoroughly. The last page of each level consists of an exam. If you complete the exam within a reasonable amount of time with no more than four errors, the program plays the graduation tune and advances you to the next level. If you fail the exam, the program takes you back about five pages for a review. The first level uses only the home keys (asdfjkl;). The second level adds the letters e, i, r, and u. The third level introduces g, h, and capitals. By the seventh level, you have covered all the letters and now begin numbers. The eighth level reviews the others. When you pass the exam at the end of the eighth level, you have completed the course and will type at least 20 w.p.m. with less than four errors.

Although *Word Invaders* is a game, don't expect great graphics or sound; it's not designed to entertain you. A spaceship moves across the screen, dropping words as it goes. You must type all the words before they reach the bottom. Each time you hit the right key, the letter above it gets zapped and the gun advances one space to the next letter. If you hit the wrong key, a buzzer sounds and you try again. Because the game offers four levels of difficulty and four speeds, you don't have to complete *Typing Tutor* to play. Two levels of *Typing Tutor* prepare you for one level of *Word Invaders*. For example, if you finish the first two levels of the typing course, you can play level A of the game. To win the game on the lowest speed setting, you must type 12 w.p.m. Speed two requires 20

w.p.m.; speed three, 30 w.p.m.; and speed four, 35 w.p.m. The spaceship increases its speed to stay at least one line in front of you (matching your speed) and can keep up with a maximum speed of 100 w.p.m. If you can type that fast, you surely don't need this course.

These two programs complement each other to make an excellent teaching package. The disk version (which I reviewed) is completely menu-driven, runs smoothly, and possesses a pleasing format. I like *Typing Tutor*'s setup, organization, and method of teaching. *Word Invaders* takes the boredom out of learning to type. This great game is really fun. One problem: although the game has numerous words, it doesn't have enough to prevent you from memorizing them and typing from reflex. While this has some value in itself, I'd prefer different sets of words or the ability to add my own sets. In addition, the graphics and sound aren't spectacular, merely adequate, though they will keep you entertained. Most important, *Word Invaders* helps you learn to type.

I disagree with Academy Software when they say that this package also suits children. Learning anything takes a certain amount of effort and this course won't do a thing for you unless you work at it. I'd expect a child to tire of it in a week or so unless unusually motivated. If you're serious and willing to invest some time and effort in learning to type, I think you'll find this package a good typing tutor and well worth the money.

Music

ADD MUS'IN

Entech
$39.95
Studio 64 required

Overall Rating	C	B	*Reliability*
Ease of Use	C	C	*Error Handling*
Documentation	D	C	*Value for Money*

This extension of *Studio 64* lets you take music files you created with *Studio 64*, and put them into your own programs. (For a description of *Studio 64*, look for the review in the Home/Personal section of this book.) To test it out, I wrote a short song. Then, I tried putting the song into a program; I eventually succeeded. This program does work, but has poor documentation. It gives only the bare bones—and is slightly inaccurate as well.

The package actually contains two programs. One lets you test your music file, and choose what speed and feel you'd like it to have. The other loads the music file(s) you want to use into a place in memory. To get your song into another program, you must copy part of this loader into that program. These five lines of BASIC code read in your music file from the disk. In order to hear your song, you must use a SYS or Poke command.

The documentation tells you to change the file names to be loaded (contained in lines two and three). Unless you name your song file "Master," you must change "Master" to your files' names. This isn't a problem, but lines two and three contain fatal errors. When you load a program from within a BASIC program, the original program restarts at its first line. If you follow the documentation, your new program (with the song file) will just keep loading in the song file, over and over and over. You need an If...Then statement to break the loop. Unfortunately, that's not the way the lines read.

For those who don't understand what I just said, you probably don't know enough about programming to make this program work. Pass it by until you learn a bit more. Also, Entech does not let you use their five-line code in a commercial program. If you want to do this, you must sign a licensing agreement; if you just write programs for your own use, there's no conflict.

