InfoWorld's ESSENTIAL GUIDE TO ATARI®

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INFOWORLD'S ESSENTIAL GUIDE TO ATARI COMPUTERS

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InfoWorld's

ESSENTIAL GUIDE TO

ATARI COMPUTERS

Scott Mace *and*
the Editors of InfoWorld

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Preface

Welcome to *InfoWorld's Essential Guide to Atari Computers.* This book will
help you get the most out of your Atari computer. Whether you already own an
Atari system or are trying to decide which computer to buy, we think you'll find
this guide essential.

As a buying guide, it will help you get the most for your money and discover
hidden costs you might overlook. After reading this book, you should have a
good framework on which to base buying decisions.

If you already own an Atari computer system, you'll want to keep this book
next to it as a resource of additional information.

To make this guide easy to use, we've divided it into two major parts: an
overview of Atari computers and reviews — a representative sampling of hard-
ware and software products. Part 1, the overview, is divided into sections, with
an explanation of what's in each section. In Part 2, the reviews — which follow
InfoWorld's well-known, well-respected format — are arranged by general
applications, such as Words and Numbers.

With this arrangement, you can read the whole book straight through or
skip around to various areas that especially interest you.

In the back of the book, you'll find a glossary.

Prepared by the editors of *InfoWorld*, noted author Scott Mace and the
InfoWorld product-evaluation team, this guide to Atari computers should be on
every Atari user's bookshelf.

Contents

Part 2
REVIEWS

Part 1

OVERVIEW

Getting Started

Starting as a video-game company and evolving into computer production, Atari has had a turbulent history. In this section, we'll trace that history.

We'll also take a brief look at buying considerations: what to buy for your needs, where to buy it and how to put it all together.

Atari — More than a Game Company
The World of Atari Software and Hardware
Buying and Setting up Your Atari Computer

ATARI — MORE THAN A GAME COMPANY

Despite being a veteran in the personal-computer business, Atari is known primarily for its video games. The company has done nothing to dispel this image. In fact, it spends most of its advertising dollars promoting the latest video games for its game machines.

Atari is more than a video-game, cartridge-making company, though. It makes a line of computers, peripherals and software that rivals or surpasses the price, quality and variety of home-computer equipment made by its competitors.

Bad management decisions and bad luck have caused setbacks for Atari in the personal-computer market. Some industry observers feel that Atari would be the home-computer-industry leader right now if circumstances had been different. It remains to be seen whether Atari can continue to be a leading player in the home-computer market. At the 1983 International Summer Consumer Electronics Show (CES) in Chicago, the company revealed a revamping of its computer line, announcing four new home computers, new disk drives, new peripherals and new software. Unfortunately, the company ran into production problems in the fall of 1983; two of its computers were never shipped, and the two that were produced were limited in supply. Many of the problems were attributed to Atari's transfer of its manufacturing and assembling facilities to Hong Kong, Taiwan and other points east.

Unlike Apple Computer, Atari has lost most of its original hardware designers. Some Atari fans claim the Atari 800, designed by those now departed from the company, represents the best Atari home computer. They think the new technical staff's inexperience has diminished the quality of Atari's newer ma-

chines. We think the newer Atari machines are more powerful and compact than the Atari 800, however, and Atari has demonstrated that it still knows how to build top-notch home computers. Software for its machines is better and more plentiful, and in many ways that's what really counts.

Although it is impossible to say for certain whether Atari will be making home computers for years to come, the company's new management has resolved many of its key problems.

The home-computer industry is richer because of the innovation and effort Atari has expended on its home-computer line. This book will introduce you to the world of Atari hardware and software, uses for the Atari computer, users' groups dedicated to Atari equipment and the network of sales and support that makes Atari home computing happen in this country and worldwide.

The Atari home computers

For the most part, the various members of the Atari family of home computers can use a base of software that is compatible from machine to machine. When we refer to *software compatibility*, we mean that most programs written for the older Atari 400 and 800 computers can run on the newest computers, the 600XL and the 800XL. Compatibility also means that programs written today, if they are written correctly, should also run on the older machines.

If you use your computer frequently, you have probably invested in a significant number of software programs. The dollar value of the software may far exceed the original cost of the hardware. Say you want to get a new computer. If the software you already own cannot run on a different machine — that is, it is incompatible with other machines — you will have to reinvest in new programs as well as lay out money for new hardware.

The situation is comparable to your record collection and stereo system. If, over a five-year period, you bought 20 records a year to play on the same stereo, you could end up with more money invested in your records than in your stereo system itself.

Now imagine that a new stereo comes out, and you decide to buy it because it's fancier or because no one is using the old kind of stereo anymore. Fortunately, your record collection, your main investment, will play on — be compatible with — this new system.

What if you had bought all 8-track tapes instead of records, though? Eight-track tapes are no longer popular, and most modern stereo systems no longer include an eight-track player. Luckily, you'd still be safe. Stereo parts are sold in component form, and you would probably be able to hook up an 8-track tape player to your stereo.

Things aren't so simple in the computer world. Quite often, two different computer models, even if they are made by the same manufacturer, are incompatible, so your original software investment pays off only on one machine.

One of Atari's greatest strengths is the software compatibility it has designed into its family of computers. A few general exceptions exist, however. If

the software doesn't use standard machine instructions, called vectors, it may run perfectly well on an Atari 800 and not run at all on an Atari 1200XL.

If the operating system — the traffic cop that finds information in memory and ushers it through the control center of the computer — varies from machine to machine, earlier software that does not follow the original Atari vectors won't operate on Atari's newer operating systems. The operating systems in the 600XL and 800XL, for example, are different from those of Atari's original home computers. Fortunately, Atari has a diskette called The Translator, which uses a tiny bit of the XL computer's memory to simulate the older operating system. With this disk, you can run the nonstandard older software.

In its later computers, Atari uses a more advanced chip, called the GTIA, to run graphics. The GTIA adds some additional colors and graphics to Atari computers. A few programs require that you have the GTIA installed in your older Atari 400 and 800 computers. If you get one of the older computers, try to run a program that requires the GTIA. If the program doesn't run, you should contact Atari Corporation to have a GTIA installed.

Atari has produced five computers since 1979. (Atari also makes two other computers that are not covered in this book: the 2600 and the 5200, which have no keyboards and only work with cartridge video games.)

	400	800	1200XL	600XL	800XL
Discontinued	yes	yes	yes	no	no
Keyboard	Membrane	Full-stroke	Full-stroke	Full-stroke standard layout	Full-stroke standard layout
RAM	16K	48K	64K	16K-64K	64K
ROM	10K	10K	14K	24K	24K
Built-in BASIC and diagnostics	no	no	no	yes	yes
Function keys	yes	yes	yes	no	no
Interface module required	yes	yes	yes	no	no
Cartridge slots	one	two	one	one	one
Joystick connectors	four	four	two	two	two
Parallel bus	no	no	no	yes	yes

The origin and evolution of Atari

The name *Atari* is derived from the ancient Japanese game Go, which ranks with chess as one of the world's master strategy games. In chess, the word *check* signifies that your opponent is in danger of losing the game. The word *atari* serves a similar purpose in Go, politely warning an opponent that he is about to be engulfed.

The company called Atari was born in the heart of California's Silicon Valley, an area south of San Francisco named for its high concentration of silicon-chip semiconductor and integrated-circuit technology that propelled a startling performance increase in computing power. In the Valley, companies rapidly rise from nothing to engulf new markets based on new technologies. The company has a fitting name, symbolizing the games that continue to make up the bulk of its sales and the entrepreneurial spirit that gave birth to the firm. That spirit has inspired a host of Atari-like companies, virtual clones churning out video games as fast as they can make them. Many of these companies are headed by former Atari executives, eager to cash in on the marketing and engineering training they received at Atari.

Founding father

Atari's prime marketer/engineer/entrepreneur, and its founding father, is Nolan Bushnell. Bushnell was an engineering student at the University of Utah when he became interested in video games.

At that time, in the late 60s, video games were played on mainframe computers at colleges such as the Massachusetts Institute of Technology (MIT) and Stanford University. The earliest video game that we know about was Spacewar, written by a student at MIT in 1962. Variations of Spacewar followed, but they were curiosities, not money-makers; no pinball arcade operator could afford to install them.

Bushnell saw the potential for a video-game machine to compete with, and eventually replace, the aged pinball machine. A cathode-ray tube would take the place of the pinball playing board.

In the early 70s, Bushnell was working as a computer engineer in Silicon Valley. Starting with $500, Bushnell formed a company called Syzygy and tried, in 1972, to market a video game called Computer Space. It flopped, so Bushnell changed the company name to Atari and worked feverishly on a game called Pong.

Pong was simple. Two players each controlled a movable paddle, represented as a bar of light on the TV screen, and they volleyed a smaller blip (the ball) back and forth, trying to send it past the opponent's paddle.

When Bushnell tried out his first Pong prototype in a Sunnyvale, California, bar called Andy Capp's, so the story goes, the machine jammed several hours after it was installed. It wouldn't work because it was crammed with quarters.

Pong was an instant success, but Atari soon had to contend with look-alike Pong machines that eventually took the majority of the public's quarters. In

fact, the financial success of Pong was relatively short-lived, and Bushnell had to come up with a winning sequel. The company nearly went broke in the process, but Bushnell was enthusiastic about the new business and full of ideas. Tank followed Pong, and Atari's creativity, so vital to success in the new industry, seemed assured for the moment.

Video wars heat up

Bally/Midway, a company located in Chicago, scored next, with the more sophisticated Space Invaders, an import from Japan, a country that would provide many of the innovative arcade video games in the years to come.

Then Atari struck with Asteroids, a game with opponents coming at the player from all sides of the screen. Other games followed, but none had a greater impact than Pac-Man. Here was a game with less violent overtones than the earlier shoot-'em-ups, and it was wildly popular, even with women and girls, who had traditionally shunned video and pinball games. The ever-hungry yellow Pac-Man and his four-colored opponents were another product of Japan and Bally/Midway, but Atari quickly grabbed rights to the home versions of the game.

When the Magnavox Odyssey game system was introduced in 1972, video games began to move into the home. First came small boxes that played only one game, such as Pong. It soon became evident that developing a box, a computer, that could play different game software cartridges would be more popular and economical.

The winner: Warner

To develop such a system, and to support the ever-increasing burden of running the research, manufacturing and marketing arms of Atari, the directors decided to sell the company to a larger corporation. Several prospective parents came to call, but the winner was Warner Communications, headed by Steven Ross. In 1976 the sale was concluded for $29 million. Bushnell, the majority stockholder, received quite a return on his original $500 investment. Though he stayed with the company as vice-chairman for a time, Bushnell eventually was pushed out of Atari's boardroom in a feud with Emanuel Gerard, Warner's point man in Atari affairs. Bushnell had lost his enthusiasm for managing the operations of Atari, anyway. When Bushnell finally left Atari, in 1978, Warner made him agree not to compete in video-game and computer technologies until late 1983.

Warner brought some order to the overly relaxed, anarchic situation at Atari's Sunnyvale headquarters. Not everyone within the company approved of the new corporate edicts coming down from high, or of the suit-and-tie demeanor of Raymond Kassar, the new Atari CEO. But outsiders were impressed, and profits at Atari began to rise.

In 1977 Atari released the Video Computer System (VCS), a box with a slot for a solid-state game cartridge. The box plugged into television sets and came with an adapter that let users hook it all together and switch between watching television and playing video games.

The VCS contained a simple computer, and the game cartridges typically contained 2000 to 4000 bytes of memory, enough for only the simplest video games. The VCS console contained no keyboard, only a reset button and two game-option switches. But it was a match for the Odyssey and other early home video-game players.

At first, in 1978, the VCS sold poorly, and stacks of them piled up, unsold. But the new Warner-selected Atari management mounted a blitzkrieg advertising campaign to promote the VCS and dropped its price to under $200. Sears agreed to sell a compatible version of the machine under its own label. In 1979, the VCS took off, and sales headed for the millions. By the end of 1983, Atari had sold 16 million of them, and analysts estimate that 50% to 80% of them are still in use.

That consumers would eventually move away from the single-purpose video-game player toward multiuse home computers was a fact Atari realized.

Nevertheless, Atari delayed introducing its own line of home computers until 1980 — even though the Altair had opened the era of home computing in 1975, and the Commodore PET and Apple II computers, wholly self-contained systems, had made their debut in 1977. Still, Atari's entrance into the home-computer market was realtively early; IBM and many others still looked upon the market as too primitive and risky to invade.

Atari computers debut

Atari's early success in the coin-operated and home video-game business gave its home-computer products a highly visible advantage over those of competitors such as Radio Shack and Mattel. Later, when the video-game business went sour, Atari's game image worked against the company. In the early 80s, though, Atari correctly diagnosed that games were the primary use of computers in the home, and it designed its computers to take advantage of that fact.

Atari computers evolve

The Atari 400 and 800 computers were based on the 6502 microprocessor, developed by MOS Technology (now a part of Commodore) and now made by many companies. Apple and Commodore also used the 6502 in all their early home computers. The chief reason, as Apple's Steve Wozniak was quick to point out, was that the 6502 was inexpensive and in plentiful supply compared to the more powerful chips that would be used in business computers.

The designers of the 400 and 800 added some features to their computer that the PET and the Apple II lacked. To give the Ataris good graphics, they added two chips, ANTIC and POKEY, dedicated to churning out enhanced screen images. The Ataris could also generate four-channel sound, as opposed to the Apple's one-channel capability. Thus the Atari could produce four-part harmony, a feature not available before.

As evidence that the Atari computers were meant to play games, look at another feature unique to Atari home computers: ports for four game controllers (paddles or joysticks) on the front of the computers.

Many of the assumptions Atari made in the early days are now easy to question. The 400, the lower-priced of the two models, has a terrible keyboard, with flat-membrane instead of "full-stroke" keys. Its keys have no "touch feedback," meaning that, without looking at the screen, you can't tell if you have pressed a key. The 800 has an adequate keyboard, but it doesn't feature the standard IBM Selectric key arrangement.

When Atari created these computers, the personal-computer market was in its infancy, and companies could make mistakes and survive. Atari fared better than Texas Instruments, which put an even worse keyboard on its 99/4 computer, used its own nonstandard chips and then proceeded to overprice the computer.

Another mistake Atari made was that software for the Atari VCS (renamed the Atari 2600) wouldn't run on the 400 or 800. Technical problems prevented compatibility, but for a long time, Atari refused to admit that home computers and video-game systems even competed with each other. It was obvious, though, that they did.

Furthermore, Atari wasn't finished developing video-game systems. The 5200, which appeared in 1982, offered more powerful graphics and memory than the 2600 did. Some critics said it was no more than a keyboardless Atari 400. The 5200 came out at a time when the industry was changing, moving away from game machines toward low-cost home computers such as the Texas Instruments 99/4A and the Commodore VIC 20.

Early sales of the Atari 400 and 800 home computers were satisfactory. The machines rolled off the U.S. assembly lines with relatively few bugs, and they were in short supply for several Christmas seasons. Software was largely limited to games and peripherals that were not really as varied as those available for the Apple II, which was a chameleon computer. The Apple's insides revealed a series of slots that accepted hardware cards — everything from internal modems to 80-column text cards.

Atari computers funneled many of their peripherals through an interface box that raised the cost of the total system, multiplied the necessary number of cables and hogged a power outlet of its own.

Still, the Ataris, especially the 800, received rave reviews from educators and home-computer enthusiasts. These computers were trendsetters when they first appeared. An attempt by Atari to sell 800s to small businesses was a flop, however, not because the Atari machines weren't as good as Apples, but because Atari's fun-and-games image diminished the machines' appeal to businesses.

Changing fortunes

In 1981, Atari could do no wrong. The VCS sold well, the home computers shared the industry lead with Apple, and Atari's coin-op division turned out hit game after hit game. Gross revenues at Atari hit $2 billion in 1982. Warner, whose other ventures in cable TV and movies were flagging, was boosted by Atari's profits.

Then everything peaked. For some months, Atari's growth continued, but insiders knew that things were too good to last. Upstart software companies sprang up to challenge Atari's dominance of the money-making 2600 game-cartridge market. Atari veterans founded many of these companies, such as Activision and Imagic. Talent, including the creators of the 400 and 800 computers, was leaving Atari.

The home-computer market heated up. Commodore announced and delivered a new computer, the Commodore 64, which was more powerful than Commodore's previous offerings. Atari dropped its prices to stay competitive. Texas Instruments joined the battle and upped the ante by pricing its home computer below $200. Timex picked up the super-cheap Sinclair computer, and suddenly $99 computers were in the stores. Waiting in the wings, IBM was deciding how to take its chunk of the home-computer market.

Storm clouds

Storm clouds gathered over the industry. Video-game-cartridge sales slowed, and retailers discounted their slow-moving merchandise. Atari's home-computer division had never been profitable in the early years, but the video-game-cartridge business had been enormously profitable. Still, the market reached saturation at Christmas 1982, and Atari posted substantially lower earnings, startling Wall Street investors and signaling the start of hard times ahead.

At the same time Warner announced the bad news about its fourth-quarter earnings in 1982, allegations arose that Ray Kassar had used his inside knowledge to sell his Warner stock before the bad news hit. The Securities and Exchange Commission started an investigation. Kassar denied any wrongdoing.

Things looked bleak as 1983 started. A new computer, the Atari 1200XL, made its debut, but it fell short of expectations, and worse, it could not run many third-party programs written for the 400 and 800. The 5200 game system premiered at the Consumer Electronics Show, but it failed to make an impact. Atari rushed two video games, Raiders of the Lost Ark and E.T., to market with heavy advertising, but the games were duds and failed to sell as well as the home version of Pac-Man had. New competitors such as Coleco entered the video-game-player market with more versatile equipment.

Among the few bright spots was the Atari Institute, which, under the leadership of Ted Kahn, started innovative computers-in-schools programs around the country (the program ended in early 1984). Computer scientist Alan Kay, hired in 1982, was in the Atari laboratory with a blank check to dream up innovative computers and software. Atari also hired Ted Hoff, a man who, while at Intel, had created one of the first microprocessors, the brains that power microcomputers.

The number of programs available for the 400 and 800 climbed past 1000. In addition to its regular software line, Atari launched the Atari Program Exchange (APX), a series of programs written by users and published by Atari with distinctive packaging. APX software originally sold through a mail-order catalog, but some Atari dealers started carrying the programs.

Bad news followed bad news, however, and Atari had four consecutive quarters of staggering losses. The home-computer price war continued, and when Commodore dropped the price of its 64K computer to $250, sales of Ataris and TI 99/4As plummeted. Texas Instruments tried to hang on, but in November 1983, it announced it would sell off its remaining 99/4A computer hardware and software at bargain-basement prices and leave the home-computer market.

The year 1983 was also filled with speculation about IBM's expected home computer. The biggest surprise at the 1983 International Summer Consumer Electronics Show was that IBM didn't announce a product. When IBM did announce the PCjr home computer in November and hundreds of software developers said they would write software for it, IBM seemed poised to take its share of the home-computer market.

At the summer CES, Atari quickly sought to recover from mistakes it had made with its 1200XL: the machine had no expansion port, and it could not run some Atari 800 software. Atari announced four new home computers: the 600XL, the 800XL, the 1400XL and the 1450XLD. It also announced a host of new peripherals, such as a touch tablet, a peripheral expansion box and an expansion box that allowed it to run the CP/M operating system.

The company, though, was months away from shipping much of the new equipment to stores. That summer, intending to compete more aggressively with foreign-made Commodore computers, Atari began to move its manufacturing facilities overseas, where it could produce computers relatively cheaply. The move cost Atari months of valuable time, and the new 600XL and 800XL computers were shipped to stores late and in small quantities in 1983. Fortunately for Atari, the rest of the home-computer industry was also having problems — with quality, with short supply and with the industry's image. By Christmas 1983, the home-computer industry had acquired a tarnished reputation.

In early 1984, new Atari chief executive officer James Morgan announced that the company would not sell the Atari 1400XL and the CP/M expansion box. The 1450XLD computer was also put on hold — Morgan had decided it didn't really offer anything new. He also announced that Atari would no longer announce products months before they'd be available.

Under its new Atarisoft line, Atari started to produce software for other home computers. Some observers saw this move as a sign Atari would soon pull out of the hardware-making business. A different interpretation was that Atari sought to emphasize software anyway, even with its own computers, and that an emphasis on software and quality computer equipment might be an effective way to combat the bargain-basement tactics of Commodore.

In early 1984, Atari decided to phase out the Atari Program Exchange. It laid off almost all APX employees and discontinued production of most of the software titles, although a few programs were merged into the mainstream Atari software line. Authors of the discontinued programs were free to publish their works elsewhere.

The home-computer industry may stabilize in the near future. Certainly, another shakeout is always possible. During the Christmas 1983 buying season, consumers showed that they were interested in buying more expensive computers; Apple lowered the price of its IIe computer and had a very profitable Yuletide. But at the same time, IBM's entry into the home-computer market, the PCjr, has not sold well. Apple's newest entry, the Apple IIc, extends the life of that computer but still is well out of the under-$500 price range that Atari computers occupy. Coleco's Adam computer, beset by quality-control problems and a lack of software, is also struggling to establish itself at the $750 price level.

The probable winner for the 1984 Christmas season will still be Commodore, whose Commodore 64 continues to be the lowest-cost home computer in its price range. But Atari still has the advantage of having a base of software compatible with a family of computers. Commodore's latest computer, the Plus/4, is a computer with fewer sound and graphics capabilities than those of the Atari 800XL or the Commodore 64.

As for Japanese electronics firms, which dominate stereo and video recorder markets, 1984 has not been the year for them to take a chunk of the home-computer market, although companies such as JVC, Pioneer and Sony continue work on a series of standardized microcomputers.

Atari at the 1984 Consumer Electronics Show
Atari kicked off the summer of 1984 by introducing the 7800, a high-end computer that runs video-game software. The 7800 takes special cartridges which don't fit any other Atari computer, but these cartridges contain the best-ever versions of the Atari/Lucasfilm games and old standbys such as Ms. Pac-Man. The 7800 has a special graphics chip that can generate moving objects in bigger numbers and sizes that any other home computer or video-game machine. As a bonus, Atari made the 7800 compatible with all 2600 game cartridges, which just plug right into the 7800 cartridge slot.

The 7800 may become Atari's introductory personal computer as well. The company plans to sell an optional keyboard that will turn the 7800 into a 4K computer, which will run software such as BASIC, word processing and telecommunications. The computer will not be able to run software from the Atari home-computer family, but it will be compatible with some Atari peripherals, such as printers, cassette recorders and the AtariLab science packages.

In the last half of 1984, Atari plans to introduce a high-end personal computer, as yet unnamed. But at the 1984 International Summer Consumer Electronics Show, Atari unveiled some specifications of the new computer, which is a considerable reworking of the 1450XLD announced a year earlier.

At the show, Atari also gave sneak previews of a revised expansion system, which will give 800XLs or the high-end computer various new capabilities. Among the possibilities are: expanding RAM to 128K; 80-column text display; a built-in clock and calendar that can be used, for instance, to create home security systems; and gateways to MS-DOS (the operating system on the IBM

PC) or CP/M, the operating system for which many business programs were written.

At the show, Atari president John Farrand said the company was starting to introduce "products that will stretch the imagination of the game players and the critics as well." The first of these products is the MindLink system, a device that lets a player control the action on a computer or video-game screen by using a headband instead of a hand controller or joystick.

According to Atari, the MindLink system detects slight electrical impulses generated by muscles in the forehead. The MindLink headband transmits these impulses by infrared signals to a receiver connected to Atari video-game consoles or home computers.

The software that comes with MindLink is Bionic Breakthrough, which looks like Breakout, where you control a paddle at the bottom of the screen, trying to keep a bouncing ball in play while chipping away at walls at the top of the screen. But this game demonstrates that mind control, called biofeedback by some, is more important than fast reflexes. Players move the paddle by moving their forehead muscles, but if they exert those muscles too much, the screen changes color and the paddle freezes. The player must learn to relax and smoothly move the paddle in order to succeed. After a while, the player achieves a sensitivity such that the forehead muscle movement is nearly imperceptible.

Atari won't just have games for MindLink. It will have relaxation software, working on the well-known relaxation principles of tensing and relaxing. Atari may also delve into the world of extrasensory perception (ESP).

The MindLink system is expected to sell for $100; versions for Atari computers will be available in the first quarter of 1985. Unfortunately, it requires specially adapted games, so you won't be able to wink your way through all your current Atari games.

Atari showed a number of new software programs for its home computers at the Summer 1984 CES. In Atari's Futuremakers series, players are astronauts taken on simulated space flights through the solar system and the Milky Way. This is Ground Control contains good sound and three-dimensional visual effects as you fly by the solar system's planets. Through the Starbridge brings players near simulated galactic wonders such as black holes and quasars.

Atari also announced the Milestone series, a series of high-quality learning software for Atari computers and other computers. It includes the AtariLab science discovery system previously announced. Among the new programs is Yaacov Agam's Interactive Painting, a sort of video art that generates a constantly changing screen of colors and textures. Also in the Milestones series is a program that teaches CPR (cardiopulmonary resuscitation) and Wheeler-Dealer, a simulation of an auto-manufacturing business.

Also announced at CES was a series of software developed by child psychologist Dr. Lee Salk. Peek-A-Boo is the first game available in the Atari/Salk series of software for toddlers aged one to three. Through eight levels of game play, the first game helps toddlers learn about cause and effect, spatial relationships, colors, shapes, letters and numbers.

Two other early-learning products, for children from 4 to 12 years old, that were introduced at the show are Letter Tutor and Word Tutor, which teach letter and word recognition; children can use the Atari Light Pen or Touch Tablet to interact with this software.

Atari on the auction block

By mid-1984, Atari was badly bruised from the continuing shakeout in video games and by Commodore's dominance of home computers. Atari lost nearly a billion dollars by some estimates. The 1450XLD computer, the high-end machine the market wanted, was canceled and restarted four times, and Atari decided not to introduce an IBM-compatible computer. Thus, through a series of blunders, Atari found itself on the auction block, and Morgan made the deal sweeter by cutting Atari staffing drastically.

Warner began looking for someone to take the company off its hands and start fresh. The first serious suitor was N.V. Philips, a European electronics giant, but Philips wanted total control of Atari, and Warner allegedly wanted to retain a majority interest in Atari.

When the talks with Philips ground to a halt, Warner turned to Jack Tramiel, founder and guiding patriarch of Commodore. Tramiel had left Commodore in January 1984 and gone traveling in the Far East. Some say he went there looking for manufacturing facilities for a new personal computer he wanted to build.

When Warner asked Tramiel to buy Atari, he drove a hard bargain: he paid no money for the company, giving Warner only $240 million in low-interest promissory notes and an option to buy 32% of Tramiel's new Atari Corporation at a later date. Some analysts said Warner gave Atari away to Tramiel, then hoped it would get some money back out of the deal someday.

Whatever the case, Warner held onto two small chunks of Atari, the coin-operated games division and a research project called Ataritel. James Morgan was gone, and Jack Tramiel was in charge of the new Atari Corp. He appointed three of his sons as his generals and reiterated his claim that "business is war."

Tramiel started at Atari by laying off nearly 700 employees, canceling customer service and laying such projects as the new 7800 video game to rest. It was the start of a new era at Atari, of products largely not reflected in this book. Yet the fact remains that Atari lives on, a survivor of the turbulent home-computer wars.

For all these reasons, Atari still has an opportunity to retake the lead in home computing, if the company can deliver the right products at the right prices.

Chapter 2

THE WORLD
OF ATARI
SOFTWARE AND
HARDWARE

In comparison to other home computers, Atari computers generate excellent graphics and sound. Most software designed specifically for Atari computers takes advantage of these capabilities. Atari computers can perform many tasks that other computers perform — run the BASIC language, word-processing programs, data-base-management programs and spreadsheets such as VisiCalc — and excel in areas such as education and entertainment.

Software considerations: where Ataris excel

Educational programs
Especially for young children, Atari computers can be a friendly introduction to reading, writing, mathematics, science and computing itself. Computers can teach adults, as well as children, and adult-oriented educational software is also becoming available.

Painting and art
With software and some kind of pointing device, such as a joystick, light pen or touch tablet, that lets them draw on the screen, artists and would-be artists can turn their Ataris into electronic canvases. Advanced programs even add animation, flipping frames of art in and out quickly to create kinetic, changing works of art.

Music composition
Atari computers can generate four channels of sound at once, which can be

routed through a TV or monitor speaker, or even (with a homemade cable) through high-fidelity speakers. Advanced programs let musicians write whole scores with an Atari, and some let nonmusicians easily create their own musical works.

Games

Atari computers play most of the best computer games available today. Many of the leading game developers (the authors who design and write game software) say Ataris are their favorite computers. They like their sound and graphics and the ease of developing new software. Many of the hit games created for coin-operated machines are available for Atari computers.

Entertainment

To an extent, this category combines all of the above. Many programs for Atari computers are fun. Too often, the promise of personal computers is merely to improve our workplace (or, worse, bring it home with us at five o'clock). Atari computers can prove as entertaining, for individuals or groups, as an evening of television or movies. Computers create new forms of entertainment, and many of the exciting programs in this category run on Atari computers.

Word processing

The computer can serve as a typewriter and much more. It can store your letters, memos, notes and other writing. Atari computers are not the best computers for writing plays or novels, but for shorter writing (20 pages or less) Ataris are fine.

Record keeping

Computers can store all sorts of records, from income-tax information to a catalog of your record collection. Instead of file cards, you have information on disks or tapes. You can sort this information in several ways, alphabetically or by date, for example.

Communications

With a device called a modem, you can communicate with other computers over telephone lines. Modems unlock a world of free software, libraries of useful information and news. They can introduce you to other personal-computer users who have common interests and are eager to exchange information.

Hardware considerations: what Atari computers can and cannot do

Atari computers, without modification, can generate first-rate graphics pictures on any standard television set. On older sets you will have a bit of setup to do first. Normally, the Atari's signal must pass through a switch box that Atari provides when you purchase your computer. This switch box converts the Atari computer's video signal into information your television can decode.

To connect this switch box to your TV, you usually need to disconnect the
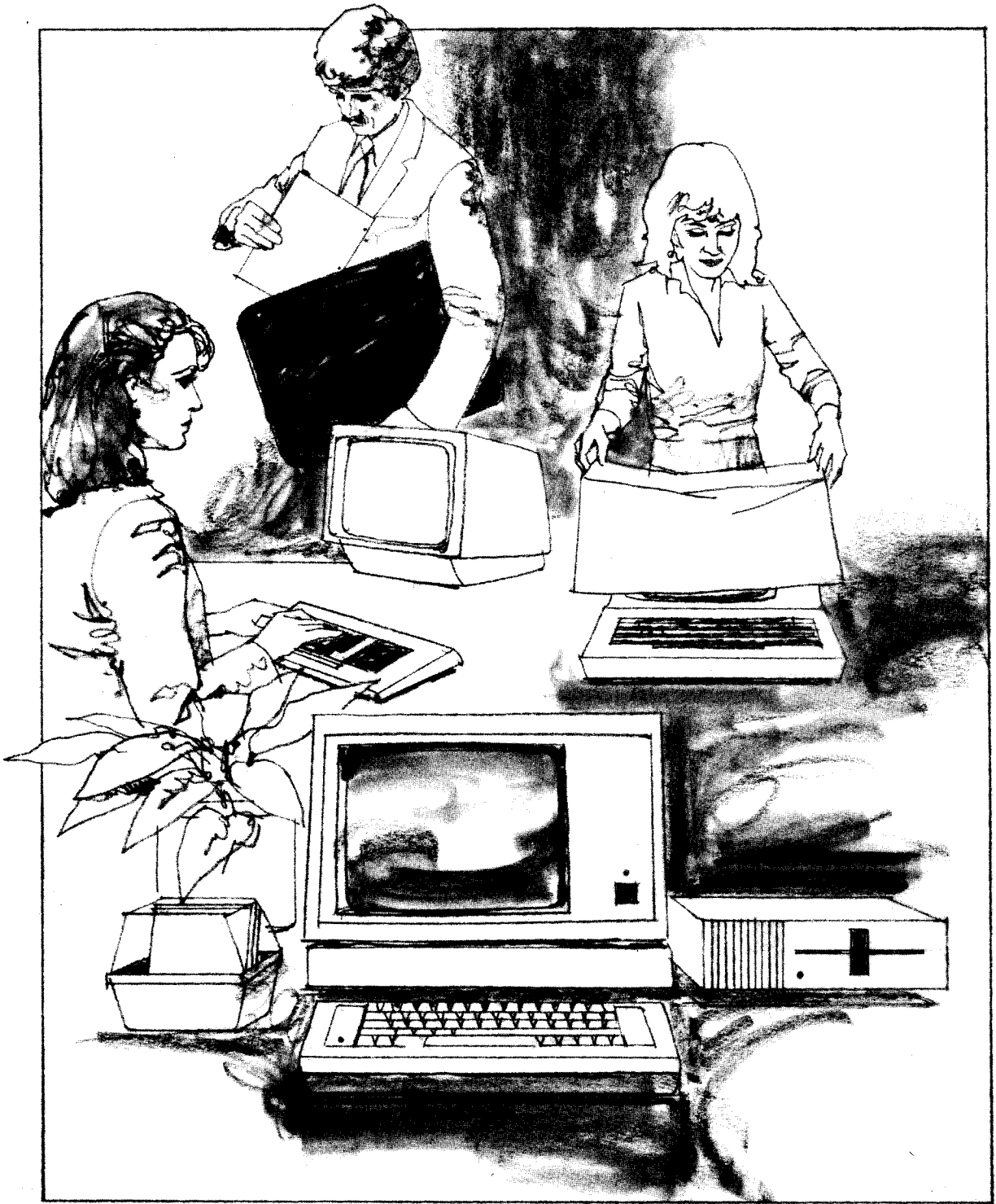
cable leading to your outside antenna (if you have one). If your antenna cable ends in two bushy bunches of copper wire, you may have to strip some cable insulation off to get a sufficient length of fresh wire to wrap around the terminal posts of the Atari switch box. Be careful you don't pare off too much wire, or it might not reach the switch box. Before you buy a computer, you should also consider whether you need a longer antenna wire, since home computers often end up at a desk or table far from where you currently have your TV set.

If you ever have to move your TV and you have one of these older antenna cables, you should probably purchase some U-shaped terminal clamps to fit over the end of the bare wire. As you tighten and loosen the switch box's terminal posts to disconnect the box from your antenna, you can use up your antenna wire fast, and the U-shaped clamps save on wear and tear. Using the terminal clamps is a good idea no matter what kind of personal computer you buy. If you need to buy a TV, an inexpensive black-and-white set should be adequate for BASIC programming and word processing, but soon you may yearn for a color TV.

Not all color televisions are created equal when it comes to using them as home-computer monitors. You should try to get one with high picture quality, especially sharpness. The Sony Trinitron system is one such brand of TV. Television manufacturers have realized that consumers are using many new video devices with their TV sets, and a number of newer models include a direct video link to computers, video-game systems and VCRs. These direct links bypass the extra processing the TV normally must do to enhance a broadcast picture. The unprocessed signal is much sharper and has higher resolution (features per square inch) than regular TV sets do.

Many of these new TV sets also have a switch on the front that lets you quickly flip between TV reception and computer reception, which lets you avoid reaching behind the set to fiddle with the switch box. Some of these sets have jacks for your stereo speakers, and computers may soon take advantage of this feature to add stereo sound to video games and other computer programs.

One of the most important limitations of regular TV sets involves word processing, a popular use for computers. Because of picture-processing requirements, a standard television cannot display 80 columns, or characters, of text across the screen. Usually, 40 columns is the most that TV sets can display without a dramatic loss in readability. A few 60-column word processors exist, but 40 and 80 columns are the industry standards, and business computers almost always use 80 columns.

Typing letters with a 40-column display is fine if you write short letters or memos, but if you plan to write anything longer, such as a book, 40 columns are a limitation.

Ways to get 80-column displays on your Atari are available, but they all require some expense and legwork. The easiest part of the task is getting a monitor that can handle 80 columns. Atari computers have an outlet into which you can plug a jack that leads to a monitor, and most standard monitors work with this jack. One exception is the RGB (red-green-blue) monitor; it uses

different signal processing than most monitors do and works with some other personal computers, but not with Ataris.

Once you purchase a monitor, you still have to modify your Atari computer to display 80 columns. For the 400 or 800 computers, you need a printed circuit board that fits inside the computer, and Atari itself has never made these boards. You have to rely on independent manufacturers to get such an 80-column board.

If you own an Atari 1200XL, you're out of luck, because this transitional computer is completely sealed and accepts no additional hardware — only the ablest of electronics experts could modify a 1200XL to generate 80 columns.

The new XL series of computers include an expansion bus in the back that will, in time, accept hardware boards and other expansion devices. Atari itself plans to release a peripheral expansion box that will accept 80-column and other boards. The net effect of all these requirements is that Atari computers are, as yet, much more difficult to convert to 80-column display than are Apple or IBM computers.

Another feature the Ataris lack is a numeric keypad. These extra keys, usually placed to the right of the rest of the keyboard, are useful if you have to enter a lot of numbers, because they resemble the keys on a calculator and are easier to use than the keys across the top of the keyboard.

Atari makes a keypad that plugs into one of the game-controller ports, but you must make sure the software you use allows you to use the keypad.

Still another useful computer function Ataris do not have is a system clock. Atari computers do contain an internal clock to time the CPU and regulate how long it takes the computer to do something, but, unlike other computers, Ataris don't come with a clock with time, day, month and year set correctly. This function is desirable if you want to have a program do something at a certain time, such as wake you up with music or turn the lights on in your house. Again, you may be able to find an independent supplier of clocks for the Atari.

Atari computers can do most things other personal computers do, but since they are intended for home use and are sold at low prices, they don't include a lot of features that more expensive computers have. You get what you pay for.

Choosing the right Atari computer

With three current models to choose from, and three recently discontinued computers, the Atari line may confuse you at first. You shouldn't be concerned, however. Atari has made sure that the majority of software written for its computers can run on any of them, provided they have 16K of random-access memory (RAM) or more. This compatibility is especially true of the primary Atari products: Atari BASIC, Atari Logo, AtariWriter and most games.

If you are considering buying an Atari computer, you should first decide what you want to do with the computer. This decision is the most important one you will have to make, and it will affect all your buying choices. If you are merely interested in becoming familiar with computers, you will probably be

satisfied with an Atari 600XL, the least expensive of the new XL computers.

The classified sections of many newspapers may offer some great deals on used Atari computers. Again, if you're mainly interested in a starter system, you can do worse than buying a used 400 or 800. Unlike the new XL computers, however, the 400, 800 and the transitional 1200XL do not have Atari BASIC built in to the computer's read-only memory (ROM). In order to have Atari BASIC, you will have to purchase the Atari BASIC cartridge, for about $50. With the 400 or 800, you will be able to run a great deal of the newer software, and Atari's service network will be able to maintain your used computer, for a price.

If you have a few more dollars to spend, you can start out with an Atari 800XL. The 800XL has 64K of RAM; the 600XL has only 16K. You can turn a 600XL into a clone of the 800XL, though, by adding a 1064 RAM expansion cartridge, which adds another 48K to the 600. You cannot expand past 64K without going to bank-switched RAM, which is not a standard feature of any Atari computer.

Why do you need 64K RAM instead of 16K? There are two reasons. First, many programs written for Ataris cannot run in 16K RAM. That is, the programs take up more than 16K of the computer's memory, which brings up another key point: Just because you start out with 16K or 48K in your computer doesn't mean you always have that much free memory for your own work. All Atari programs take up some RAM after the computer loads in the software from a ROM cartridge, cassette or disk.