MASTER COMPOSER

Access Software
$39.95

Overall Rating	B	B	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	B	B	*Value for Money*

Master Composer allows you to compose complex, three-voice music in sheet music form and then play it back. Coupled with the ability to modify the waveshape characteristics of the SID sound chip, the program is quite versatile and moderately easy to use. It has its own form of beats and measures that control timing during playback. Up to 127 measures make up one block, and each of these sixty-four blocks can be arranged in any order so that it's simple to repeat sections of music. By defining one or two measures as a block, you can make changes in timing so that trills and triplets, or rubato and ritards are possible.

You enter music on a screen that represents one measure on a musical staff. While only one voice is shown at a time, you can use the function keys to reach any of the other three. The cursor keys are used to position note entry. Rather than choose the duration of the note, sound continues until the next note in the same voice is played. Guide marks at the top and bottom indicate durations of sixteenth and quarter notes. Thus if you were to place markers four units apart at the appropriate pitch level on the staff, you would get quarter notes. You can easily stop the sound with a rest. The voices are chosen by number (1, 2, or 3); sharps, flats, and naturals can also be added. Since the program only allows one note for each voice at any time marker, changing a note in a particular voice automatically erases it at its previous position. When you are finished, you can easily look at the staff and read the composition or play that measure with the "*" key.

All three staves are displayed during playback. The notes for each voice are depicted in a different color and are plotted one at a time. It probably wouldn't be so confusing if notes from the previous pass were erased before plotting the current notes. Information at the top of the screen shows the current page, block, and measure positions as well as a running clock which

starts at the beginning of the composition. You can also fine tune the computer. A separate screen allows for adjustment of waveform and all of the parameters for each voice of the SID chip. You can even print compositions to any line printer, measure-by-measure.

The fifty-four-page instruction manual covers everything you need to know—and then some. It has a good, easy-to-read tutorial and explains how you can use your compositions in your own BASIC programs. Enough technical information is supplied for programmers to customize their playback.

A number of sample compositions come with the disk. Among them are *Fur Elise*, a *Brandenburg Concerto*, *The Entertainer*, and *Bill Bailey*. They clearly show the power of the system.

Master Composer is definitely one of the better musical programs that I've seen for the computer. While it is moderately easy to use, musicians who are used to seeing and entering actual note values may find the notation annoying. Also the cursor movement keyboard entry system becomes tedious to use with even short compositions. I think programs like *Music Construction Set* are more likely to catch on with musicians.

MUSIC COMPOSER

Commodore Business Machines
$19.95
Stores data to Datassette

Overall Rating	D	B	*Reliability*
Ease of Use	D	D	*Error Handling*
Documentation	D	D	*Value for Money*

Music Composer allows you to create and play back your own musical compositions as they are displayed on a scrolling sheet of music. The program is versatile in that it can use all three voices simultaneously, allows you to choose from three different sounding instruments, and has the ability to repeat phrases automatically. However, entering music is a chore and the *Composer* only supports Commodore's Datassette for storage.

You enter music by line numbers, like a BASIC program. You must indicate the voice, octave, and duration of each note. Since all three notes for each of the voices have to be entered in one place, you have to do a lot of typing just to produce one chord. For example, the following sequence produces a single quarter note chord in the second octave for three voices:

V102QGV2#CV3E.

Fortunately, you only need to enter octave and note length changes when you need them. Of course things become much simpler if you choose just a single voice.

A piano keyboard option uses two rows of the Commodore keyboard, but this is never linked to a record option for easy entry. It is too bad that this program has about the hardest entry system that I have ever encountered, because the scrolling sheet music (upon playback) is actually fun to watch. I would pass on this cartridge. A lot of available new programs are much easier to use than *Music Composer*.

MUSIC CONSTRUCTION SET

Electronic Arts
$40.00

Overall Rating	A	B+	*Reliability*
Ease of Use	B+	A-	*Error Handling*
Documentation	C-	A	*Value for Money*

Music Construction Set leaps far ahead of its predecessors. It eliminates the need to enter musical notation using the keyboard, and instead employs a moving "hand" that roams about the screen, capturing the various musical symbols, and transporting them to the staff. You can find virtually everything you need to write down music: notes, rests, clefs, ties, dots, and so forth.

The program boasts flexibility as well. You can use a joystick or koala pad to guide the pointing hand, or the keyboard if you lack these peripherals. The iconographic gauges that the pointer manipulates adjust the volume, sound quality, and music speed. Similarly, nine icons represent different functions. For example, the home icon takes you back to the beginning of your composition. The disk icon lets you save or retrieve files. Symbols for scissors and a glue bottle (the cut and paste icons) represent two powerful functions that let you edit and repeat small portions of musical notation that, otherwise, you'd have to write each time. Using these two functions, you can even combine two separate music files.

Keyboard shortcuts also save time. Rather than moving the hand up and down the screen (grabbing and placing notes), you can produce the same results with a few keystrokes. Confining the roving hand to the staffs eliminates a lot of travel time. You can use one or both available staffs, and choose between treble or bass clef. Two and a half measures appear on the screen at all times. The arrow icons permit both left and right movement, and you can easily transpose your music into any key as long as the highest and lowest notes do not exceed the machine's voicing limits. You get four time signatures, a note indicator, and a beat counter.

To play the music, employ the piano icon. The music scrolls across the screen as it plays. The volume and sound gauges give you flexible musical tone. You can use thirteen different settings: eight mimic particular instruments like the harpsichord, oboe, flute, and organ, and five create percussion and special effects. A

keystroke command triggers the note indicator, which both names and plays the note, facilitating placement on the staff. Finally, you can print out your music with a dot matrix printer.

Significantly, this program (and others like it) separate music from musicianship. Prior to the advent of the home computer, anyone interested in music had no choice other than to learn to play an instrument. *Music Construction Set* lets you focus on the elements of music, such as melody, harmony, and rhythm, rather than mastering the technique of playing piano, guitar, or violin. The computer won't replace musicianship, but it will help people become better musicians.

This program has other applications, too. Music texts come alive with *Music Construction Set*. A student who cannot play can hear the notes that appear on the paper after you enter them into the program. Although the Commodore 64's tone quality lacks the fine musical quality you'd desire, it still provides the opportunity to get your music down on tape so that others can hear your musical ideas. Despite the program's strong points, it does have some serious shortcomings. It does not allow standard, acceptable musical notation. For example, you cannot beam eighth, sixteenth, and thirty-second notes together, which means you can end up with a fairly illegible composition. Also, chords must contain only notes with the same durational value. This means, for instance, that you can't combine a whole note in the bass with three-quarter notes above it, and can't make triplets.

Also, users must carefully put the correct count of notes or beats in every measure. The program will play despite mistakes in your count, but the beat counter will not synchronize with the scrolling graphics. Advanced users will notice many other inconveniences. The most annoying aspect is the software's significant alteration of the world of music to accomodate the computer.

The program contains another serious limitation: it handles only 700 elements per staff. That may sound like a lot, but when you start to build multiple voices and chords, the limit quickly creeps up on you. *Music Construction Set* also lacks repeat functions, which would lengthen the capacity because so much music is very repetitive. Another useful addition would give you the ability to link a number of files together without having to pause and reload. Finally, the literature supplied with the package confuses more than it helps. In particular, the documentation does not cover in depth some of the special techniques involved with using this editor.

Music Construction Set represents a tremendous breakthrough in music software for the C-64. To date, it provides the most direct method for grouping musical elements together to construct musical pieces. Your interaction with the program—plucking and arranging, just like an arcade game—encourages experimentation. You experience almost instant gratification since you immediately hear and see your creation. Of course, entering long musical pieces is tedious and time consuming, but, if you've used other Commodore music programs, you'll appreciate this package's easy entry. Finally, despite its flaws, *Music Construction Set* undoubtedly complements any musical educational curriculum.

MUSIC MACHINE

Commodore Business Machines

$19.95

Overall Rating	D	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	C	D	*Value for Money*

Music Machine is a program that turns your computer into a simple keyboard synthesizer. The third row of keys, "Q" through the up arrow, becomes your instrument. You may choose your waveform, octave, and effect. By changing the effect, you can sustain notes (hold a note longer), get a richer harmonic quality with two voices (special), or play the note with vibrato (rapidly changing frequency up and down, like an organ sound). There is also an option for rhythm accompaniment where you can adjust the tempo. While this program may be an introduction to the musical capabilities of the computer, it is basically a waste of money. You would be better off investing in a Casio keyboard synthesizer.