That consideration brings up the second reason you may want 64K. After your software loads, you have a certain amount of memory left for your own data, whether it's word-processing files, VisiCalc files, graphics, a music program or BASIC programs. If you have a 16K computer, you are not going to be able to store much of your own data before you run out of memory. That limitation doesn't prevent you from entering more data, but you will have to save your data to disk or cassette frequently, dealing with small chunks of information at one time. With 64K, you can handle bigger chunks of data, perhaps four times as much as you can with a 16K Atari.

Again, you must ask yourself what you are going to do with your computer. If you are only going to play arcade-style games, write short letters with a word-processing program and fiddle around with BASIC, 16K won't be a problem. If, on the other hand, you want to play more advanced games, many of which require more than 16K, you will need an Atari with more memory.

Chapter 3

BUYING AND SETTING UP YOUR ATARI COMPUTER

Atari computers are generally sold through mass-market stores, such as Toys R Us and K Mart. The employees at these stores generally know less about computers than you do. Thus, you won't be able to rely on such stores for any service or for technical advice on how to set up your system. You may find a store with a knowledgeable employee or a well-staffed computer department where someone may answer some of your questions — before you make your purchase.

Generally, though, these stores make too little profit on the sale of personal computers to spend a lot of time with you.

If you insist on having a friendly, chatty dealer to hold your hand through the purchase of a home computer, you are in the wrong price bracket. In contrast, the Apple IIe and IBM PC computers, used by many small businesses, do not sell in mass-market stores but rather in stores that specialize in selling computers.

But you won't be totally on your own with Atari computers — far from it. Computers are too new a commodity to be sold like color TVs or stereos are currently sold.

You can get help from users' groups and electronic bulletin boards (see Chapter 9) and from a wide variety of publications that deal with Atari computers and related matters.

What then should you look for when you're buying?

Price and availability become the critical factors. Compare prices on home computers as you would compare prices on anything else, and be as wary of

gimmicky come-ons and advertisements as you would be when buying a car. Keep abreast of any new product announcements by Atari or any of its competitors, such as Commodore, Coleco or IBM. Often these companies will react to each other's moves by dropping prices or adding more features. Prices can even go up, as they did when IBM announced the PCjr in November 1983. Atari raised the prices of the 600XL, 800XL and some other products, and many observers say it happened because IBM had introduced a higher-priced, entry-level home computer.

Computer prices also follow seasonal patterns. Right before Christmas, prices may be fairly high because computers are in short supply. On the other hand, if the model has recently been discontinued or if it's not selling well, inventory can pile up, and manufacturers will drop prices to move out the excess computers before Christmas.

Summer is a good time to look for bargains. It's a slow time of the year for home-computer makers, and they may drop prices to pick up sagging sales. Also be on the alert for sales on hardware peripherals such as disk drives and printers.

Availability is another factor to consider. Sad to say, occasionally a manufacturer heavily advertises a computer and builds up demand, only to find itself unable to ship sufficient supplies to stores. Atari had this problem in 1983, when it launched a huge TV campaign featuring Alan Alda, of the hit TV show "M*A*S*H," using the new 600XL and 800XL computers. The ad campaign was a success, but Atari couldn't deliver enough 600XLs and 800XLs to the stores before Christmas. Many stores had waiting lists, but others simply refused to take customers' money because they didn't know when the computers would arrive.

Atari isn't the only home-computer maker with availability problems, and its track record is about average for the industry.

Be wary of paying in advance to get on a waiting list. Chances are you may find a store with ample supplies somewhere else. Shortages are spotty because the distribution system has some kinks in it, and no retailer can always predict sales accurately. Being on a waiting list can be frustrating and can ultimately be a bad decision.

Another way to buy an Atari computer is via a mail-order dealer. If you don't live an easy driving distance to an Atari retailer, this approach may be your best bet. You will find the names of some reputable mail-order dealers in the magazines published for Atari users, such as *Antic* and *A.N.A.L.O.G.* These mail-order dealers may also be able to beat your local store's price, but remember, you are getting on a waiting list of sorts by ordering though the mail. Get a guaranteed delivery date in writing, and if anything seems amiss, ask for references and check out the legitimacy of the dealer.

Earlier we mentioned the possibility of buying a used Atari computer. Classified newspaper sections, under general-merchandise, video-game, electronics or even computer headings, may include used Ataris for sale. Don't discount flea markets, garage sales and the like. Make sure that the equipment

is intact, and beware of picking up a computer hacker's model if the hacker has made extensive or unorthodox modifications to the machine. Try all keys on the keyboard, and make sure they don't stick. If you purchase any peripherals, such as disk drives or printers, ask the present owner to hook up the whole system and show you how it works.

Atari computers are rugged, so you shouldn't have to deal with any dangling wires or open electronics, as you might have to with other computers. Atari designed these computers to work for years and stand up to the punishment that a family (especially children) can inflict on a household appliance.

Where to buy software

Home-computer software can be sold just about anywhere, but where you buy your software is just as important as where you buy your Atari computer, and maybe more so.

Some retailers think selling software is just as easy as selling records or books. After all, the packages look similar, software prices are usually only $10 to $20 higher than book or record prices and the fronts of the packages clearly say which computer the software runs on. These retailers soon discover that it isn't that easy, though. They have to stock a wide variety of software for several different machines — Commodore, Atari, Apple, Coleco and others. Keeping such a large inventory of software drives prices up.

You should never buy software sight unseen. You should be able to try out the software before you buy it, or at least when you go to the store to buy it. Many places that sell software, such as supermarkets, bookstores, toy stores and others, have no way for you to try the software on the spot, however. They usually don't even have demonstration computers on hand.

What do you do? Read this book, which reviews leading software products. Search for a software dealer who'll let you try the software before the sale.

One by-product of the personal-computer boom is software stores, and these stores can be the best place to examine software. Softwaire Centre is the name of one chain of software stores. These stores specialize in computer software and sell no hardware, except for peripherals such as disk drives or joysticks.

You can try the software at a software store and then buy it at a discount store for a lower price, but give the software store your business, too. It is providing a valuable service to home-computer users, and if you don't buy something there, the discount house will soak up all the business and make the software stores drop the software the discount house carries.

Another place to try software may be your public library, but only a few libraries have the necessary computers and software. A few computer time-rental stores exist, and they charge you an hourly fee to try a computer and some software.

It's important that you try the software before you buy. Unlike hardware, software comes with a very limited warranty. Typically, the software is guaranteed against media defects only. If the disk or tape simply won't load into your

computer, your software warranty covers it, but the software itself is not guaranteed to satisfy you. Software makers say they provide software "as is." If you are unhappy with the way the program works, they don't have to refund your money.

You are not always out of luck if you want to return a program you don't like, but you are usually at the mercy of the store or dealer that sold you the software. Some will cheerfully refund your money; others will give you a chit worth the purchase price of the software you return, but that chit is only good toward purchase of something else at that store. Still other stores will tell you to contact the software manufacturer directly. The software manufacturer may refund your money, give you a chit of his own or propose some other return policy. We'll cover warranties and software backup policies in more detail in Chapter 8.

The best insurance is to look before you buy. Be on the alert for no-return policies, especially at sales.

You don't have to buy software in person. Many mail-order businesses will sell you software at lower prices than store prices. Again, these out-of-town channels may or may not allow you to return software. Don't forget to ask in advance.

Why you probably need a disk drive

What kind of data-storage device should you get for your Atari computer? If you can afford it, you should get at least one floppy-disk drive.

Disk drives can store more data than cassette tapes can, and disk drives can store or retrieve that data three to five times as fast as a tape recorder can.

Disk drives also let you run more complex programs. Some disk-drive software programs are actually a series of programs that won't all fit in the computer's memory at once, so the computer calls in only the program it needs and loads in the other programs from disk when necessary. This method is awkward with a cassette tape, because you have to rewind or advance the tape to different locations. It makes more sense to let the computer search for the programs on a floppy disk.

Another reason you should get a disk drive is that it allows you to more easily make backup copies of your data files. You can make multiple tapes with a cassette drive, but you will save lots of time using a disk drive.

The Atari disk-operating system (DOS) includes a simple command to let you duplicate a disk. You can't copy some disks, especially the ones that are protected against copying, but you will always be able to make backup copies of your own data files, such as letters, your own BASIC programs, Logo programs and more.

The easiest way to make a backup copy of a program is to have two disk drives. If you have only one disk drive, the Atari disk-duplication program will stop halfway through reading the disk to be copied and ask you to put in the blank disk. You will have to swap these two disks once or twice to copy an entire

disk. With two drives, you can just put a disk in each drive, and the DOS will do the rest.

By the way, you can also copy your cassette programs or data onto disk, or vice versa.

You may still want to purchase the Atari cassette recorder. Some educational programs on cassette not only load data into the computer but also have an audio track synchronized with the program. The audio track, which can be music, narration or special tones, plays through your TV speaker (provided you aren't using a monitor without a speaker).

Putting it all together

Atari computer systems are useful for many tasks, but you won't know if they're right for you until you have some idea of what you want to do with a home computer. Below are the major uses for Atari computers and some recommendations for what Atari computer hardware and software to get. These are the minimum systems for each task, but you can add more hardware and software if you wish.

You should not construe this guide as an endorsement of the particular products listed; equivalent products work as well. See the following two chapters for information on the various products that perform each task.

One note: If you are using a printer with Atari 400 or 800 computers, you need to get an 850 interface module, which translates the computer's data into information the older printers can understand. The newer XL computers do not need the 850 module.

BASIC or Logo programming
Any Atari computer, Atari cassette-tape recorder or one floppy-disk drive, color TV or monitor, dot-matrix printer.

Graphics programs
Atari 800XL computer, Atari cassette-tape recorder or one floppy-disk drive, color TV or monitor, Atari 1020 four-color plotter, joystick. An Atari program called B-Plot lets you make printed copies of anything you can draw on your screen with the Atari Touch Tablet, Atari Light Pen or other graphics programs.

Word processing
Any Atari computer except the 400, Atari cassette-tape recorder or one floppy-disk drive, black-and-white or color TV, dot-matrix or Atari 1027 letter-quality printer.

Education
Atari 600XL or 800XL, Atari cassette-tape recorder or one floppy-disk drive, color TV or monitor. Printer optional. Schools can share disk drives and printers by getting a local-area-network system (see Chapter 7).

Communications
Any Atari computer, one floppy-disk drive, black-and-white or color TV, Atari 1030 direct-connect modem or equivalent. Printer optional.

Games
Any Atari computer, color TV or monitor, at least one joystick, game paddles. If you want to play more advanced games, you will need an Atari tape recorder, at least one disk drive and at least 48K of RAM.

Music
Any Atari computer, black-and-white or color TV with a speaker, a disk drive if the music software you buy requires it. Some music packages come on ROM cartridges and require no disk drive, but you may want a drive to store your compositions. As yet, none of the packaged music software lets you plug your Atari into your stereo system. You have to know electronics and stereo systems and be prepared to do some wiring.

Speech
Any Atari computer, black-and-white or color TV with a speaker, a disk drive if the speech software requires it.

Home finance
Any Atari computer, black-and-white or color TV, an Atari tape-cassette recorder or disk drive to store your data. A printer is optional but strongly recommended.

Data-base management
Atari 800XL, black-and-white or color TV, two disk drives, dot-matrix or letter-quality printer. You need 64K of RAM and two drives to run most data-base programs.

Spreadsheet analysis
VisiCorp's VisiCalc runs with an Atari 800 or 800XL with 32K of RAM or more (48K is recommended), black-and-white or color TV, one disk drive, Atari dot-matrix printer (most can print 80 columns across, but you may want to get a printer that can print 132 columns across). Synapse Software's SynCalc, sold by Atari, is even more powerful and can exchange information with a data-base manager (SynFile+) or a graphics and statistics program (SynTrend).

Accounting
Atari 800XL computer with 64K of RAM, black-and-white or color TV, two disk drives, Atari dot-matrix printer (again, you may want 132-column capability).

Programming
Any Atari home computer with the needed RAM, black-and-white or color TV, one disk drive, an Atari dot-matrix or letter-quality printer.
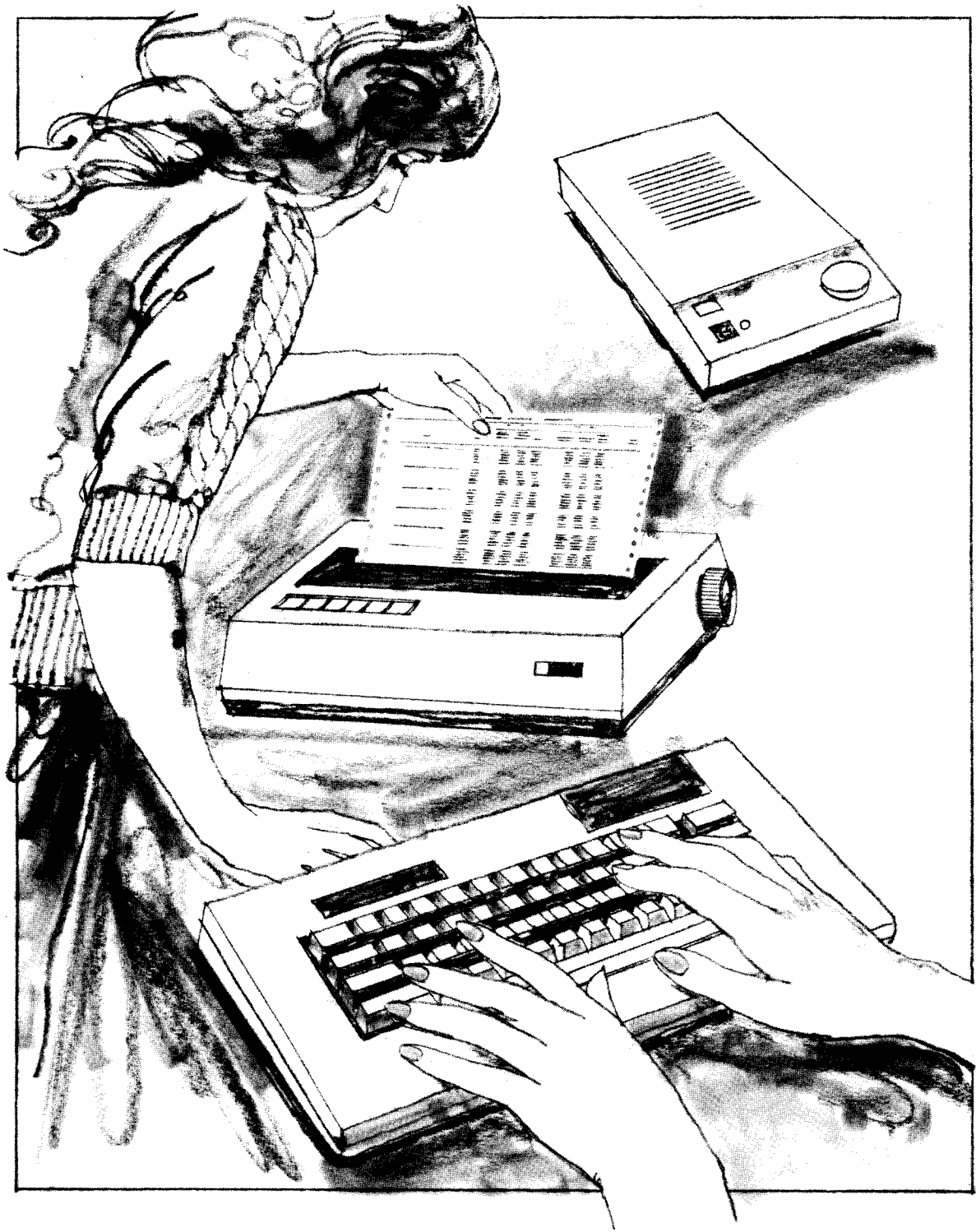
Section Two

What You Can Do with Your Atari Computer

In this section, we explore what you can use your Atari for.

Chapter 4 examines BASIC, Logo and other programming languages.

In Chapter 5, we cover the application software that turns your Atari into a useful tool.

Chapter 6 is the fun part: games.

In Chapter 7, we examine the peripherals you can attach to your Atari to complete or augment your system.

Atari BASIC, Logo and Other Languages
Application Software
Games
Peripherals

Chapter 4

ATARI BASIC, LOGO AND OTHER LANGUAGES

When you purchase an Atari computer, chances are you will first run several games and Atari BASIC. In fact, the newer Atari XL computers have Atari BASIC built in, but BASIC isn't your only choice.

BASIC

The BASIC programming language was created at Dartmouth College in the 60s. *BASIC* stands for beginner's all-purpose symbolic instruction code. It is by no means the newest, most powerful or easiest-to-learn computer language, but it is the one most widely used on personal computers.

What is a programming language, and why would you need one? To answer that question, you have to know a bit about how your computer works. The circuits inside a computer can understand only on and off states, and they translate information into 1s and 0s (which signify "on" and "off" and are meaningful to languages).

With BASIC, you can do many things. You can give simple, direct instructions, such as PRINT "HELLO," to the computer. The computer will display HELLO on the screen. If you have a printer hooked up and you tell BASIC to LPRINT "HELLO," the printer will print HELLO on a sheet of paper.

You can also use BASIC to add, subtract, multiply and divide numbers. By typing PRINT 8+6, followed by a carriage return, you'll get the answer 14.

Most BASIC programs contain many different commands. To organize these commands, programmers assign each command or set of commands a line

number, followed by a space. These line numbers also serve as addresses, much like a house address on your street. The programmer can tell the program to GOTO 1030 at one point, and the program will next execute line 1030. The program will always start with the lowest numbered BASIC line, and if it isn't told to GOTO anywhere, it will do the next higher number after that and so on.

Atari BASIC provides the quickest key to the graphics and sound power of Atari computers. You can draw lines on the screen, change colors and even write video games in Atari BASIC. Atari computers include a special series of commands used to create player-missile graphics. With player-missile graphics, you can create moving objects and animate them. If the object collides with a moving object (the "missile"), the program can award points to the player, for example. With Atari BASIC's Sound command, you can make your Atari play music in four-part harmony. For ease of use, though, software companies have also produced programs that let you create sound and graphics in other, simpler ways than BASIC, but you can do everything they can do with BASIC.

A problem with BASIC is that you have to type in so many commands before your program will begin to work. True, you can run your program at any time, but typically you have to name your variables first, enter some data and "debug" your program — that is, find any mistakes you may have made while writing your program. Like all BASICs, Atari BASIC is "unforgiving," especially to new users, and you can end up using the Run command on a program many times before it comes out to your liking.

Still, BASIC is a powerful tool. Atari BASIC comes on a ROM cartridge for older Atari computers and is built in on newer ones. Atari BASIC is similar to other BASICs but not identical — many versions of BASIC are available for personal computers. Microsoft, a company in Bellevue, Washington, created one of the first BASIC languages for microcomputers, and over the years, Microsoft BASIC has been popular. Applesoft BASIC is Apple's version of Microsoft BASIC.

Atari BASIC and Microsoft BASIC are different — so different that Atari also sells a version of Microsoft BASIC, MBASIC, which is more powerful than Atari BASIC.

Atari also offers Microsoft BASIC II, a combination cartridge and diskette package for Atari systems with less than 32K RAM.

Another powerful BASIC that comes on a convenient cartridge is BASIC XL, produced by Optimized Systems Software. The author of BASIC XL is Bill Wilkinson, who designed Atari BASIC for Atari. BASIC XL is faster and more powerful than Atari BASIC.

If you plan to do only casual programming, Atari BASIC should be adequate. For advanced programming, look at Microsoft BASIC or BASIC XL.

Logo

Logo, developed at the Massachusetts Institute of Technology, is the other popular programming language for the Atari. The language grew out of a

perceived need for children to have a more effective, computer learning tool than BASIC. A major part of Logo is called turtle geometry, which uses an object on the screen that vaguely resembles a turtle. To make the turtle move, you type a command such as FORWARD 10, or FD 10 for short. Next you press the Return key, and the turtle scoots forward ten units and stops. You can make the turtle go forward or backward any number of units, although you can make it go off the edge of the screen if you're not careful. You can always retrieve it, though.

You can make the turtle turn by typing RT (right turn) or LT (left turn) followed by a number that indicates degrees. If you give the turtle the instructions FD 10, RD 120, FD 10, RT 120 and FD 10, RT 120, it will draw a triangle and end up where it started.

The power of Logo is to take primitive commands such as Forward and RT and turn them into more complicated commands called procedures. To make a procedure, you type TO followed by the name you have given the procedure. Then you type the commands the turtle is to follow in that procedure. When you have finished, the computer remembers that command from then on (as long as the power is on or as long as you save it to disk for use next time). You can then build even more complicated procedures that use the procedures you've already created. With only a few keystrokes, you can make the turtle perform many tasks.

Logo also has a shape editor that lets you change the shape of the turtle, so you can make surrogate turtles that look like a person, a house, a car or anything you want. Creating new objects with the shape editor is easy, and you can do it with a joystick by adding or subtracting building blocks to the shape.

Logo is much more than just turtle graphics, however. You can create programs that use English words and sentences and accept lists of information. You can have lists of lists and lists of lists of lists. Because you can create your own commands in Logo, you can handle large amounts of information with a few powerful commands. Atari Logo can also create music, as can the Atari BASICs.

Other programming languages

Although the most popular programming languages for Atari computers are BASIC and Logo, a whole range of other languages is available. Each language offers some advantages. It may be particularly suited for a certain task, it may be faster than Atari BASIC or easier to use or it may be more powerful than Atari BASIC. With certain programming languages, you may have an easier time finding programming errors, or bugs. Some programming languages come with adjuncts called utilities that can enhance your programming.

Atari PILOT is an authoring language that has turtle graphics. Educators can use PILOT to design their own computer-based lessons, including graphics and animation, which makes PILOT a low-cost alternative to buying many off-the-shelf, drill-and-practice or tutorial programs.

For advanced programmers, Atari offers the Assembly Editor, a program that lets you program in the Atari's assembly language and edit with the Assembly Editor. When you "assemble" those programs, they will be ready to run on your Atari in the computer's own machine language, the 1s and 0s that the Atari can understand. You can add machine-language subroutines to your Atari BASIC programs, or you can write your programs entirely in machine code to speed up operations.

Assembly language is tougher to master than BASIC, but it does give you some capabilities that BASIC can't offer. In BASIC, you use commands such as Read, Print or List, followed by strings of information. In assembly language, the commands don't resemble English; they are in a numerical code equivalent to base 16, called hexadecimal. The digits in hex numbers are 0 through 9, then A through F. For example, the base 10 number *17* becomes *11* in hexadecimal; the base 10 number *256* is hex *100.*

Several companies other than Atari offer assemblers and editors that let programmers write assembly-language code and assemble that into machine language. Optimized Systems Software (OSS) is regarded as one of the best suppliers of programming languages and enhanced operating systems for the Atari. OSS president Bill Wilkinson designed Atari BASIC for Atari and then went off to start his own company. OSS products include:

□ BASIC XL, an improved version of Atari BASIC provided on a cartridge (see section on BASIC).

□ MAC/65, billed as the fastest macro assembler for Atari computers, does everything the Atari assembler/editor does, and it includes an advanced tool for debugging your programs. MAC/65 also lets you build libraries of preprogrammed code, called macros, which you can store and retrieve for use in many different programs.

□ Action! This language, developed first for the Atari by OSS, is like a cross between BASIC and assembly language. It's faster than BASIC and easier to use than hexadecimal code. It incorporates features found in other popular programming languages such as Pascal, C and Ada, but it also has commands familiar to Atari BASIC programmers. Action! comes on a cartridge and contains four parts. The editor lets programmers create and modify programs with two separate windows for viewing programs. The monitor turns Action! programs into machine code, a process called compiling that is common in many programming languages. The Action! monitor saves compiled programs to disk and traces the steps your program goes through as each instruction is carried out. The library is a built-in collection of useful subroutines for you to use in your programs.

□ C/65 is OSS's version of the C language for Atari computers. C is an advanced, high-level programming language used on large computer systems, particularly those running AT&T's UNIX operating system. C code is highly compatible across a line of computers. The OSS package includes a compiler to generate machine code.

☐ DOS XL, also from OSS, is an enhanced disk-operating system for Atari computers. DOS XL operates in two ways. It prompts with a series of menus, or it switches to a blank screen where users can enter DOS commands themselves. DOS XL also takes up less space in the Atari's memory than does DOS 2.0, so users have that much more RAM for important programming space. DOS XL is included with several popular disk drives built for the Atari, including the Percom, Astra, Indus and Amdek drives, but you can use it with any Atari-compatible disk drive.

Another popular language for microcomputers is Pascal, named after the famous mathematician and philosopher of the seventeenth century. It's a language that helps programmers give structure to their programs.

Before it was discontinued, the Atari Program Exchange offered a two-disk Pascal Language System for the Atari. Atari may offer Pascal through its main line of software. APX Pascal includes all the major features of Pascal and a compiler. It isn't that easy to learn unless you are already familiar with Pascal.

Draper Software offers another version of Pascal that only requires one disk drive and includes both an editor and a compiler.

Serious programmers may also want to hunt around for a language called Forth. Known for its fast speed, Forth is somewhat of a cult language. Several small companies have offered versions of Forth for Atari computers from time to time, but none have sold many copies. You may also find a version of Forth on some users' groups' bulletin boards. Various users' groups have placed this language in the public domain.

Chapter 5

APPLICATION SOFTWARE

This chapter examines *application* software — software you can use to perform a variety of specific functions and tasks.

Graphics

With Atari computers, you can generate impressive computer graphics. Graphics users regard the color-graphics capabilities of Atari computers as more advanced than those offered by any other 8-bit home computers, including the Apple II, the Commodore 64 and the Radio Shack Color Computer. One reason for the graphics superiority is the presence of two specialized custom chips, the ANTIC and the GTIA, that Atari has always built into every computer.

Atari computers can generate 16 colors: gray, light orange, orange, red orange, pink, purple, purple blue, dark blue, medium blue, light blue, turquoise, green blue, green, yellow green, orange green and medium orange.

In addition, you can vary the brightness of the colors. If you have an Atari 600XL, 800XL or 1200XL, you can generate up to 16 brightnesses — called luminances — to get a total selection of 256 colors. When you vary the brightness of one color, however, it determines the brightness of all the other colors on the screen at that time, so you can only use one brightness of each of the 16 colors at one time. By programming, you can flip to different colors fast enough to put many more than 16 colors in your program. With special programming tricks, you can even get the Atari to display 256 colors or more at one time on the same screen. (Note: Early Atari 400 and 800 computers could

generate only up to 128 different colors, using the same 16 primary colors but only 8 luminances, because the early computers had a more limited graphics chip called the CTIA. All later 400 and 800 computers, as well as all Atari XL computers, have the GTIA chip.)

You can mix colors in a checkerboard fashion to create even more colors. For instance, mixing red and black, or red and green, in a fine grid will give you brown and so on.

The Atari computers use color and graphics in 12 different graphics modes. A graphics mode sets the ground rules for how many colors you can use at once. The number is largely determined by the number of individual dots (or pixels) used in that mode. Because of inherent limitations in the computer, the more dots the mode uses, the fewer colors you can use.

Several excellent books, which are listed in the bibliography, can instruct you on how to program Atari graphics. You don't have to be a programmer to use Atari graphics, though. Programs and special hardware exist that make changing colors and drawing shapes as simple as moving your finger across a table or playing a video game.

In a video arcade, players manipulate the spaceship or Pac-Man by moving a stick vertically, horizontally or diagonally. This "joystick" is also available for Atari home computers. Several programs, including MicroPainter from Datasoft, let you paint on the screen using the joystick.

Another popular joystick graphics program is Paint, now offered by Atari. Paint's chief virtue is its low price, $40. With Paint, you can create your own multicolored pictures, save them on a disk and create art shows with up to 24 paintings, cycled through the television screen.

Using a joystick is not the only way to paint on the Atari screen, though. Atari recently released two new devices that come with their own software and let you paint simply by pointing. We'll discuss these devices in Chapter 7, but we will explore the software here.

The Atari Light Pen comes with a program called Micro Illustrator, developed by Island Graphics, a company run by Steve Dompier. Steve Gibson of Gibson Laboratories adapted Micro Illustrator to work with the Atari Light Pen. By touching the pen to the screen, you can move a cursor around the screen and click a button on the pen to make something happen.

When you point to the box that is labeled Draw, the screen clears and your cursor appears. The Light Pen optically senses where you are on the screen, and when you hold the pen's button down and move the pen, a line appears on the screen.

On the Micro Illustrator main screen, you can point to boxes that let you draw, fill in a closed shape with color, change the color of the pen line and change the width of the pen stroke. You can save your creations to disk and retrieve them later. The Light Pen software itself comes on a cartridge, so it doesn't occupy a disk drive.

The Atari Touch Tablet, which we will discuss later, also plugs into the Atari. You can draw lines on the screen by dragging your finger across the flat

surface of the pad. The Atari Touch Tablet comes with the AtariArtist cartridge, again inspired by Dompier's Micro Illustrator. You can fill areas with color, just as you can with the Light Pen.

A third illustrating device is the KoalaPad from Koala Technologies. The KoalaPad is similar to the Atari Touch Tablet. Like the Touch Tablet and Atari's Light Pen, it uses Micro Illustrator. Koala also has additional graphics and educational software for its KoalaPad.

Software for all three devices also lets you draw mirrored shapes — as you draw something on the left side of the screen, a mirror image of your work appears on the right half of the screen.

With each device, you can use only 4 of the 256 primary Atari colors at once. But you can cycle through those colors until you get the 4 you want to use. Both products also provide patterns, made up of two or more of the primary colors, that you can use. When you change the primary colors, the pattern color changes.

Another useful feature of all three devices is called the "rubber band" effect. By selecting the Line box, you can put a point down on the screen, move the pen or your finger around and select the other end of a line you wish to draw. The line will flicker until you click the button on the pen or the tablet: then the line will become solid.

You can also draw a series of lines by choosing another box. The start of the second line will be the end point of the first line and so on. When you click the button twice, you end the series of connected lines.

Some parts of the software create effects that are unique to computers. Ray is one of them. It lets you leave many afterimages of a line as you move one end of it around the screen. The result is a series of lines that all radiate from one point.

Just as you can draw lines, you can also draw boxes and circles, which can be empty or filled with the solid color or pattern of your choice.

Another useful feature of these software packages is the Magnify box. By turning Magnify on, you can get a picture of your graphics several times their normal size, which enables you to work on individual blocks of color and do other detailed work on your picture. When you're finished, you can return to working on the picture in its normal size.

You can also erase your work and start over. The Light Pen software lets you refill an area of color if you want a different color instead. You can paint over any part of the screen with a wide brush stroke and the color of your choice. Both programs also have an Erase box. Point to it and the entire screen will be wiped clean, ready for your next work of art. AtariArtist, the software included with the Atari Touch Tablet, also lets you select colors by moving the pen around the screen.

The other devices do not have this color-adjustment feature. They do have a color menu that lists the possible choices — a feature that the AtariArtist also has.

The Atari Light Pen has "pop-up" windows with color menus. This design

approach lets you see part of the drawing while you're using the menus. You can refer to whatever colors, lines or shapes you've already used in your drawing while making further selections from the menu.

All three of these products are easy to use, compared to graphics products that use the keyboard or a joystick. Each is priced at $100 or less, including software.

If this graphics software has a deficiency, it's the lack of a readily available way to print out your color drawings, for which you would need a color plotter or color dot-matrix printer. Recently, this situation has begun to change. Atari is selling a less costly, four-color plotter that makes small color drawings from programs such as Logo. A program called B-Plot from Atari lets you print out anything you can generate on the screen using the Atari Light Pen, Touch Tablet or other graphics programs. Recently, Okidata introduced a color dot-matrix printer for the Atari that lets you print out your screen images in color.

With an advanced graphics program from Reston called Movie Maker, you can make a movie or an animated cartoon. Movie Maker was developed by Interactive Picture Systems (IPS), the same team that wrote Paint.

Movie Maker lets you create animated characters with your own shapes and colors, a frame at a time. Then you can put the frames in order to create the illusion of running, flying, jumping or spinning. The program lets you move the animation around the screen and record the action at many frames per second. You can also paint the backgrounds on which your action will take place.

You can also dub in sounds, including music and sound effects such as crashes, explosions and rumbling. The sample cartoons on the Movie Maker program disk are spectacular. One segment shows Charlie Chaplin picking flowers and giving them to a young woman to the accompaniment of ragtime music.

Although the program is tricky to learn, once you've mastered it you can create cartoons, storyboards for movies or images you can use in video games. Most of the commands require you only to move the joystick and press the joystick button. The keyboard commands are single letters and numbers. IPS also sells an expensive professional version of Movie Maker for serious programmers looking for a way to create graphics easily .

Word processors

Recently, an author of computer books wrote a humorous book about a new word processor. He said this amazing new word processor used no electricity, contained a device for making corrections and was easier to use than a computer. What was this word processor? A pencil.

A funny story? Yes. But a pencil is a kind of word processor. So is a typewriter. They both "process" words. But word processing is much more than just a new device for recording your prose; it is also a revolutionary new tool for writers.

The words start in your head, but you have to record the words somewhere.

To do that, you use tools: your hands, some paper and a pencil or a typewriter. As you create the words in your head, your tools process these words. They are then on paper for all the world to read.

Enter the computer, nothing more than the latest tool, but it is a powerful one. With the proper word-processing software, you can do many things you can't do with a typewriter or a pencil.

You can type your words into the computer's memory and display those words on the computer's TV screen.

You can move around the TV screen with a small marker known as a cursor, which marks your current position in the document. With the cursor, you can delete letters, words or whole sections of text, or you can insert new text at any point in the document.

You can store documents, such as letters, memos, notes, diary entries or homework, on the Atari's floppy disks or cassette tapes — so you can turn off the computer but still have a permanent copy of your words on disk or tape.

You can format your documents, changing the left and right margins, the spacing between lines or the number of lines to be printed on each page. Many other formatting commands are desirable; you'll see a list of them in this chapter. Not all word processors can do every kind of formatting, though.

You can print out your work using a computer printer or even an electronic typewriter, as long as the printer or typewriter is connected to the Atari by a cable and printer adapter.

You can check your spelling by loading a dictionary of words into your computer's memory. A spelling-checker program flags any words in your documents that are not in the dictionary. In many cases, you can add your own special words to the dictionary.

You can make multiple copies of your documents. By changing the name and address at the top of a letter, you can create personalized copies of one original quickly and easily.

You can search through your documents for sequences of characters called strings. A string can be a word, several words or any combination of letters and numbers.

One desirable word-processing feature that few Atari programs have is the option of typing over existing text, rather than inserting text. Most programs will not let you type over text.

If you want to type your math papers on a word processor, be careful. Some printers, such as the Atari 825, have a tough time generating superscripts and subscripts, and a few, such as the Atari 1027 letter-quality printer, can't do it at all. Among those that can handle such characters is the Atari 1025 dot-matrix printer. If you plan to do much of this kind of work, get the complete story on the capabilities of the printer and word-processing program you're thinking of buying.

Just as there are many different kinds of typewriters, there are many different word-processing programs. No one word processor is perfect, but few are worthless, either. You can even use Atari BASIC as a word processor, using the

Print command, but BASIC is not a good word processor. Many local Atari users' groups have a rudimentary text editor that far surpasses BASIC and is virtually free.

Chances are you will buy a commercial product for the Atari to do word processing. These products range in price from about $50 to about $200. Some of the $50 products, being quite new, can do things the $200 products cannot, so don't just judge word processors (or any program) by price alone.

At the very least, all these programs let you enter text, edit it, search for strings of text and print out your work. Some of them work with a spelling checker, sold separately. Each one can do differing amounts of text formatting.

All these word processors store text files in RAM until you tell them to copy files onto disk or tape. The size of the text files you can create depends on the word-processing program itself and the amount of RAM in your Atari. For the comparison below, we've used an Atari 800, with 48K of RAM, as our sample computer. If you have a 64K computer, you will be able to store about 16,000 more characters per file, providing the word processor can take advantage of the extra 16K; quite a few word processors written for 48K Atari computers don't take advantage of the extra memory.

Here are a few of the leading word-processing programs for Atari computers. Refer also to the reviews in Part 2.

AtariWriter
Atari Corporation
38 characters per line by 21 lines
Size of file with 48K RAM computer: 20,704 characters
Supports Atari printers and others
Other printers are supported with printer drivers from Atari (optional)

AtariWriter comes on a ROM cartridge that plugs directly into the Atari. It's an adequate first word processor for any Atari owner, and Atari supports AtariWriter as its primary word processor for all its computers. When AtariWriter loads into the computer's memory, you see several choices that let you create, edit or print files, and load or save files on either disk or tape. Since AtariWriter is supplied on a cartridge, you won't have to spend $300 to $500 for a disk drive if you don't want to. We strongly recommend you buy a disk drive, though. You will need some way to store your text files when the computer is turned off, because that always wipes out anything in random-access memory. If you can't afford a disk drive, you can go with tape storage, though it is slow and sometimes chancy.

AtariWriter uses the Atari disk-operating system. You may never have to use Atari DOS, but other programs for the Atari can read AtariWriter files if those programs also use Atari DOS. Another popular word processor, Letter Perfect, doesn't use Atari DOS, so reading Letter Perfect files into DOS programs is trickier.

AtariWriter displays 38 characters across the screen by 21 lines down the

screen. This matrix isn't the maximum possible display of the standard TV screen, but it's adequate.

AtariWriter documents can be 20,704 characters long. The average page of single-spaced typed text has 2000 characters, so you can type about 10 pages with AtariWriter. You can also "chain" print files to get more pages out of your computer at once, but you can't edit more than 20 pages at once without loading a new AtariWriter file. You can also merge files with AtariWriter by using the Option Load command.

Letter Perfect ROM cartridge 2.0
LJK, Inc.
Requires 32K, disk drive
40 or 80 columns by 23 lines
Size of file with 48K RAM computer: 35,391 characters
Supports Atari, Epson, Qume/Diablo and NEC (disk version only) printers
Printer editor disk (included)
Utility disk for form letters (optional)

Letter Perfect is the other leading word processor for the Atari that comes on a ROM cartridge. Letter Perfect is a more complex program than AtariWriter. For instance, it lets you merge two files — an extremely useful feature. With more features comes more complexity. You'll spend more time learning how to use Letter Perfect.

As with AtariWriter and all other major Atari word processors, your text files can only be as large as your RAM. Letter Perfect's editor always displays the number of free bytes left while you're writing. With AtariWriter, you have to hold down the Option key and type F to get the free memory amount.

Letter Perfect displays more text than does AtariWriter (40 columns across instead of 38 and 23 lines instead of AtariWriter's 21). You can also choose an 80-column display when you load the program from disk or cartridge, but this feature only works if you've added a hardware board called the BIT-3 to an Atari 800. This board costs extra, and at the time of this writing, no 80-column boards are available for the Atari XL computers. Also, you'll need a high-quality computer monitor for 80-column text display; television sets cannot display 80 columns of text.

Inserting text into a Letter Perfect file is awkward. You must create lines of blanks and add the text and then delete the extra blanks. AtariWriter doesn't have this shortcoming.

Letter Perfect is noticeably faster than AtariWriter and can store about 15,000 more characters per file, because Letter Perfect does not use Atari DOS. LJK, Inc., uses its own operating system but includes a program to convert LJK files to Atari DOS and Atari DOS files to LJK DOS.

The foregoing information is important if you want to move files from one application to another. For instance, you may want to load your word-processing files into a data-base filing system, or you may want to take names and

addresses from your data base and move them into your word processor.

The Letter Perfect diskette comes with a disk printer editor. This editor includes a menu of different popular printers for the Atari, including the Epsons with Graftrax, Atari's 825 and Qume, Diablo and NEC printers. If you're technically inclined, you can also configure most other parallel-interface printers for the Atari. If you have the Letter Perfect ROM cartridge, you can't easily use a NEC printer, though.

Bank Street Writer

Broderbund Software

38 columns by 18 lines

Size of file with 48K RAM computer: about 12,000 characters

Bank Street Writer trades some of the power of the other Atari word processors for ease of use. Bank Street Writer was designed by a team of educators at the Bank Street College of Education in New York City, along with Intentional Educations, an educational-software firm in Massachusetts.