MUSIC WRITER 64

Double E Electronics

$29.95

Overall Rating	B+	A	*Reliability*
Ease of Use	B+	A-	*Error Handling*
Documentation	C+	B+	*Value for Money*

If you're looking for an excellent C-64 music program for a budding musician or composer, *Music Writer 64* may fit the bill. Its real-time keyboard piano entry system lets even the novice musician play composer, while its more advanced keyboard entry and editing system allows you to create more complex musical compositions.

The keyboard system enters one voice at a time to the beat of a metronome. You may enter additional voices during playback of the first one to achieve three-voice harmony. The screen displays a piano, its keys corresponding to the displayed notes of music. The range is about three octaves, if you count the bass and

treble clefs. You enter three clefs into memory, one for each voice. You specify the rate of the metronome and the time signature, or beats per measure, then you set the system to record in the desired voice and play the keyboard. The metronome counts the beats in each measure, increasing the measure counter at the bottom of the screen after each one. When you are finished with one voice, you record the second and third while the previous one plays. If you make a mistake, erase that complete voice, or wait and edit it later.

You can play the music with no visuals, or watch the sheet music scroll as it plays. Since the scroll routine is slow (due to considerable memory shuffling), it plays at about one-third of normal speed. This is fine for checking your music, but not for listening. Capacity is about 12K of notes. The number of measures depends on the number of notes per measure and the number of voices. You may be able to fit in nearly a thousand measures, but I had to split one short Bach fugue on the disk into two parts.

You make keyboard entries in the visual mode on the sheet music. There are eight little status lights at the top of the screen. Each time you make an entry, a letter appears above one of the points. For example, to enter an F quarter note in octave 1, you type "F1Q." Those entries would appear above the fifth through seventh status points. Other status points are used for naturals, sharps, flats, dotted notes, clef, and completion of a measure. It is important to put the measure marks in so that you can use the Goto Measure function in the edit mode. You can erase any sequence with the up arrow key, but only before you enter the duration.

Editing is not always as simple as it looks. You can scroll to the note you want to edit, or Goto the selected measure. But you must maintain the count in each measure. If you try to correct a wrong note, its replacement must have the same duration. If you delete a note the computer will think it's just a rest, and will wait for the measure to be completed. If you have to lengthen a note, you must insert notes, then add or remove the correct measure lines to get the music to come out right. The program can't just shift notes down the line, correcting measures as it goes and building ties if notes cross measure boundaries.

You can print out sheet music if you either have a VIC 1525 or another brand connected by The Connection interface by RAK-Ware. It didn't work with a Cardco G+ Interface connected to an Epson MX-80 printer. If you do have the proper equipment you can print an entire composition or just a snapshot of the screen.

You can save and load songs from disk. One disk can hold thirteen songs. Data loads and saves are even slower than usual because the program verifies the data on the disk.

This program is one of the best music entry systems I've seen for the Commodore 64. In my estimation, the piano keyboard entry system is the easiest and most convenient system to use in a program of this kind. While it's difficult if you're prone to making errors, it does give you considerably more creative freedom since you can compose in real-time as you hear and play the melodies. The normal keyboard entry system is adequate, no better or worse than many other systems. To sum up, *Music Writer 64* is very good: a solidly reliable package with good error trapping, quite suitable for the novice musician and/or musical composer.

MUSICALC—Modules I, II, and III

Waveform

$49.95 (I), $34.95 (II), $34.95 (III), $24.95 (each template)

Overall Rating	B	A	*Reliability*
Ease of Use	C	A	*Error Handling*
Documentation	B	B-	*Value for Money*

Musicalc, a series of modular sound synthesis programs, maximizes the SID sound chip's potential, producing user-generated music. This powerful package sounds great, but its programs require endless tinkering, and entering music is tedious.

Musicalc contains three modules: Module I is the Synthesizer and Sequencer disk; Module II is the Score-writer disk; and Module III is the Keyboard disk. In addition, you can buy two template disks: African and Latin rhythms on one, new wave and rock on the other. Eventually, a Colortone, piano-like keyboard will be included with *Musicalc*'s Module IV. This device will finally simplify music entry.