If the thought of word processing terrifies you, Bank Street Writer is about as gentle an introduction as you're going to get in the world of personal computers. At all times, the top line of the screen tells you what you can do. For instance, while you're typing, the upper left says "write" or "correct," meaning you can type or delete. At the upper right, the screen says "ESC for menu or cursor movement." By pressing the ESC (Escape) key, you get a menu of options, which includes a second menu with more options. You move from option to option with the < and > keys. You can also move the blinking cursor around by pressing the Atari keys showing arrows (you don't have to hold down the Control key while you do this). Everything is geared to single-keystroke commands.

The text area in Bank Street Writer is small, though, because of the help information at the top. You have only 18 lines to work with at a time and 38 characters across the page. Bank Street Writer files are fairly tiny, only 2300 words, according to the manual. (If those words are five characters long, that's only 11,500 characters per file.)

For an experienced computer user, some of Bank Street Writer's features will be annoying. Other word processors let you move the cursor around and still enter text. In this word processor, you can't move the cursor around until you press ESC, and then you can't enter text until you press ESC again. Also, Bank Street Writer comes only on disk, so you'll have to have at least one drive to use it.

You can protect your Bank Street Writer files with a three-letter password. You should write down the password somewhere so you'll remember it. This feature is especially useful in a school or library where many people might use the same floppy disk.

Bank Street Writer is one of the least expensive and easiest word processors. It's great for kids, but that's no surprise, since teachers wrote it. You'll proba-

bly move on to a more versatile word processor if you stick with Atari computing.

Letter Wizard

Datasoft, Inc.

Requires 32K, disk drive

40 columns or 36 columns by 20 lines

Size of file with 48K RAM computer: 23,500 characters

Printers supported: Atari 825, Epson MX-80/FX-80, Star Gemini, Centronics 739, Atari 1020/2025/1027, Okidata 82, NEC 8023, C. Itoh

Letter Wizard is an updated version of Text Wizard, which was developed by the same company that developed AtariWriter. Letter Wizard is not quite as easy to use as AtariWriter, but it has some improvements. For instance, you can change the color of the screen background from the standard blue to whatever you prefer. Also, Letter Wizard lets you type over existing text, rather than merely inserting text and deleting the older text.

At the bottom of the Letter Wizard text-entry screen is a status window that displays the available memory in bytes, the number of free sectors (a larger memory unit than bytes — each Atari single-density disk has 707 free sectors to begin with) and the number of words. As you type, this display isn't automatically updated; you have to hold down the Option key and type U to update the status window. The word counter is particularly helpful to professional writers and students who must turn in long essays.

Letter Wizard lets you format your text in ways you can't with AtariWriter. You can have headers and footers, the extra title or identification lines at the top and bottom of each page, appear in one place on odd-numbered pages and another place on even-numbered pages. With many printers, you can print characters in "pica" spacing (10 characters per inch) or "elite" (12 characters per inch). You can also print in boldface or italic.

Homeword

Sierra On-Line, Inc.

Requires 48K, disk drive

40 columns by 15 lines

Printers supported: Atari 1025 or 1027; customizing option

Homeword is an innovative word processor with pictures to point to instead of words. With these pictures, you can move blocks of text, print a file, save a file to disk or change your margins. Homeword shows you how the text will appear on the printed page by drawing a tiny picture with lines on it. Each line represents a word as it will actually appear on the printed page. When you type in more text, this tiny picture is automatically updated.

Homeword displays only 15 full lines on the screen at a time, and fewer than 40 characters across. Homeword is also slower than other word processors for

the Atari. But like Bank Street Writer, it is easy to use. In fact, IBM liked it so much, it's selling it under the IBM label for the IBM PCjr.

Among the excellent features of Homeword is a tutorial on audio cassette. Users can just pop it into a tape player and follow instructions. Even the most reluctant computer user will be creating, editing and printing Homeword files in minutes.

Also, Homeword automatically senses if you have a 64K RAM Atari computer or one with only 48K of RAM. Some word processors don't allow you to use the upper 16K of RAM in a 64K RAM Atari, but Homeword is smart enough to avoid this restriction.

Super-Text

Muse Software

Requires 48K, disk drive

Yet another word processor for the Atari is Super-Text from Muse Software. One advantage of Super-Text is that when you want to load a file from the disk, you can call up a menu of files, and each file has its own number. You can enter either the full name of the file or just its number, so you don't have to do as much typing. Additionally, you can't accidentally type in the wrong filename.

Super-Text has its own set of commands you must remember, and they are different from AtariWriter's or Bank Street Writer's. Luckily Muse includes a quick-reference card, as well as a comprehensive manual.

Incidentally, when you buy a word processor or other serious software program with a thick manual, look for manuals that will lie flat when you've opened it to a particular page. One problem with some reference books and manuals is that they are "perfect bound" and won't lie flat. Look for spiral-bound books and manuals instead. You may not base your buying decision on it, but it's something to keep in mind if you have a choice.

Spelling checkers

Once you've picked up the fundamentals of word processing on the Atari, you may want to purchase a program to check your spelling.

First, determine if you really need one. If you're just using AtariWriter to send letters to family and friends, you probably don't. On the other hand, if you will be producing business correspondence and you aren't confident about your spelling, you may need a spelling checker. You may just be fumble-fingered around a typewriter keyboard and appreciate having a spelling checker to catch your typing mistakes.

When you use a spelling checker, the program takes up some of your computer's RAM, and the included dictionary may take up a lot more. Thus, you may not be able to check very large files (10,000 characters or more). Try to get a spelling checker that doesn't use much RAM. Inevitably, there are trade-offs between having a large dictionary and large amount of free RAM.

Each spelling checker includes a program and a dictionary of words, written

in proprietary codes to save space. As a result, you cannot display or run through the entire dictionary at once, although often you can look up specific words.

Most spelling checkers available work with a specific word processor. Here are two examples:

For AtariWriter, you can get Atari Proofreader, published by Atari. The Atari Proofreader program comes on one diskette, and the dictionary, which contains more than 36,000 words, comes on a second diskette. The package requires 32K RAM.

One good feature of Atari Proofreader is that you can run it without leaving the AtariWriter program. You load the Atari Proofreader program disk at the time you load AtariWriter. A new option — V, for Verify spelling — appears on the main AtariWriter menu. By typing V, you can check the text file you currently have in memory.

You can first ask Atari Proofreader to highlight errors to give you a quick view of the errors in your document. When you start correcting your document, you usually proceed to the end, so this highlighting comes in handy because it lets you know how much work lies ahead of you.

You can then correct all errors in your file. Like most spelling checkers, Atari Proofreader stops when it reaches a word it doesn't find in its dictionary. You can then type in the correct word.

Atari Proofreader, like other spelling checkers, lets you search the dictionary for the correct spelling of a misspelled word, requiring you to type at least the first two letters of the word. You can also load a disk with a dictionary of words not included in the main 36,000-word file. You can create and change this personal dictionary and, when you load this dictionary into memory, Atari Proofreader won't flag those words when it checks your file. The words you add can even be proper nouns, so if you don't want commonly used names to be constantly flagged as unrecognized words, just add them to your personal dictionary.

In Atari Proofreader, the larger your personal spelling dictionary, the smaller the maximum size of your text files. Both reside in RAM, and there's only so much RAM to go around.

For Letter Perfect, there's Spell Perfect, from LJK, Inc. Like Letter Perfect, Spell Perfect can work with 40-column or 80-column text. This program is the most powerful spelling checker for the Atari. It can actually generate a list of similar but correctly spelled words based on your misspelling of the word, using rules of pronunciation. For instance, if you check for the word *akused,* you'll get an alphabetized list of words similar in sound to that word. Letter Wizard's spelling checker is called Spell Wizard, and its dictionary has more than 33,000 words.

So there you have a view of Atari word processing. It's a rapidly changing scene, and you should compare the programs in this book to any that might become available in the future.

Educational software

Although a computer cannot take the place of a private human tutor, it has certain advantages over human beings. A computer is patient. It can present the same material over and over again, at the student's pace. A computer is thorough; with the right software, it can present a whole encyclopedia of knowledge. A computer is precise; it always knows the right answer (provided the software is valid). And, of course, a computer can play video games. Video games come into the learning process in a big way with Atari computers.

A few tips on educational software

Don't buy unless you try. If the software is for your children, ask their teachers what subject they need attention in. Find out what skills the software teaches. Is it software for remedial work? Enrichment? Will the parent be required to help the student throughout the lesson? What are the pros and cons of letting the student run the entire program, unattended? Does the program require joysticks or game paddles, or can you play it from the keyboard?

What are the limits of solitary learning environments? Much of education is social. Don't isolate your child unnecessarily. Consider making learning with the computer an activity your child can share with friends.

Atari computers have advantages and limitations when it comes to educating. On the plus side, they have great graphics and sound. Games can take place in an arcade-game environment that kids find exciting and interesting.

On the negative side, the Ataris' lack of 80-column word processing makes them a poor choice for courses such as touch typing. The Ataris' small storage space and maximum RAM of 64K make them less useful than other home computers such as the IBM PCjr in the size of programs that they are able to handle.

Educational software is supplied "as is"; usually, you get no guarantee that it will improve your child's grades. (A few programs guarantee improved SAT scores or your money back.) In this section, we will examine some popular and critically acclaimed educational software, but you should not expect miracles. A computer is just another tool, like a blackboard, textbook or slide rule, but it is one of the most effective learning tools that education has acquired in about 100 years.

Tutorial

Tutorial software presents subject material and drills students on it at the student's pace. The key to good tutorial software is the presentation of the material; if it is done in a lively manner, it can be quite effective.

The AtariMusic I and II series is an example of good tutorial software. The programs teach kids how to sight-read music, how to identify keys on a piano keyboard, how to understand the major musical scales and how to recognize whole steps and half steps. Developed by a college educator, AtariMusic uses the Atari's graphics and music capabilities, presenting each concept in an

orderly fashion and reinforcing the material with frequent tests. Both packages culminate in a video game that requires students to use their newly acquired knowledge of musical notation.

A pioneer in the field of classroom educational software is Minnesota Educational Computing Consortium (MECC). Many parents have found MECC's software useful in the home as well. MECC sells drill-and-practice software, as well as some excellent tutorial and simulation software.

Recommended tutorial software

Atari

- ☐ AtariMusic I
- ☐ AtariMusic II
- ☐ Music Composer
- ☐ Invitation to Programming 1: The Fundamentals of Programming
- ☐ Invitation to Programming 2: Writing Programs One and Two
- ☐ Invitation to Programming 3: Sound and Graphics
- ☐ My First Alphabet
- ☐ Spelling in Context 1-8
- ☐ Conversational Spanish
- ☐ Conversational German
- ☐ Conversational French
- ☐ Conversational Italian
- ☐ Atari Speed Reading
- ☐ Atari Touch Typing

Control Data Corporation

- ☐ PLATO courses

Minnesota Educational Computing Consortium

- ☐ MECC Music Series I, II & III

Another company that produces a lot of tutorial and drill-and-practice software is Dorsett Educational Systems. Dorsett has many cassette-based, 16-part courses on subjects such as U.S. history, accounting and algebra. Atari used to market the Dorsett software but dropped it, apparently because of low sales and a desire to get more game-oriented educational software. Not all educators are impressed with Dorsett's software, but there's plenty of it, and you may find it covers material not presented by other educational-software firms.

Drill and practice

The primary purpose of drill-and-practice software is not to instruct; usually, the software authors presume the students have been exposed to the material

already. Drill and practice gives students a chance to show what they know and find out what they don't. Good drill-and-practice software is like good tutorial software; it challenges students in a lively and entertaining manner.

Often, though, the entertainment value is secondary to presenting material as rapidly as possible. The theory here is that the more exposure students have to the material, the more they will remember. The success of this approach depends partly on the motivation of the student. Some students don't need games and music to learn; others need some sort of stimulus. Determine which kind of student your youngster is.

Minnesota Educational Computing Consortium

☐ Division Drill

EduWare

☐ Compu-Read
☐ Fractions

Artworx

☐ Hodge Podge

MicroLearn

☐ SAT Math I
☐ .SAT English I

Krell Software

☐ SAT Prep Series

CBS Software

☐ Mastering the SAT
☐ Mastering the College Boards: English Composition

Simulation

Simulation software is useful for helping students learn how to solve problems and put knowledge to practical use. Unlike drill-and-practice software, which concentrates on one skill at a time, simulation may require a student to use several skills simultaneously, such as good English grammar, math skills and scientific knowledge.

This sort of software lets your Atari shine. A good simulation combines elements of a mystery novel, an arcade game, a historical movie and science fiction. Simulations challenge the mind, tease the ego and provide students with hours of useful, educational things to do with the computer.

For instance, In Search of the Most Amazing Thing (Spinnaker Software)

scores of your money back.) in this section, we will
critically acclaimed educational software, but you should not expect miracles. A

combines elements of adventure games with an economic simulation. Players bargain with aliens at an auction, raise currency and then buy their provisions and board a sailing ship, searching for the Most Amazing Thing.

Scram (Atari) is a simulation of the inner workings of a nuclear-fission reactor. Like many simulations, Scram takes place in real time — that is, things continue to happen whether or not a player does anything. In the Scram game, the reactor starts out running normally, but things start breaking down. The player must determine what's wrong and fix it, or the reactor will melt down, and the game will end.

Many simulations deal with money and economics. One of the classics is called Lemonade. Lemonade simulates a small business with which many kids are familiar: a lemonade stand. Players have to buy supplies, such as sugar and lemons, while contending with shifting supply prices and product demand that increases if the temperature goes up. Many of the financial simulations are not in real time, so players can spend time studying the current game situation before they continue playing.

In Sunburst's Survival Math, students play four different simulations. In one, Travel Agent Contest, students plan a seven-day, six-night trip without exceeding a prescribed spending limit. They must allocate money for transportation, meals, lodging and special events.

Not only do such games reinforce basic skills in math and problem solving, but they also expose students to real-life situations they may someday face.

Here are a few recommended simulations:

Atari

- ☐ Energy Czar
- ☐ Scram
- ☐ Kingdom

Spinnaker Software

- ☐ In Search of the Most Amazing Thing

Electronic Arts

- ☐ Pinball Construction Set
- ☐ Music Construction Set
- ☐ M.U.L.E

Minnesota Educational Computing Consortium

- ☐ Expeditions
- ☐ Selling Apples
- ☐ Selling Plants
- ☐ Selling Lemonade
- ☐ Selling Bicycles

Sunburst Communications

☐ Survival Math

Learning games

Like simulations, learning games challenge students to use basic skills and their wits to complete a puzzle or a task, but learning games generally are shorter and contain more elements of classic arcade games.

Many of the games teach basic skills. Juggle's Rainbow from The Learning Company teaches very young children important prereading concepts such as up, down, left and right. For older children, you can get Typo Attack, a game in which students learn how to find the keys on the keyboard.

Developmental Learning Materials' six learning games, including Meteor Multiplication, require students to complete a simple math equation by "zapping" the correct object on the screen.

In many learning games, recognizable cartoon or entertainment characters help increase the child's enjoyment of a game. For instance, the characters of Walt Disney head up a new line of software. In Atari's Mickey in the Great Outdoors, Mickey Mouse must complete a simple sentence by firing an arrow at passing clouds and hitting the cloud with the correctly spelled missing word.

Learning games also create more fantasy and role-playing situations for players than do simulations. Fantasy and role playing, so much a factor in children's play and in most top-notch video games, are significant in educational software. In Scholastic's Agent U.S.A., kids must learn how to read maps in order to save the country from the diabolical FuzzBomb. The program also gives kids practice at solving problems.

In DesignWare's Spellicopter, the player is a helicopter pilot who has to pick up letters in the correct order to complete a puzzle, usually a word with some missing letters. As in most learning games, players use the joystick and firing button, rather than the keyboard.

A fine learning game is Rocky's Boots from The Learning Company. In this game, players move from room to room with a joystick, collecting parts to build different machines. These machines are based on the fundamental principles of logic and electricity and are, in effect, rudimentary computers. They can sense the state of various objects and react according to a set of logical laws. The game, which appeals to players from 7 to 70, is easy to use and fun to play.

Another clever learning game is The Factory from Sunburst Communications. The player is the foreman of a simple assembly line with various pieces of equipment such as a drill and a cutter. The raw materials are white squares. The object of the game is to use the equipment to turn the squares into finished products. The catch is that although the players know what the object looks like from an overhead view, they have only a profile view of the assembly line. They have to turn the pieces, then use a piece of equipment, move the object ahead and try again. At the end of the assembly line, the players get to see their product and if it's correct. If not, it's back to the start of the assembly line.

Players are not limited to the joystick or the keyboard as game controllers. Koala Technologies is the manufacturer of the KoalaPad touch tablet discussed earlier in this chapter. Koala sells some learning games, such as Spider Eater, that work with the KoalaPad. The game comes with a plastic overlay that fits on the surface of the KoalaPad. On the overlay are some printed piano keys. In the game, players see and hear a note on a musical staff, and they must press the correct keyboard key before a spider crosses the screen.

Below we list but a few of the outstanding learning games available for Atari home computers.

Atari

☐ Typo Attack
☐ Juggle's Rainbow (developed by The Learning Company)
☐ Juggle's House (developed by The Learning Company)
☐ Mickey in the Great Outdoors (developed by Disney)

MECC

☐ Prefixes
☐ Prereading Games:
    Caterpillar; First Letter; Pictures, Words and Shapes
☐ Word Games:
    Recall List Maker, Word Scramble, Guess Word, Spelling Bee
☐ Basic Arithmetic:
    Base Ten, Estimate, Math Game, Round, Speed Drill
☐ Counting:
    Smile, Wuzzle, Spaceship, Smile More, Return of the Wuzzle
☐ Math Facts and Games:
    The Count Down, The Secret Word, Tic-Tac-Toe,
    Computer Challenge
☐ Concentration
☐ Metric and Problem Solving
☐ Graphing
☐ Secret Formula
☐ Elementary Biology
☐ Earth Science
☐ Geography

The Learning Company

☐ Moptown Hotel
☐ Moptown Parade
☐ Bumble Games
☐ Rocky's Boots
☐ Colorasaurus

Developmental Learning Materials

- ☐ Alien Addition
- ☐ Meteor Multiplication
- ☐ Demolition Division
- ☐ Minus Mission
- ☐ Alligator Mix
- ☐ Dragon Mix

Sunburst Communications

- ☐ The Factory
- ☐ The Pond
- ☐ The Incredible Laboratory
- ☐ Teasers by Tobbs
- ☐ M-ss-ng L-nks
- ☐ Semcalc

Mindscape

- ☐ Tink!Tonk! adventure games

Program Design, Inc.

- ☐ Sammy the Sea Serpent

Scholastic Wizware

- ☐ Spelldiver
- ☐ Agent U.S.A.
- ☐ Bannercatch

Scarborough Systems

- ☐ Mastertype

Spinnaker Software

- ☐ FaceMaker
- ☐ Snooper Troops 1 & 2
- ☐ Story Machine
- ☐ Fraction Fever
- ☐ Hey Diddle Diddle
- ☐ Rhymes and Riddles

DesignWare

- ☐ Math Maze
- ☐ Spellicopter

Edupro

- ☐ Addition and Subtraction
- ☐ Number Relationships
- ☐ Storybook Animals and Things

Counterpoint Software

- ☐ Early Games
- ☐ Early Games Fraction Factory

Maximus

- ☐ Software Movies:
     Storyline
     Safetyline
     Adventureline

Krell Software

- ☐ Plato's Cave

CBS Software

- ☐ Half-Time Battlin' Bands
- ☐ Movie Musical Madness
- ☐ Coco-Notes

Koala Technologies

- ☐ Spider Eater (works with KoalaPad)

Communications

Computers have been talking to one another over distances since the early 60s, when timesharing was invented. Timesharing offers a way for many different users to "log on" to one computer system, either at different times or even simultaneously. When users pay for a timesharing service, they must usually log on with some sort of password. Every modern bank or airline has a series of terminals linking each clerk with the company's central computer. Similarly, the 24-hour automatic teller machines outside many banks are also computer terminals, and your authorized code is, in effect, your password permitting you entry into the system.

Terminals

In a timesharing system, each user logs on using a computer terminal, normally a CRT or other TV-type device that displays text. These terminals don't have to

be microcomputers; they can just be keyboards and monitors. With the proper software, Atari computers become terminals, displaying timesharing computers' data on a TV or monitor screen.

Computer terminals are either *dumb, smart* or somewhere in between. These terms are used loosely when it comes to microcomputers, but generally a smart terminal can perform more tasks and has more capabilities than a dumb terminal. The trade-off between the two kinds of terminals comes in price. Usually a dumb terminal — or dumb-terminal software — costs less then a smart terminal or smart-terminal software.

A dumb terminal is not stupid; think of the other definition of *dumb*, as in "deaf, dumb and blind." About all a dumb terminal can do is display text and accept text typed in at the keyboard. Normally it cannot display graphics, except for crude graphics made out of characters, such as a row of letter *o*'s used as a decorative border.

Dumb terminals scroll text by, line after line. The text rolls up and off the screen, just as a sheet of paper in a typewriter rolls through the platen as you type.

Smart terminals, on the other hand, can capture the text and save it on a permanent storage medium such as a diskette or tape. Depending on the kind of smart-terminal software you have and the timesharing system you're using, you may be able to capture nontext characters, graphic shapes and other Atari symbols.

Smart-terminal software can also check the data you're capturing as it comes in, letting you know the data is arriving intact. Because of the antiquity of our phone system and random events such as sunspots, lightning, power surges and line usage, your phone line may not always transmit data cleanly. Smart-terminal software can check for errors, usually using a version of the program called XMODEM, originally written by computer enthusiast Ward Christensen.

In a similar fashion, smart-terminal software lets you transmit whole files of information at once from your computer's disk or RAM to the timesharing system.

Unfortunately, the modems sold by Atari for its computers (Chapter 7) come only with dumb-terminal software. This software is fine for general-purpose communications with a wide variety of other computers, including Atari's. Without the ability to capture (download) or transmit (upload) data to or from disk or tape, however, this software, which includes TeleLink for the Atari 835 and ModemLink, which is built into the 1030 modem, is useless for serious computer users.

Fortunately, you can find help. It comes not from the commercial software world but from users' groups and services such as CompuServe, where smart-terminal software for Atari modems exists in the public domain. Public domain simply means you can get a free copy of the software from those services — or from your friends — and you can make as many copies of the software as you want.

The two primary Atari smart-terminal programs are called AMODEM42 and JONESTERM, or just plain JTERM. A third program, TSCOPE, lets you send and receive CompuServe files.

AMODEM42 is the product of dozens of people who have worked to perfect it, but it has been made available most recently by an Atari user named Jim Steinbrecher. You can write to him at 37220 Tricia Drive, Sterling Heights, MI 48077, for details. He also provides an 835/850 Handler, a BASIC program that gets the Atari's attention and tells it that a modem is connected to it and ready for a call. Atari Corporation can provide you with information about creating your own smart-terminal program.

Many Atari owners have 24-hour-a-day electronic bulletin boards operating around the country. Most of these are free, but some require you to pay a monthly or yearly fee to belong. Others accept voluntary contributions. You will be able to get public-domain software from these bulletin boards, but if they ask for your financial support, you should try to help out. Maintaining one of these bulletin boards is costly and time-consuming. With computers, disk drives and printers running 24 hours a day, equipment wears out, and most bulletin-board-system operators aren't rich. They operate their systems for their own enjoyment.

We'll take a closer look at bulletin boards in Chapter 9.

One advantage of AMODEM42 is that it supports a type of communication called XMODEM. This protocol is a kind of shared language between the two computers that lets them check for transmission errors. There is a catch, though; if you use AMODEM42, you won't always be able to talk to computers that don't use XMODEM.

Some computers send information seven bits at a time, and some send eight bits at a time. Computers using AMODEM42 always send eight bits at a time, which is the normal transmission method for Ataris. Information services such as CompuServe and The Source send seven bits at a time, however, and many other computers also use seven bits, ignoring the eighth bit. To communicate with these computers, you'll need either TSCOPE or JTERM. They can't do the kind of error checking that AMODEM can, but they let you communicate with a variety of computers.

Most personal computers talk to computer systems in full duplex, but some timesharing systems require you to switch to half-duplex transmission. Not all terminal programs for the Atari can talk in half duplex, but the need to make the switch is so rare that you shouldn't have to worry about it.

The number of stop bits can be either one or two. Most personal computers require only one stop bit.

Parity is important. Try to determine ahead of time what the parity of the host system is, and try to match it with your terminal software. If you don't know the parity, try no parity first; then try even or odd. Establishing communication often takes trial and error, especially where there is no documentation, which is the case with many small bulletin boards.

Another important factor that we will focus on in Chapter 7 is the speed at

which your modem works. The two standard speeds are 300 bits per second (bps) and 1200 bps. Not all bulletin boards work at 1200 bps, but when they do, the increased speed of communication helps reduce long-distance bills and time spent in front of the computer.

When you dial your phone to establish communication between your computer and another, the computer usually answers on the other end, but the computer's human operator, often called the system operator, or sysop, can also pick up the phone and proceed manually.

Information utilities

The term *information utility* refers to large networks of computers, users and resources that provide a variety of services, such as transfer of software, electronic mail, bulletins, on-line conferencing and data bases.

The three leading information utilities in the United States are the Dow Jones News/Retrieval Service, The Source and CompuServe.

All the information utilities have some kind of registration process. You can't just dial in and start using them. First, you need a user identification number and a password. By registering and paying any hookup fee, you will receive by mail the passwords and identification numbers you will need.

The toll-free number for getting information about Dow Jones is (800) 257-5114. In New Jersey, call (609) 452-1511.

Once you've paid any initial hookup fee, you'll be charged by the hour for the service you use. If you are hooked up for less than an hour, the charge is prorated. Hourly charges vary, depending on the time of day or day of the week that you use the service, and you are billed monthly.

Keep in mind that these charges are on top of the normal phone bill you receive. If you live in a metropolitan area or in certain rural sections of the country, however, most major information utilities provide a local telephone number for your use, which spares you any long-distance charges.

One caution: Certain services on The Source and CompuServe will cost you more than the regular hookup time does. The services that are in high demand or that use a lot of computer power — the news-wire sections of The Source and MegaWars, a popular multiplayer game on CompuServe, for instance — carry a surcharge.

Dow Jones, the company that publishes *The Wall Street Journal*, offers computer users coverage of business news and financial markets. It's primarily designed to provide information for investors, although it also has electronic mail so users can exchange information. Many people believe subscribing to Dow Jones is the quickest way to keep abreast of news in the world of business, and professionals preparing reports can gain the archival data they need.

Atari TeleLink or ModemLink owners can get a free hour of evening or weekend use of Dow Jones. Dow Jones waives the normal one-time $50 hookup fee for these new users. After a month, if you decide it's worth it, you pay $50 and get a permanent password.

CompuServe has the most users of any information utility. Here you'll not

only find electronic mail and a variety of information on various topics from travel to educating your kids, but you'll also find the Atari Special Interest Group (SIG), a section dedicated to messages about Atari computing and free software for your Atari. The Atari SIG is a great place to meet other Atari users from around the country and even overseas. By typing V from the main menu, you can get a list of users and their interests, as well as their CompuServe ID numbers if you want to send E-Mail (electronic mail) to them.

The free Atari software in the Atari SIG is stored in an area called ACCESS.

The Source is organized a bit differently from CompuServe and offers less help to beginners. Experienced users, though, say The Source is more flexible than CompuServe. Like most on-line services, CompuServe does have an expert mode, in which you can skip the lengthy menus that scroll by. In The Source, you don't see any of the menus unless you want to. Instead, you type simple commands such as READ MAIL. The only trick is remembering them.

The Source offers UPI wire services, updated hourly or even more frequently. There is no specific area for Atari users, but in the PARTI (for participate) area, dozens of conference groups tackle different topics such as gourmet foods and U.S. foreign policy. These groups come and go, but some are quite long-lived.

Both The Source and CompuServe store files differently from the way that your Atari stores them. If you think of file as a leaf of a tree on a branch that connects to a larger branch and so on down to the trunk, you have an idea of the structure of these utilities. Normally you start with the broad subjects and work through the branches of information until you reach the leaf that interests you. You can go back up the tree gradually, or you can jump from one branch or leaf to another with special commands, such as GO INF-1 in CompuServe.

CompuServe's main menu:

CompuServe   **Page CIS-1**

1 Home Services

2 Business & Financial

3 Personal Computing

4 Services for Professionals

5 User Information

6 Index

The Source's welcome screen:

Welcome to the Source

1 Using the Source

2 Today

3 Business Update

4 The Source main menu

5 What's new

6 Command level

**Enter your selection number,
or H for more information**

    In some areas, you can already conduct some of your business, such as shopping and home banking, through a modem and a home computer. Residents of the New York metropolitan area are already able to bank in this way. Chemical Bank of New York has one of the first operational home-banking networks in the country. Called Pronto, it requires users to have an Atari home computer.

    With Pronto, you can check your bank-account balances, see which checks or deposits have cleared and automatically reconcile your checkbook, all without leaving your home. You can also pay bills to more than 350 different merchants, just by using your Atari computer. An electronic-mail command puts you in touch with Chemical Bank's customer-service staff.

Pronto isn't free, and you should get a demonstration before signing up. You can get more information on it by calling (800) 782-1100.

In California, Bank of America is also offering home banking to owners of personal computers, including Ataris; you have to have a modem as well.

Two other information utilities focus on education. The first is PLATO Homelink, which is run by Control Data Publishing, a division of Control Data Corporation. PLATO Homelink makes available a wealth of educational software because it is linked with Control Data's master computers, which contain thousands of PLATO programs developed during the last ten years. Currently, about 250 of those courses, on topics such as business simulation, medicine and social studies, are available through PLATO Homelink.

PLATO Homelink also has more than 30 interactive games, including chess, Maze War and Concentration. The most exciting game is an epic called Empire, which allows PLATO Homelink users in many cities to join the game. All of the players are playing the game at once, aware of one another, forming alliances or trying to beat one another on an intergalactic stage.

PLATO Homelink also has an advanced electronic-mail system that works with either 300- or 1200-baud modems.

Another educational information utility, run by TeleLearning Systems, offers you the world's first electronic university. The founder of the company, Ron Gordon, used to be the chief executive officer of Atari.

TeleLearning links human instructors with students through a network of personal computers. Students enroll in the university by buying a special, low-cost, 300-baud modem with software. This modem can be used only to dial the TeleLearning computers, but it is simple to use for that purpose, since the software dials TeleLearning's number automatically.

TeleLearning offers hundreds of courses, and students can even get college credit at places such as Ohio University and the University of Wisconsin. In effect, the computer and modem give students a more convenient way to take correspondence courses. Students can even chat with their teachers during preagreed "office hours" by typing messages on the screen. Teachers can give tests over the computer and return results. The courses themselves cost $50 to $150 each plus any college registration costs.

For more information on the services discussed in this chapter, write or call:

- □ CompuServe, Inc.
  Consumer Information Service
  5000 Arlington Center Blvd.
  Columbus, OH 43220
  (800) 848-8199; (614) 457-8600 in Ohio

- □ The Source Telecomputing Corporation
  1616 Anderson Road
  McLean, VA 22102
  (800) 336-3366; (703) 734-7500 in Virginia

□ Control Data Publishing Company
P.O. Box 261127
San Diego, CA 92126
(800) 233-3784; (800) 233-3785 in California

□ TeleLearning Systems, Inc.
505 Beach Street
San Francisco, CA 94133
(415) 928-2800

□ Dow Jones & Co., Inc.
P.O. Box 300
Princeton, NJ 08540
(800) 257-5114; (609) 452-1511 in New Jersey

□ Chemical Bank (Pronto)
55 Water Street
New York, NY 10041
(212) 310-6161

Data-base management

Electronic filing is one of the more powerful uses of your Atari computer, but many people never explore it fully. In this chapter, we'll show you that it's easier than you think.

A data base is similar to a set of folders you keep in a filing cabinet. Each file in the data base represents a drawer in the cabinet, and a record in the file represents a folder in the drawer. In each record are items of information called fields, which you can define. Typical field names are First Name, Last Name, Address, Income, Expenses and Check Number.

Setting up a data base

Let's look at how an actual data base might be arranged. It's a good idea to design your data base before you start using it on a computer. If you want to go back and add another part later, you may not be able to do so. Better to think of it all ahead of time.

First, name the data base, for example Home Inventory. You can break it down into the next smaller unit, called a file. A file is generally described as a collection of data that you can load into the computer's memory all at once. (With certain data-base programs, you can create files larger than RAM and load in a part of each file at a time.) Atari DOS can list your files for you, or the data-base manager will have a command to let you list files and then create and save files to disk.

For example, your file is called Stereo Equipment, and your first records hold information about the Sony Walkman II.

DATA BASE: Home inventory for insurance purposes
FILE: Stereo equipment
RECORD: Sony Walkman II
FIELD 1: Value: $149
FIELD 2: Condition: Excellent
FIELD 3: Date bought: 1/23/84
FIELD 4: Where bought: Pacific Stereo

The other records in this file could be:

- ☐ JVC Turntable
- ☐ Pioneer Receiver
- ☐ Kenwood Tape Deck
- ☐ Blaupunkt Speakers
- ☐ Koss Headphones

The first field, or entry, in each record holds the title of the record item, such as Sony Walkman II or Pioneer Receiver. Instead of calling this Field 1, most data-base managers let you call it anything you want. Let's call this field Title.

Similarly, you can call the second field, which will hold the value of the item, anything you want, so we'll call it Value. Each of the records has a value, useful for insurance purposes.

The third field could be called Date Bought. Each record will have a Date Bought field, useful for seeing how much you spend on stereo equipment each year or for checking if the item is still under warranty.

The fourth and final field in this data base could be Where Bought. You can determine from this information where you have to take the item for servicing. If the item breaks down early, you may want to avoid the store where you bought that item.

This file is only one of many in the Home Inventory data base. Other files can include records and tapes, kitchen appliances, coin collections, computer hardware, computer software or jewelry.

Software limitations

When you are happy with the design of your data base, it's time to create the actual data base with the computer program. Here you start running into the limitations of the software. Certain data-base programs, known as file managers, let you have only one file per data base. Not all file managers are this limited, but many are.

A second restriction can pop up at this time. You may try to enter Home Inventory as the data-base name and find that the program will accept no more than six letters as the title of the data base. You'll have to shorten the name to something such as Inven.

Once you have a name for the whole data base, though, you can load it from your data diskette.

You'll probably have similar limitations in naming files. The Ataris them-

selves often limit your possibilities, since normal DOS allows only eight letters in the filename, followed by a period and an optional three-letter extension. Here are some examples:

- □ STEREOEQ.NEW
- □ COINCOLL.VAL
- □ APPLIANC.KIT

Notice that Stereo Equipment became STEREOEQ and Appliances became APPLIANC. True, you could use the three-letter extension to make it a little clearer, but generally it's a good idea — even when you're just doing simple word processing — to reserve that file extension for important uses, such as backup copies, time-related copies of the file or some common extension such as VAL, which lets you know that several different files contain similar types of information.

Within each file are the records that contain the actual information you'll type in. Typically, records are about one page of information or less. When creating your data base, you either use a preexisting screen with blanks on it, called a form, or you create your own form, which becomes the way you enter information into your records.

The fields in each record start at the top of the form and work their way down the screen. You may have the same restriction on the number of letters in a field's name as you did on the filenames, or you may be able to make the field names longer and, hence, more understandable.

After naming all the fields, you may also have to decide how many characters you'll need for each entry. Typically, you can allow 20 characters for an address but only two characters for a state, since you can use the two-letter ZIP code abbreviation.

Other times, the program may automatically put in a certain number of characters, especially if you are using a form that comes with the program. Also, the program may have a maximum number of characters per form or per field. In such a case, you may have to scale back the size of your data base or use only the most important information.

When you're finished creating the data base's structure, you have what's commonly called a template, a blank that's waiting for you to enter information. The next step is to save this template.

Now you're ready to bring back the template and begin entering your data. You proceed directly to the blank form and enter information into each field. Commonly you can type in only as many characters as there are blank spaces on the screen. The data-base manager lets you update information in your records without having to type in everything every time.

You can also search through your records for information. How many pieces of stereo equipment cost more than $400? Which ones did you buy before September 1980? Is the warranty on that blender still in effect? Data-base management gives you the answers, quickly with just a few keystroke commands.

Many data-base managers let you sort your records, that is, arrange them in a more useful order. For instance, you can alphabetize the records by their Title fields, or you can list the records according to their Value field, from most expensive item to the least expensive.

You can also generate reports from your records. Here you may be limited by the width of your Atari printer. A 40-column printer won't be able to print many fields across the page. An 80-column printer will do better, but you may want an extra-wide 132-column printer. Sometimes you can condense the print on a report to get more than the normal number of columns.

Sometimes you can also use your data base for simple calculations. In the case of the home-inventory data base, you may be able to get a total of the value of your personal property and then have the program calculate the percentage of the total that you should pay in insurance costs.

Besides taking care of home inventory, data-base-management programs can also serve as address books.

Relational date-base programs can move records from one file to another and sort your data in more complicated ways. You can also change your entry form and transfer information created with the old form into the new form. Advanced record keeping, especially for businesses, requires such abilities.

A few data-base managers

Data Perfect from LJK, Inc., lets you organize files on your budget, checkbook, phone and mailing lists, travel expenses, insurance inventories or whatever you wish. You can establish a file of records and save it on a floppy disk. You can specify up to 32 fields in each record. Each field can have up to 127 characters in it, so even if your address includes an apartment number, a post-office box and a company name, it will fit in the field. Field names can have a maximum of 12 characters.

The data-base-merge facility of the Letter Perfect word-processing package from the same company can access fields in Data Perfect records, meaning that you can take your data-base reports and include them in your regular correspondence. You can create reports in Data Perfect by typing a report screen that uses the same fields you designed for data entry. Data Perfect also has a special program for producing mailing labels.

Data Perfect includes a tutorial. In the tutorial are some useful sample working data bases: purchase orders; accounts receivable and payable; payroll; ownership data base for insurance, including estimated value, description and insurance value; general data file, with name, address and employer; and even a Christmas-card data base.

Although you won't find the more powerful data-base managers such as Lotus 1-2-3 or dBASE II available for the Atari, you will find products such as the CCA Data Management System from CE Software. It features 24 fields per record and ten-level sorting. Atari itself sells Home Filing Manager, a small-scale data-base program that can store 18 fields, each of which can have up to 38 characters. The program, which requires only 16K of RAM, is good enough

to replace a typical box of index cards, and you can sort on any field. Its simplicity limits its use in complex tasks.

The newest filing manager, developed by Synapse Software and distributed by Atari, is SynFile+, successor to Synapse's popular File Manager 800 program. SynFile+ can store much more than Home Filing Manager can — 66 fields per record — and each file can be on up to 16 disks. It can also share and exchange information with other Synapse business-software programs: SynCalc, a spreadsheet; SynTrend, which organizes statistical information and generates graphs; and other programs, such as one that will be able to communicate with other computers and another that will calculate taxes. You can also read SynFile+ files with Atari's word processor, AtariWriter, and incorporate data-base reports into letters and other text.

Dynacomp offers Hiscore Database, which is specially tailored to record the high scores you and your friends get when you play games on your Atari computer. Hiscore can store 400 records if your computer has enough memory. Also from Dynacomp is Golfer's Database, which keeps track of golf scores, number of putts, greens hit, courses played, course ratings and weather conditions. Dynacomp also offers the Data Retrieval System (DRS), a program originally created to index journal articles. The company says DRS can also create other kinds of data bases. TMQ Software offers File Fax, a data-base manager whose records can have 31 fields of 40 characters each and a total record maximum of 800 characters.

Data-base management is one of the most powerful of all computer applications. If you can spend the time to learn a little about it and choose a package with the features you need, you'll find it a rewarding use of your Atari.

Spreadsheets

An electronic spreadsheet can help you do work in minutes that used to take hours when all you had was a calculator, a pencil and a sheet of paper.

The idea behind electronic spreadsheets is simple. A calculator can perform many functions in one direction. The paper tape scrolls off the top and gives you a record of your calculations. A spreadsheet is like a calculator in two dimensions. You can add down and sideways at the same time. Maybe you want to add numbers down and multiply them across. The spreadsheet can do that, too.

Electronic ledger sheet

A spreadsheet looks a bit like a general ledger. Normally the rows, which run across the screen, are numbered, and the columns, which run up and down the screen, are lettered. Each intersection of a row and a column is called a cell, and each one is identified by its row-column location. For instance, cell B3 is located at the intersection of row 3 and column B.

With a spreadsheet program, the cells can be places where you enter numbers or places where totals are displayed, or you can use a cell as a place to store a label identifying a row or column. If you were doing your annual budget,

columns 1 through 12 could be labeled with the names of the month. The rows could contain different items in your budget.

If you set up cells C1 through C6 as places to put January's expenses, you can set up cell C7 as the place where the spreadsheet program adds C1-C6. To do so, you indicate that cell C7 solves a formula and then type in that formula: C1 + C2 + C3 + C4 + C5 + C6. That formula appears displayed only when your cursor is at that cell; normally, it doesn't clutter up your spreadsheet.

By the way, a cursor in a spreadsheet program differs from the cursor you see in other programs. In a word-processing program, the cursor — that small square or line that indicates where you'll type next — is one character wide. In a spreadsheet, the cursor is a wide bar that highlights an entire cell.

Because the Atari screen is normally 40 characters wide, you couldn't build much of a spreadsheet if you couldn't move past the edge of the screen. Spreadsheets can move around, though, and the screen becomes a window onto just one part of it. For instance, ten quick right-arrow strokes may bring you to columns H, I, J, K and L, but columns A-G would then have scrolled off to the left. You can move back there if you want, and you can scroll through the rows.

You may also be able to vary the width of columns. Normally they are eight characters wide, but with a more powerful spreadsheet program, you can narrow or eliminate the display of certain columns, even though they may still contain information. You can also restore them to their regular dimensions later.

So you've created a grid of your monthly expenses, but that's not interesting in itself. The advantage of electronic spreadsheets is that you can play "what-if" games. Let's say you're using last year's expenses to project this year's.

All you have to do is go back to the cell where you entered a particular cost and type in the new number. Simply entering that number will make the formulas the totals, and you can repeat this process as often as you want, with as many different factors as you want.

Electronic spreadsheets have many other capabilities. You can duplicate whole blocks of cells and carry over the formulas associated with those cells, saving the work of keying in these formulas again. You can print out your spreadsheets, and sometimes you can generate a graph to turn confusing numbers into understandable point, line or bar charts.

Using a spreadsheet is often called financial modeling. Investors, analysts and business managers have found spreadsheets invaluable for doing forecasts, budgets and analyses. Home use of spreadsheets is less popular, but these programs are less restricting than the personal-finance programs we looked at earlier.

The first and most popular electronic spreadsheet for personal computers was VisiCalc from VisiCorp. A version for Atari computers came out a few years ago, but recently VisiCorp stopped making this version.

The new kid on the block is Synapse's SynCalc. It includes all the functions of VisiCalc for the Atari, plus a few new ones — ability to sort certain cells and a

split-screen function that lets you view two parts of the spreadsheet simultaneously, using a vertical or horizontal split screen.

SynCalc is compatible with the AtariWriter word processor, so you can incorporate spreadsheet information into reports.

Accounting

Before converting your general-ledger books over to your Atari, be aware that your Atari computer is not optimized for accounting programs. The computer's image as a game and education machine for the home means that Ataris have not invaded offices in the way Apple and IBM computers have. Accounting is generally an office function, and if you accumulate any moderately large records, you'll quickly reach the capacity of both the Ataris' RAM and their disk drives. Also, hard disks are not readily available for the Ataris, and most businesses need the speed and storage capacity of hard disks to store their records.

If you operate a very small business or have a money-generating hobby, however, your Atari will be able to take care of your basic accounting needs.

From Atari itself comes The Bookkeeper, a double-entry bookkeeping system for your home office. Accountants prefer double-entry accounting software. You must post each entry twice, into different accounts, so the program can check the two entries against each other.

The double-entry feature and the kinds of reports the program can automatically produce are two of the few functions that distinguish accounting programs from data-base-management programs. In some ways, accounting records are merely a data base of information that you can sort and search, but accounting programs tend to follow certain guidelines. Normally, for instance, you can't go back and change accounting entries once they're finished.

The Bookkeeper features a self-guided tour at the start to get you going. All screens are color-coded to show you what section of the program you're in. The program prints the following financial reports: profit-and-loss statement, balance sheet, trial balance, general ledger, accounts payable and accounts receivable.

Atari provides The Bookkeeper on four diskettes. It requires 48K of RAM, a disk drive and a printer.

Also available for the Atari is an accounting package that lets you generate a small company's payroll. Miles Payroll System from Miles Computing does a thorough job of automating payroll for companies with 50 or fewer employees. Miles can print payroll checks, withholding money for state and federal taxes, disability and more. Unlike the tax programs we discuss later in this chapter, Miles' program doesn't come supplied with the latest tax tables; you have to enter your own rates and change them as needed.

For a small company, an Atari can be a welcome alternative to paying your accountant a fortune.

Music and speech

Sound and video go together naturally. You can generate four-part harmony with Atari computers. By using the Sound command in Atari BASIC, you can determine the pitch, loudness and length of each musical note.

The Atari sound chip can also generate many synthesized sounds by distorting normal tones. These sounds can resemble explosions, dripping water, motors and hums, or they can just be electronic bleeps. For instance, a sudden up-and-down sound can be effective when you're trying to illustrate jumping, such as in the game Miner 2049er from Big Five Software.

If you own an Atari 400 or 800, you'll hear sound come out of your Atari computer system in two places. The computers themselves have a built-in speaker. A loud tone sounds when you load a program from the Atari cassette recorder or when you've pressed an inappropriate key in a program such as AtariWriter. Another tone this built-in speaker generates is a softer, clicklike one that you'll hear when you use AtariWriter or other programs.

If you have any other Atari computer (one with XL after the number), your computer doesn't have a built-in speaker. The sounds generated for these computers come through the television or monitor speaker.

The later Atari computers are more flexible. With the earlier computers, you can't turn off the built-in speaker sounds (unless you pull the speaker out of the computer). On later computers, you just turn the television or monitor sound down.

With all of the computers, the four-channel sound that generates music, sound effects and even speech comes out of the TV or monitor speaker. In Atari BASIC, you generate these sounds in the following way:

SOUND 0,68,10,10

Four numbers follow the SOUND command, each set off by a comma. The first number is the number of one of the four sound channels (which, for the computer's benefit, are numbered 0 through 3). The second number is the pitch. In Atari BASIC, the pitch is represented by a number from 0 to 255. Zero is total silence, and 255 is the highest pitch. Atari computers can generate three octaves of music, two below middle C and one above middle C.

The third number is the tone of the sound. You can use eight different even-numbered tones — 0, 2, 4, 6, 8, 10, 12 or 14. Tone 14 is a pure-sounding tone. As the number falls toward 0, the tone gets fuzzier and scratchier. At tone 0 the sound resembles a buzz saw, or static, depending on the pitch. You can use these distorted sounds to create sound effects.

The last number is the loudness of the tone. This loudness is relative, because you can control the overall loudness by adjusting the volume on your TV set. Zero is the quietest, and 15 is the loudest setting.

If you can read music, you will have to adjust to Atari BASIC's unusual musical notation. If you can't read music, don't expect to acquire this skill just by using Atari BASIC.

Atari Logo also can generate music. By using the Toot command, you can work music into your Logo programs.

Many software programs exist whose main function is to create music on the Atari in easier or different ways from those of Atari BASIC. Some of these programs use standard musical notation, such as the staff, treble clef and measured notes such as the whole note, half note and quarter note.

One program with nonstandard musical notation, Dancing Feats from Softsync, lets you experiment with different sounds by moving the joystick. Dancing Feats resembles an organ with preprogrammed rhythms.

In Dancing Feats, you can choose from several different bass lines (jazz, rock, blues or boogie-woogie), different beats (cool, rumbalike beguine, syncopated and dance), two styles (swing or blues) and different tempos — adagio (slow), allegretto, allegro and vivace. You can also select four different kinds of endings to your songs. The songs repeat over and over until you press the space bar. Then the word *coda* appears, and the chosen ending to the song plays.

You can play the melody in Dancing Feats by moving your Atari's joystick around. Each of the eight notes you get with the eight positions of the joystick is consistent with the chord the bass line is currently playing. As the chord changes, the notes you can play change.

By holding down the joystick's fire button, you can play melody notes an octave lower than usual.

Dancing Feats, like all music software for the Atari, lets you record your compositions and play them back for your friends. It's an unusual program and an example of how the computer lets us play with art forms in new ways.

More traditional sight-reading music packages also exist. One of the best is the AtariMusic series by Atari. This series of four disks teaches youngsters and adults about musical notes, their names and how to read them, whether on sheet music or a piano keyboard.

AtariMusic I uses drill-and-practice techniques to teach note reading and the concept of whole and half steps in music. AtariMusic II guides students through the major scales. Both packages come on either disk or cassette. Each culminates in a video game that requires students to use the knowledge they've gained through drill and practice to win the game.

Packages like this show off drill-and-practice techniques at their best. The computer can show musical concepts in a new way, and students can follow along at their own pace, never worrying about falling behind.

For more advanced musical composition, there's Music Construction Set by Electronic Arts. Music Construction Set is similar to Pinball Construction Set and owes a lot to the Pinball Construction Set program. By using a video hand, composers can move musical notes around the screen and put the notes on a musical staff that scrolls to the left, making room for more notes. (See next chapter for more on games.)

Music Construction Set also comes with some songs already recorded on its disk, to let music students study how a particular tune is scored.

Perhaps the most impressive part of Music Construction Set is that you can

do everything by moving the joystick and clicking its button. With many music-composition programs, you have to type in the notes themselves at the keyboard.

Such is the case with the Advanced Musicsystem from APX, a program that includes five classical music compositions from composers such as Bach.

Some Atari users' groups provide songs that run under the AtariMusic system. You can transfer these programs from the users' group computer to your own if you have a modem and smart-terminal software. For more information on this process, see the section on free software in Chapter 9.

Still lacking for the Atari is a plug-in keyboard that lets you play music on the Atari as you do on a piano. Let's face it, the typewriter keyboard is no substitute for a musical keyboard, and neither is a joystick. A full 88-key keyboard to plug into the Atari would be great, and someone will probably produce one.

In the meantime, if you have a KoalaPad (described earlier in this chapter), you can use Koala's program Spider Eater with the pad. This package includes a thin overlay for the top of the pad with nine whole-note piano keys drawn on it. Spider Eater lets you compose music and play musical learning games using the simulated keyboard on the KoalaPad.

You can also make the Atari talk to you. Tronix publishes a program called S.A.M. (Software Automatic Mouth). S.A.M. is a software program that requires no additional hardware; it uses a TV speaker to generate music and other sounds.

The way S.A.M. works is simple. You type in words, and S.A.M. turns them into speech. It correctly pronounces 90% of the words you enter without any modifications. If you type in a word that it pronounces incorrectly, you can use a special built-in phonetic alphabet to generate the correct pronunciation. S.A.M. also lets you stress certain parts of words, just as people do when they talk. Many early speech synthesizers just generate flat, monotone speech that sounds computerlike. Adding inflection and changing the pitch of the speaker and the speed of the speech make the computer sound more human.

Computerized speech is still in its infancy, however, because the computer requires ever larger amounts of memory as we try to add subtle nuances. A program has to translate every particle of speech into 1s and 0s, and despite the use of some clever routines called speech algorithms, you can still tell when a computer is speaking.

Home finance

Most home-computer makers promise that their computer can help you keep track of your household finances. Such promises remain partly unfulfilled — the home computer can handle only some financial duties.

No one has invented a program that really makes balancing your checkbook any easier. The two biggest causes of checkbook error are arithmetic mistakes and entry mistakes, and even with a computer you still must enter all the

information from your checkbook manually into the computer's memory.

Although a computer can check your arithmetic, it cannot check your numerical entries. You may have made some gaffes when you first wrote down the check amounts, and entering the numbers into the computer offers you a second chance to bobble the accuracy of the numbers.

So until someone invents a checkbook register that you can plug into your home computer — which may be only a few years off — you will probably continue to balance your checkbook the old-fashioned way, with pencil, paper and calculator.

A home computer is more than a calculator, though, and balancing your checkbook is only one of the things it can do. An Atari can also organize and analyze your personal finances.

Atari offers a program called Family Finances. On one disk is a program called Family Cash Flow, which can track up to 100 expenses and 20 sources of income. The program helps you with a series of menus, and you can record all your expenditures in a master "file cabinet." Within a few seconds you can retrieve any of this information.

On the second Family Finances disk, you can use the Family Budget program to create a budget based on information in your Family Cash Flow files. Family Budget lets you look at your spending patterns and budget your money for up to a year ahead.

The program comes with sample data for a hypothetical family, and the manual uses this data to help teach you how to use the program. Since the program comes on two disks that also store the data, it helps to have two disk drives, although it's not essential.

Naturally, you can also print out your expenses and any budgets you create. You can have up to 13 categories of income and expenses. It's up to you to stick to your budget, but the Atari computer makes it easy for you to create a plan.

From Thorn-EMI comes Home Financial Management. It lets you set up a budget and see, with numbers or bar charts, where you stand financially.

FutureHouse offers The Complete Personal Accountant, which manages your checkbook and budget and creates a schedule of your payments.

Another company offering a budgeting package is Culverin Corporation. The product, called Lifestyle Budgeting, was written by Dr. Harper Roehm, the author of *Spending Less and Enjoying It More* (McGraw-Hill). Included with Lifestyle Budgeting is a book that explains the "behavioral aspects" of successful budgeting. We'll probably see more of this psychological approach to home finances in future software programs.

One of the most popular home-finance programs is Continental Software's Home Accountant. This program, available for all major home computers, including those made by Atari, consistently has been at the top of the best-seller list of software.

Home Accountant is an all-in-one package that takes care of both your budget and your checkbook. This program has up to 200 budget categories and can handle up to five separate checking accounts. You can even store informa-

tion on multiple disks, so you're not limited to one data disk.

Best of all, Home Accountant can generate graphs, using bars, lines or plotted points, to show your expenses and income from month to month. Often, a graph can make the meaning of numbers much clearer than when they stand on a balance sheet.

The only catch with Home Accountant is that it's so complex that it will take longer for you to learn than most other programs for your Atari.

You can find programs that are easier to learn and use than Home Accountant, but they will probably be less advanced. Such is the case with Personal Accountant from Softsync. This program conforms more to traditional accounting practices than do the other programs. You even have to enter each amount twice — a "double entry" system most accountants demand to ensure accurate record keeping. Personal Accountant is adequate for those who don't need all the features of Home Accountant.

Computari sells another personal-finance program, A Financial Wizard 1.5. The package has 25 expense categories in its Budget Forecast section. It includes checkbook balancing and lets you compare your expenses to your budget. A Financial Wizard 1.5 can also print customized checks and generate bar graphs for your screen or printer.

Yet another personal-finance program for Atari computers is The Money Processor, available from Luck Software. This program files and retrieves all your spending and income transactions.

Another popular use of home computers is preparation of income-tax forms. No computer program can take the place of an inquisitive tax preparer, asking questions and digging for deductions and tax shelters, but home-computer software not only can help prepare your tax form, but also can compare various tax strategies to let you choose the best one.

Since tax laws change from year to year, software companies normally offer a yearly update to tax-prep-software owners. These updates are usually available for a nominal cost compared to the cost of the original package and include the latest tax tables and any relevant changes in deductions or tax forms.

Continental Software has a tax-preparation package called The Tax Advantage. You can enter all your tax-related data through the keyboard, or the program can read in data from your Home Accountant records. Then it can calculate how much tax you owe, using current tax tables and your information on deductions.

Among other tax-preparation programs available for Ataris is Tax Command from Practical Programs, which includes the 1040 form as well as capital gains and losses, income averaging and other forms. From Northern California comes The Tax Consultant, a program that includes all required IRS forms with the preparation features of the above packages. The Tax Consultant's creator claims that it will, at your request, check your return closely and print out a list of those items that, in the program's judgment, may be questioned by the IRS. The Tax Consultant is available from Morbius Software.

The Atari computers can perform more specialized financial tasks that

aren't included in the larger home-budget packages. Creative Software produces a package called Loan Analyzer that lets you compare different financing schemes if you buy a home, a car or other big-ticket items. If you are eligible for one of the newer variable-interest loans, this program can help you assess the total cost and monthly payments you will encounter. Again, a real-estate broker or accountant can probably do better, but the Loan Analyzer is cheaper and lets you draw your own conclusions.

You needn't feel limited to these programs to help track your finances. Spreadsheet programs such as VisiCalc and SynCalc can easily help you generate your budget. The advantage of the more specific financial programs is that they are menu-driven: they prompt you about what to do next or give you a few choices. With a VisiCalc program, you'll have more flexibility, but you won't have a series of menus to guide you. Perhaps once you've tried a personal-finance program, you'll be ready to move up to a spreadsheet program.

Chapter 6

GAMES

Now comes the fun part.

Atari game software is some of the best in the world, which is not surprising, since Atari is the world's leading producer of video-game cartridges for video-game players (installed base in 1983: 12 million) and continues to produce innovative new coin-operated arcade games.

Computer games are coming into their own as a form of entertainment. The overwhelming majority of people who buy a home computer spend more time playing computer games than doing anything else with their computer.

Nevertheless, computer games are still in their infancy. Most only have a little intelligence built in, and you will need little more than a sharp mind to memorize information. Other computer games, with random factors built in, require fast reflexes. Atari is certain to explore this new entertainment form to its limits.

Atari computer games fall into five categories: arcade games, strategy games, adventure games, simulations and learning games. Below are some minireviews of popular games available for Atari computers.

Arcade games

The idea of these games is to re-create, as closely as possible, the experience of visiting a coin-operated video-game arcade. They emphasize great graphics and music and the need for quick reflexes and eye-hand coordination. Make sure you have a good joystick; the Prostick by Newport Controls is one of the

best. Atari, TG Products and WICO also make joysticks for Atari computers. Incidentally, your joysticks can also plug right into a Commodore VIC 20 or Commodore 64.

From Atari itself comes a whole series of arcade-game classics, such as Pac-Man, Ms. Pac-Man, Space Invaders, Joust, Asteroids, Missile Command, Centipede, Dig Dug, Donkey Kong, Kangaroo, Qix, Pole Position and Defender. In Pole Position, your race car zooms down a curving road, passing other race cars and avoiding roadside hazards. Caverns of Mars is another good Atari game. One original Atari game, Getaway!, from APX, makes you a thief driving a getaway car over a scrolling map several times the size of your TV screen, and it includes realistic police-siren sound effects and fast action.

Activision and Imagic, two major producers of game cartridges for Atari game machines, have converted many of their games to run on Atari computers. A good one is Activision's River Raid, which lets you bomb targets while your plane flies over a river that scrolls by. Imagic's Demon Attack, a real shoot-'em-up that demands your quickest reflexes, is one of the most popular video games ever.

Datasoft and Datamost are two Southern California companies that produce a lot of software for Atari computers. Datasoft's good arcade games include Pooyan, featuring marauding wolves and an arrow-shooting sheep; O'Riley's Mine, an advanced version of Dig Dug; Zaxxon, the best-selling home-computer game in 1983, with its distinctive three-dimensional graphics; and Bruce Lee, an adaptation of the late kung-fu star's adventures.

Datamost's best arcade games include Mr. Robot and His Robot Factory, which lets you create your own game screens as well as play the 22 included screens; Monster Smash, in which, for a switch, you control the maze walls and try to stop escaping monsters; Cohen's Tower, where you are an office mail-delivery boy, avoiding a pesky dog and giving the office secretary a kiss every now and then for extra points; and a series of games featuring Captain Sticky, a real-life caped crusader who appears on NBC-TV's "Real People" show from time to time.

Big Five Software contributes Miner 2049er, an excellent romp in which your player, Bounty Bob, operates a scissors lift, catches elevators and escalators and gets shot out of a cannon. Big Five also has another game with Bounty Bob called Scraper Caper.

Synapse Software has a whole series of innovative games, such as Blue Max, a variation of Zaxxon's 3-D approach, only this time you are in a World War I biplane and have to land to refuel and contend with crosswinds. Another winner is Necromancer, a strange game in which you cast magic spells to make trees walk and avoid nasty hands that reach down to grab you. Still another good Synapse game is Rainbow Walker, a color-in-the-squares game in which all the action takes place on a scrolling rainbow high up in the clouds.

Sierra On-Line splits its efforts between arcade games and adventure games (see below). Frogger is Sierra's arcade game for Atari computers. You have to make your frog hop across a busy highway and a rushing river to get points.

Another entertaining Sierra game is Quest for Tires, which features cartoon characters from the comic strip "B.C." Sierra's Jawbreaker is vaguely similar to Pac-Man because you control a dot-eating mouth. When this mouth is hit by enemies, all its teeth fall out, and when it successfully eats all the dots, a toothbrush appears to clean the teeth. Sierra's trickiest arcade game is Oil's Well, where you must drill for treasure but have to retract your line and bit in a split second to avoid danger.

Broderbund Software of San Rafael, California, always manages to create some innovative arcade games for Ataris. Choplifter is its most famous. In it, you are a helicopter pilot, saving American hostages held at an enemy camp (this game came out after the Iranian hostage crisis). A.E., which stands for *stingray* in Japanese, is another winner. Flying mantas swoop and dive in simulated 3-D. In Serpentine, your roving segmented serpent must eat other serpents and their eggs to survive. Seafox is an engaging game in which you must sink ships and submarines with your submarine. In Drol, your player must dodge flying hatchets and a head-turning witch doctor to rescue some children and their mother, who is gagged and bound in a corner of the screen. The Arcade Machine is a real tour de force, letting you design an unlimited number of your own arcade games without learning to program.

Epyx of Sunnyvale, California, has many games for Atari computers. The standouts are Jumpman and Jumpman Jr., two Donkey-Kong look-alikes. Precision is more important than speed in these games. The catch to Jumpman is that jumping is very, very hard.

Other arcade games of note: Electronic Arts' Pinball Construction Set, which lets you create your own video pinball games, and Microfun's Crisis Mountain, a *Raiders of the Lost Ark*-type game, in which you have to deactivate ticking nuclear bombs inside an active volcano.

Recommended arcade games

Pac-Man	Atari
Ms. Pac-Man	Atari
Space Invaders	Atari
Joust	Atari
Asteroids	Atari
Missile Command	Atari
Centipede	Atari
Dig Dug	Atari
Donkey Kong	Atari

Kangaroo	Atari
Qix	Atari
Pole Position	Atari
Defender	Atari
Caverns of Mars	Atari
Getaway!	Atari
River Raid	Activision
Megamania	Activision
Demon Attack	Imagic
Pooyan	Datasoft
O'Riley's Mine	Datasoft
Zaxxon	Datasoft
Bruce Lee	Datasoft
Mr. Robot and His Robot Factory	Datamost
Monster Smash	Datamost
Cohen's Tower	Datamost
Scraper Caper	Big Five Software
Miner 2049er	Big Five Software
Blue Max	Synapse Software
Necromancer	Synapse Software
Rainbow Walker	Synapse Software
Frogger	Sierra On-Line
Quest for Tires	Sierra On-Line
Jawbreaker	Sierra On-Line
Oil's Well	Sierra On-Line
Choplifter	Broderbund
A.E.	Broderbund
Serpentine	Broderbund
Seafox	Broderbund

Drol	Broderbund
Spare Change	Broderbund
The Arcade Machine	Broderbund
Jumpman Jr.	Epyx
Jumpman	Epyx
Pinball Construction Set	Electronic Arts
Hard Hat Mack	Electronic Arts
Crisis Mountain	Microfun
Night Mission Pinball	Sublogic
Congo Bongo	Sega

Strategy games

Somewhere between arcade games and adventure games is the strategy game. Many are carry-overs from classic strategy board games such as chess, checkers or the ancient Japanese game of Go.

Computer chess games have been around for years, and programmers love to try to build more and more intelligence into each succeeding game. Some games, such as Sargon, have even beaten human chess masters. In the ultimate face-off, computer chess-game manufacturers play their game against the rivals' games.

Lately, the emphasis in chess games such as Mychess II is to increase the quality of the graphics. In Mychess II you can choose different sets of chess pieces if you wish. Also, instead of looking down on the chess board from directly above, you see a perspective drawing of the board, much as you would if you were sitting at a table. You can even rotate the board to get different views of it.

The most unusual variation of chess for the computer is Archon from Electronic Arts. In this game, players control two rows of pieces, each of which is a creature with certain movement abilities and strengths.

When one piece tries to capture a square with an opposing piece already on it, the screen clears and Archon becomes an arcade game. The two pieces fight for their lives with bolts of energy. When a winner emerges, the chess board rematerializes and the next move takes place.

One or two humans can play Archon; as with most strategy games, the computer can be the second player if necessary.

If you're a born competitor, you'll probably want to play games such as One on One by Electronic Arts. The game pits Julius "Dr. J" Erving against Larry Bird. Erving and Bird helped design the game, and each of the computerized players has some of the qualities of their pro inspirations.

The game Go was unfamiliar to most Westerners before the microcomputer came along. The game Othello is a variation of Go. The object of both games is to encircle your opponent's pieces, but in Othello control of the outermost squares is crucial and you must flip your opponent's pieces over to your color. The computer is ideal for changing the pieces quickly after a move. Hayden's Reversal and Jay Gee's Devil's Dare are two good examples of computerized Othello.

Recommended strategy games

Mychess II	Datamost
Archon	Electronic Arts
Reversal	Hayden
Devil's Dare	Jay Gee
Football Strategy	Avalon Hill
One on One	Electronic Arts

Adventure games

Adventure games are popular nowadays, although the reasons aren't readily apparent. They generally don't use computer graphics or joysticks. You sit at a keyboard and type things in. You can't see where you are unless you type Look, for example, and then you get some weird reply such as "You Are In A Sloping East/West Corridor With Exits To The North. You Can Hear A Dull Booming Sound In The Distance."

The computer makes you create pictures in your own mind and, because the rules and solutions are not clear, an adventure game is more lifelike than an arcade game.

The first adventure games were created in the 60s on mainframe computers at MIT. They quickly spread across the country and into the mainframe computer systems of companies such as IBM. The first one was called Adventure, and no one really knows who invented it — more than likely it was a collaborative effort.

When micros appeared, adventure games appeared almost immediately to run on them. The best of the early ones was Scott Adams' Adventure, published by Adams' company, Adventure International. You can still buy that one, as well as several other adventure games, from Adams.

Each adventure takes you into a fascinating miniworld. Some are based on real-life present-day or historical situations. Some take place in the distant future or in fantasy worlds; some are inspired by literature such as J.R.R. Tolkien's *Lord of the Rings* trilogy. Computer adventure games normally in-

volve only one human player (although that player often has one or two kibitzers in the room).

Soon after Atari computers appeared, makers of adventure games added graphics to the text the games presented. In games such as Sherwood Forest, you can actually see a color picture of the road in front of you, the blacksmith's shop, Nottingham Castle and the characters. Sierra On-Line's Dark Crystal, inspired by the movie *The Dark Crystal*, which was created by Jim Henson of Muppets fame, comes on three disks with data on both sides of each disk. It re-creates the creatures from the fantasy world in that movie.

In these games, you still control your adventurer's actions by typing in simple commands, such as Go East. More advanced games let you enter complete English sentences, such as Lift The Door To The Basement With The Crowbar.

One notable exception to this format is Electronic Arts' Murder on the Zinderneuf, a murder mystery set on board a dirigible during the 30s. You pick your identity from several thinly disguised detectives from history and literature. You have to solve the mystery by searching rooms for clues and questioning suspects. What's especially clever is that you control the whole thing with your joystick, asking about particular suspects by moving the cursor to their name. We'll probably see more adventure games like this in the future.

Another entertaining adventure game you can play with joystick or keyboard is Castle Wolfenstein from Muse Software. The scene is a Nazi-occupied castle during World War II, and a dying Allied soldier has just handed you a gun with ten bullets. Your objective is to find the war plans hidden somewhere in the castle and get out. Hundreds of Nazi guards and deadly SS men stand in your way. Be warned, though: when you shoot the guards, they turn into a pool of blood. This game is too gory for young kids.

Infocom, a company started by several students at MIT, makes some of the most imaginative adventure games. Its most famous games are Zork I, Zork II and Zork III. This trilogy tooks five years to create and, like all Infocom games, is available for Ataris as well as other computers.

Infocom keeps extending the limits of adventure games, adding realistic characters and situations. The company now calls its games "interactive fiction" because the newer ones resemble novels. There's Deadline, a murder mystery. ("A locked door. A dead man. And 12 hours to solve the mystery.") Infidel starts near the Great Pyramid of Egypt. Planetfall combines comedy with drama, as a futuristic space adventurer struggles to succeed with the help of a dubious robot named Floyd.

Usually, you can save your position in an adventure game in midgame, which is helpful, because a game can take days or weeks to complete — if you don't get killed in it first.

Recently companies have been offering special adventure games geared to kids. Snooper Troops from Spinnaker Software is an example. Infocom is also working on some games that will resemble the stories in the Nancy Drew/Hardy Boys mystery books. These games are relatively easy to play and often

help teach kids problem-solving skills. They're educational, but subliminally so; just don't let the kids know they're supposed to be learning something.

Just remember, to win an adventure game, you'll need to *think*, not just react by pressing the joystick button.

Recommended adventure games

Zork I	Infocom
Zork II	Infocom
Zork III	Infocom
Deadline	Infocom
Starcross	Infocom
Suspended	Infocom
Infidel	Infocom
Scott Adams' Adventure	Adventure International
The Wizard and the Princess	Sierra On-Line
Dark Crystal	Sierra On-Line
Murder on the Zinderneuf	Electronic Arts
Snooper Troops	Spinnaker Software
Castle Wolfenstein	Muse Software

Simulation games

Simulations are more involved and take a longer time to play than arcade games. They generally have more graphics than adventure games, and players control most of the action with the joystick, rather than by typing in commands. Often, they combine the fun of arcade games with the strategy of chess or a board game such as Monopoly.

These games usually have two or more players with equal powers at the start. Almost always, the computer plays the second player, and even a third or fourth player, to provide endless amusement and challenge to the human players. Just as often, though, a second human player can face off against the first human, and the game becomes a battle of wits.

Simulation games are still in their infancy. The first good one was Chris Crawford's Eastern Front 1941 for the Atari. Eastern Front was offered by the Atari Program Exchange (APX), and Atari may release it under its own label.

To understand Eastern Front, you have to understand that military leaders have been simulating strategic conflict since Roman times. Until the computer came along, this conflict took place on giant board maps symbolizing the terrain. Small pieces stood for each army, and usually the pieces also told the commanders the strength, speed and size of the army units.

In the last 20 years, companies such as Avalon Hill and Strategic Simulations have produced hundreds of board games simulating historical wars, from the global scale down to local skirmishes. But the boards were large and unwieldy, and players had to fumble with thousands of tiny cardboard pieces. Also, their only opponents were often "play by mail" associates whose moves arrived in the mail only every few days.

Eastern Front changed all that. Crawford saw that a computer with enough memory and good graphics could take the place of a board game. But to ensure that the board would be big enough, Crawford perfected the Atari's ability to scroll through the terrain smoothly, so that the playing field was many sizes that of a TV screen. Moreover, war-gamers could have the computer as an opponent.

Eastern Front 1941 was an immediate sensation, and it induced people to buy Atari computers.

The setting of the game is the summer of 1941, when the Germans invaded Russia during World War II. The action ranges from Poland to Moscow, and from Leningrad to the Black Sea. You control the German forces and try to reach Moscow before winter sets in. You move pieces around with your joystick. Each turn represents one week, and the whole game has 41 turns.

Since producing Eastern Front, Crawford has also designed Legionnaire, a game published by Avalon Hill. Legionnaire takes place in Roman times during the Gallic wars (58-51 BC) in southern France, when the Roman legions opposed the "barbarians" of Gaul. The game supplies marching sounds that take place during troop movements.

Crawford's other simulation game, Excalibur, is his most detailed yet. The setting is England during the time of King Arthur, and you control the knights of the Round Table, who must face many enemies in their quest to protect England. This game, originally sold through APX, may be rereleased by Atari.

Avalon Hill publishes several other war simulations, including Paris in Danger, a simulation of Napoleon's 1814 campaign, and Tanktics, a simulation of modern tank warfare.

Strategic Simulations, Inc. (SSI), also publishes programs for the Atari. For a complete listing of its games, you can call (415) 964-1353 during West Coast business hours. Here is a sampling of its games:

☐ 50 Mission Crush: You are the pilot of a B-17 Flying Fortress during World War II. You must try to survive 50 harrowing raids over France and Germany in 1942. After each mission, the accuracy of your bombing and the number of enemy fighters your gunners knocked down are evaluated.

□ Germany 1985: NATO forces must repel a Soviet invasion of West Germany.
□ RDF 1985: The U.S. Rapid Deployment Force (RDF) must take Soviet-captured oilfields in Saudi Arabia.
□ Knights of the Desert: Joust with armored tanks during the North African Campaign of 1941-42.

SSI also has simulations of science-fiction and fantasy adventures, such as Epidemic! In this game, billions of lives are at stake as Earth is infected by deadly, alien microbes. You are the world's only hope. In Cosmic Balance I and II, you command a starfleet and can design and build your own starships.

Some simulations are approaching the proportions of an epic movie or novel — some are so complex that it takes weeks to complete a single game! One example is Jupiter Mission: 1999, created by Scott Lamb for Avalon Hill. This simulation, which comes on four floppy disks, is the most complex game ever written for the Atari computer. You play the role of an ordinary citizen abducted for a secret emergency mission to Jupiter. The four disks contain every type of game discussed in this chapter: arcade games, adventure games, strategy games and simulations. In one part of this game, you have to navigate from one sector of the solar system to another. During another, you land your spacecraft on a planet.

Some will find Jupiter Mission: 1999 too complex, but for those who seek a really substantial entertainment experience, this game will go a long way.

No discussion of simulation would be complete without mentioning the various flight and cockpit simulators available. These simulators turn the computer screen into the front window of an aircraft, often embellished by a host of dashboard controls such as altimeter, horizon indicator, fuel gauge, speed indicator and radar.

The best flight simulator for the Atari is Sublogic's Flight Simulator II, which puts you in the pilot's seat of a Piper 181 Cherokee Archer, a small plane. You see the runway in front of you, and when you hit the throttle and pull back on the stick, you take off for a simulated flight from New York to Los Angeles. Now and then you have to find a landing strip, land, refuel and take off again. You have several different radios to help with navigation and weather information. If you become a pro, not only can you play the World War I flying ace (aerial battle simulation included), but you're also well on your way to understanding how powered flight actually feels.

Several other cockpit simulators are also available. The most famous in the Atari world is Star Raiders, a space-war simulation in which distant enemy ships are small and closer ships are large. As with many cockpit simulators, you have a cross hair for aiming and firing at advancing ships, but Star Raiders has few cockpit controls and thus is one of the least realistic of the simulators.

A company called MicroProse Software, from Hunt Valley, Maryland, specializes in flight simulators, with excellent games such as Solo Flight, Hellcat Ace and MIG Alley Ace. The last game even features a split screen so two players

can see out of different cockpits, finding each other in the cross hairs. MicroProse also has a board-type simulation game, NATO Commander.

Although armed conflict dominates the world of game simulations, economics and finance form another major category of games. Re-creating the rough-and-tumble of marketplaces, both familiar and alien, is a favorite pastime of programmers.

Some of these games are text-oriented and resemble adventure games to a certain degree. SSI's Rails West! is a detailed and complex simulation of the economic wars between growing railroad empires in the American West in the 1860s and 70s, as competing players try to build the first transcontinental railroad. Most of the game revolves around the money needed for the venture.

One game towers above the rest: M.U.L.E. from Electronic Arts, a simulation of an economy in which the designers use the power of the computer to simulate a science-fiction vision.

As the game begins, a spaceship is dropping four colonists off on the distant planet Irata. They must explore and develop the planet's resources, represented as a map of squares on the computer screen.

To do this, the colonists have to use strange machines called a M.U.L.E. (Multiple Unit Labor Element), a low-budget robot that breaks down a lot. They must acquire land and outfit M.U.L.E.s to mine or harvest the natural resources of each plot.

Once in every turn, the cultivated land yields its harvest, and the colonists take it to market. They can sell their products to each other or to the planet's store and buy needed products if they are available. The price of the products fluctuates with demand, and in the auction stage, colonists can bicker over prices by moving their player up and down a graph. If a buyer and seller meet at a certain price, a sale takes place.

As in any good board game, players can take risks to try to get ahead. They can also form alliances and conspire against other players. But the M.U.L.E. rules also require that all four colonists produce a minimum amount of wealth, or everybody loses. Thus, economic back stabbing does not take over.

All M.U.L.E. players control their actions with the joystick. The game keeps track of everybody's earnings and holdings and sets time limits on auctions and other events.

If you have an Atari 800, you can have up to four humans playing M.U.L.E. at once. Unfortunately, all other Atari computers have only two joystick ports, and players 3 and 4 will have to use keyboard controls. Game experts who have seen M.U.L.E. regret that the discontinued Atari 800 is the only home computer with four controller ports. Four-player M.U.L.E. is a unique entertainment experience for the entire family, and it gives us a glimpse of the true promise of the home computer to take us to simulated worlds. Even two-player M.U.L.E. is a delight, and as with other games, the computer will be only too happy to act as the second, third or fourth colonist.

Ozark Softscape, the company that developed M.U.L.E. for Electronic Arts, has another simulation for the Atari, called Seven Cities of Gold. The game

simulates the conquistadores' march across the Americas in the Age of Discovery.

Learning games

We covered these games separately in the education section of Chapter 5. Just because they're there instead of here doesn't mean they aren't fun to play, however. With those games, learning is always the first priority, though. Anything you learn from the noneducational games will be incidental; with many of them, you'll simply improve your hand-eye coordination. As games grow more complex, they will no doubt contain more educational material.

PERIPHERALS

What makes the Atari run? Software plays an important part in this function, as you've seen in the preceding pages. But for this software to fulfill its purpose, it needs to work in conjunction with hardware, called peripherals, and we'll discuss some of the major ones here.

Monitors

In Chapter 2, we mentioned that you can display Atari graphics on your television set or on a color monitor, and we described the Atari switch box that attaches to your television set's antenna connection. The cable supplied with your computer plugs into the single-hole video socket on the switch box. On early Atari computers, the other end of the cable is permanently attached to the Atari; on the XL computers, the cable unplugs at both ends.

Atari computers have another five-hole socket that accepts a cable leading to a color monitor. This cable doesn't come with your computer, but you can buy one in the stereo/video section of your local department store for $7 to $10. At the other end, the cable has two jacks. One plugs into a video socket on a monitor, and the other plugs into an audio socket, if there is one.

This cable is your gateway to a better display picture than that on your TV screen. A monitor will make all the images sharper, the colors more vivid and the blacks blacker. You'll probably also cut down on eyestrain; a fuzzy picture quickly makes you tired. What's more, some older TV sets don't have the right electronics for displaying a computer picture; these sets flicker.

Several medium-quality personal-computer monitors are available for the Ataris. These monitors will also work with most other computers. The monitors generate what's called a composite-video signal. The highest-quality monitor is called RGB, which stands for red-green-blue. The computer processes each color independently, and the monitor actually blends three images into one. Unfortunately, the Ataris don't work with RGB monitors. If you try to use one, expect the colors to be wrong.