Module I is the master module—the heart of the system. It turns your computer into a three-voice synthesizer and an interactive stepping sequencer. This latter feature lets you develop and repeat up to sixteen note sequences of a musical score in any order you desire. Unfortunately, you must use the keyboard to enter music. This works fine when you're adjusting the seventy tonal controls on *Musicalc*'s main control panel, but it takes all night to enter music. Ugh!

You enter music on a score screen. Picture a bar graph with sixteen notes running across the bottom, and two sections—octaves and notes (including whole notes and sharps)—on the horizontal axis. A plus sign (+) along the bottom indicates the note you are on; you move it with the cursor keys. The F1 key raises the note's value, the F7 key lowers it. Likewise, the F3 key raises the octave, the F5 key lowers it. Since all notes start at low C octave 0, there is no auto repeat; you must, for instance, type many keystrokes to reach G#

octave 4. This setup has visual advantages for beginners. Also, novices immediately hear the changes, since the program plays those sixteen notes continuously. However, this is only voice one; the user must assign link parameters with every sixteen notes. You must devote *hours* to enter a moderately long piece of music. It is certainly more visual than entering a series of numbers and letters for each note, but not simple, like the *Music Construction Set*, where you actually put the note on the staff and hear its sound as you place it.

The synthesizer controls let you accomplish endless modifications, and you can combine sets of preset melodies, and play them any way you wish—valuable features. The control panel contains switches and sliding controls which adjust waveform, sound envelop, pulse width filters, pitch, tempo, and volume controls for each of the three voices of the SID sound chip. Various keys activate the switches; once activated, the function keys adjust the slider levels. You can actually create any tonal quality of the instrument that you prefer.

The presets loaded with the program contain thirty-two different melodies. Number thirty-two, the Bach *Fugue*, plays during all of Commodore's television commercials. The others run the gamut of musical styles from reggae, to new wave, to old familiar melodies. Each sound, background beat, tempo, and tone is distinctively different. It's a lot of fun mixing one preset song with another preset sound.

Musicalc's documentation is quite thorough. Its seventy-two-page instruction book contains a very good tutorial that takes you step-by-step through several short examples. You must remember much when you use this program, but the vendor tries to ease your pain.

Module II, the Scorewriter disk, works with Module I to change your compositions into musical notations on the traditional staff. Furthermore, it prints out to a variety of line printers.

Using Module III, the Keyboard-Maker, you create your own customized musical configurations. Frankly, I wouldn't turn my keyboard into a piano-style instrument, but others may disagree. Customizing is tedious. The disk does contain over thirty preset keyboard scales spanning just about every musical form imaginable. Documentation is internal, rather than on paper, and, to be honest, I'm not exactly sure how this module works with Module I.

On the whole, *Musicalc* is a very powerful package. I'm certain that C-64 users with enough time and patience can produce spectacular results—sounds they never dreamed they could create on a home computer. Practically speaking, it's not easy to create musical compositions using *Musicalc*, but you'll have fun experimenting with and creating unusual sounds and sound effects.

NOTEPRO BRIDGE

Electronic Lab Industries

$27.95

Overall Rating	B	A	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B+	*Value for Money*

NotePro Bridge lets you take advantage of the C-64's built-in 6502 and SID chips to generate music in your own programs, without doing a lot of complicated programming. *NotePro Bridge* requires some programming experience to use, but it greatly simplifies the process of adding music to programs. Because the documentation is very well-written, you need only be slightly familiar with BASIC.

This package offers three versions of the bridge. Each one is used for a slightly different application, but all of them read in music that you've created, so your program can use it. Actually, *NotePro Bridge* lets you put in a combination of sounds that do not necessarily have to be music. For instance, you may create some great effects for a smash-'em-up game.

Unlike other packages, *NotePro Bridge* can read music written independently of its companion program, *NotePro II*. This would be a piece of cake for an experienced programmer, because the *Bridege*'s documentation explains how the program uses files. The documentation tells you exactly how it works, gives you sample programs to run and fool around with, and has a trouble-shooting section that describes possible symptoms and what may be wrong.

Electronic Lab Industries grants permission for anyone using *NotePro Bridge* to use its modules in his own programs, regardless of purpose. The authors of *NotePro Bridge* sanction the inclusion of the modules to generate the sounds in commercially-retailed software packages. This simplifies matters tremendously if you're developing software that you one day hope to market (no licensing agreements or sublicensing contracts to worry about).