If all you want to do is process text, monochrome monitors are best, and amber monitors are the best monochrome monitors. Actually the screen background is dark, and the characters are a deep orange color. USI makes one, and so does Amdek.

The next-best screen color is green. Green letters are less eye-fatiguing than white ones but more tiring than amber letters. Leading Edge makes a 12-inch green-screen monitor, and Amdek offers one as well.

If you plan to do anything more than processing text or managing data bases, you'll need a color monitor. Most other programs written for the Atari use color. In fact, some word-processing and data-base programs make important use of color. You'll spend about the same on a color monitor as you would for a color TV.

One other consideration is that you'll have to decide how large a screen your monitor should have. For most desktop uses, a screen measuring 12 inches diagonally is fine. You can work with monitors that are a bit smaller, but you may want a larger one if you need it for a school, a special presentation, a store window display or a group of children.

Amdek's Color-1 color monitor is an excellent choice, as is Commodore's Model 1702, which has a 12-inch screen. Unlike some monitors that have controls placed inconveniently in the back, the 1702 has its controls in front.

If you need sound and music, make sure the monitor you buy has a speaker. The 1702 has an excellent speaker and volume control. Monitor makers continue to improve speakers as well as the picture tube.

Also, make sure you'll have room in your work area for your monitor. It won't fit on top of your Atari (except maybe for the older 800, and only if it's a small monitor). You may want a lazy Susan under the monitor, to raise it from behind the computer and to let you turn the monitor easily. The ultimate solution is to buy or make a piece of computer furniture to hold your entire Atari computer system. Leave plenty of room for the monitor or TV.

A good monitor can make all the difference when you're working for long stretches with an Atari. It's the only way to display 80 columns of text with an Atari, so it will let you get the most out of your software.

Printers

In the world of home-computer hardware, the cost of the computer itself is substantial, yet not the biggest cost of all. That honor probably belongs to the computer printer.

The printer is the most vital peripheral in your Atari computer system. Without it, your computer cannot generate the text, reports, labels, program listings, graphics or other output that ultimately makes the computer so useful. In selecting a printer, take your time and carefully consider what you need; then see what you can afford. Dozens of printers are sold through computer stores and mail-order outfits, so you can afford to be choosy.

Printers produce print in various ways.

Dot-matrix printers produce copy quickly and cheaply. They generate a pattern of dots on the paper that makes up characters, much as the lights on a marquee make up a movie title.

The size of the matrix determines how good the print from a dot-matrix printer is. A 5 × 7 matrix can generate the letter *S* like this:
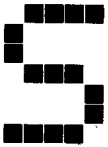
A 7 × 9 matrix can generate this letter:
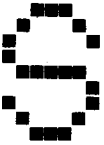
The letters will be the same size, so you have to imagine how they actually look. The second character is more recognizable.

Each dot-matrix printer has its own particular way of printing each letter.

Thermal printers produce characters in the same way as dot-matrix printers do. Both have printheads with thin points that strike the paper, but thermal printers require no typewriter ribbon, and dot-matrix printers do. The special paper you use with a thermal printer is sensitive to heat from the printhead. A third kind of printing process, called thermal transfer, does require a special ribbon but can often use plain paper. Hence the printhead doesn't have to strike the paper as hard, and the printing process is quieter.

Thermal printers do have their drawbacks. The paper is not always available; your best bet is a store such as Sears, which carries an electronic typewriter that uses thermal paper. These stores usually keep some thermal paper in stock. The second drawback is that the print isn't nearly as bold as dot-matrix print. Some of the paper produces blue print, some others black. Both are fairly light. You wouldn't want to use a thermal printer to produce anything you intended to photocopy or duplicate.

Neither of these print technologies has the visual appeal of what's called

letter-quality printing. Letter-quality printers contain a series of preformed raised characters that resemble the elements of a typewriter. This type strikes the paper through a reusable cloth ribbon or one-time carbon ribbon and produces a clear character on the paper.

Like all print technologies, letter-quality printing has its problems. It's much noisier than the other kinds of computer printing. Partly that's because it's slower (as much as five times as slow as a dot-matrix printer). Also, the printhead strikes the paper more forcefully and longer than a dot-matrix printhead does.

If your correspondence has to look as though it came out of a typewriter instead of a computer, though, you'll have to have a letter-quality printer. Despite many claims to the contrary, no affordable dot-matrix printer can yet produce letter-quality printing. Some printers come quite close, and a few expensive printers can do the job, but they're out of the reach of most home-computer owners.

Both letter-quality and dot-matrix printers can generate different styles of type. Many letter-quality printers have removable parts that store all the cast letters. You can put in different styles of type, known as fonts.

With a dot-matrix printer, you don't need to physically remove anything; the printing software lets you change the type style. The results will be satisfactory but not perfect. The size of the matrix may prevent you from generating certain fonts. Others won't look quite right. Since printing is under software control, you can even invent your own fonts.

Now that you know about the different kinds of computer printers, here are a few questions to ask yourself when shopping for one.

Are the controls accessible? They should be on the front or the side. Reaching around to the back to turn on a printer is ridiculous; so is having to take the cover off a printer to change certain settings.

Can the printer accept single-sheet or continuous-feed paper? The better printers can. Continuous-feed paper can have punched holes on perforated strips, and a printer with a tractor feed can grab these holes and hold the paper steady for precise printing.

Does the paper feed in conveniently? Beware of printers that make you go through all kinds of contortions to align the paper. Printers that require you to feed paper through the bottom instead of the back can also be a pain, unless you have a slot in your table. A printer that can feed from both the back and the bottom is the best.

Does the printer have push-button controls to feed paper, or do you have to roll it through by hand? If you need to skip a whole sheet of continuous paper to start a new printout, a form-feed button, which advances the paper the length of a whole page, can be much more convenient than rolling the paper by hand. Also, a line-feed button lets you adjust the paper a line at a time. Printers you adjust by hand may be harder to align precisely.

How hard is it to change the ribbon? Some printer ribbons will take you half an hour to change. That's too long. The process should take no more than five

minutes. Unfortunately, many computer printers don't have ribbons encased in a convenient cartridge. They come with the old-fashioned spool ribbon, which you'll have to guide through twists and turns with your fingers turning black, if you can understand the loading instructions. Try to find a printer whose ribbon system has the least muss and fuss.

Find out if the printer requires an Atari 850 interface module. Older printers such as the Atari 825 hook into the module, which hooks into your Atari. Newer printers don't require the module.

Here's a sampling of printers available for Atari computers:

Letter-quality printers

Atari 1027:
This letter-quality printer is relatively inexpensive. It plugs directly into any Atari computer through the serial cable. The typeface on the 1027 looks just like typewriter type.

Transtar 120:
This printer can accept different print wheels but it comes with only one. You can also print boldface type, underlines, subscripts and superscripts. Unlike the Atari 1027, the Transtar requires the 850 interface module.

Dot-matrix printers

There are too many dot-matrix printers available for the Atari for us to go into detail about them here. Here's a list of some of the dot-matrix printers that do work with Ataris:

- Atari 825 (discontinued)
- Atari 1025
- Axiom AT-100
- Epson MX-70
- Epson MX-80
- Epson MX-80F/T (with Graftrax, ROM software that enhances printing of dot graphics)
- Epson MX-100 (similar to MX-80, but prints 132 columns across instead of 80)
- Epson FX-80
- Epson RX-80 (low-cost version of MX printers)
- Gemini 10 and 15
- Mannesmann Tally Spirit
- NEC 8023A
- Okidata 82A, 84P, 92 and 93

Thermal-transfer printers

- Alphacom 42
- Alphacom 81

The Alphacom 42 thermal printer can print 40 text characters on one line, and the Alphacom 81 will print up to 80 characters across the page. The Alphacom 81 will also print control characters, inverse-video characters and other hard-to-print Atari characters. These printers are fast (better than 100 characters per second), and since they use thermal-transfer technology, they are quiet as well.

In order to use many of these printers, you'll need an 850 interface module, but a company called Macrotronics has a device that hooks into the Atari's two joystick ports and lets you use Epson, Okidata, NEC and Gemini printers with programs such as AtariWriter. Macrotronics' Screen Printer Interface includes a parallel cable that plugs into the Atari joystick ports and also comes with software.

Other companies offer cables, interface boxes and adapters to let your Atari work with various printers. Since most of these companies are small, check first with the printer manufacturer for the name and address of a reliable interface maker.

Atari also makes a color plotter that works with its home computers. The Atari 1020 Color Plotter generates four-color graphics and text, letting you create charts, graphics and art. It comes with programs that let you draw on the screen and plot on paper directly, using a joystick. The plotter paper is narrower than standard typing paper and comes on a continuous roll you have to buy from your Atari dealer. Plotters can draw pictures very quickly but are slow at printing text.

Disk drives

Your primary means of permanently storing information is a floppy disk, a piece of mylar with a magnetic coating, encased permanently in a protective plastic jacket. The computer's floppy-disk drive can turn the computer's RAM signals into magnetic patterns on the surface of the disk. The drive records this information on concentric tracks, invisible magnetic lines that are inscribed on the disk, much as a record groove is, but with none of the wear and tear. The floppy disk is a reliable way to store everything from games to poetry.

The disk drive uses a magnetized head to transfer information. It can put data on the disk, wipe out old data to make room for new information and pluck the magnetic patterns off the disk and move them into the computer memory. A device built into the disk drive, called the disk controller, governs the action of the head. Because the information is stored on different tracks, the head has to be able to move quickly to any point on the disk to access any piece of data.

Several techniques increase the capacity of disks. These include squeezing more tracks onto a disk by placing them closer together, packing more data onto each track or writing on both sides of a disk.

The Atari disk-operating system (DOS) controls the Atari disk drive. The first DOS, version 1.0, was quickly replaced by DOS 2.0, which was the standard Atari DOS until recently. It can write information on one side of the disk

only, because the first Atari disk drive, the 810, has read, write and erase heads only on one side of the disk. One Atari 810-formatted disk stores up to 60 pages, up to 88,375 bytes, of text or program information.

Floppy disks themselves come in various sizes. When IBM invented the floppy disk for use with its minicomputers in the 60s, it used a disk 8 inches in diameter. The first personal computers also used such disks, since they were the only ones available. The first generation of home computers, including the Apple II, Commodore PET and Atari 800, uses a smaller, 5¼-inch disk.

The disk itself has a notch on one edge. This write-protect notch must be uncovered for the drive's write head to work. If you cover that notch with an adhesive write-protect tab and then try to erase information from that disk or write to it, the drive will not allow you to. You can remove and replace write-protect tabs over and over.

One way to store more information on your Atari disk is to flip the disk over and insert it into the drive upside down, but first you must create another write-protect notch, just opposite the position of the first one. The simplest method is to use a single-hole paper punch. You can then record and erase information on the second side of the disk. There's one catch: disk manufacturers, after testing thousands of disks during the manufacturing process, only guarantee the quality of the top side of the disk. Although you will probably have no trouble using the second side, you may hit a "glitch" in the media and lose some data.

A floppy disk must be handled with care. Until you're ready to use it, keep the disk in its protective jacket to keep dust from its exposed portions. A few specks of dust, caught between the drive and the disk, can cause misreading of information or even physical damage to the magnetic recording surface. Handle the disk by its edges; a fingerprint on the exposed portion of the disk can damage it. Keep the disk from direct sunlight; heat can warp the disk and prevent it from spinning in the drive. Moisture can also distort the shape of the disk or its jacket.

Store your disks on edge. Most computer stores carry special boxes that hold many disks. These are rather expensive but durable. A shoe box will work fine too. One good way to store disks is to put them in alphabetical order and keep the documentation in another box, also stored in alphabetical order. The original boxes that software comes in take up space and often get crushed over time; they generally aren't designed for long-term storage.

Virtually all disk drives for Ataris use 5¼-inch disks. Once you put disks into these drives, you generally have to close and latch the drive door before you start using the drive. The Atari 810, discontinued in 1983, was supplied with two kinds of drive-door latches. One drive has a vertical door that slides down to lock; the other has a retaining latch that pivots down to keep the diskette in place.

Atari replaced the 810 with the 1050, a disk drive that cosmetically matches the Atari XL line (the 810 looks more like the Atari 800 and 400). The 1050 comes with Atari DOS 3.0, the replacement for DOS 2.0, with several enhancements. DOS 3.0 can store information on tracks in a single-density or enhanced-

density configuration. A single-density disk stores about 88K, and the Atari 1050's enhanced-density disks store about 130K.

Three other floppy-disk drives, made by companies other than Atari, can store even more on each disk, writing data in double-density amounts, about 176K per disk. The drives are the Rana 1000, from Rana Systems, the Trak AT-D2, from Trak Microcomputer, and the Indus GT, from Indus Systems. Each can use Atari DOS and read all disk software that works with the Atari drives, but the Trak and the Indus GT come with Optimized Systems Software's DOS XL 2.2, and the Rana comes with Rana SmartDOS. These disk-operating systems have some enhancements of Atari DOS. Each also claims to be faster than Atari disk drives, and several, such as the Indus, claim to be quieter.

Trak has a new drive, the AT-D4, the first 5¼-inch, double-sided Atari floppy-disk drive. It stores 352K on one disk. It includes printer interfaces that replace the functions of the Atari 850 interface, normally needed to run many popular printers.

As drives have improved, they've also become smaller. Newer drives such as the Atari 1050 are only half as high as earlier drives such as the Atari 810. Some companies even package two half-height drives in one box. Astra Systems makes a two-drive box for the Atari. Each drive stores 176K in double-density mode. The Astra comes with OS/A+ DOS from Optimized Systems Software.

Percom also makes low-cost drives for the Atari. The AT-88 is the "master" drive of the system (drive 1). You can buy up to three more "slave" drives, which don't contain the controller included with the first drive, and, by doing so, you save money. The AT-88 includes the OS/A+ 2.0 operating system.

One drive does not use the standard 5¼-inch floppy disk. The Amdek Amdisk III uses a 3½-inch disk developed by the Dysan Corporation. The 3½-inch disk comes in a sturdy cartridge-like sleeve and stores more than 720,000 bytes of information, eight times the storage of Atari disks. Amdek is making software available for the Amdisk, including OS/A+ and LJK's series of software: Letter Perfect, Data Perfect and Spell Perfect. But you'll still need a 5¼-inch drive to load most popular Atari software.

One company produces a popular, hardware-upgrade package for older Atari 810 disk drives. The Happy Warp Drive Enhancement is a plug-in, printed circuit board that significantly speeds up the 810's read and write functions. The Happy package also includes the Warp Drive DOS, a faster and more powerful version of Atari DOS 2.0, and utility programs to copy or back up your software.

You'll find several different disk-operating systems to use with your disk drive. One is TOP-DOS, from Eclipse, which has the features of Atari DOS 2.0 and six new commands. The file directory is listed in two columns, instead of the normal one column, which makes the directory easier to read.

Although each drive is claimed to run all Atari software, certain factors may cause a disk created on one drive not to run on another. Each drive operates at a certain speed, which may be set at the factory but change from wear and tear over time. You should try to have the dealer run a test of a drive's speed when

you buy it to make sure the drive is within the proper tolerance.

Another thing to be aware of regarding disks is protected software. Software piracy is a growing concern. All commercial software is copyrighted, and the law says you may make copies only for your own use. If you give or sell a copy of a commercial program to another person, you have technically broken the copyright, unless you have permission or a multiple-machine license from the software producer.

The law hasn't stopped many Atari owners from making copies of commercial software. Some owners collect software just for the fun of it. Others claim making copies for close friends is "fair use." The law says otherwise, but it's almost impossible to enforce. Because software manufacturers don't think users will abide by an honor system, they've put special protective programs on each disk they sell that foil the Atari DOS Copy command and other copying programs. Unfortunately, these copy-protected disks may not run on some of the newer drives, because the software publishers used special, secret tricks on the Atari 810 disk drive to protect their software.

Incidentally, make sure you can get a backup copy of any copy-protected disk software you buy. Most companies will sell you a backup disk for a nominal fee, such as $5. Others demand you return the first disk if it goes bad.

Atari made some changes in the computer's ROM when it started the XL series of computers. Atari sells a disk called The Translator that allows use of all programs written for the 800 that cannot work otherwise on the XL computers. In order to use The Translator with the Atari 600XL, owners of that computer will have to buy the Atari 1064 Memory Module, which upgrades the 600XL to 64K RAM, which is The Translator's minimum memory requirement.

One last note on disk drives: Remember to back up your work. Disk drives don't often fail, and the disk medium itself is relatively reliable, but when either goes wrong, the results can be disastrous if you don't back up your work frequently. Take a little time each night to copy any important work onto an extra disk. Store the second disk away from where the first one is, just in case the first one gets wet or worse. You'll avoid 98% of the major problems with disk drives if you take that little bit of time.

Modems

In order to take advantage of software that lets your computer talk to other computers through the phone line, you have to have a device that turns the computer's signals into tones the phone system can carry. At the other end, the other computer has to have something to convert the beeps back into bits. Computer technicians say the signals are first *modulated*, then *demodulated*. Hence we get the word for the device we use for signal conversion, a *modem*.

Modems come in many sizes and shapes, but they all do essentially the same thing. Ease of use depends partly on where the modem's controls are.

The two major kinds of modems are acoustic modems and direct-connect modems. The acoustic modem is connected to the computer and has two cups

that accept a standard phone handset. Normally, you dial the phone number of the remote computer and wait for a high-pitched tone known as the carrier. When you hear it, you place the handset in the acoustic cups. The modem sends a tone back, and the connection is established. You then return to the keyboard to begin typing in instructions to the remote computer.

A direct-connect modem doesn't have any cups; it plugs into the computer and also directly into your phone line. You won't be able to talk on your phone when your direct-connect modem is hooked up, unless you buy a phone line splitter — you can find one at any Radio Shack store — and have them both connected. You can use the phone line for only one thing at a time, though — talking or sending data. When you dial the remote computer number, either with the phone or from the computer keyboard, the modem sends the tone back automatically when it receives a tone. The direct-connect modem can also auto-dial — dial a number you select from a directory of numbers in your computer's memory — and auto-answer — pick up the phone, so to speak, when it rings and log on the user at the other end automatically. You need software to do that.

Modems transmit at all sorts of speeds, but the two most common are 300 bits per second (bps) and 1200 bps. At 300 bps, text scrolls by slowly. At 1200 bps, it scrolls by too fast for you to read without stopping from time to time. The 1200-bps modems generally cost about $500 and transmit at either 300 or 1200 bps, and you can buy a 300-bps-only modem for $100 or more.

We've previewed how modems communicate with each other; be assured that there are many other factors to consider when you buy or use one. More information is available in the section on communications in Chapter 5. You should not be afraid to ask questions and get a thorough demonstration before you buy. Also, note that acoustic modems do not work with many modern phones, whose handsets are not shaped properly to fit into the acoustic cups.

Atari made two 300-bps modems during the 400/800 era. The 830 is the acoustic modem, and the 835 is the direct-connect one. The 830 required the Atari 850 interface. The 835 was replaced by the 1030, whose style is like that of the Atari XL computer line; both plug directly into the Atari's serial port. The 1030 has a built-in software program called ModemLink with auto-dial capabilities. Unfortunately, the modem software doesn't include upload/download software. You can obtain such software, though (see Chapter 9).

The 1030 can send two kinds of signals when dialing. Older phone lines use pulse dialing, the kind in operation when all phones were rotary dial. Newer lines accept touch tones. The 1030 can generate either kind of dialing signal.

Other manufacturers of modems include Microbits Peripheral Products, which makes the MPP-1000C, a direct-connect modem that plugs into the Atari serial port. It includes a software cartridge that supports uploading and downloading of software, error checking of your software transfers and demonstration time on CompuServe.

The king of the modem hill is D.C. Hayes' Smartmodem. Compact and powerful, the Hayes direct-connect modems connect with any personal comput-

er with a serial interface. They work with both touch-tone and rotary phone lines. Hayes makes a Smartmodem 300 and a Smartmodem 1200 for the different transmission rates.

Anchor makes many modems for personal computers. It offers a variety of direct-connect modems that work with the Atari, from the Volksmodem to the 300-bps Mark X, with upload and download software and auto-dial/auto-answer features. At the 1200-bps level, Anchor offers the Mark XII. Cermatek also makes a 1200-bps direct-connect modem, the 212A. Bizcomp's Versamodem operates at 300 bps.

These modems are only a few of those available for Atari computers. Some may require the 850 interface box or its electronic equivalent; others require special software. The Atari modems are the easiest to hook up, but they are not the most powerful. As modem technology continues to improve, 1200-bps modems will become more affordable.

When you connect a modem to your phone line, you should call your phone company and inform it that you have an FCC-registered device that you want to connect to the phone lines. The phone company may need to know the number of the lines to be used, the make and model of modem and its FCC registration number, usually found on the bottom of the device. Some phone companies are trying to make modem users pay higher phone rates, so be careful to find out ahead of time what those rates might be. Many phone companies don't care about whether or not you have a modem and don't want your registration number.

Pointing devices

The simple controller called the joystick guides you through the mazes of Pac-Man, the jungles of Jungle Hunt and the scorching skies of Defender.

The Atari style of joystick works on a simple principle: Tilt the stick in one of eight directions, and whatever's on the screen will move that way. Do nothing and you won't affect the present movement at all.

All Atari-style joysticks also have a button that lets you affect something on the screen when you press the button. This is commonly called the "fire" button because it's used in all shooting gallery-type games. But the fire button can do many other things besides send a bullet or missile on its way.

There are different kinds of joysticks for the Atari, some you might not even recognize as joysticks. For instance, Amiga makes a device called the Joyboard. Instead of controlling it with your hands, you put your feet on it and steer the board. Amiga even produces a game designed with the joyboard in mind. That game, Mogul Maniac, simulates a downhill skiing run. You steer your way through gate after gate on a brisk downhill run.

Atari's own joystick is rugged and stands up to some abuse by children, but it's not very precise. It works with Atari 2600 and 5200 game machines, as well as Atari computers. WICO Corporation makes joysticks for the Atari. They're all large and similar to WICO's controllers used for coin-operated games.

Smaller joysticks are becoming popular, especially with people who want precision. Kraft makes a joystick for the Atari that fits in your hand.

One of the best joysticks is Newport Controls' Prostick II. It includes a small plastic ring that points either to the number 4 or the number 8, and you can move it to either number. In the 8 position, it works just like other joysticks. In the 4 position, it locks out the diagonal positions. This setting is useful if you're playing a maze game in which you can't move diagonally. With a normal joystick, you may encounter irritating "dead spots" when the stick points diagonally. Prostick II eliminates those dead spots. The controller is also durable and has a firing button on each side, to accommodate southpaws as well as right-handed players. (On Apple computers, the two firing buttons operate independently of each other; on Atari computers, no matter how many firing buttons the joystick has, they all do the same thing.)

Atari offers two other game controllers. Neither is very popular, and few games work with them. The first is a pair of game paddles that plug into one game-controller port. The paddle is actually a dial. It lets an object on the screen move along a line. Normally, when you turn the paddle all the way to the left, the object goes to the left edge of the screen and so on. The paddle was invented for Pong, the first successful video game, but it's been ignored lately because it's too limiting.

The other device, still popular on games such as Missile Command and Crystal Castles, is a trackball. The ball part of the mechanism is trapped in plastic, but you can spin the surface of the ball in any direction. Just as with other game controllers, sensors underneath turn players' movements into electrical signals.

You might have heard of a new pointing device called a mouse. A mouse is essentially an upside-down trackball. You move the ball's case around a desktop, but the ball is still the moving part. Mice are becoming a popular alternative to cursor keys with many new computers.

Not all pointing devices are dedicated to game playing. Two others primarily enhance your ability to draw with Atari graphics. The Atari Touch Tablet lets you move your cursor around by pressing on the surface of a small, flat plastic square. To draw, you hold the tablet's button down and drag your finger around the surface of the tablet. For convenience, the tablet has buttons on both its left and right sides. Both act the way a firing button does on a joystick.

For more precision, you can use the stylus that comes with the tablet. This stylus plugs into the back of the tablet and has a firing button on its side. To stop drawing, you can either let up on the button or lift your finger or the stylus. The cursor disappears, and you can move to another section of the drawing.

Like most pointing devices, the Touch Tablet plugs into an Atari joystick port. The AtariArtist software that comes with the tablet is described in the section on graphics in Chapter 5.

Koala Technologies makes the other touch tablet for the Atari. The KoalaPad is a bit smaller than the Atari Touch Tablet, and its stylus doesn't

include a button, but the KoalaPad has two buttons on the tablet itself (one for right-handers and the other for lefties). Koala also sells a variety of graphics software and educational programs for its touch tablet, described in Chapter 5.

The Atari Light Pen, sold by Atari, is the other pointing device for painting. A light pen is a hand-held device that users point at a computer screen. The pen looks for light on the screen and sends relevant signals back to the computer. The computer can recognize the coordinate the pen is at and can perform various operations, depending on the software supplied with the pen.

When you touch the pen to the screen, a cursor appears. By holding the pen's button down, you can draw by moving the pen. Let up on the button or the pen and the cursor disappears; then you can move to another part of the screen.

The most simple use of a light pen is to select something from a menu, a list of choices on the computer screen. You can call up files simply by touching the pen to the screen.

The touch tablet and the light pen each have their advantages and disadvantages. The light pen is easy to handle, and you can point directly at the spot on the screen where you want to draw something. The disadvantage is that you have to raise your arm, and your arm may quickly tire. The touch tablet doesn't have this problem, since your arm rests on the tablet, but your eye-hand coordination has to be better.

Several other companies make light pens for the Atari, including FutureHouse of Chapel Hill, North Carolina, but these pens are less rugged than the Atari pen and are aimed more at children. Because so few people know what a light pen is, these devices have yet to gain widespread popularity.

Memory builders

As powerful as the Atari computers are, they have their limits. With a 64K RAM computer, you can store only about 32 pages of information. Actually, the available RAM in the Atari 800XL is only about 40K, meaning you can store only 20 pages. If you have the 16K Atari 600XL, you have far less room for information. With an 88K disk drive, you can store only about 44 pages.

There are several ways to beef up the Atari's RAM and disk memory. For Atari 600XL owners, Atari sells the 1064 Memory Module, which expands the 600XL's memory from 16K RAM to 64K RAM. The 1064 Memory Module plugs into the parallel-processor connector on the back of the 600XL. Unfortunately, it won't turn the 800XL into a 112K computer; the Atari doesn't work that way. The only way to add RAM beyond 64K is to use a hardware routine, called bank switching, that normally lets you use the first 64K or the second 64K, but only one at a time. Atari does not yet offer such a bank-switched memory.

You can also buy a 600XL memory expander from Microbits Peripheral Products. The MicroRam 64K memory board expands the 600XL's memory to 64K RAM.

Various disk-drive systems increase your Atari's disk-storage capacity. You can add up to three Atari disk drives, in addition to your present Atari drive. A switch at the back lets you select the number of each drive, from one to four.

For a real boost, try SWP Microcomputer Products' ATR-8000, a central-processing unit that hooks into your Atari computer and runs the CP/M operating system, which works with thousands of business programs. The ATR-8000 lets you hook up one to four low-cost add-on drives, either 5¼-inch or 8-inch, single- or double-sided, in any mix, and work with any single- or double-density DOS. With a double-sided, 8-inch disk and a double-density DOS, you can increase the disk-storage capacity of each drive to 500K, or half a million bytes.

The ATR-8000 includes a Z80 microprocessor and 64K RAM of its own, meaning that you can not only run all your Atari software, but you also can switch to the CP/M operating system and run all that software. It also has an RS-232 port, which runs a serial-interface printer or a modem in Atari DOS or CP/M. It includes a 48K printer buffer, meaning you can tell the computer to print out a file of up to 48,000 characters and immediately start working on your next file. Normally, while the Atari is printing, you can't work on anything else with the computer.

The ATR-8000 upgrade kit is also available separately as a self-contained computer. Purchasing a stand-alone CP/M computer will cost you at least $1000, so the ATR-8000 is quite a buy.

CP/M software, available on both 5¼-inch disks and 8-inch disks, is more powerful than Atari business software. There's WordStar, the most popular word-processing program for microcomputers. It includes formatting commands not commonly provided on home computers. There's dBASE II, a powerful program whose commands are really a language for building data-base-management systems. You can find more information on CP/M in *InfoWorld's Essential Guide to CP/M.*

One other extension of your Atari's capabilities is the local-area network, which lets you link several Ataris to share resources such as disk drives, printers and modems. Corvus Systems of San Jose, California, made a local-area network for the Atari for some years but discontinued it in late 1983, because it failed more stringent FCC radio-frequency-interference requirements and because sales of the network had dropped off. Still, several school systems own such a network system for their Ataris, and Corvus continues to service and support those systems. The company won't install any new ones, though.

Some of those systems have a Corvus hard disk for their Ataris. A hard-disk drive contains a sealed metal disk that can store much more information than any floppy disk can — up to millions of bytes. If you're thinking of attaching a hard disk to your Atari, you'll have to pay a custom-disk-system installer dearly or learn advanced memory electronics in your spare time.

Atari announced several memory-expansion devices at the 1983 International Summer Consumer Electronics Show, including an expansion box to hold plug-in circuit boards that add extra memory, cards that let the computer

display 80 columns of text, modems and more. Atari also announced its own CP/M add-on module. Both products never made it to market because the new management judged the products unsuitable for introduction.

Music and speech, reprise

One way to enhance the speech capability of a personal computer is to add special hardware that does some extra sound processing. Companies specializing in making these add-on speech processors include The Alien Group and Votrax.

The Alien Group's Voice Box II plugs into the Atari's serial port, the same one that you plug your disk drive and cassette recorder into.

The Voice Box II not only talks, but sings, too. It can sing in a humanlike voice with three-part harmony. At the same time, a human face on the screen lip-syncs the songs. The software includes a library of 30 well-known songs, including "Amazing Grace" and the Beatles' "When I'm 64."

Unlike some other speech synthesizers, the Voice Box II can also talk with inflection. The Voice Box II software includes two talking games, Green Goblins and Stud Poker. It also includes Number Speak, which converts numbers with up to nine digits into English pronunciation. The Alien Group says you can use Number Speak to develop math games for kids.

Learning the phonetic alphabet used by programs such as S.A.M. (see Chapter 5) may discourage some people from fully exploring speech synthesis. No one has found a really effective way to use synthesized speech in home computers yet. A few coin-operated arcade games, such as Atari's own Star Wars, use speech to enhance the game situation. Other than that, speech has yet to offer many practical uses and remains a curiosity. Some handicapped people with speech impairments use personal computers to communicate, and speech synthesis has been a godsend for them.

Votrax makes speech synthesizers for various home computers, including a voice synthesizer for the Atari called Type 'N Talk. This synthesizer uses a phonetic alphabet similar to that of S.A.M., but it includes a hardware device that plugs into the Atari 850 interface box's RS-232 interface. The Type 'N Talk box contains circuitry specially designed to produce speech.

Another company producing a speech synthesizer for home computers is Street Electronics Corporation. Its product, called the Echo GP, includes software and a synthesizer box with a built-in speaker.

Atari almost released a home computer with a built-in Votrax chip. The quality of the Votrax speech is as good as S.A.M.'s or better. You would have been able to type in commands from BASIC to produce speech, but Atari didn't release the 1450XLD, so you'll have to buy programs such as S.A.M., or hardware such as Type 'N Talk, instead. Future Atari computers may include a speech-synthesizer chip as standard equipment.
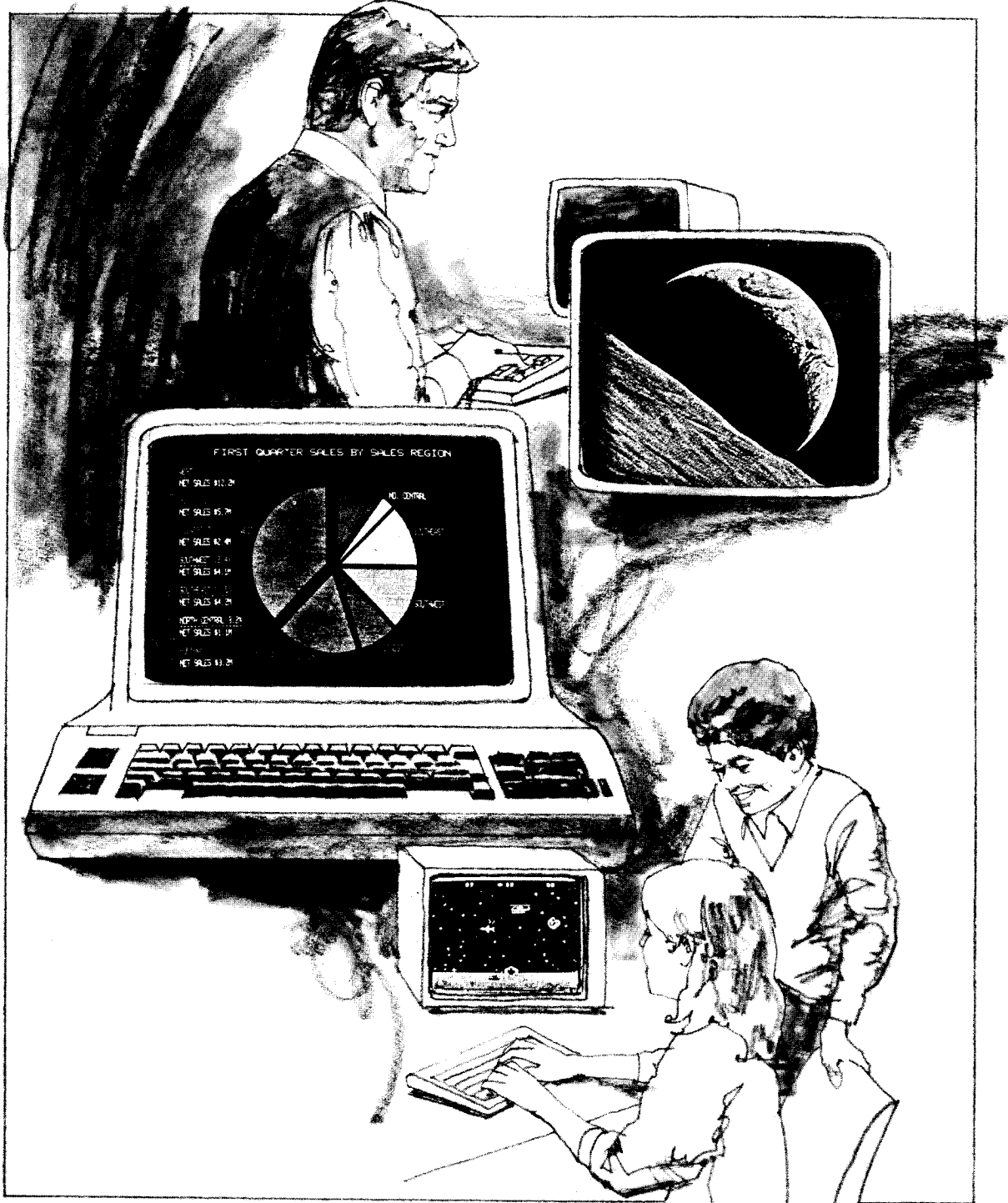
Section Three

How to Keep Your Atari Up

How do you keep your Atari healthy and happy? What do you do if something goes wrong or if you need assistance?

Chapter 8 explores warranties and what happens after the sale.

Chapter 9 tells you how to get news and help from groups of Atari users and how to obtain free software.

Finally, in Chapter 10, we examine the future of Atari.

Service and Maintenance
Users' Groups and Free Software
The Future

Chapter 8

SERVICE AND MAINTENANCE

The standard warranty for most personal computers and related hardware equipment is 90 days.

What does a warranty mean to Atari owners?

First, you should try out all your newly purchased equipment during those 90 days. You have to learn how to use the computer before you can tell if it's working. Not that much can go wrong with Atari computers. They're pretty rugged. Later in this chapter, we'll give you some tips on troubleshooting.

Your warranty goes into effect the day you buy your Atari computer or the day you receive it as a gift. You have to fill out and return the warranty card in order to be a registered owner, but you need not produce any proof of registration when you take in your computer for warranty service.

Warranties cover reasonable amounts of damage and abuse. If the keys on the keyboard stick or come off, that problem is covered. A disk drive with a faulty door latch will also be covered.

After your warranties expire, you may be able to purchase a service contract through Atari for regular maintenance, but chances are you'll have so few problems that a contract won't be necessary.

Atari service

The customer-service division oversees the repair of Atari consumer hardware products. Atari operates one service center, staffed by Atari service personnel, in Sunnyvale, California.

Consumers can always send products to this service center for repair. You pay the cost of shipping the equipment to Atari, but Atari picks up the bill on the way back. "Swapping" is cheaper than repairing and is common for most mass-market products. Since Atari computers sit at the low end of the computer market, this arrangement is the only way computer companies can provide servicing and still make a profit.

Atari also maintains a factory-authorized network of 1500 service centers nationwide. If you live in any urban area, you can probably find your local Atari service representative advertised in the *Yellow Pages* under "computers" or "computer repair." If you can't find a listing there, you can call Atari at (408) 745-2000 for the location of a service center near you.

Some stores that carry Atari hardware may also be authorized service centers, and still others may refer you to the nearest service center. Don't count on much information on local service from large stores such as K Mart, Childworld or Toys R Us. You can return your computer to the store if it is under warranty.

If you do turn in Atari hardware for servicing, the turnaround time will depend on the availability of parts and the type of device being repaired. If a part merely needs to be adjusted, service will be fairly quick. Parts replacement takes longer. Overall, disk-drive repair will probably only take a few days. If you carry your equipment into an authorized service center, the average turnaround is about a week. It doesn't include the time necessary to mail something to and from the Sunnyvale service center.

Non-Atari software and hardware producers provide various degrees of service and support. At the least, you should be able to call someone who can answer questions about the product. Some companies may only have an answering service and can take days to get back to you. Some other companies' phone lines are chronically busy, and the service is generally not up to Atari's standards. Other companies do a good job of supporting users.

At-home maintenance

Atari frowns on attempts by computer owners to do their own repairs at home. If you do tinker with your machine and subsequently take your computer to Atari for servicing during the warranty period, Atari may void the warranty if the service technician detects signs of tampering.

After the warranty period ends, attempting your own maintenance of internal parts could cause further damage, unless you know what you're doing.

Also, if you alter parts such as the computer's power supply, you run the risk of electric shock. Better to leave such work to Atari service technicians.

We're not implying that the electronically inclined can't figure out how to maintain their Ataris at home. Many hackers can diagnose a problem as well as the service technician can, and they may also have the parts on hand to fix machines. Some of these amateur repairmen even work on their friends' computers.

The heaviest home maintenance you may want to attempt is the diagnostics test supplied in ROM with the Atari XL computers. The diagnostics won't catch every problem, but they will catch the most common ones, such as faulty RAM chips. If the diagnostics do locate a problem, you should take the computer in for servicing.

One common ailment you can fix involves the joystick connector ports. As you repeatedly connect and disconnect the joystick cables, the pins inside the connector port may become bent. The next time you try to insert the joystick cable, it may not go in. Examine the connector pin pattern; you can usually tell which pin is bent. Bend it back gently with a ballpoint pen or the tip of your finger.

Keep your Atari clean by wiping the keyboard about once a month with a soft cloth. Use a household dust-removal spray, not water. (One exception: the Atari 400, whose sealed flat keyboard can be cleaned with a damp cloth if need be.) You'll be surprised how dirty the keyboard can get, especially with young children around.

The other part of your computer system that collects dust is the TV or monitor screen. When the system is on, the screen attracts dust like a magnet. Dust and dirt on the screen will reduce readability and increase eyestrain. Use a glass cleaner once a month.