I think this program will be useful to programmers who don't want to hassle with Poking a dozen numbers into as many registers, just to get a train whistle (or any other sound, for that matter) into a program. For the average user, this program might be a bit much. You do need to know a little bit about programming to get started. The documentation supplies a lot of helpful information, so you don't need an advanced degree in Computer Science. In my estimation, *NotePro Bridge* is a good program for the money.

NOTEPRO II

Electronic Lab Industries
$49.95

Overall Rating	B	B	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	C	B	*Value for Money*

Like many other sound generating programs for the Commodore, *NotePro II* accepts input using a musical scale on screen. After entering the notes one at a time, you can play back the music, rearrange measures, and play it again. You can edit eight measures, but only one voice (three are available) at a time. Changing voices is not a difficult procedure, though. The program handles the full eight octaves which the Commodore can generate. However, the notes do not appear in standard musical notation; they are open or filled circles, hearts, and spades.

The three voices are color coded—a nice touch, fairly standard for this type of program now—which makes following the different voices easy, since each is a different color.

You can change the type of sound played using the Preset option. The standard ADSR modifications change the shape of the waveforms generated. You can choose a triangle, sawtooth, pulse, or noise waves. You can alter the pulse width, and place four different types of filters on any voice. You can set up sync and ring as well.

This package has all the features of most good music synthesis programs. It does not reconfigure the keyboard to play music like a musical instrument. The documentation does not explain why you'd want to adjust any preset information; it merely explains how to do it. A sound change accompanies each change in the ADSR or waveform. The documentation does not tell you how to modify a sound to get the results you'd like. Of course, you can save the music and presets to disk or tape, and reload later for further editing.

An experienced synthesizer player might find this program useful. It's a low-cost system which helps someone who has a pretty good idea what he is doing. For the casual musician, though, I wouldn't recommend it.

SONGWRITER

Scarborough
$40.00

Overall Rating	A-	A	*Reliability*
Ease of Use	B-	A	*Error Handling*
Documentation	A	A	*Value for Money*

Songwriter is a disk-based program that allows you to create music. Unlike most such programs, it does not use standard musical notation. The reason, according to the manual, is that "musical notation is not easily understood and requires the user to have a significant amount of prior knowledge about music," as well as presenting "a distorted visual picture of music." *Songwriter*'s approach attempts to overcome such failings, though you still can see the names of the notes as they appear onscreen.

When you boot up the program, what appears across the screen resembles a section of a piano keyboard. Behind this, extending above and below, is a vertically moving work space. The music you enter via the keyboard is transferred to this area and "played back," much like a player piano with tunes punched on rolls of paper.

To enter music, you must move a cursor using either the [and], or > and < keys. (You also have the option of employing a joystick.) You change the size of this cursor in order to indicate the duration of a note. A wide selection ranges from a whole note (with a value of 1) to a "1/48th" note. The keyboard ranges over two and a half octaves, but you can create music with only one voice at a time. At first glance, this may seem unnecessarily restrictive, but it actually isn't since you can create the effect of multi-voice harmony by rapidly jumping from one voice to another. You may save your musical "ideas" as well as entire pieces to disk; furthermore, you may append one work to another. You can manipulate both the tempo and quality of sound while pieces are playing (though this information cannot be stored).

The program uses 50K for storage, the operating system, and system buffers, and 14K for music storage. The maximum number of notes allowed per piece is 7,000. You can store up to fifty-four songs and/or musical ideas on disk. The *Songwriter* disk comes with thirty songs, including "Row Your Boat" and a version of "Flight of the Bumblebee."

You can carry out most of the program's commands for creating and editing music with single keystrokes and an unusual system of mnemonics: "X" erases a note, "C" continues playing the song, "O" records a rest, "P" plays the piece, and so on. Some of the advanced commands might be rather complicated for younger users, so the program may require parental guidance.