Obviously, it's a good idea to keep the computer away from food and drink. Atari computers don't have to be kept in pristine condition — they're designed to take abuse — but a little discretion doesn't hurt. For instance, try not to use your primary dining table as your computer table as well.

You might also check the chair you're going to use. A good, firm-backed chair is much easier on your back when you're computing than is the sofa or the floor.

USERS' GROUPS AND FREE SOFTWARE

Users' groups are a rich resource for Atari computer owners. In most metropolitan areas, you'll find a group of Atari computer users meeting, usually once a month, at a computer store, auditorium, school or conference room. These groups tend to spring up spontaneously; Atari does support them in a limited fashion but does not control the groups in any way, either financially or politically.

What is a users' group; and why should you belong? Simply, it's a group of users such as yourself who want to share information and software in the public domain.

It's also a place where commercial producers of software can come and present their wares and answer tough questions on their products from experienced users. Last, it's a way for Atari users to meet each other socially and form friendships based on their common interests.

If you don't know anything about the users' groups in your area, check our list of groups for the one nearest you. Local newspapers may also carry announcements of where users' groups meet. Your local Atari dealers may have a bulletin board posting users' group announcements and information on used and new hardware for sale and local computer classes. A list of Atari users' groups is also included in the back of this book.

Computer classes may spawn users' groups. Local high schools and colleges may also harbor them. It's unlikely that these types of groups have many Atari users, but if the group is oriented primarily to home computers, it's possible.

Normally, users' groups meet on a weeknight, though some meet on Saturdays. The meetings are generally three to four hours long. Many users' groups support their activities by charging dues, typically on an annual basis. These dues help pay for newsletters, software librarians, incidental expenses, group purchases and/or electronic bulletin boards. Typically dues for Atari groups are $12 to $15 per year, but groups may have to "pass the hat" from time to time to raise money for special uses.

After introductions and announcements, users' groups usually have a guest speaker or presentation. The better groups have computers and projection facilities available so everyone can see the screen during presentations. Less affluent groups may have a small system upon which people can demonstrate the software after the end of the formal meeting.

Following this presentation is a section most groups call "random access." People stand up, one at a time, and ask questions, such as "Does anybody know how to hook up the Rana drive? I'm having trouble with mine," or "Who knows how to get past level 22 of Defender?" Then, whoever can answer the question stands up and answers it or arranges to meet the person after the meeting to answer the question.

Finally, if the group has a software librarian, that person makes available the public-domain software owned by the group for loan to the group members. This software is usually less easy to use and less powerful than commercial software, but it's inexpensive. Users' groups have various ways of distributing the software. Sometimes, they lend the master copy at one month's meeting, and you take it home, duplicate it onto your own storage medium and return the master at the next month's meeting. Most other groups, fearing the loss of the master, do all the duplication themselves and sell the duplicated program for the cost of the disk or tape, plus a slight charge to support the service. The disadvantage of this system is that whoever does all the copying wears out his or her disk drive or tape recorder.

Users' groups also have to be aware of what they're putting in their public-domain libraries. Most software for each group comes not from members within the group but from other users' groups and electronic bulletin boards around the country. Some of this software turns out to be commercial and, thus, illegally copied. When the users' group librarian isn't familiar enough with the world of Atari software, that stolen software can end up in the hands of innocent users. Group librarians can and should make an effort to screen out commercial software.

Recently, the standards for free software within users' groups have begun to rise. Some groups won't accept programs, even great ones, unless the producer provides some documentation. Usually the documentation can be a text file on the same disk or tape as the program; no one expects free-software authors to fork out money for printing and packaging, but any kind of documentation will help beginners.

Why do software authors put their creations into the public domain? Some do it just for the joy of creating software and watching it being used. Others

have programs that are good but have no chance of becoming a commercial success. This commercial factor is one reason that public-domain software is dominated by programming utilities, programs that help programmers instead of general users.

Whatever the reason, users benefit, and users' groups with a strong free-software library flourish.

Users' groups can also help combat software theft. It's illegal for anyone to make copies of commercial software and give them away — you may make copies for your own use, if the software is unprotected. Unfortunately, some users' groups specialize in cracking the copy-protection schemes embedded in commercial software, but most users' groups obey the law, and they can also help educate newer users about the seriousness of software theft. This problem will always be around, but if the user community can keep it in check, software development for the Atari can thrive.

One innovative users' group, especially for educators and teachers, is Computer-Using Educators (CUE), P.O. Box 18547, San Jose, CA 95158. Together with the San Mateo County Office of Education in California, CUE runs a public-domain-software exchange called Softswap. CUE provides "dissemination disks" with quality educational software for Atari and other personal computers.

Softswap has at least six disks, each with several educational programs covering diverse subjects. Each dissemination disk costs $10, which includes all charges. If you contribute your original program on a disk, Softswap will send you a free disk of your choice.

CUE offers a great deal more to educators. It publishes a monthly newsletter with articles by other educators and information on new educational software. CUE also holds spring and fall conferences in California. To join, send $8 for one year's membership, or $14 for a two-year membership, to CUE at the above address.

One book has more information on free software and Atari users' groups than any other source. That book is *Free Software for Your Atari* by David and Dorothy Heller, published by Enrich/Ohaus. This book has information on obtaining free communications software and has a buyers' guide on Atari modems. It has the phone numbers of hundreds of electronic bulletin boards and addresses of dozens of users' groups.

Bulletin boards and free software

Bulletin boards are computer systems to which you can connect with your Atari, a modem and your phone line. These bulletin boards also offer ways to communicate with other Atari users and obtain more free software.

Most electronic bulletin boards are run by other Atari users, who have their computers running 24 hours a day or some specified hours. In order to set up such a bulletin board, these users have to have a modem and a software program that automatically answers the phone and logs callers on to the

system. The program may then ask you for your name, city and even your address and phone number. The more exclusive bulletin boards may tell you to hang up and call back in a few nights. The system operator (sysop) of the bulletin board may run a check on your name to make sure you're not a software pirate or other unscrupulous character. If you're OK, the sysop will add your name to the list of bulletin-board members. Most bulletin boards don't have this kind of elaborate security, though.

When you first connect, you'll probably get a title screen and a description of the system. Finally, you'll reach a point where you have to type in a command telling the remote computer what you want to do next. Often, if you don't know what to do next, you can type HELP or ? and get more information on your options. Some systems give you explanatory menus automatically.

Each system usually has a message area, where anyone can leave messages on any subject. These messages are numbered, the most recent being the one with the highest number. You can list the messages, or usually you can quickly scan them, reading just the subject of each message, and then go back and read the ones you're interested in. Sometimes these message areas are separated into subject categories.

When you move on to the free software, you'll be instructed on how to move the software into your own system. You'll need a smart-terminal program such as AMODEM or ATASCII, available through many users' groups, to capture the free software via modem. Many such programs use a routine that checks the data coming over the phone line for errors. This check is necessary because many phone lines are "dirty," containing static or interference that scrambles some of the data coming across. With error checking, your computer can tell other computers to resend a sector of information if it didn't come through correctly. The formal name for the most common personal-computer error-checking method is XMODEM, named after a public-domain program written by Ward Christensen. AMODEM supports what's called the XMODEM protocol, enabling you to receive error-free code from any other computer running XMODEM or AMODEM.

You can also receive programs from non-Atari computers, but these programs may not run on your Atari. Atari BASIC is significantly different from Applesoft BASIC or IBM PC BASIC. Only if the BASIC program contains commands common to both BASICs will it run on your Atari. The same goes for programs written in other popular languages.

The large files you receive from remote Atari computers can also be text files, either explaining the programs you can get or possibly clarifying documentation for some commercial product that isn't adequately explained by the company selling it. Another common type of file is a list of other bulletin-board numbers, both in your area and around the country. These lists circulate from board to board and quickly can become obsolete. Unlike services such as The Source and CompuServe, private bulletin boards often change phone numbers, go out of service or appear from nowhere.

Remember that you'll have to pay long-distance charges if you dial private

bulletin boards across the country. So even though you won't pay a connect fee for being on the board, you'll still have a long-distance bill. You may want to get MCI or Sprint to offset the cost somewhat, but make sure any such service supports data transmission and has good-quality phone lines. At first, stick to local bulletin boards if you can; major cities usually have five or more, devoted just to the Atari.

Chapter 10

THE FUTURE

The entertainment and video-game end of the home-computer industry has been in constant turmoil since mid-1982. That's when home-computer prices took their plunge and Commodore began to dominate the market.

Nolan Bushnell, who started Atari, was an engineer. The management team that produced the Atari VCS, 400 and 800 was technology-driven, just as Commodore is today. Former chief Morgan's background was in sales and marketing, not technology.

Although Commodore continued to dominate the home-computer market in early 1984, Commodore is by no means the sure victor in the home-computer race. For one thing, its former boss, Jack Tramiel, now runs Atari. Tramiel, a veteran of the calculator and personal-computer wars, is also a Polish immigrant, a survivor of Auschwitz, the notorious World War II concentration camp. He has a reputation as a fighter and a savvy businessman who acts with lightning speed and foresight.

Under Tramiel, Atari will now concentrate once again on personal computers for the home. By the time this book appears, Tramiel may have announced the first new products from the new Atari Corporation; but in the meantime it may be the heyday at last for the Atari 800XL. Tramiel was expected to cut both costs and prices of the computer to compete head-to-head with Commodore. At the same time, he appears to be pressing forward with the notion of a much more powerful computer, with increased memory and disk storage.

Tramiel immediately picked up some former engineering and sales people who worked for him at Commodore, and he also inherited a hand-picked num-

ber of technical geniuses left at Atari, as well as a host of Atari-bred laboratory inventions. Watch for breakthroughs in computer graphics, sound, speech and ease of use from the new Atari. Computers will continue to get cheaper to make and will be packed with more features. You'll also see new uses of computers emerge, such as the following.

Home security

An electronics standard already exists for linking the lights, appliances and alarms in your house to one central, microprocessor-driven machine. It may or may not be a full home computer. Such a system was developed for the Mattel Aquarius and shown at a Consumer Electronics Show, but it ran aground when Aquarius sales stalled and Mattel sold off its electronics divisions. Atari may be working on software in ROM or cartridge form that will let you program security codes for your alarms, turn on your lights at preset times and notify police of the exact nature of any break-in.

Home music system

Microprocessors are already being used in many stereo systems, but Atari might release a product that duplicates the hundreds of dials on a mixing board in a small unit. This super-synthesizer and recording machine would be more powerful than today's electronic keyboards made by Casio and others. It would let everyone have a professional-quality, recording-studio mixing board in their home.

Master video controller

Since video images can be digitized and manipulated by computer, Atari could produce a device that lets you rotate, flip and move images in the same way as they're done on TV. An even more advanced product would be a high-quality, totally digital, videotape recorder. George Lucas of Lucasfilm is interested in replacing conventional film technology with digitally stored video film. Atari might undertake a joint venture with Lucas to make this concept a reality.

Innovations

Atari Learning System's first product was AtariLab, the first in a series of electronic science kits. Students discover the principles of science by following a workbook included with the program.

At the heart of AtariLab is an interface box with holes for ten different probes and sensors. The first such probe, included when you buy the main AtariLab module, measures temperature. The probe includes a thermometer. Students measure the temperature of something over a period of a few minutes to many hours, and the AtariLab software displays a moving thermometer. At

given intervals the top point of the thermometer mercury is marked, the thermometer disappears and the student is left with a graph of plotted temperatures. The software vividly illustrates the concept of graphing.

Other AtariLab modules, sold separately for about $50 each, measure other physical phenomena. The light module includes a light sensor and a small light. Students can measure light intensity, reflectivity and absorption.

The biofeedback section trains students to relax while the Atari measures their skin moisture, temperature and pulse rate.

Other modules, measuring motion, time and even whether someone is lying or not, will also be available. All AtariLab products are aimed at students aged 9 to 18.

If Atari continues to produce innovative hardware products such as AtariLab, it may gain back some ground it has lost to Commodore. Although Atari plans to convert products such as AtariLab to run on other computers, Morgan believed Atari is in the home-computer business to stay.

In May 1984, Atari announced its first two games developed by Lucasfilm, Ballblazer and Rescue on Fractalus! Lucasfilm is the company set up by filmmaker George Lucas to produce the *Star Wars* movies. Lucasfilm's computer division is developing new games for Atari. Ballblazer is a futuristic soccer match between two human players or one player and a computer opponent. Rescue on Fractalus! lets players rescue downed pilots from a hostile planet. Both games feature a realistic three-dimensional perspective; in Rescue from Fractalus! you look out the window of a shuttle craft as you fly by craggy mountains.

Also, independent software producers continue to develop innovative products for the Atari home computer first. Synapse Software has released Relax, a biofeedback program with a sensor band that fits around your head. The Synapse product includes an audiotape with a series of exercises designed to get you to relax. You can watch your progress on the Atari's screen as a series of points plots your stress level.

From Spinnaker Software comes the first exercise program for a computer. Aerobics features a lively music soundtrack that plays as you follow your exercise leader, a woman in exercise clothes, demonstrating each move on the screen. You can set the length and difficulty of each lesson.

Arcade games continue to get better. Fernando Herrara, award-winning creator of My First Alphabet for Atari, formed his own company, First Star Software, now partly owned by Warner Software. First Star already has produced innovative games such as Astro Chase, Flip and Flop and Boulder Dash. Look for much more innovative learning and game software for the Atari from First Star.

Educational software will continue to get better, as educators, animators and programmers refine their skills.

Graphics software continues to move forward. B/Graph, from Commodore Business Machines is one of the best graphics programs for home computers,

and the first version of B/Graph appeared on the Atari (it's also available for the Commodore 64).

B/Graph generates professional-looking graphics, including point graphs, bar graphs and pie charts. The bars on the bar graph can even be in 3-D. The program automatically "scales" all graphs so they fit on the screen.

B/Graph also can perform several powerful statistical functions, including regression analysis, chi-square tests, t tests and F tests. Even if you don't know what these functions are, the B/Graph manual tells you.

B/Graph, used on Atari computers, is powerful enough for business use. The program lets you present your graphs one after another, as you might have to at a business presentation.

A new hardware device for the Atari could spell the end of having to type in long programs by hand. The Databar Corporation is producing a low-cost optical reader that plugs into the Atari and can read lines of bar code, much as scanners do in grocery stores.

Databar's product, called OSCAR (optical scanning reader), includes a small hand-held reader. By running the reader across each line of bar code, you can load in programs. Since the bar-code lines can print on regular paper, the cost of providing this software is inexpensive.

Databar publishes a magazine with programs for various home computers. By joining the Databar Club, you can receive 12 issues of the *Databar Magazine* for $10 an issue. The premier issue includes more than $75 worth of software. The programs include learning games, health analysis, a financial quiz, legal advice and a scientific puzzle.

Atari under Tramiel

Industry analysts are optimistic about Tramiel's new Atari, which could pump life into a lackluster home-computer industry. Tramiel says Atari employees will work hard and frugally to restore the confidence of their "bosses," the consuming public. Analysts say if anyone can cut costs and put together innovative technology for the home, it's Tramiel.

Atari is a company of paradoxes — of wild success and sudden bust, of Pac-Man and learning games. It has changed hands twice, traveling from the free-wheeling Nolan Bushnell to the gritty Jack Tramiel. The video game, which seemed to define Atari, was obscure when Atari started and seems obscure again today, after the fad has passed. But something of the Atari magic will continue to live on, in the hardware produced and in the software, which is the most important element of any personal computer.

Independent software and hardware developers continue to innovate for the Atari computer line. A lack of third-party products is death to any home computer, but the variety of software available for the Atari keeps growing. The compatibility of the software with older Atari computers is good news for any Atari computer owner.

Part 2

REVIEWS

InfoWorld *instituted its product-review process at the magazine's birth in early 1980. Since then,* InfoWorld *software and hardware reviews have gained a reputation as accurate, objective evaluations of microcomputer products. Products are evaluated by independent reviewers, who work closely with* InfoWorld. *A list of reviewers who wrote the product evaluations in this book follows these guidelines. To permit easy comparison of products, all product reviews follow a similar format. The format is based on a Report Card, which we print with each review.*

To help you understand our evaluation process, we're summarizing the criteria our reviewers use to evaluate products. We apply a different set of guidelines to software and hardware products, but our overall goal is to enable our readers to make informed decisions about buying hardware and software products.

The products reviewed in this book represent a sampling of the myriad products available for Atari computers.

Software-review guidelines

In reviewing software products, our reviewers consider the following areas:

Features.   *Reviewers describe what the product does and how it does it. They consider factual information about the product, then provide the information readers need to decide whether the product is appropriate to the task they have in mind.*

Performance.   *Here, reviewers assess how well a product performs its intended task. They determine who the intended user of the product is, what his or her needs are and how well the products fulfills those needs. Reviewers also measure the manufacturer's claims for the product against its actual performance. A product should perform its intended tasks in a reasonable amount of time, and reviewers assess the product's relative speed.*

Ease of use.   *Ease of use comprises three categories: ease of installation, ease of learning and ease of operation.*

Ease of installation deals with the degree of difficulty a user will encounter setting up a program for the first time.

Ease of learning examines the degree of difficulty inexperienced users of the program will encounter when they employ the product.

Ease of operation explores the general level of complexity involved in continued use of the product.

Reviewers consider these three categories to give an overall rating to the product in the Ease of Use category.

Error handling. *Any good program should be able to routinely handle incorrect input and other mistakes without damaging data or causing undue difficulty. Any time a user tries to make an irrevocable change, for example, the program should ask for confirmation of the change. In addition, the program should be set up to prevent or minimize loss of data in the event of a power failure or the failure of some piece of hardware. Reviewers assess how well the program prevents and deals with errors.*

Documentation. *Documentation for computer products has a reputation for being awful. Reviewers rate documentation based on its conciseness, clarity and readability. The primary consideration of a product manual's usefulness is whether it is written so that anyone can understand it. If appropriate, reviewers also evaluate the existence and effectiveness of a product's "on-line" documentation (information the program provides on the computer's screen). In any case, if you have to be a technician to comprehend the document, its value is minimal.*

Support. *Although this area does not receive a grade, reviewers note in the review what customers can expect for support from the company.*

You'll notice that we have grouped the products reviewed into general categories. Some products may appropriately fit into other categories, but we've tried to put each product into its most relevant area.

115

Hardware-review guidelines

In reviewing peripherals, our reviewers consider the following areas:

Features. *Same as software.*

Setup. *Some equipment is more difficult than other equipment to set up. In any case, reviewers discuss what users have to do to set the product up for use. They evaluate the clarity of setup instructions and tell readers whether all the components for setup are present.*

Ease of use. *In this category, reviewers evaluate two categories of use. Are the controls on the product easy to learn and use? Is the product easy to use in sustained operation?*

Performance. *This is the primary evaluation category reviewers consider. Reviewers perform standard measurements of products (printer speed tests, for example), and they evaluate how well the product performs its intended use in the following categories:*

> *Abuse testing — what happens, for example, if you leave the product on for 48 straight hours?*
>
> *Environment testing — how well does the product work in its intended environment?*
>
> *Specification testing — if a manufacturer claims its printer produces 100 characters per second, does the printer really work this fast?*
>
> *Overall usefulness — does the product perform well continuously?*

Documentation. *Same as software.*

Serviceability. *Hardware will not function correctly forever. Reviewers assess the "after-the-sale support system" the manufacturer has developed or built into the product. Reviewers consider such factors as warranties and service contracts in this category.*

Grades. *Reviewers use the following grades to rate products in the categories listed above:*

Excellent. *The product clearly excels and has no deficiencies that affect use.*

Good. *The product has no significant shortcomings and should prove capable in day-to-day use.*

Fair. *The product has some significant shortcomings, but these can be circumvented, or they only affect some specialized use of the product.*

Poor. *The product cannot be recommended in this category because it has serious shortcomings.*

List of reviewers

Richard A. Anderson
Martin C. Bass
Richard Bretschneider
Kevin Cheung
Bruce Frumker
Pamela Lam
Leo G. Laporte
Carol Low
Scott Mace
Micheal D. Morrow
M. A. Olds
Phillip Robinson
Stephen Robinson
David and Sandy Small
Cassie Stahl
Harald E. Striepe

WORDS

The programs reviewed in this category work with words. They let you process, arrange, rearrange and organize words . . . something you could never do with a typewriter.

REVIEW

Atari Writer

Given the limitations of Atari hardware, AtariWriter is a good word processor. If you write documents larger than your computer's memory though, or if you need to display 80 columns of text on the screen, forget AtariWriter: stick to your typewriter or buy a more expensive computer.

The AtariWriter program is supplied as a ROM cartridge that fits into the Atari cartridge slot (located on the top of the 400, 800 and XL series computers and on the side of the 1200). Although no disk drive is necessary to use AtariWriter, we strongly recommend one; tape-cassette storage is a slow and chancy thing.

You make basic selections from a menu, a simple screen that has eight options, each selected by a single letter.

The options let you create, edit, print or delete files; save files to disk or tape; format disks; or get an index of files on a disk.

When you create a document, AtariWriter presents you with a nearly blank screen and some preset formatting commands that you can modify. By creating separate files to contain the format information, you can bypass the time-consuming process of constantly setting margins, spacing and print styles.

If you wish to save a document, you must press the Escape key to again see the main menu and type S (for Save) to store the document. Until you do this, your document exists only in memory; AtariWriter does not automatically save a document.

When you choose to edit a document, AtariWriter prompts you with a message that is a bit cryptic but not too difficult to decipher. Atari owners who have had their machines for

InfoWorld
Report Card

AtariWriter

	Poor	Fair	Good	Excellent
Performance	☐	■	☐	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
AtariWriter is adequate for casual word processing, but you can't use it to write documents larger than your computer's memory (20K on the Atari 800) or to display more than 38 columns.

System Requirements
☐ *Atari computer*
☐ *16K RAM*

Suggested list price: $99.95

*Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000*

a while will understand this prompt more readily than computer novices.

Deleting documents and formatting disks are fairly straightforward procedures. The program asks you if you are sure you want to perform these operations.

You can print documents on any one of four printers, all made by Atari: the 1025 or 825 dot-matrix printers or the 820 or 822 thermal printers. For printing, you can instruct AtariWriter about your preference for any of the following measurements, by columns or half-lines: page length, bottom margin, top margin, left margin, right margin, justified right margin (on or off), line spacing (single, double or triple), paragraph indentation, spacing between paragraphs and print style. The print styles you can choose from include 10 characters per inch (standard), 16.7 characters per inch (condensed) and proportional spacing. You are not limited to continuous-sheet printing, and you can also start and stop printing at any page in the file.

For casual word processing, AtariWriter is adequate. You can create text easily and, by moving the cursor around the screen, edit the text. The formatting commands are hard to remember, but Atari includes a quick-reference card listing them.

Because AtariWriter displays only 38 characters on a line, you do not see the text as it will be when printed if you set its margins wider than 38 columns. You can get a rough idea of how the file will print out with a special Print Preview command, but this preview still displays only 38 characters on a line. To see the right half of a wider page, you must move the cursor to the right while the display slowly scrolls by.

This problem is common to all word-processing programs that are designed for people who use a television set as a screen. Most television sets cannot

adequately display more than 40 columns on the screen — you need a monitor to do that.

Whether you are editing or previewing with AtariWriter, you can only see 21 lines of text at once, so you must use arrow keys to scroll up and down. When you format a document for previewing, you can only see a page at a time; AtariWriter asks you to press the Start key to see the next formatted page. This command takes you forward one page at a time. You cannot back up until you reach the last page, at which time you return to regular editing.

The preview process is too cumbersome for you to create and view columnar information quickly, unless you can get used to understanding what you're doing by looking at only 38 characters at a time on each line.

The Atari's limited memory is the chief drawback of AtariWriter. Your files cannot be larger than available memory, which in an Atari 800 is about 20K. Each single-sided printed page takes up about 3K, and you'll have to leave an equal amount of memory in reserve if you wish to preview the printed format of a file. These complicated limits handicap your ability to write more than short documents with the program.

If you must write the Great American Novel with AtariWriter, though, you can chain-print the numerous documents involved by inserting a special control character at the end of each. To edit these files, you must load them into memory, one after another.

It is easy to learn the basics of AtariWriter, but it is hard to remember all the specific control codes. You will probably rely heavily on the documentation for refreshers; the program itself lacks a Help command or the on-screen help prompts of advanced word-processing software. Fortunately,

the spiral-bound manual lies flat and is well organized. It contains an index, a reference section and a tutorial. Most valuable of all is the quick-reference card, which summarizes all AtariWriter's commands.

If you do have a disk drive, you must turn it on before starting to use AtariWriter, otherwise you will not be able to save your AtariWriter files to disk. The wrong time to find this out is after you have composed your documents.

If you choose the wrong printer when printing files, too bad. The Printer Selection menu does not return unless you restart AtariWriter.

Atari provides its standard 90-day warranty with AtariWriter, covering only defects in the materials or assembly of the AtariWriter cartridge. Otherwise the software is provided "as is," which means that if you don't like it, you'll have to convince your dealer to give you your money back.

The bold type on the back of the AtariWriter box proclaims that "your love/hate relationship with your typewriter is about to end." Maybe, but the line is on the wrong software box.
—*Scott Mace*

REVIEW

Bank Street Writer

Nearly every producer of a word-processing program claims that its package is easy to use. The publisher of Bank Street Writer can honestly make that claim. Because the program was developed for use by children, it has a simple structure and makes extensive use of menus and prompts.

You need to memorize only a few commands. These are perfectly logical, such as B for "go to the beginning of the text" or E for "go to the end of text." Whether you're a child or an adult, you'll get the hang of the program almost immediately and can get on with your writing.

The program has three modes: Write, Edit and Transfer. When you boot the program, you're in the Write mode. A writing box occupies most of your screen, and command prompts fill the upper part. As you enter text into the box, it's easy to correct mistakes. You simply press the Backspace key to delete the letter you've just typed. You can also center a line of text with the Control-C command and indent a paragraph with the Control-I command.

The Indentation command is somewhat unusual in that it works not on a single line but on the entire paragraph, temporarily resetting the left-hand margin. This makes it particularly useful for writing outlines or for setting off long quotations.

As with many word processors, this program has automatic wordwrap at the end of each line and automatic scrolling when the text-entry area gets filled up. The maximum length of a document, 2300 words, is plenty for most school assignments — if you need to write something longer, you must break it up into separate files. You can link the files easily when you're ready to print.

When you've finished composing, you press the Escape key to get to the Edit mode, which you use for cursor movement and text manipulation. The commands U, D, B and E (Up, Down, Beginning and End) allow you to skip quickly around your text. To reach some particular point in your document, you can use the four arrow keys. You can then perform such operations as moving and erasing blocks of text. You

InfoWorld

R e p o r t C a r d

Bank Street Writer

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	■

Summary
Bank Street Writer is an excellent word processor for beginners. Its use of three operational modes makes learning the system easy. That same three-mode structure can hamper the editing process, however, and if you tend to edit documents heavily, this word processor probably isn't for you.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *Atari DOS*
☐ *One 5¼-inch disk drive*
☐ *Requires BASIC to run tutorial*

Suggested price list: $69.95

Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170

can also "moveback" and "unerase" the blocks — particularly nice features that encourage experimentation. Search and Replace is another option of the Edit mode.

Finally, Bank Street Writer has a Transfer mode, from which you save and retrieve files and issue print commands. Bank Street Writer provides for two different types of printing, rough draft and final. The Rough Draft option gives you a printout that exactly reproduces what you see on the screen (38 characters wide). This is great for proofreading because if you find a spelling error, it's easy to go from the paper to the screen to correct it.

With the Final Print option, you can adjust several characteristics of your to-be-printed document, such as line length, spacing and pagination. You can set default values for these parameters, customizing them for the type of document you print most frequently. With multiple-page documents, you can see the location of page breaks and can override them when you wish.

The three-mode structure of Bank Street Writer makes the program a breeze to learn. Whenever you switch modes, the upper part of the screen contains prompts, so there's hardly anything to memorize. At any time, if you get lost, you just press the Escape key once or twice to return the Write mode.

On the other hand, the three-mode structure makes for cumbersome editing. In the Write mode, your arrow keys don't work, and in the Edit mode, your typewriter keys don't work. So if you're writing along and you notice a problem somewhere in your text, you can't simply jump there, make the change and resume writing. You have to switch back and forth between modes. If a document needs just one or two changes, the mode switching may not bother you. The more editing you have

to do, though, the more tedious all the extra keystrokes become.

As far as error handling is concerned, Bank Street Writer does a great job. Its designers have taken extraordinary care to ensure that inexperienced users don't make fatal mistakes. For example, if you try to delete a block of text, the program asks you if you really want to, and you must confirm your decision before it will make the deletion. Here's another example of good error handling: If you try to save a file to a full disk, you get the message, "Cannot Save — Disk is Full." You can then insert another disk and reinitiate the saving process with no loss of data. If you don't have an initialized disk handy, Bank Street Writer allows you to initialize a disk on the spot and then continue with your saving.

The program's documentation is first-rate. It comprises an on-disk tutorial, as well as a 22-page booklet that explains the operation of the program in jargon-free English.

The program is copy-protected, but a backup disk is included free with the package.

Bank Street Writer lives up to its billing as a "home" word processor. With its emphasis on simplicity and ease of learning, it's an ideal program for novice users, whether they be children or adults.

—*Martin C. Bass*

REVIEW

Letter Wizard

Letter Wizard, a word-processing program for Atari home computers, includes many features not found in other word processors. For example, you can print headers and footers on alternating pages, and you can also embed information in text that you have previously stored in File Manager+, a file-management program from Synapse Software. The latter feature makes it easy to write reports that include text and figures.

If you have used another word-processing program, you will be able to use this one fairly quickly and easily. The most difficult part of learning to use any new program is remembering the multitude of commands that you use to format the text. Letter Wizard comes with a standup, quick-reference card, and most of the names of the commands are mnemonically related to their functions. You can embed commands in the text wherever you need them.

Letter Wizard allows you to set the screen color and brightness to any one of the many possible combinations available with your Atari computer. You can convert files that you have created with Datasoft's Text Wizard to Letter Wizard's format by removing the formatting commands that were embedded in the text and replacing them with Letter Wizard commands. You can also convert most standard ASCII files to the Letter Wizard format by using the same technique.

Although you can print your headers or footers on alternating pages, you cannot have more than one line of text. You can also put subscripts and superscripts in your text. This feature is handy if you need to print mathematical

or chemical formulas.

Letter Wizard allows you to create a file that is ten pages long and single-spaced. You can create even longer documents by combining several files into one. A special command called the ch command allows you to print the files out as though they were one long document by making the program link individual files when it prints them. You can interrupt printing at any time by pressing the space bar and typing the letter O.

Letter Wizard also allows you to format a disk and view the catalog of any disk so that you can know instantly whether you have room for a particular document. You can rename files and lock and unlock files. You can also delete files.

The bottom portion of the screen contains information about a file. It tells you how many sectors the file takes up on the disk (even before it is completely saved to disk) and how many words are in the file. The file-status section also displays the name of the file and the number of free bytes. If you are busy typing and need a word count, you only have to press Option-U and the program updates the word count and other information.

Several features make it easy to write custom form letters using nothing more than your Letter Wizard program. You can append a file to one on which you are working. If you use a particular paragraph often, you can save it to disk and recall it with this same function. You can also save a portion of the document to disk and, at the same time, retain that section on the screen.

The program's Form Letter feature allows you to type up your form letter and insert special characters in the text to mark the places where you want data to be inserted. Next, you type a data file that contains all the information that is needed to fill in the blanks in the form

InfoWorld
R e p o r t   C a r d

Letter Wizard

	Poor	Fair	Good	Excellent
Performance	□	□	■	□
Documentation	□	■	□	□
Ease of Use	□	□	■	□
Error Handling	□	□	■	□

Summary
Letter Wizard is an easy-to-use word-processing program. You can use it to create custom form letters, and you can do this without having access to a data base. Printing columnar information may give you some problems, however — you can't preview the final printout on the screen and the text screen is set in 40-column format even though most printers print in an 80-column format.

System Requirements
☐ *Atari computer*
☐ *32K RAM*
☐ *One disk drive*

Suggested list price: $49.95

Datasoft, Inc.
19808 Nordhoff Place
Chatsworth, CA 91311-9969
(818) 701-5161

letter. The information in the data file must be in the same order as the blanks it will fill in the form letter.

You can select which information you want the program to use by inserting a Skip command into the form letter. This command instructs Letter Wizard to print certain information and to skip over other information in the data file. This is a handy feature if you routinely send information to a group of people.

If you want to send information that needs to be sorted or otherwise manipulated in a data base, you can use File Manager+ to store the information and then use Letter Wizard to merge the information into form letters.

You can make use of your printer's special characteristics by embedding control codes into the text in one of two ways. You can embed the graphic symbol, which causes the printer to activate one of its special features, such as underlined printer, or you can use the ch command. This command allows you to insert the decimal code in your text for the desired printer function and so allows you to use many different printers with Letter Wizard.

Several menus are included in this program to move you quickly from editing to printing to disk management. One menu asks which printer you are using. It would be nice if you did not have to specify which printer you are using each time you want to print, but, if you own more than one printer and want to print something out on each one, this menu may be useful. Otherwise, having to go through this menu every time you use the program could become annoying.

Also included in the package is a printer-equivalence table, which lists the Epson MX-80 with and without Graftrax, Star Gemini, Microline 82 and the C. Itoh as printers that you can use if you select one of the printers listed in

the Printer menu. The printers that Letter Wizard fully supports and lists in the menu include the Atari 825 printer, Atari 1020 color printer, Atari 1025 dot-matrix printer and the Atari 1027 letter-quality printer. You can also use the Epson MX-80 and the NEC 8023, which are also listed in the menu.

If you have a printer that is not listed, you have to make sure of your control codes and embed them in the text for the desired results. Remember, though, that Letter Wizard may not support some of your printer's features if your printer is not listed in the menu.

When you want to print a special table or list items in columns, you can mark the table or listing so that it will not print on two pages. In fact, the manual's only reference to columns is to tell you how to keep them all on one page. This technique is necessary because you cannot preview a document before it is printed.

If you are doing a lot of work in columns, you may find them difficult to produce using Letter Wizard. The program always displays your letter or document in a 40-column format on the screen. This is acceptable for most uses, but when you want to make columns, it's difficult to determine whether the columns will be lined up properly when they are printed out.

The problem arises because you type on a screen that displays only 40 characters across, but most printers print in an 80-column format. It is, therefore, hard to visualize where the columns will fall because the printer prints out one line for every two lines that you see on the screen.

The only error messages that you see when you work with Letter Wizard are those pertaining to disk errors. If you select a drive that is not connected, you receive a message that tells you the drive is not there. The manual does not explain what errors 128-170 mean.

Instead, you are referred to your Atari owners' manual. Let's hope you still have it!

It is possible to save a file on top of an existing file on the disk. This could cause nightmares for novice users. If you are accustomed to seeing a prompt that asks you to verify your choice of the Save function, you may be a bit surprised when you find that this program can save your file right over an existing file of the same name without giving you any warning at all.

The program's manual is divided into several sections that explain the different functions of this word processor. It includes an index and table of contents for easy reference.

The manual asks you to type in a couple of paragraphs and then proceeds to explain how to find the top and bottom of this document. This exercise seems to be the beginning of a tutorial, but the manual refers to your document only superficially from this point on, which is a bit of a disappointment. The lack of a tutorial may make it harder for novice users to understand some of the concepts used in word processing.

For some reason, the manual tells you to press the Control key while you are using the arrow keys to move around on the screen and to make sure that you release the arrow key first. Well, we thought we would try releasing the Control key first. What we found was wonderful — the arrow key repeats and allows you to scroll, full speed ahead, through a document. It's too bad this feature is not correctly documented.

We did not notice a technical hot-line number in the manual, although we have called Datasoft in the past and have found the company to be most helpful when we have experienced problems with its software.

This is a good general-purpose word processor with a nice Form Letter

feature — you can even create form letters without using a data base. We noticed that our typing speed was greatly improved when we used this word processor — it appears to have a type-ahead buffer. Letter Wizard is simple to use and performs most of the functions that users of a home word processor require.
—*Cassie Stahl*

REVIEW

Homeword

Homeword is a word processor that runs on Atari home computers. Its use of icons and other innovative techniques make it an interesting program. Because of its document-size limitation of three pages, this program is suitable for use only by youngsters and people who want to compose short documents. Keeping that limitation in mind, this is a good program.

You can use icons to teach young children word processing in a simple fashion. If the children are old enough to type, they are old enough to understand what the various icons represent. Homeword's icons make the program easy for beginners to use, but once you have learned how to use the system, you may wish to bypass the icon-selection method by typing in the command code that takes you quickly and directly to the function you want to use. The icons need never become a burden; instead, they can act as an introduction to Homeword, stepping aside when they are no longer needed.

To choose an icon, you frame it with the icon cursor. You control the icon

InfoWorld
Report Card

Homeword

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	☐	■
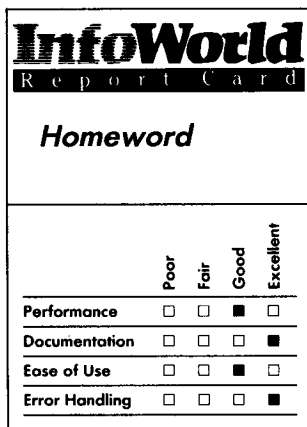
Summary
Homeword is an easy-to-use word processor for Atari systems. Its use of icons makes it simple for novices to understand and use, although more experienced users can bypass the icons and use command codes. This is a good program, but it does have one limitation — you can only store documents that are up to three pages long.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One disk drive*

Suggested list price: $69.95

Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858

cursor by using the Control key and the arrow keys. You move the icon cursor from the far right of the screen to the far left by moving it all the way to the right and off the screen — it then reappears on the far left side of the screen. This wraparound technique makes the icon cursor easy to use. The main-menu area of Homeword contains six icons. When you have selected an icon from the main menu, a submenu of additional icons appears. These additional icons allow you to perform specific functions that relate to the main icon you have chosen.

One of the six main icons is the Print icon, which you use to specify paper type, print style and beginning page numbers. You can also select a portion of the text that you want to print. The print preview shows the text on the screen in Atari's Graphics mode 8; in this mode, the text is displayed in a full 80 columns. The letters are half as wide as normal (the Atari screen is usually 40 columns wide) and may be difficult for some people to read. You can still see the layout of your text, though. We found the display to be clear on a good television set, but we wouldn't want to have to try reading it if reception was poor.

You use the Edit icon to erase text and put erased text portions back into the document. You can move or copy parts of your text, find a word or phrase or find a word or phrase and replace it with another word or phrase. This Search and Replace feature is common to most word processors.

The File icon (the icon cursor initially rests on this icon) allows you to insert text taken from one document into another, get documents out of a file or file a document when it is time to print.

Another icon allows you to modify the page layout. You can use this icon to set line spacing, set margins, start a

new page, make an outline or create a bullet paragraph. A bullet paragraph is one that has a mark to the left of the first line to set it apart from other text. This icon also allows you to boldface and underline your text, if your printer has the capacity for these functions, and place headers and footers that are no more than one line long onto your document.

You use the fifth icon to customize your Homeword disk to fit your personal needs. You can make backup copies to have on file, change the permanent or default margins of your text and arrange a standard outline form that you can use again and again.

The Outline feature lets you automatically print uppercase or lowercase letters starting with the letter *A* or numbers starting with number *1*. You can combine these elements in an outline to create subcategories. No other word processor for Atari computers lets you create outlines with such ease. The Outline feature is the most outstanding function of Homeword. Most other word processors require you to embed margin values to make the bullet paragraph work, and none offer the Automatic Outline feature — just by selecting the type of outline you want, you can automatically have it.

The final icon allows you to manipulate your document files on your work disk. You can format a disk, erase single documents and display the disk directory. If you want to end your word-processing session and boot another disk program, you can select the Exit function from the Disk Utilities menu, and it will boot the disk without making you turn off your computer first.