When you press "G," you get a list of options that includes saving and loading songs and ideas, adding (appending) songs, naming notes, starting a new song, and formatting a new disk. This all takes place away from the main work area. Some of the prompts supplied in this section could stand improvement. For instance, pressing F1 allows you to escape back to the work area after choosing either the Load or Save options, but there is nothing onscreen that indicates you can do this. And selecting the Start New Song option takes you to the work area, where you may not wish to be if you want to load in a new tune.

One of the things *Songwriter* sorely lacks is a Help screen. Constant onscreen references refer you to several of the major keys used as commands; however the only way to figure out what these signify is to either consult the manual or the interior of the program's package (which serves as a reference card).

One of the manual's few shortcomings is its description of how to erase songs from the disk: it tells how to scratch one song, but says nothing about subsequent ones or how to close the file that you must open when performing this operation. Another aspect to which I object: all disks created with the program have the same name and ID, which could lead to confusion.

The disk is copy-protected via an error on Track 1, a procedure which may cause drives to go out of alignment. Quite hazardous. The manual claims the disk is also write-protected, but I encountered no problems writing to the disk. An added feature is a cable that plugs into the audio-video connector, allowing you to play the music through your stereo. (This is useful only to people who use their 64s with a TV; people with monitors already have this option.)

The company offers a warranty for thirty days; after that time, you can replace damaged disks for a nominal charge of $5.00. On the whole, *Songwriter* is an excellent program with plenty of creative applications, as suggested by its top-notch, literate, and logical manual.

STUDIO 64

Entech
$39.95

Overall Rating	A	A	*Reliability*
Ease of Use	B	A	*Error Handling*
Documentation	B	A	*Value for Money*

Studio 64, one of the nicer music-generating programs for the Commodore 64, makes two rows of keys a musical keyboard. Consequently, it lets you "record" songs by playing them on the keyboard, changing sound parameters as you go along. The keyboard's "ASDF" row is white keys, its "QWER" row black keys. Like a piano keyboard, no "black" keys exist between notes E and F, or B and C.

As you enter music, a musical scale on the screen identifies the notes you play. You choose whether the notes appear on a bass or treble clef. You press a two-key combination to change octaves (the program supports eight)—convenient and necessary, since the keyboard is only about an octave and a half wide. You can use a Help screen to identify which keys to use to change the sound quality.

Although the program lets you use three voices, you must enter the notes one voice at a time. After you enter them, you can press a key to play the song back. You can enter rhythmically correct notes, or let the computer choose the note values, just as though you were playing a piano in real-time. You can hear the other voices as you enter notes. The edit mode makes synchronizing the lines easier; you can see all three voices together, and make any necessary adjustments.

A tempo adjustment speeds up or slows down the playback. Like most good Commodore music programs, this one lets you change the ADSR settings, waveforms, filters, resonance, sync, and ring modulation for each voice. It even has a tuning feature, which tunes your Commodore with another instrument.

You can save songs on disk and retrieve them easily. Saving music also saves the synthesizer settings for the voices, so you don't lose the sound quality. In the editing mode, you can delete, copy, or move sections. However, this feature has one restriction: you can't move a section backwards in the piece. You must move and copy blocks to a later point in the music, but most programs available have this limitation.

The adequate documentation has no illustrations. Graphics demonstrating what the screen should look like would be a welcome improvement.

All in all, this is a nice music synthesizer. Adding two announced programs, *Add Mus 'In* and *Lead Sheet Writer*, will really make this program shine.

SYNTHY-64/ SYNTHY-64 COMPANION ALBUM

Abacus Software
$29.95 and $12.95

Overall Rating	B	B	*Reliability*
Ease of Use	B	B	*Error Handling*
Documentation	B	B	*Value for Money*

Making music on the Commodore 64 is no easy task, thanks to the number of SID chip-related inputs which you must make, plus values for notes. Abacus Software's *Synthy-64* successfully simplifies this problem.

This machine language program, which uses about 5K of memory (leaving around 33,700 bytes for music creation), loads itself into protected memory areas when booted up. At this time, the disk drive gets excited about an error placed on Track 1 to discourage copying, which badly affects its alignment.

You can then enter music using the program's own peculiar version of BASIC, which includes many standard BASIC commands. You enter notes by typing the note name, octave, and other information indicating sharps, flats, naturals, and duration. For example, "C#5/4" indicates C sharp to the right of middle C, with a quarter-note duration. When you run the pro-

gram, *Synthy-64* interprets the pseudo-BASIC program, and plays the composition.

You can create music using all three voices simultaneously, and apply all sixty-four parameters, such as waveforms, filters, ADSR (attack, decay, sustain, and release), to each voice. Notes' lengths can range from a whole note to a sixty-fourth note, and the program allows dotted and double-dotted notes, and triplets. You can tie notes and control key signature, tempo, and volume.

As you might expect, *Synthy-64* is not a musical tutor: it assumes you know the fundamentals of musical notation and theory. It's mainly for transcribing music from sheet music or scores, rather than creating music, since you have no score-like grid to refer to on the screen. Anyone who wants to compose using the program must write his piece on music paper first, unless he's extremely diligent and patient.

Transcribing some two- and three-part Bach Inventions produced reasonable success. Three-part harmony was somewhat tricky, since you must remember to think about voices which sound simultaneously. Certain combinations of notes cause irregular tempos, but I might have entered notes the wrong way. Trills (rapid alteration between one note and the next higher note) seem to cause irregular tempos when combined with a second voice. The voices also went out of synch on one occasion, but I corrected them by adjusting the tempo one unit faster. Unfortunately, you cannot listen to each voice separately to debug a multi-voice composition.

The well-written lists sample programs on the disk. A single page with all the basic commands, a reference card, or any form of "cheat sheet," would also help.

Abacus produces a *Synthy-64 Companion Album* for $12.95, containing thirteen arrangements of classical pieces by composers of the fifteenth to eighteenth centuries, such as Bach, Scarlatti, Handel, and Couperin. As well as providing a pleasant listening experience (the pieces play one after the other, thanks to the program's auto-loading feature), it also gives some examples for people who want to study how to create music with *Synthy-64*.

Vendors

Abacus Software
P.O. Box 7211
Grand Rapids, MI 49510
(616) 241-5510
p. 111, 119, 407

ABRASCO
(See 3R Import and Export Corp.)

Academy Software
P.O. Box 6277
San Rafael, CA 94903
(415) 499-0850
p. 399

Access Software
925 E. 900 S.
Salt Lake City, UT 84105
(801) 532-1134
p. 134, 170, 176, 190, 401

Activision, Inc.
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
(415) 960-0410
p. 157, 164, 165, 167, 177, 224, 260

Adventure International
P.O. Box 3435
Longwood, FL 32750-3435
(305) 862-6917
p. 284

American Educational Computer, Inc.
2450 Embarcadero Way
Palo Alto, CA 94303
(415) 494-2021
p. 296, 301, 303, 304, 306, 310

Arrays, Inc./Continental Software
11223 S. Hindry Ave.
Los Angeles, CA 90045
p. 42, 106, 368, 381, 382, 389, 397

Atarisoft
Atari, Inc.
1399 Moffett Park Dr.
Sunnyvale, CA 94086
(408) 745-2000
p. 162, 179, 180, 191, 217

Audiogenic, Ltd.
P.O. Box 767
Orange, CA 92666
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   1-2 years ____ More than 5 years ____
2. What brand and model of computer do you own?
   Type 1 Brand: _____ Model: _____
   Type 2 Brand: _____ Model: _____
3. Is your computer used in the:
   Home ____ Both ____
   Place of Business ____
4. If used in the home, in which room is your computer kept? (Example: family room or den)
   _____
5. If your computer is used in both the home and business, please indicate what percentage is devoted to each category.
   (Example: Home 50/50 Business)
   Home _____/_____ Business
6. Who in your household uses the computer?
   Yourself ____ Children ____
   Spouse ____ Other (Specify) ____
   _____
7. How many hours a week do you personally spend using your home computer?
   Less than 3 hours ____ 10-15 hours ____
   3-5 hours ____ 15-20 hours ____
   5-10 hours ____ 20+ hours ____
8. Approximately how many hours a week do others spend using your home computer? (If applicable)
   Less than 3 hours ____ 10-15 hours ____
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   5-10 hours ____ 20+ hours ____
9. Where do you purchase most of your computer books?
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   Computer Store ____
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   Other (please specify) _____
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    _____
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21. What are your interests and hobbies?
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