Homeword has almost all the features you would expect to find in a word processor. Its main limitation is the number of pages that you can hold

in memory at one time. When you use icons with a computer that has only 64K RAM, something has to be eliminated to make room for the icons. In Homeword, the text-storage space shrinks to the equivalent of only three pages of text. For some people, such as teachers who need to make lesson outlines, students who have small assignments and anyone who wants to maintain a daily journal, this storage space will be more than adequate. Others who need to produce longer documents can overcome this limitation by chaining files so that when they print, they print as one long file.

This is the first word processor that is designed specifically for use with the two latest Atari printers, the 1025 and the 1027. We used it with an Atari 825 printer, and all of the features worked well when we tried them, except for boldfacing and underlining. The 825 printer is capable of both these functions, so we do not understand why Homeword seemingly does not support them.

This program is easy to use. You simply place the disk in your drive and turn on the computer. Within a short time, the Sierra On-Line logo appears, and then the Homeword menu appears. The icons make Homeword simple to understand and easy to use. As we mentioned earlier, you can bypass the icons once you learn the command codes.

The program is well protected; we were unable to crash it. A special section of the manual helps you to diagnose problems with the system. If you own two drives, you may be a bit confused when a message appears that tells you to take the Homeword program disk out of drive 1. You don't have to follow this instruction, as the Help section of the manual explains.

Homeword is well written and easy to use, but you should read the manual

to get the most out of the program. Although the basic operations are available and easy to use if you have used a word processor before — all you need to do is pick an icon that seems to represent the operation you wish to perform — the uses of command codes and certain other features are not readily apparent until you read the manual.

The package also includes a cassette tape that provides you with step-by-step instructions to get you started. (If you do not own a cassette recorder, a small booklet included with Homeword contains the complete transcript of the tape.) The tape allows time for even slow typists to type when instructed to do so.

The tape is nicely done and has a professional-sounding narrator and pleasant music. It explains important concepts so that beginners can more easily understand the program — you learn how to save documents to disk and the importance of saving these documents, and it also explains editing in detail.

Once you master the commands that operate your new word processor, you need to refer to your manual only occasionally. A reference folder contains the structure of the menus and the command codes to move you quickly from one area to another.

The manual also contains a phone number you can call when you run into a problem that you are unable to solve on your own. When we called the company, we learned that the files created with Homeword are not standard ASCII files, so you cannot access them through Atari DOS 2.0. This is a limitation only if you transmit your text files to a host computer.

Homeword is enjoyable and interesting to use. Because most of our work involves the creation of long documents, we probably will not use it

as often as other word processors, but when we need to draft an outline quickly, you can bet we will pull it out and put it to work.
—*Cassie Stahl*

REVIEW

Super-Text

The Super-Text word-processing program was originally written for Apple computers, but Muse Software has now released an Atari version of the program. Unfortunately, in rewriting the program, Muse has made only a few changes to the program's operation and has not taken advantage of any of the Atari computer's special features.

If you have used the Apple version of Super-Text you will probably like using the same program on your Atari. Don't look for math and form-letter capabilities in your Atari version, though — this version does not have them. Super-Text for the Atari also inexplicably ignores your computer's special operating features, complicates text editing and offers you only marginal documentation. Despite these drawbacks Super-Text is a fair word-processing program that you may want to consider.

When you first boot the Super-Text disk, you see a title screen that displays three options. The first option lets you run Atari DOS. The second lets you run the System-Options program, which allows you to configure Super-Text to work with your printer. The System-Options program also allows you to define certain keys to send control codes to your printer. The title screen's third

option lets you use the word processor. When you choose this option, Super-Text asks you to either load a file or create a file before you start editing. Super-Text's editor has three distinct modes — Add, Change and Cursor. Each mode allows you to accomplish different tasks.

The Add mode allows you to create text and is the mode that you use most often. In this mode, you cannot move the cursor around the screen. When you make mistakes, you can use the backspace key to correct them. To exit from the Add mode, you press the Escape key twice.

Super-Text's Change mode, however, does allow you to use the cursor-control keys to move the cursor freely about the screen and replace letters or words. The Cursor mode is the most complex of the program's three modes, and you use it to perform most complex word-processing functions. In this mode, you can page through your file with the P key and search and replace by pressing the F and R keys. You press Control-D — not the Delete key — to delete text. In fact, the Atari Delete and Insert keys have no function whatsoever when you use Super-Text.

Super-Text allows you to use wild cards in searches, which makes large searches easier. A wild card is a character that you can use to represent any character in a search. For example, if the * character were a wild card, a search for c*t would return not only "cat" but also "cut" and "cot." Using a wild card makes it easy for you to search for prefixes and suffixes. Super-Text also allows you to search for multiple words in one search, which makes searching quick and efficient.

Super-Text allows you to carry out block operations using the Cursor mode. You have the option of saving the block to disk, copying the block to another part of the file, moving the

block to another part of the file, deleting the block or unmarking the block. You can also identify the last four changes that you made. This is helpful, but unfortunately this command does not undo mistakes — you must exercise care when you use block functions.

To leave the Cursor mode, you can either press Control-A to return to the Add mode or press Control-C to enter the Change mode. In this mode you can change any characters in your file, but you cannot add any text. If you want to make a change in your file that requires the addition of words or letters you must go into Add mode, add the text, then return to the Cursor mode and delete unnecessary text. As you can see, editing files can be cumbersome.

Super-Text has adequate formatting features. You specify the text format you require in a single line at the beginning of the file. The single-line format is a little difficult to work with — we found ourselves constantly referring to the manual to figure out which code formatted what.

Super-Text has a set of tabbing features that not only allows you to print something on a tab stop but also allows you to left or right justify relative to the tab location. The program also has several page-numbering options. You can number pages normally (1,2,3 . . .) or with relation to chapter (1-1, 1-2, 2-1, 2-2 . . .), and you can print the page numbers alternately on the left and right sides or on the top or bottom of the page. Super-Text can produce headers and footers, and you can embed page numbers in the headers to create headers such as "Page 1" or "Page 3 of 10."

Super-Text also supports several printer-control characters. You can define most of these characters with the System-Options program, but functions that are common to all printers such as

formatting, boldfacing and underlining — are already defined by the system. The System-Options program sets up control characters and their related functions for specific printers. Super-Text supports most major printers including Epson, Okidata, NEC and Atari.

Super-Text also has the ability to send a file to disk, which is handy if you want to process material for transmission over telephone lines.

Super-Text's printing features are good. When you first start using the program, you must load the Printing module. This module offers you three printing options: Sheet Feed lets you print single sheets of paper on a letter-quality printer; Form Feed lets you print continuous paper forms; and Preview lets you display your text before you print it. The Preview mode, however, is difficult to use. Since the Atari screen is only 40 columns wide, you can only preview half of the document at a time — to preview the other half, you have to reset the left margin. This command is cumbersome and unsatisfactory; using arrow keys to scroll around the document would be easier.

Super-Text also includes a function called Autolink, which allows you to link files logically. This is helpful when you have exceptionally long files or files in sequence. Autolink treats the set of files as one large file, so you can search and replace not only the file you have in memory but also other files on the disk. Autolink enables you to chain files when you are printing them, which means that you can print a multiple-file document by using one command.

If you forget how to use Super-Text's functions, you can call up the program's Help screen. This screen can stay up while you are editing files so that you can easily refer to it. The only disadvantage of the Help screen is that it takes up to two-thirds of the screen.

InfoWorld
R e p o r t   C a r d

Super-Text

	Poor	Fair	Good	Excellent
Performance	☐	■	☐	☐
Documentation	☐	■	☐	☐
Ease of Use	☐	■	☐	☐
Error Handling	☐	■	☐	☐

Summary
If you have never used the Apple version of the Super-Text word-processing program, you won't know what you're missing in this Atari version. This program lacks the math and form-letter capabilities of the Apple version, and it ignores the Atari's special operating features. Unless you are already familiar with Apple Super-Text, you will probably find this program cumbersome and difficult to use.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One disk drive*

Suggested list price: $99

Muse Software, Inc.
347 North Charles Street
Baltimore, MD 21201
(301) 659-7212

This is not a great disadvantage, though, because you can remove it at any time using a single keystroke.

The documentation that comes with this package is fair. The manual has no index, and its table of contents is too general. Muse Software supplies a reference card, but it is sketchy and not complete. The manual is not well written and is sometimes difficult to decipher. We had a hard time trying to figure out how to use some of the program's functions.

Super-Text's error handling is adequate. The solution to all your problems is to press Reset. Super-Text then places you back in the Cursor mode with the file you are currently working on. Although it works, this procedure is crude — Super-Text should allow you to recover from errors more gracefully. A section in the manual points out common errors and tells you how to alleviate them.

Super-Text is an adequate word processor. If you are accustomed to using the Apple version of Super-Text, then this is the program for you. If you are used to Atari's editing capabilities and special features, though, you will find Super-Text cumbersome and difficult to use.

—*Kevin Cheung*

REVIEW

Letter Perfect

If you are looking for a versatile word processor and are willing to spend some time learning how to use it, you'll like LJK's Letter Perfect. This program offers you the power of larger and more expensive dedicated machines and includes features such as the ability to embed text that will not be printed and mail-merge. (To use its mail-merge facility, though, you need to purchase LJK's Data Perfect separately.)

Moving through the text is important when you work with long documents. Letter Perfect allows you to move to the beginning of a line, the end of a line, the beginning of text, the end of text, one page forward and one page backward. You use the cursor-control keys to move the cursor in any direction, one character at a time. You perform all these functions by depressing the Control key and a one-letter command key.

One of this program's unusual features is the continuous scroll, which lets you proofread an entire document as it scrolls up the screen. You can control the speed of the scroll by pressing the > symbol, and pressing the space bar stops and starts the scroll.

You can delete text in several ways. Delete commands can delete text before and after the cursor, and you can delete a character or a line at the cursor. All these deletions require that you press the Control key and a command key. If you mark a block of text at its beginning and end, you can delete it by pressing the Control key and the letter *N*. You can delete the previous character by pressing the Delete key.

You control your printer through this program by embedding printer commands in the text. You can access boldface type and turn underlining on and off. You can also justify text at the right margin and center it easily. If your printer has special functions that can be accessed from BASIC, you can access them from Letter Perfect by using its Very Special Character command.

You can insert text, such as page numbers, at the top or bottom of every page by typing it once and calling it a

header or a footer. Letter Perfect lets you place these headers and footers on opposite sides of the page on alternating pages.

You can type over existing text, which lets you update information quickly without disturbing the layout, or you can insert typing between blocks of text. You can also insert lines or spaces at the cursor location.

Subscripts and superscripts, which are necessary in mathematical and scientific equations, are available through a three-key command. You can also link files into larger files, so that, if you are writing a book and it is too long to fit into memory at one time, you can create short sections, link them and then print them sequentially.

Letter Perfect lets you search for a word and replace it with another word — you can replace every occurrence of a word or only certain occurrences. You can also search for a word without replacing it, so you can find your place in a document without scrolling all the way through it.

You set tabs by placing the cursor at the appropriate location and pressing the Shift/Tab combination. You clear tabs by pressing the Control key and the Tab key, and the Tab key moves you to the next tab location.

You can move text by marking the area you want to move with Control-Ds. You can then copy the text to the buffer and move it to another location.

One of this program's most unusual features is a built-in Mail-Merge function that lets you combine documents that you create using Letter Perfect with information stored in LJK's data-base program, Data Perfect. You can then send form letters to everyone in your data base. You can also send them billing statements — the Mail-Merge function even lines up the decimal points for you.

Letter Perfect can perform almost

any word-processing task. Its one drawback is that the program uses its own disk format. To use files that are in Atari DOS format with Letter Perfect, you must purchase a special utility program from LJK. This utility program can convert any Atari DOS file to an LJK format and vice versa. (We wrote this review with Letter Perfect and in less than five minutes we converted it to a standard ASCII file.) You can't use third-party spelling-check programs either unless you convert your files first. (LJK does market its own spelling checker, Spell Perfect, though, and you can use it on Letter Perfect documents without converting your files.)

When an error occurs, an error message flashes at the top of the screen. The manual does not contain a list of error messages, so if Letter Perfect is the first program you have ever used, you could become frustrated. The program ignores other input errors, such as typos you may make when you enter text.

Letter Perfect's manual contains six sections. The first section, the introduction, explains the concepts behind the program and some of the terminology that the manual uses, and it also includes a getting-started section.

The second section describes the Editor and tells you how to enter the Editor and how to enter formatting commands. This section also describes the commands you use to move around in the typing area.

The manual's third section deals with disk operation. It explains how you select the work drive — the drive that contains data — each time that you initiate a drive operation. This section also discusses loading and saving files, as well as the various disk functions available. For example, you can select Quit from the menu and boot a new program without turning off the computer.

InfoWorld
Report Card

Letter Perfect

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
The word-processing program Letter Perfect contains many features that are usually available only on more expensive dedicated machines. It can perform almost any word-processing task well, although its complexity may make it difficult to learn to use if you have no prior experience of either word processors or computers.

System Requirements
☐ *Atari 400 or 800 computer*
☐ *32K RAM*
☐ *One disk drive*

Suggested list price: $99.95

LJK, Inc.
7852 Big Bend Blvd.
St. Louis, MO 63119
(314) 962-1855

The printing section explains Letter Perfect's Screen Format function, which lets you see what your document will look like when it is printed. Actually, you see a 40-column screen that displays text in a jagged fashion — after a while you can make some sense out of what at first appears to be a messy-looking screen. You can learn how to print multiple copies of a document or even a partial document and how to use the Screen Format function to insert page-break commands. This section also includes information about creating form letters using LJK's Data Perfect.

Following this section is a tutorial that gives you step-by-step commands to correct a sample letter saved on a disk. It also explains how you use the continuous-scrolling function to proof a document.

The final section is an appendix that explains the use of the Printer Editor program, which lets you tailor your printer to Letter Perfect — you enter the decimal values for the different functions your printer can perform. You cannot configure every printer on the market to work with this program, though.

The manual should answer most of your questions. If you still need help, LJK's customer-service representative is available to assist you.

Letter Perfect is not a simple program to use, but it is not overly cumbersome either. Although the program performs its functions quickly, you must take some time to learn its commands. The package includes a foldout card that lists all Letter Perfect's commands, so you can keep them in view while you work.

Novices may find Letter Perfect difficult to learn to use because they will have to learn word-processing functions as well as all the commands that initiate them. Unless you have done word

processing or used a computer before, don't expect to be able to write a complicated document within days.

Letter Perfect can make life much easier for you. If you plan to send form letters, for example, it's a handy program to have. Just keep your command card in front of you!
—*Cassie Stahl*

REVIEW

Spell Perfect

If you own LJK's word-processing program Letter Perfect and want to check the accuracy of your spelling, you can use Spell Perfect to proof your documents. Spell Perfect can only proof documents that you have saved in the LJK format, though. If you want to check documents contained in Atari DOS files, you must purchase a conversion program from LJK to change them to LJK format.

Spell Perfect lets you use one or two drives while you proof a document. If you put your document disk in one drive and the Spell Perfect dictionary disk in the other, you do not need to swap disks. As a precaution against writing to your original program disk, you are instructed to make a backup copy before you start any work session.

After you have made backup copies, you can begin to proof your documents. All you do is put the dictionary and Spell Perfect disks in the drives and select the Change System option from Spell Perfect's main menu. You then configure the system by telling the program which drive holds which disk. You merely make your selection from

the menu, and the program automatically accesses the correct drive. If you want to change the configuration, it is always in the menu for you to reselect.

After you load a file into Spell Perfect, the program presents you with a menu that allows you to access the submenus. You can also use this menu to check the spelling of words in a file. The program contains routines that let you control your files in a manner similar to the control you have through DOS. The submenus allow you to save, lock, unlock or delete a file, and you can also format a blank disk with the LJK format.

Besides having the usual functions of a spelling checker, such as highlighting words and making corrections, Spell Perfect adds a nice touch with its personalized dictionary. You can add any words to the main dictionary that would normally make the program stop. For example, you could add the word *InfoWorld* to the dictionary, and the program would then quit flagging the word as misspelled. Without this feature, you would be forever tripping over the unusual spelling of such words.

You can add words to the dictionary in two ways. You can create a long file of words by using Letter Perfect, or you can add words as you go. You will probably want to sit down and identify all the words that you use frequently. Spell Perfect lets you have the equivalent of 255 different disks full of words for your dictionary.

Spell Perfect has a feature that enables you to look up words. If you run across a misspelled word, you select the Match function from the menu. The program then displays a list of similarly spelled words on the screen. If it can't find a similar word in the dictionary, a No Match message appears.

Spell Perfect selects words

phonetically (most other spelling checkers list words that are alphabetically similar), so some strange words appear with the correctly spelled word when you ask for a match. If you are a poor speller, you may love this feature!

When we used the program, the misspelled word *akuse* brought 32 words to the screen. Pressing the Return key brought up another 32 words, and pressing the Return key again produced even more words. We obtained words as diverse as *guest, cassette, eject, eyesight, squid, highest, jest* and *housecoat*. A truly strange collection! The first word to appear, however, was *accused*.

Each word that Spell Perfect finds appears on the screen with a number beside it. To place the correct word in the document, you press the S key and type in the number that corresponds to the correct word. The word then appears at the top of the screen for further editing. If the word appears correctly, you press the Return key to insert the word automatically into the text.

If you are checking a document and you want to indicate that a highlighted word is spelled correctly, you simple type I for "ignore." Spell Perfect will then ignore every further occurrence of that word in the document. You can therefore skip over an unusual word that is not in the dictionary but that appears several times in a document.

Spell Perfect is easy to use and understand. If you follow the directions and take the time to complete the tutorial, you can learn all the program's functions in an afternoon. The only strange part of this system is the location of the single-density side of the dictionary: the back of the disk. Many people still own single-density drives, and if you do, be sure you don't put the disk in with the wrong side facing up.

InfoWorld
R e p o r t   C a r d

Spell Perfect

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
Spell Perfect is a spelling checker for documents you produce using the word-processing program Letter Perfect, also from LJK. If you want to use it with documents created by other programs, you must purchase a special utility program from LJK to convert your document files to LJK format.

System Requirements
☐ *Atari computer*
☐ *32K RAM*
☐ *One disk drive*

Suggested list price: $79.95

LJK, Inc.
7852 Big Bend Blvd.
St. Louis, MO 63119
(314) 962-1855

Several error messages appear when you make mistakes. If you ask to load a file that is not on the disk, you see a Not Found message. The other messages are also self-explanatory. If you put a disk in the drive that should contain the dictionary but does not, the program tells you it is not a dictionary disk. Another message tells you when you have put the wrong disk density in the system configuration.

An unusual error occurs when you try to correct a word that is less than three letters long. Spell Perfect cannot handle such small words, but you can get around this limitation by entering the word and adding an asterisk on its end. If you then search for the word when you use Letter Perfect, you can change it to the correct size.

The errors and their messages are explained in the back of the manual, and these explanations are enough to get you back on track.

Spell Perfect's short manual contains all the information that you need to learn how to use the program, but an absence of section headings makes it difficult to jump into the documentation and learn about a particular feature. After you finish the tutorial, you can use the index and the table of contents to find additional information.

The documentation serves its purpose, but it lacks the pizzazz that comes with a nice format and attractive artwork. It looks complicated because of the large black blocks that represent what appears on your screen. Little black-and-white stop signs in the text point out important features. If you know what you want, you probably won't mind the manual's appearance, but if you are just starting to work with computers, you may find the manual dry and intimidating.

LJK's employees are able and willing to answer questions about its products. The company does not have a toll-free line, and its employees will not call back to spare you the expense of the call. If you leave a message, they will return your call, but you cannot be certain when.

Spell Perfect works well. It is a shame, however, that by purchasing Letter Perfect you are limited to this one spelling-check program. You can always convert your files to a standard Atari DOS format, but why would you take the time to convert to Atari DOS when you must convert back to LJK DOS after the spelling check?

If you own LJK's Letter Perfect, you should purchase Spell Perfect. This program completes the LJK trio. With LJK's Letter Perfect, Data Perfect and Spell Perfect, you should be ready for any word-processing task.
—Cassie Stahl

NUMBERS

The programs in this category help take the headache out of dealing with numbers. For example, they prepare taxes, calculate spreadsheets and help you with personal finances.

REVIEW

SynCalc

SynCalc is a spreadsheet program that runs on Atari home computers. It is supposed to work on any Atari computer that has at least 48K RAM and a disk drive. We tested it on an Atari 800XL with an Atari 810 disk drive. Though sold by Atari, SynCalc was developed by Synapse Software.

SynCalc is compatible with SynFile+ (a data-base program), SynTrend (a graphics program), AtariWriter and VisiCalc. It features pop-up menus, vertical and horizontal split-screen ability, a large spreadsheet grid and simple formatting commands. SynCalc is intended to be easy for beginners to use and powerful enough for business users to appreciate.

Atari offers its standard, limited, 90-day warranty on SynCalc. This assurance, valid in the U.S. only for cassettes, cartridges and disks, warrants that the medium (not the program) is free of any defects for 90 days from the date of purchase. To get a replacement under such conditions, you must send the product, with the Atari label intact, and a proof of purchase to Atari. The address and all this information are listed on a warranty card that is tucked into the front pocket of the manual's binder. Other than this material and the warranty registration card, Atari is specific about its lack of liability if the program or the documentation doesn't work. What Atari doesn't say, however, is that the law in some states may not permit the waiving of implied warranties.

Limited liability is common among software companies; Atari is just unusually upfront about it.

The SynCalc disk is accompanied by a typeset, 146-page manual that is illustrated with both sketches and

InfoWorld
Report Card

SynCalc

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	■
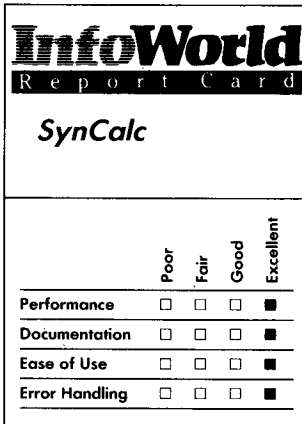
Summary
SynCalc is an exemplary spreadsheet for Atari home computers. It offers features and commands not found on other home-computer programs of the same class. Because you can choose whether you use either menus or one-letter commands, this program is suitable for both beginners and experienced users.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One disk drive*

Suggested list price: $99.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

screen photos. The manual is enclosed in a plastic binder that fits well on bookshelves and lies flat when you open it. A quick-reference guide folds out from the beginning of the manual.

The manual includes a general introduction, a tutorial and a reference section. The introduction talks about handling disks, what a spreadsheet is, how to use the keyboard and other such topics. The tutorial occupies almost 90 pages of the manual and consists of three lessons that lead you from the main menu through backing up your data disk to creating a household-budget spreadsheet. The reference section describes the functions, notations and file structures and offers information about what to do if the program won't load. Finally, the manual offers hints for saving memory space and improving program-execution speeds.

The introduction refers to four major sections of the manual, including a Section 4 that is the Appendix and contains the index. The actual manual and its table of contents in fact contain only three sections — the final information, including the index, is part of Section 3. Although this sort of mistake makes us suspect that the manual wasn't well proofread before going to press, we didn't find any problems in the actual text.

The error messages listed in the back of the manual are accompanied by suggestions of what to do to correct each error. That is a wonderful, though obvious, element that is left out of many manuals; Atari should get kudos for including these suggestions.

In a few places the manual does not offer enough detail to beginners. In particular, the loading sequence mentions such things as drive codes without telling you specifically when to worry about them and when not to. Also, when it tells you to push the disk

all the way into the drive, it doesn't tell you how you'll know that you have reached "all the way."

With its table of contents, index and glossary, this manual provides superb documentation that is well written, thorough, well illustrated and professionally packaged. The index, tutorial and quick-reference guide enable you to easily find out what you need to know.

As with any powerful program, however, you cannot just turn on a spreadsheet and discover where the money is leaking out of your budget. To apply versatile software such as SynCalc to real-world problems, you must work through the tutorial, practice and learn your way around the keyboard.

SynCalc takes about a minute to load. The manual claims that SynCalc is as easy to use as a pocket calculator, but the long load time means that this is only true when the program is already running. We wish it were on a cartridge instead of a disk.

The spreadsheet contains 255 rows (numbered 1 – 255) and 128 columns (lettered A through DX). Twenty rows and four columns appear on the screen at a time, and you can scroll the display either horizontally or vertically to see the other areas of the spreadsheet.

The top-left corner of the display shows what cell the cursor is on (A1, originally). The top-right corner shows the amount of RAM used by the spreadsheet and the total RAM available (for example, when you start using the program, you see 0/21, or none used of 21K available). The manual warns you to save your worksheet (the spreadsheet you are building) when the used memory approaches the total memory.

Loading the worksheet to disk and then reloading it sometimes frees some more memory, because when the computer routines store the worksheet, they may eliminate unnecessary memory

wasters without losing any information.

You can enter numbers, labels or formulas in any row or column of the worksheet. You can then copy them to other rows or columns. You can sum or average rows, columns or ranges of cells and manipulate the size and format of columns and rows.

The main menu contains four headings: Load/Save, Text, Numeric and Command. From each of these main choices you can reach a submenu. Though the process is not clearly described in the manual, you move the cursor from one menu choice to another by using the arrow keys on the keyboard.

Load/Save is for disk work — that is, loading and saving files, formatting disks and so on. In fact, you can make three kinds of disk saves. The first kind, using the Worksheet option, saves the entire worksheet with formulas, labels and all and is the method you most often use to save your spreadsheets. The second, Data, saves the worksheet as a DIF file (a special kind of file used by many spreadsheet programs from other software companies) so that you can use the same files with several different spreadsheet programs. The third method you can use is the Text option, which saves a specified cell area as a text file and so lets you incorporate the worksheets you build into text that you write with AtariWriter.

Load/Save also contains instructions for deleting and renaming files and for formatting disks. These disk-manipulation commands are important and are sometimes left out of spreadsheet programs because programmers figure that users can just use the operating-system commands. Having the commands within the spreadsheet can save you a lot of time and bother and also makes the program easier for beginners to use. The formatting command formats disks so

that they are Atari DOS 2-compatible.

You use the Text choice on the main menu when you want to enter any sort of text into the worksheet, and the Numeric option is your choice for entering numeric values and formulas. The pop-up window that appears for the Text command is blue; the window for Numeric is green.

Command is the option you choose when you want to perform operations within the worksheet, and it holds all the commands you can execute. These include Format, Copy, Erase, Window, Global, Move, Goto, Titles, Width, Insert, Print, Headings, Unformat, Delete and Soft.

SynCalc has some similarities to VisiCalc — its commands, for instance, are prefaced by the slash (/) key. The program is menu-driven and the commands within the menus are logically organized, so the program is easy for beginners to use.

At the top of the screen is a message line. Menus pop up from the bottom line of the screen, and the message line at the top echoes the commands you choose from the menu. For example, if you choose Load/Save from the main menu, /L appears at the top of the screen. Experienced uses can make their commands known to the computer simply by typing the key letters, such as /L, onto the message line at the top of the screen.

Error messages are also displayed in the top line. Just below the message line is the title line. On the bottom line of the original screen display is the caption "Option = Menu," which indicates that if you press the Option key on the Atari keyboard, you can see the main menu. You press the Escape key to return to the regular display.

Submenus work just like the main menu. After you make a selection from the main menu and press Return, the bottom quarter of the screen display

changes color (from brown to blue on a color TV), and that changed area is inhabited by the submenu choices. The changed area is clearly linked to the previous main-menu choice, which remains visible on the bottom line of the screen.

SynCalc even has sub-submenus. The Global command, for instance, contains the following commands: Format, Width, Recalc, Unformat, Erase and Text Mode.

Formatting options are also listed in a sub-submenu: Justify, Dollars, Precis., Margin, Commas, Number, Protect, Percent and Sign. The point to listing all these choices is that SynCalc is not a simple spreadsheet. Some of its abilities, such as Protect, which can shield information on the spreadsheet from change, are rare on home-computer spreadsheets.

SynCalc uses a beeping sound to alert you to errors. When you ask the computer to do something that you may regret, such as erase the entire screen, you are asked for a final Start command to certify that you really mean what you type.

The program contains a few shortcuts even for those who want to use the menus. For example, if you type a letter or any one of most punctuation signs, the Text pop-up window automatically opens, even though you didn't select the Text choice from the main menu.

When you get set to load a spreadsheet, the directory of your disk appears on the screen, temporarily displacing whatever worksheet you had on the screen before. In addition, you can load a spreadsheet anywhere on the screen, using the cursor to point to the top-left corner.

All cell references are adjusted. The program contains no routine to enable you to make a backup, but because the entire spreadsheet is held in active memory at any time, you can simply slip in another data disk and again save the worksheet.

You can make calculations using either relative or absolute references. SynCalc has quite a few built-in mathematical functions, including ABS, ACOS, ASIN, ATAN, AVG, CNT, COS, EXP, FV, IF-THEN-ELSE, INT, LOOKUP, LN, LOG, MAX, MEAN, MIN, NPV, PI, PMT, RNG, SD, SIN, SQRT, SUM, TAN and VAR.

SynCalc allows you to fix titles in place. This facility makes reading a spreadsheet simple because, for instance, you can set the explanatory text in the first column of a spreadsheet to appear on the display at all times — even when you scroll to a distant part of the spreadsheet.

Windows are an advanced spreadsheet feature that you may want to use sooner than you expect. Windows allow you to view two parts of the spreadsheet at the same time on the display. You can have the windows separated vertically or horizontally and synchronize them to scroll together or have them scroll independently.

Sorting is another rare home-computer spreadsheet feature. SynCalc can sort your data entries into alphabetic or numeric order.

You can also have calculations that refer to labels, not just to other cells, and accomplish referencing more easily than with many other spreadsheets.

Finally, SynCalc has a Print command that lets it send data directly to Atari printers. We tested this feature on a brand-new Atari 1025 printer, and it worked smoothly. You can print the entire spreadsheet, any chosen portion of the spreadsheet or a list of the cell contents. This flexible printing, particularly the ability to print specified areas, is handy. You can also embed printer-control characters in your text.

All the features of SynCalc that we

tested worked quickly, particularly its loading and saving operations.

We only found two drawbacks to SynCalc, and both were the fault of Atari and not the program's developers (Synapse). The first weak point is Atari's puny warranty. The limited 90-day warranty that applies only to the media is among the skimpiest in the software industry. Syncalc's second weak point is generic and is a hardware problem: a Reset key abuts the Option key (one of the keys you use most often in this program). Even though we noticed this when we began to use the program, we still destroyed worksheets twice by accidentally pressing Reset; this, of course, erased the worksheet and the program from the computer's memory.

If you need a spreadsheet program for an Atari home computer, consider SynCalc. Its minor drawbacks do not prevent us from giving Syncalc a high recommendation. Syncalc offers superb documentation, fast operation, a complete library of features (including some advanced features superior to other home-computing programs of its class) and an easy-to-learn and easy-to-use design.

—Phillip Robinson

REVIEW

VisiCalc

Imagine yourself sitting down at your desk and spreading out in front of you a large piece of graph paper. We mean really large — 63 squares across the top and 254 squares down. Attach an electric power cord and a whole lot of

flexibility and you have VisiCalc, the "instantly calculating electronic worksheet" from VisiCorp.

To use this program on an Atari computer, you will need at least 32K RAM (48K is highly recommended by the manufacturer), a single-sided, single-density disk drive and a printer. A nice option to have is the Atari CX85 Numerical Keypad. With this equipment, you are ready to use what is perhaps the most significant piece of business/personal software made for the Atari computer to date.

VisiCalc is a tool for planning, plotting, calculating, organizing and printing information. It uses the format of a matrix to logically lay out information. All of us know how to use a matrix to some extent. Even a child who wants to keep track of the score in a softball game can create a matrix by putting labels on a piece of paper. He places the names of each team on the vertical axis (on the left side of the paper from top to bottom) and the numbers of innings across the horizontal axis (along the top from left to right). At the end of each inning, he posts the number of runs in the box that is formed at the intersection of lines drawn across from the name of the team and down from the appropriate inning number. Additionally, to the right of the ninth-inning column is a total column that he can change when scores are posted each inning.

The businessperson who is setting up the firm's profit-and-loss statement, or the sales manager who is establishing sales quotas or results, is doing much the same thing as the boy with his softball score sheets. The only difference between score sheets and business forms is that the latter are usually more complex.

Business worksheets will have many interrelated variables — if you change an entry at one particular location on

InfoWorld
Report Card

VisiCalc

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
The Atari version of VisiCalc, the granddaddy of spreadsheet programs, performs well. If you want to use your Atari computer for serious applications, you should add this program to your software library.

System Requirements
☐ *Atari 800, 800XL or 1200XL computer*
☐ *32K RAM*
☐ *One single-sided, single-density disk drive*

Suggested list price: $199.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

the matrix, it affects entries all over the matrix because the different locations on the matrix have a mathematical relationship with each other. Making numerous changes is laborious, and because so many mathematical relationships may involve complex formulas, you can easily make errors.

VisiCalc can make the job easier because it automatically changes all matrix entries that are related to any one entry that you might change. Seventeen commands allow you to use the power of VisiCalc in your own operations.

VisiCalc has no menus — you perform all operations using commands that you must memorize. Command operations are most favored by experienced users who find them faster; beginners usually prefer menus that display commands from which they make choices. Unless you use VisiCalc on a daily basis, you will probably need to keep a quick-reference guide handy when you use the system.

The command used to move quickly about your huge matrix is represented by the symbol >. Typing this symbol causes the prompt line to read GO TO:. If you then put in the coordinates BK254, the cursor instantly moves to the lower right-hand corner of the matrix. The alternative to these command operations, often desirable for short moves, is to scroll to your desired location using the arrow keys while you hold down the Control key.

Type any letter or quotation marks, and the program sets up a label. This Label Entry command lets you label your columns and rows. Labels are necessary to make your data comprehensible.

Typing any of the following:
any digit
+
-
/

*
†
initiates the Value Entry command. Using this command, you can enter amounts or formulas that tie the location to other locations on the matrix.

The Blank command (/B) clears a location. The Delete command (/D) deletes entire rows or columns at a time, and the Clear command (/C) clears the whole worksheet. The Format command (/F) lets you accomplish justification within columns or automatically round off number entries to two places past the decimal.

VisiCalc's Global command (/G) allows you to adjust the width of the matrix locations (between 3 and 39 places) and also to establish the order in which calculations take place within the matrix. The Insert command (/I) allows you to insert blank rows or columns when you need them, and the Move command (/M) lets you pick up completed rows and columns and put them where you feel they would be better located.

The Print command (/P) lets you send your worksheet as a report to your printer, the disk drive or through your interface to a modem for transmission to another location. If you have used more of your potential worksheet space than will fit on a single piece of paper, you can print it in sections and assemble it later.

The program's Storage command (/S) lets you store your work on disk, load saved work back into the computer from disk, initialize new disks and exit from the program.

The Replicate command (/R) is one of VisiCalc's most powerful commands. It allows you to copy a single entry from one place to another, copy a single-entry position into a row or column or reproduce a single row or column as many times as you wish. If you use this

command when you initially set up your spreadsheet, you don't need to repeat the same tasks over and over again.

The Title command (/T) lets you fix titles in place so that when you scroll the window about the sheet you can still identify the data you see. The Window command (/W) lets you look at two columns or rows that are physically far apart on the sheet by splitting your screen. When you split your screen, the rows or columns that are eliminated from the screen are not altered in any way, and you can redisplay them at any time.

Finally, the Repeating Label command (/-) allows you to draw lines or borders across a column or the whole sheet for that matter. Although you'd probably use the dash to create this command, you can also use any other symbol, letter or number.

You handle errors simply by deleting an erroneous entry, backspacing over it or reloading your program. You are encouraged to save your program frequently to disk and, of course, to make backup copies. Should you then have to reload the data from the disk file, you will not have to reenter too much data.

VisiCalc is not an easy program to master in its entirety. It is both necessary and fortunate, then, that excellent documentation is available. The VisiCalc manual comes in a hardcover, three-ring binder that has a hard sleeve. The basic users' guide is 170 pages of thorough discussion and tutorial plus an additional 24 pages of DIF (data-interchange format) technical information to assist you in merging VisiCalc files with other programs.

The tutorial consists of four lessons spread over 74 pages, and it contains clear directions and illustrations of screens. You should not rush through it, but if you work through it diligently, you cannot fail to understand VisiCalc.

In addition to the users' guide, the program comes with a pocket reference card that contains a complete list of commands and functions, plus a brief discussion of each. This card is a must if you want to use the program comfortably.

At the start of this review, we described VisiCalc as perhaps the most significant piece of business/personal software that is available for your Atari computer to date. The response of third parties to the program is the proof of this statement. Because VisiCalc is widely used by those who have other machines (Apple, IBM and so on), numerous articles and books about VisiCalc have been published. Most helpful amongst these are the books containing ready-made templates. Purchasing these predesigned templates is like buying good cookbooks when you already have the basic food supplies on hand and don't want to have to figure out the best way to put a recipe together and cook it by trial and error. Lots of templates exist for both business and personal use. Unless you have unlimited time to experiment, we recommend you examine the work others have done and consider modifying it to meet your particular needs — it's a real time-saver.

VisiCorp provides extensive support. Sending in your warranty card is a must because it allows you to access technical support by telephone, mail or telex. You are then also eligible for credit toward the purchase of newer versions of the program. As long as you've sent in the warranty card, VisiCorp will replace defective program disks free of charge within 90 days of purchase or for a fee of $20 after the 90-day period has passed.

VisiCalc is a powerful and exciting tool, but you should not consider it as an alternative to a data-base program — its strength lies in its ability to calculate

numbers not reorder text. It also lacks other facilities that a good data base has, such as the ability to sort data. What it does do, it does well, and anyone who uses his Atari computer for serious applications will eventually have reason to be glad if he has VisiCalc.

Do take the time to shop around for price, though. VisiCorp is reevaluating its price structure, so a variety of price discounts are available. VisiCalc is worth buying, but it's also worth spending time shopping for the right price.

—*Richard A. Anderson*

REVIEW

The Bookkeeper

The Bookkeeper, from Atari, is a no-nonsense bookkeeping software package. It is, therefore, one of the few programs from Atari that is not at least partly recreational — the people who put The Bookkeeper together took their assignment seriously.

Hardware requirements are an Atari computer with at least 48K RAM, one (and only one) disk drive, an interface module, an 80-column printer and a television or monitor (color or black and white). An Atari CX85 Numerical Keypad is a nice-to-have option if your volume of data entry will be heavy.

The Bookkeeper package consists of four disks, the *User's Guide* (a manual) and a quick-reference folder called the *Simplified Guide.* Three of the disks are working disks, and the fourth is a sample data base used for the tutorial.

The physical process of data entry with The Bookkeeper is not difficult.

The program prompts are easy to comprehend, and the input sequence is not complex. On the other hand, this program is designed for bookkeepers, so if you are not now a bookkeeper, mere possession of The Bookkeeper program will not turn you into one overnight. The publishers point this out, and they encourage you to consult with a CPA for advice in setting up your accounts. For the nonbookkeeper, just hearing that debits are entries made on the positive (+) side of the ledger and credits are entries made on the negative (−) side of the ledger can be intimidating.

The *User's Guide* is a fine reference work. It contains a general overview of the system and information on equipment requirements, followed by the information on each of the eight menus.

Utilizing the sample data disk included in the package, you are given the chance to enter data in virtually every area, a process designed not only to make you familiar with the package, but also to help convince you that the program is simple. Next, with the data you have entered plus that which was already on the sample data disk, you print samples of every report and every data list that the system creates.

Now that you are feeling confident that you understand the system, you move to setting up your own account. At this point, you may need the assistance of a professional who can advise you on the specifics of bookkeeping.

Although the physical process of entering data is simple, the program requires considerable planning before you actually enter the data. You must assign an account number to each account. For example, Balance Sheet account numbers would be assigned as follows (numbers shown are minimum to maximum in range):

Current Assets 1000-1499
Fixed Assets 1500-1799
Other Assets 1800-1999
Current Liabilities 2000-2599
Long-term Liabilities 2600-2999
Capital 3000-3999

Profit and Loss (P&L) accounts are assigned like this:

Income 4000-4999
Cost of Sales 5000-5999
Expenses 6000-7999
Other Income 8000-8499
Other Expenses 8500-8999
Income Transfer 9999

Balance Sheet accounts that all have the same first three numbers are consolidated into the account with the lowest number. For example: 1021, 1022 and 1023 are all consolidated into 1020. This technique is useful for consolidating funds from several bank accounts into a single Cash-on-Deposit account.

If you want your P&L Statement to be consolidated for your entire company, simply end each P&L account number with the same digit. For example: 4011, 5011, 6521, 6581 and 8531. If you have three stores, by setting up P&L account numbers ending in the digit 1 for the first store, 2 for the second store and 3 for the third store, you get separate P&L Statements for each store plus a consolidated P&L Statement. Up to ten separate "stores," "departments" and so on can be listed (0-9).

The system includes four journals (Checks Written, Cash Received, Invoices Written and General Journal). Written reports include three ledgers (General Ledger, Accounts Receivable and Accounts Payable) and three financial reports (Profit and Loss Statement, Trial Balance and Balance Sheet). You may also print out listings of customers and vendors (by assigned number or alphabetically) and journal entries.

The Bookkeeper uses the double-entry accounting system. This simply means that every positive entry requires a negative entry to offset it because the books must always balance to zero. Most of the offsetting entries are made automatically by the computer.

The program is menu-driven from beginning to end. Once you have completed the initial setup, which requires some text entries, almost all entries are numeric only. Decimals are not used at all in making monetary entries — the computer translates 4672 to mean 46.72, for example.

Another "speed device" feature is the ability to create codes for standard vendors and regular credit customers. Indicating V2 and the amount could, for example, automatically enter data pertaining to the Pacific Gas and Electric Company, a vendor, and C6 could automatically enter data pertaining to the account of Larry Smith, a customer.

Several sample General Ledger accounts are provided in the manual's appendix. If your business is similar to those shown, much of the job of creating codes for your system may be eliminated, although some personalizing will be required in most cases. Samples provided are (1) home-office and personal accounting; (2) husband and wife, personal accounting; (3) professional services; (4) medical services; (5) dairy farming; (6) retail grocery store; and (7) wholesale durables.

You may enter up to 350 total accounts for your General Ledger and lists of customers and vendors. This should be generous for most small businesses.

A maximum of 1000 distributions may be made each month. Because The Bookkeeper is a double-entry accounting system, every journal entry creates two distributions: a debit and a

InfoWorld
Report Card

The Bookkeeper

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
The Bookkeeper offers small-businesspeople who own Atari computers a double-entry accounting system that can track up to ten different "stores" or "departments." It is designed to run on one disk drive, resulting in much inconvenient disk swapping — and increased chances for error — if you exceed the total number of entries allowed per month.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One single-sided, single-density disk drive*
☐ *80-column printer*
☐ *Atari interface module*

Suggested list price: $149.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

credit. This cuts the effective number of journal entries to 500 per month. In the Checks Written, Cash Received and Invoices Written journals, however, a single check or invoice may create as many as 13 distributions to General Ledger accounts with the computer making one additional automatic distribution.

In the General Ledger journal, you may make 10 account distributions per journal entry. Additionally, each line of comment entered to the General Ledger journal counts as a separate distribution. All this means that the 500 check and/or invoice entries can be eaten up fast.

If you fill the disk before the end of the month, you must go through a procedure of closing the month and carrying consolidated data forward. The procedure is complicated and laborious and introduces the most significant opportunity for serious error. Nevertheless, the procedure is clearly spelled out in the manual, and if the procedure is followed carefully the method is usable.

Like many Atari programs, The Bookkeeper has not disabled the System Reset key, and pressing it can cause problems, usually meaning lost or distorted data. Backup copies of your data disks are your only form of self-defense against a problem created in this manner.

Error messages may be generated by The Bookkeeper program itself or by the computer. A program-generated message, for example, would be: Error; Invalid Command. To correct such an error, you simply press the Return key to clear the message and then enter the correct data.

The computer generates an error message if, for example, you have a malfunctioning component. Error codes used are those in the *Atari BASIC Reference Manual.* The correction procedure is identical to that followed for program-generated error messages. For example, you must first turn the printer on or do whatever must be done to correct the malfunction.

Atari backup service is covered for 90 days under Atari's warranty. Help may be provided beyond that date, but don't count on it. Atari has no extended warranty on software.

The Bookkeeper is a good business-accounting software package aimed at professionals or skilled amateurs, not bookkeeping and accounting novices. It has excellent documentation that is both thorough and clear.

Because The Bookkeeper is designed to work with only one disk drive, more disk swapping is necessary than if optional dual-drive capabilities were included. The "disk-full" procedure should not exist. If the program were to allow extension to a second data disk, not only would less chance for error exist, but also a lot of work would be eliminated.

Because it is heavily weighted on the accounting side, with no budgeting capabilities, we think The Bookkeeper would be overkill for keeping household accounts. In the hands of knowledgeable users and used for its intended purpose, The Bookkeeper is a quality product that can provide a valuable service for members of the small-business community who own Atari computers.

—*Richard A. Anderson*

REVIEW

Home Accountant

Continental Software's Home Accountant is a powerful but flawed personal-finance package for Atari home computers. At first glance, it offers the Atari users so many options that it would seem to be the ideal income-budgeting tool. The program can monitor transactions for your checkbook and credit cards, produce bar graphs and print out many types of reports — these are just a few of its abilities. When it comes to real-world use, however, the program falls short of expectations.

You'll have to study Home Accountant's documentation before you do anything with the program. You can count on spending an entire evening reading the manual and experimenting.

Don't expect the owners' manual to answer all your questions, though. The 143-page manual does not provide enough practical information. We were unable to resolve several problems, even though we searched diligently for the answers. Also, the manual has many little errors — such as showing the wrong menu with an example — that left us wondering what we had done wrong. We were annoyed when we tried to correct an apparent error on our part only to find that the instruction manual was at fault.

Before you can begin to use this program, you have to perform many preliminary steps. We cannot emphasize enough that this is a very lengthy process if you use only one disk drive with this program. You have to make a minimum of ten disk swaps to complete the setup.

The first of these steps is initializing a data disk. Ten programs, which

provide all the necessary information for your accounting system, are written to your data disk, leaving approximately half the disk (45K) open for your data.

Second, you must inform the program of your hardware configuration (we hope you have two disk drives). Because some printed reports require a 132-column format, you must have either a 132-column printer or an 80-column printer with the ability to print in a condensed mode.

You must enter the proper ASCII codes required by your printer for 80 and 132 columns. The instruction manual conveniently provides the ASCII codes for many popular printers, but it completely ignores the Atari line of 80-column printers.

Third, you are required to establish a budget, whether you want to or not. You must set up a budget for only two categories — checkbook and cash — although you can establish up to five checkbook and corresponding cash budgets. You must enter an initial amount (the amount you currently have) and an estimated amount, or zero, for every month thereafter for the entire fiscal year. After this, you have the option of setting up budget categories of five types: assets, credit cards, liabilities, income and expenses.

Fourth, and finally, you must choose the New Month/Auto Transactions modules (a segment of the program) before you enter transactions. This automatically sets the first month of your transactions to the month you chose when you set up your budget. The program lets you enter up to five automatic transactions per month when you are using this module.

Fortunately, you only have to perform the above operations once for each data disk. If you can endure this tedious process, you advance to the "meat and potatoes" of the program.

The program actually starts working

InfoWorld
Report Card

Home Accountant

	Poor	Fair	Good	Excellent
Performance	☐	■	☐	☐
Documentation	☐	■	☐	☐
Ease of Use	☐	■	☐	☐
Error Handling	☐	■	☐	☐

Summary
Home Accountant personal-finance package for Atari computers offers a great many options, but it is frustrating to use and does not live up to expectations. Before you can begin to use it, you must spend several hours reading the documentation, which does not contain enough information and has many errors. You also have to perform an inordinate number of disk swaps to set up the program. We cannot recommend this program.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *Atari DOS*
☐ *One disk drive*

Suggested list price: $74.95

Arrays, Inc./ Continental Software
11223 South Hindry Avenue
Los Angeles, CA 90045
(213) 410-9466

for you when you encounter the Transactions module. It is here that you enter all your expenditures and deposits, and it's by far the nicest part of the program — which is a good thing, because you spend a majority of your time entering information in this module.

You can enter information pertaining to the cash, checkbook and credit-card categories you set up in your budget. (If you don't set up a budget for a credit card, don't try to enter any information here or the program will prompt you endlessly for the name of your credit card.)

The program prompts you to enter information in several important categories. For example, for each check, you have to enter the date, check number, payee, amount and a memo. Also you can flag tax-deductible payments, cleared checks and the expense category for an individual entry.

You can use Home Accountant to generate several types of graphs and reports. The program can display three types of graphs: bar graphs, line graphs and trend-analysis graphs. The bar graph compares, for example, budgeted amounts and actual amounts.

Three types of printed reports are also available: budget vs. actual reports, personal balance sheets and income and expense summaries. Of these, the most useful is the Budget Amount vs. Actual Amount report. This report prints your assets and liabilities and your net worth. In addition, you can make the program print checks automatically.

One gripe we have about this program is its overall slowness. This problem could be circumvented if the program were written in a compiled language instead of Atari BASIC. Also, with some optimization of the code, the program could fit in a cartridge, which would save you from having to make endless disk swaps.

After reading glowing reviews of this product for other machines, we expected a lot. Unfortunately, Home Accountant does not improve upon the pen, scratch pad and calculator. You are bound to meet with a lot of frustration in trying to figure this program out. To say we were disappointed with Home Accountant is an understatement.
—*Pamela Lam*

REVIEW

The Tax Advantage

Preparing your federal income-tax return often provides enough anxiety and frustration to last a full year, but The Tax Advantage from Continental Software, can go a long way toward making the job easier, more accurate and more complete. Although several more expensive and competing tax-calculation products are available, The Tax Advantage's modest price compares favorably with them and with the cost of a professionally prepared tax return.

The program includes almost all the IRS forms that individual taxpayers commonly use. Specifically, in addition to the basic Form 1040, it includes Schedule A (Itemized Deductions), Schedule B (Interest and Dividend Income), Schedule C (Profit or Loss for Business or Profession for a Sole Proprietorship), Schedule D (Capital Gains and Losses), Schedule E (Supplemental Income Schedule from Rents, Royalties, Partnerships, Estates, Trusts, etc.), Schedule G (Income Averaging), Schedule SE (Computation of Social Security Self-Employment

Tax), Schedule W (Deduction for a Married Couple When Both Work) and Form 4562 (Depreciation and Amortization). The program can handle up to three Schedule Cs for three different businesses and can handle three properties on Schedule E. It can print all forms in draft format.

Unfortunately, The Tax Advantage does not include Form 2106 (Employee Business Expense), the form that outside salesmen, executives or anyone traveling or entertaining on company business might require. It also provides only one Form SE — it's not unusual for two people filing jointly to each have self-employment income and to each require a form. Most of the other forms that the program lacks are uncommon ones and their absence is not serious. What is essential is that you have a good knowledge of the necessary forms for your particular situation — you must not rely on The Tax Advantage to tell you what forms you need to use.

The Tax Advantage package contains a single disk that has programs on each side — side A contains only utilities for such tasks as initializing new disks and configuring hardware, and side B contains the tax-preparation software. No matter what your equipment configuration, count on some disk flipping until you have prepared your program and data disks. If you have two disk drives, you should be finished with frequent disk switches once you have booted the program's main menu on side B of the disk. If you have only one disk drive, you need to switch constantly between the program and data sides of the disk. Although this switching can be a nuisance, it is only that and in no way affects the program's performance.

This program is easy to use. Each form represents a separate file and takes a few moments to load, but you can move about quickly and easily within each form. Editing, either to correct errors or to make updates, is a snap, and the program performs addition and subtraction of numerical data within a single line entry. For example, if you have three sources of income, you don't need to total them before you enter them into the computer. You just enter the first and second amounts, and the program totals them. You then enter the third amount, and the program finds the new total.

One of the best aspects of The Tax Advantage is its ability to create separate pages of itemized entries. The program adds (or subtracts) each item to the others and automatically enters the total on the correct line. You can make up to 30 separate entries on each itemization sheet and can print this sheet in the same manner as the IRS forms. This feature accomplishes two tasks. First, you can submit occasional itemizations to the Internal Revenue Service, and second, you don't need to keep those scraps of paper you've been using to record your itemized lists.

The program lets you store a lot of information. You can have as many as 64 files, where a file consists of an IRS form or an itemization page, and the program can handle dollar amounts up to $9,999,999.

The Tax Advantage's excellent manual helps both novices and experienced users to get started quickly. It is compact and has a rugged hard-cover binder. Its table of contents is well laid out, and it has a concise but thorough index. The manual's nine chapters are clear, well written and logically arranged. Chapter 8 is a 32-page tutorial. The tutorial guides you through initializing a disk and creating a hypothetical income-tax return — with painstaking care it leads you through the entries on the Form 1040, creates an itemization page and makes entries on a Schedule B. All the

InfoWorld
Report Card

The Tax Advantage

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	■	☐

Summary
The Tax Advantage enables you to prepare the forms most commonly used when you file your federal income-tax return. The program cannot prepare your returns for you — you need to know which forms you require and how to fill them in — but it can make your task easier and more accurate. The package's excellent manual contains a tutorial that makes the program easy for both novices and expert users.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *Atari DOS*
☐ *One disk drive*

Suggested list price: $69.95

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11223 South Hindry Avenue
Los Angeles, CA 90045
(213) 410-9466

program's functions are considered in the tutorial, including entering data, itemizing, adding, subtracting, moving about line by line, a page at a time and by line number. It also shows you how to get additional information on a line by using the menu's Help prompt, how to get an immediate tax-refund/liability estimate in the middle of the program and so on. Once you have worked through the tutorial, you should know how to use this program. If you're still unsure, one choice on the program's main menu is Demonstration, and it's just that.

The program handles errors well. Because it records data on the disk frequently and has relatively small files, you don't lose much data even if you do press the wrong button. If you do lose some data, you can reenter it easily. We experienced no errors when we tested this program. It is so simple to use that errors should be infrequent. Also, the program always prompts you to back up your disk when you exit from the program and provides you with Atari DOS to enable you to make backups easily.

Continental Software will replace defective disks and provide update information for 90 days after you purchase The Tax Advantage. The cost of a replacement disk after the warranty has expired is $17.50. For an additional $10, the company will extend your warranty and provide you with telephone support should you have problems with the program. The $10 fee also entitles you to buy the next year's version of The Tax Advantage for half price. To get full value from this program, we recommend that you do as the manual suggests and use the program as a tool for planning next year's tax return.

This program is designed to work with Home Accountant, also from Continental Software. If you create your Home Accountant categories in careful accordance with The Tax Advantage's requirements, you can then enter most of your data into The Tax Advantage automatically at the end of the tax year. The Tax Advantage's manual contains complete directions for doing this.

Purchasing this program with the idea that it will do your tax return for you is dangerous. If could cost you a lot of money in lost tax deductions if you don't know what is tax-deductible. Do your homework *before* you use the program. You will also need to know how to gather your data before you begin — no shortcuts exist here. Remember, too, that the pages printed by The Tax Advantage are not the forms you file with the Internal Revenue Service — you need to transfer the data from the printed forms to the official internal-revenue forms.

The Tax Advantage is a well-thought-out, largely complete, well-documented and easy-to-run program at a reasonable price.
—*Richard A. Anderson*

REVIEW

Miles Payroll System

Miles Payroll System is a payroll system for Atari 800 home computers. It is suitable for small- and medium-size companies, and it can handle information for up to 50 employees on one disk. Miles Payroll can generate paychecks as well as a variety of yearly reports. To use the program you need 32K or more of memory, two disk drives, an Atari 850 interface module, a television or monitor and any standard

80-column printer.

Miles Payroll System allows you to pinpoint specific employees easily and to update their records; you do not have to cycle through all of the employee numbers to find the one you wish to change.

The program even takes into account employees who may be working under a special visa or with a Green Card; in the place where you would enter a social-security number, you can enter both alphabetic and numeric information.

The program allows you various combinations of payroll types and deductions. Pay periods can cover weekly, biweekly, semimonthly or monthly time spans. You are given a choice of regular, overtime, double-time, sick, legal holiday, vacation, bonus or commission pay; you simply designate with an *A* or *I* which categories are active or inactive. You can change a category's status at any time, and yet Miles Payroll System also retains the last three pay changes for each employee.

Deductions that the system allows you to make include federal, state and city withholding taxes; FICA (Federal Insurance Contributions Act); SDI (State Disability Insurance); group insurance; and three user-defined deductions. From the user-defined deductions, you can create tax shelters — for instance, a tax-sheltered annuity such as an IRA (individual retirement account). Miles Payroll System has built-in tax tables that are easy to update. You can also maintain state and federal unemployment-insurance records with this program.

If your company is linked to workers' compensation, you can take advantage of Miles Payroll System's ability to handle information for compensation classifications.

Miles Payroll System lets you generate 15 different reports. Except for running pay-period reports, you can run reports without affecting your employee-data disk.

Many of the reports are variations on a basic employee report. You can create standard-deduction reports for period-to-date, for month-to-date and for year-to-date. You can generate period, month and year-to-date group-insurance reports as well as a month-to-date workers' compensation report. Other report capabilities include a tax-sheltered, annuity-deduction report; employee-pay-history report; time-card entries; W-2-forms report and quarterly and yearly earnings reports.

The program's check-printing ability is a fine feature. Miles Payroll System automatically calculates all deductions and overtime payments and any other categories you activate and then prints a beautiful, finished check. You can even order checks and envelopes from Miles Computing, and the company will add a custom logo for a small additional charge.

The performance of Miles Payroll System is excellent. It handles all its promised features quickly and easily. Computer novices will have no problem using this program. You will find it easy to follow the well-written manual, which gives you step-by-step instructions coupled with screen pictures, charts and other helpful visuals. It is an easy-to-learn program that is very powerful.

Although earlier versions of Miles Payroll System had snags that could cause crashes, this version has been improved and is relatively bug-free — a well-protected program. Of course, you must be careful to check for possible errors in your tax tables.

The program's well-written manual has all the features you'd want — a table of contents and an index — and some other thoughtful features. It comes with two plastic pages to store

InfoWorld
Report Card

Miles
Payroll System

	Poor	Fair	Good	Excellent
Performance	□	□	□	■
Documentation	□	□	□	■
Ease of Use	□	□	□	■
Error Handling	□	□	□	■

Summary
Miles Payroll System, for the Atari 800, is a thoughtfully planned and well-executed payroll program that is especially suitable for companies with 50 or fewer employees. The system has most payroll features that you would need. You can calculate payrolls based on weekly, biweekly, semimonthly or monthly time spans and adjust the pay scale, depending on special circumstances. It can also print 15 different reports, as well as payroll checks.

System Requirements
☐ *Atari 800 computer*
☐ *32K RAM*
☐ *Two disk drives*
☐ *80-column printer*
☐ *Atari 850 interface*

Suggested list price: $179

Miles Computing
7136 Haskell Avenue, Suite 212
Van Nuys, CA 91406
(818) 994-7901

the program and data diskettes. The binder has two built-in pockets to let you store your tax tables and other notes.

The manual contains six appendices. Appendix A helps new users decide how to start. It details the differences between entering all the year-to-date information as opposed to maintaining totals from the time you start to use Miles Payroll System — with strong recommendations that you take the time to enter all of the year-to-date information that you have been maintaining manually.

Appendix B explains the correct procedures that you must follow for each pay period. Appendix C, Appendix D and Appendix E contain the steps necessary to ensure proper updating of your end-of-month information, your end-of-quarter information and your end-of-year information, respectively. Appendix F tells you what other supplies you need to use Miles Payroll System effectively.

Miles Computing is a small company that cares about users of this program. When we called with questions about the program, its staff called us back within two hours. During the several months we worked on this review, Miles Computing kept us informed by providing us with several updates that explained how to use some of the program's functions in a slightly different way.

In all respects — features, performance, ease of use, documentation and support — this is a professionally conceived and executed program. We look forward to other business software from Miles Computing that will serve the needs of Atari owners.
—*Cassie Stahl*

REVIEW

Family Finances

You may wonder whether a personal computer can make you stick to a budget. Perhaps you just want to know if a computer can make more sense out of your personal finances than you can on your own by sifting through the jumble of check stubs in your desk drawer. The answer is, "Maybe." A lot depends on your willingness to be honest about your finances and to keep faithful records.

Atari's Family Finances package can assist you in tracking your income and expenses and can then set up a suggested budget that you can alter and update. It's easy to use and can show you where your money's coming from and where it's going. The software is divided into two parts — Family Cash Flow and Family Budget — each of which comes on a separate disk.

To use the Family Finances programs, you must have the Atari BASIC language and at least 32K RAM in your computer. You can also make good use of a second disk drive — you can place the Family Cash Flow program in drive 1 and the Family Budget program in drive 2. This arrangement cuts down on the amount of disk swapping you have to do, but because you don't have to do too much swapping, you can get by with only one drive. Having two drives doesn't increase the amount of information you can store.

Loading the Family Cash Flow program is as simple as turning on the disk drive, inserting the disk in the drive and turning on the computer.

The program greets you with the main menu, which lets you review your finances, edit or add expenses, edit or

add income, print finances, set up a new year of finances or leave the program.

You can tell the moment you start the program's tutorial that the program is going to tell you where you are in the program at all times — it won't let you get lost. For instance, if you choose option B from the main menu, the program tells you "I'm on letter B" as it gets the option. If you're using the program to load data (either your data or the sample data that is provided on the master disk), the program displays each month as it loads the information. The rate at which the program loads data is slow but tolerable.

If you have only one disk drive, Family Cash Flow can track up to 100 expenses per month in 13 broad categories. If you have two disk drives, you can track 220 expense entries in 13 categories per month. On the income side, the program can record up to 20 sources of income per month in 13 categories if you have a single drive; if you have two drives, capacity is increased to 100 income entries per month. Family Cash Flow can store entries for 12 months.

If you have a color TV or monitor, you'll appreciate the color coding that tells you which part of the program you're in. When you're recording or examining expenses, the screen is red; when you work with income, the screen is green.

For a quick glance at total income and expenses (broken down by month for the entire year), you select the Review Finances choice from the main menu. The Detail of Finances screen comes up and lists income and expenses for each month, as well as the variance — the net loss or gain in money for that month. Months for which you have no data show a .00 in the appropriate columns. At the bottom of the screen are totals. You can print out this screen, but you can't change any of the

numbers (they are the calculated results of your monthly reports).

The only problem with this Detail of Finances screen is the screen color, which on our TV set was a murky gray. It wasn't nearly as readable as the green or red screens used elsewhere in the program.

The Expense and Income options in the main menu function much like the Review Finances choice. First, you are asked to choose which month you want to work on; the month you select then appears at the top of the screen. You can review previous entries, enter new data, change entries, delete entries, print entries or go to a new month.

If you are entering new data, you have to enter the amount and a description of the expense or income. You need not give the month, though — you can enter the day only, because you're already working in that month at this point. The program automatically assigns a unique entry number to each of your entries. This number is displayed next to each entry as you review or change it.

If you choose to review previous entries for the month, you see a screen that displays the monthly totals in the 13 or fewer expense (or income) categories you've set up. For more detail on that month, you type the letter (*A* through *M*) that is associated with the 13 or fewer categories. You then get a screen showing the individual entries in that category. Entries on this screen contain the date (entered by you at the start of each session) and a short description of the expense or income (15 characters or less). Next, you see the amount, which can be up to $999,999.99.

Changing entries is similar to reviewing entries, except that at the bottom of the screen, you are asked to give the ID number of the entry you want to change. After you enter the

InfoWorld

Report Card

Family Finances

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	■	☐	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
Family Finances is a simple home-budgeting system for Atari computers. Its two programs, Family Cash Flow and Family Budget, enable you to track your income and expenses and make projections about your budget for future years. Their helpful menus and messages make these programs easy to use.

System Requirements
☐ *Atari computer*
☐ *32K RAM*
☐ *Atari BASIC*
☐ *One disk drive*

Suggested list price: $49.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

number, the screen displays the three parts of that individual entry — date, description and amount — labeled A, B and C. The program asks you to enter the letter and then type in the new data. This system makes entry changing virtually foolproof.

Deleting entries works in a similar fashion. The program asks for the ID number, but then it asks you if you're sure by saying, "Is this the right one (Y/N)?" When you delete an entry, the program automatically reassigns new ID numbers to all higher-numbered entries. If you go back to older months and add new entries, they aren't numbered as if they were entered on that long-ago date; they have the later, higher numbers.

Family Finances shows its careful attention to user convenience in such error messages as the one that comes up when you try to print something without first turning on your printer. The program displays the message "Where's the printer?"

The main commands of the program are consistent, with one exception. At most points in the program, you press the Escape key to return to the previous menu, but when you exit from the expense or income sections of the program and wish to return to the main menu, you're asked to "press X to exit" — if you press the Escape key at this point, nothing happens. Perhaps Atari changed the command because at this point the program is tidying up and saving your work to disk. ("I'm putting it away" is the message you get when you save your work.)

Another criticism we have is that the program cannot tell you how much free space remains on your disk. Atari claims that the program can hold as much data as you can generate for a year's worth of finances, but we were unable to verify that claim, and, in truth, you are limited in the number of expense and income entries you can make. The only way you

can find out how much free disk space you have is to exit from the program to Atari DOS and call up a disk directory.

The second half of the package, Family Budget, takes the data you have entered in the Family Cash Flow program and creates a projected budget for the coming year. It does this by taking the figures you provide for each category and each month and averaging them by month for the 12-month projection. If you choose to review your expense budget, the screen shows you, month by month, the budgeted amount, the actual amount spent if you have already spent it (or zeros if that month or category is untouched in your cash-flow program) and the variance (the amount by which you were over or under budget), which is clearly marked with a plus or a minus sign. You can further break down your budget review by month, looking at the 13 expense categories and changing any budget amounts for seasonal or month-to-month variations.

You need to have a few months of data on your Family Cash Flow disk before you can run Family Budget and benefit from the averaging of several months of data. The program presents the calculated monthly income and expenses so you can adjust for inflation (you can include higher food prices or your latest raise). As soon as you finish reviewing the projected budget amounts, the program writes all the data to disk and fills in the proper numbers for all 12 months, plus the expected variance.

It's best to practice using both the Family Cash Flow and Family Budget programs before you try to make serious use of them. To help you, Atari includes a 24-page manual and nine months of sample data on both disks. When you're ready to make real use of the programs, you can delete all the sample data provided; this takes a

considerable time, but the programs helpfully note, "I'm working on it!"

The manual is adequate: it contains illustrations of many screens that accurately show you what you're doing, and it has a crisp tutorial. It lacks an index and a quick-reference guide, although you don't really need the latter because the program is laden with menus.

On the manual's plus side, Atari clearly warns you at the start to make working copies of your write-protected program disks before you start storing data to disk and also cautions users to back up their data.

One major problem is that the manual doesn't say which printers Family Finances can work with, and the programs have no menu that lists possible printers. An Atari customer-service representative says the program works with all Atari printers but can't say if it can work with non-Atari printers.

Family Finances is both easy to learn and easy to use. You never get lost within the program, and usually you can press the Escape key to get back to the previous menu. The error messages are clearly written; for instance, if you try to enter more than 100 expense entries and 20 income entries in one particular month, the program tells you, "Data overflow. Please delete an entry to add more."

In one area, the program's error handling is not satisfactory. Pressing the System Reset key causes your program to reload, and any data you've entered since the last disk save is lost. Although the chances are you won't press the System Reset key by accident, that key should have been completely disabled.

If you take the time to read the manual and the sample records supplied with this program, you should be running a family budget on your computer in no time. It's up to you to follow through on the recommendations of that budget.

—*Scott Mace*

DATA

The programs reviewed in this category keep track of data bases, a fancy term for lots of information.

REVIEW

SynFile+

SynFile+ is a data-base-management program for Atari home computers. Although it requires a minimum of 48K RAM and a disk drive, other devices, such as a printer, the Axlon 128K Rampower and the Mosaic 64K Rampower, can help you get more out of the program.

SynFile+ is just one part of a larger package that Synapse Software has developed for Atari. The package also includes SynCalc (a spreadsheet program) and SynTrend (a graphics and statistics program). Combine these three programs with a word-processing program, and you have a complete, standard-application program library for your Atari home computer. SynFile+ is also specifically designed to work easily with the popular AtariWriter and VisiCalc programs.

We found SynFile+ to be both powerful and understandable, because it combines useful, flexible features with clear documentation and thorough error handling. Whether you are interested in business, household or academic applications, you can use this program to manage your information in a practical, interesting and logical way.

You can find many of SynFile+'s features in other data-management programs. Such features as pop-up command menus, form-creation commands, file-editing commands and wild-card searches are common attributes of business-oriented data-base-management programs. Sometimes, though, data-base managers that are sold for home computers cut corners and leave out some of these features.

SynFile+ sets itself apart not only by having these features, but also by the quality with which it implements them.

The logic and layout of its menus, the speed and variety of its searches and the flexibility of its editing are all outstanding.

Some less-standard features of SynFile+ also set it apart from many other other data-base-management programs. Functions such as disk copying and formatting are easy to use directly from the program. You don't, as with some other programs, have to leave the program and accomplish these tasks with DOS commands. Another SynFile+ command, Merge, is particularly powerful because it transforms SynFile+ into a relational data base, where you can combine or modify large and possibly cumbersome files.

The documentation makes several claims concerning SynFile+, such as "You can design your own data structure, make calculations, print attractive reports"; each of these claims is well substantiated. The freedom the program offers in data-structure design is considerable. You can perform many types of calculations using the ABS, SQRT, LOG, LOG10, EXP, and EXP10 function keys. Furthermore, you can use SynFile+ to print attractive mailing lists and tables.

Still, the most important claim in the documentation is that SynFile+ can give you a sense of control over your task of data management. This is no exaggeration. Many choices are available to you when you use SynFile+, so your power to create, edit, search and rearrange files is great. For example, you can use up to 16 fields of search criteria in conjunction with wild-card searches and conditional searches. (An example of a wild-card search is: you are searching a data-base file by names, and you enter A* as the search criterion. This search by the program would find all records with names that begin with the letter A. Similarly, if you use *A as the criterion, the program

would find all names that end in A.)

You can also have SynFile+ perform conditional searches, using the symbols > and <.

Learning to use SynFile+ is easy, despite the large number of choices available to you. We found that we could master all of its basic operations and some of the more involved procedures in one afternoon. By following through the tutorial in the manual once and then facing the computer with data and SynFile+ Reference Card in hand, you should be able to handle your data-management problems simply and efficiently.

Because of the wide range of options that SynFile+ makes available, its documentation is particularly important. Fortunately, the 121-page booklet (in a three-ring binder) provides complete information in an interesting and easily referenced way. Examples of this are the Glossary and the Appendices, which contain sections entitled Error Messages and Recovery Suggestions.

The Glossary provides definitions of terms that might be completely foreign to first-time users or ambiguous to users who may have encountered the same terms used differently in other programs.

The Error Messages and Recovery Suggestions sections provide explanations and solutions for specific error messages. We found these sections of the manual particularly useful when we were caught in errors with causes that were too obvious to recognize.

The main section of the documentation is a tutorial that accomplishes two goals simultaneously: it gives an overview of the most important aspects of the SynFile+ program, and it gives an introduction to the subject of data-base management. To cover the many aspects of this program and the subject of data-base

InfoWorld Report Card

SynFile+

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	■	☐

Summary
SynFile+ is a fine data-base-management system for use with Atari computers. It offers powerful features and is also easy to use. We'd like to see some on-line documentation, but beyond that reservation, we have only praise for this program.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One disk drive*

Suggested list price: $99.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

management in great detail could force a manual into lengthy dullness, but the SynFile+ documentation maintains a balance between detail and interest. Subjects that are not covered completely in the tutorial are covered in detail elsewhere in the manual — the tutorial even tells you where to look.

Still, we sorely missed on-line documentation — Help should be an additional choice on the pop-up menus. The Help messages could be as specific and useful as the messages in the Error Messages and Recovery Suggestions sections of the manual. Come to think of it, the Recovery Suggestions should be on line as well.

Our second criticism of the documentation is that the explanation of indexing is at first difficult to understand and use. It was not until the tutorial put indexing into practice that we understood the method and meaning of it.

Nevertheless, because of the good documentation, we found this program appropriate for almost all levels of users. You need to consider numerous options when you are creating and using files, so you might find it difficult to just turn on the program and go, but anyone who works through the tutorial should be able to make use of this program's power.

At any point in using the program, you can easily know where you are because the screen displays are well labeled and your choices are all outlined in simple, pop-up menus. The command words are easy to recognize and understand, and they are arranged in a logical order under the headings of Files, Records and Reports.

As logical as the program is, however, we sometimes wished that it was easier to exit from functions and move to other functions. Rather than simply skip to another function, we had to use several escape keys, switch a disk

and then go through several menus. Although this process may be valuable for beginners who must be careful to keep track of their position in the program, it hinders more experienced people who can make good use of shortcuts. This problem is not too serious — it merely represents a difference between the simply efficient and the very fast.

As we have already mentioned, error messages are specific, understandable and well explained in the documentation. Errors that are not recognized and labeled by the program are difficult to force. We found that no amount of devious program wrecking could confuse or freeze the system.

Atari provides a limited, 90-day warranty on SynFile+. If, within the first 90 days after you purchase the program, the disk shows any defects in material or workmanship, you can return it for a replacement. The program itself is not warranted. Many software companies now offer warranties better than this.

Although SynFile+ would be more useful if a few modifications were made to it, such as the addition of both on-line Help messages and of faster exit and entry commands for advanced users, it is a powerful program. It requires practice to use, but fortunately, the documentation, error handling and format of the program are so high in quality that virtually anyone can use the program skillfully, with just a little practice.

—*Stephen Robinson*

REVIEW

Data Perfect

The marriage of data-base and word-processing programs on the Atari home computer has been long-awaited, but at last, the wedding has taken place. Data Perfect teams up with LJK's word processor, Letter Perfect, to allow you to create custom form letters that you can send to anyone in your data base. If you combine the programs, they can handle billing procedures with ease — for example, you can take figures generated in the data base and plug them into a form letter.

Most data-base programs allow you to create fields of information that you can then combine to create records. Using Data Perfect's Checkbook tutorial, you can place checks and check numbers into fields and create a data base. You can include all the information that the bank provides when it sends you a statement, and after the information is entered, you can have it sorted by any field. You then can print out a copy that is sorted by check number or by amount.

By requesting break levels, you can ask for a printout of your check-balancing program that uses the date as a group heading. All of the checks that were written on that date will appear on the printout, also sorted by amount.

Data Perfect allows you to make use of most of Atari's built-in cursor-control commands. You can also harness additional commands while you are entering information into the fields. You can edit a field and enter a command that tells the system to accept the information to the left of the cursor only. You can move quickly between the beginning and the end of a line for fast editing. If you change your mind about

an entry, you can erase the entire line and begin afresh.

The most outstanding feature of Data Perfect is its ability to add all the information in several fields and total that information in another one. It can perform up to 16 computations in one data base. When you combine this ability with its ability to set up numbers in neat decimal columns, you have a tool for billing. Now you can use your Atari to keep tabs on small business and hobbies, as well as to track your personal finances.

Data Perfect lets you create 32 fields that have a maximum length of 127 characters each, for a maximum number of 511 records. Filenames cannot exceed 12 characters in length, but you can always rename a field when you print out your data. You can combine text, date formats (MM/DD/YY), numbers and arithmetic fields that are used in computations to produce calculated fields. You can enter positive and negative numbers in your fields and can select all positive or all negative numbers and give them different labels in the report. For example, using the Checkbook tutorial, you can have one entry serve as the basis of both the deposit column and the withdrawal column of the check register when you print out your statement.

You can have totals and subtotals of fields printed when you create reports. The computational power of this data base is impressive. Other data bases allow for some of these powers, but few combine to make such a nice integrated system.

When you combine Data Perfect with the Letter Perfect word-processing system, you have a real workhorse at your command. For example, a Mailing Label feature lets you set the label width and the number of labels across the page. By entering the fields that you want, you can create custom form labels

InfoWorld
R e p o r t   C a r d

Data Perfect

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
Data Perfect lets you create and manipulate data bases on your Atari computer. You can merge data bases easily, and the program also allows you to create custom form letters if you use it in conjunction with LJK's Letter Perfect. If you can take the time to familiarize yourself with Data Perfect's many commands, you are bound to find this program useful.

System Requirements
☐ *Atari 400 or 800 computer*
☐ *32K RAM*
☐ *One disk drive*

Suggested list price: $99.95

LJK, Inc.
7852 Big Bend Blvd.
St. Louis, MO 63119
(314) 962-1855

to go with your custom form letters. If you are using this program to orchestrate a group sales campaign, for example, you can use the labels to send the final reports to your crew in the field.

Whenever you use a program that has a lot of powerful features, you find that the program demands more from you. You cannot sit down and expect to learn how to use Data Perfect in one day. If you are a complete novice, you have two things to learn with this program. First, you must learn what a data base is and how it operates, and second, you need to learn how to use this particular program. Trying to learn both lessons at once could prove difficult.

You can change your mind easily when you work with Data Perfect. If you create a data base that lacks several fields, you can create a new data base and merge the old information into the new. This feature did seem to have some limitations when we worked with it — we were unable to complete a successful merge. The problem could have arisen because we had the same fields in the two data bases but had added to their lengths in one of the data bases. When we tested this, we were able to merge the fields when they were the same size and we were merely adding fields. This feature also works in reverse — we were able to take certain fields from the main data base and merge them to create a smaller data base.

You'll hear little beeping sounds when you type in invalid commands or wrong letters. You can also protect your data base from erroneous entries, such as those involving invalid dates. If you accidentally press the Reset key during data entry, the program returns you to its main menu and your data is undisturbed. These little protections can mean a lot to new users.

The program used to come with a thick, padded binder containing all the instructions you need to get your data base running; the new version has a small spiral-bound manual. Portions of the manual are unclear, but it is generally well written and comes with many details and pictures. Screen layouts are printed in the manual to help you follow along with the written instructions. Creation and manipulation of a sample data base is presented as a tutorial to help guide you through the program's complex features.

The manual's index makes it easy for you to find your way around when you have finished with the tutorial and need to look up facts. This program uses many commands to control its many features; the best way to use the program is to learn its commands.

Computer terms are used liberally in this manual. Explanations are given for most of them, but certain things are taken for granted — for example, you are expected to know the computer definitions of characters and files. If you are new to computers, you should perhaps buy a program that is easier to understand. If you are familiar with such terms and want to harness some of your Atari machine's power, then you should certainly give this program a try. If you run into problems, you can call LJK and talk to a technical-support person.

Data Perfect is powerful and can perform many routine tasks in much less time than it would take to complete them by some other method. We highly recommend it for your home or office needs.

—Cassie Stahl

REVIEW

FileWriter and ReportWriter

Here are two programs that are designed to work together to enable you to custom-design your own data-base and report-generating programs. Because the programs use plain English commands, you need little knowledge of programming or computers to use them. For this review we tested a package that contained both programs, on separate disks, although you can purchase FileWriter on its own.

FileWriter enables you to design your own data-base programs that display custom-created error messages when incorrect data is entered. You can enter data into your program and use it to perform standard sorts and to make calculations that involve the four basic arithmetic operations — addition, subtraction, multiplication and division. ReportWriter lets you further manipulate information contained in your data-base programs and design programs to generate a wide variety of reports. Once you have created your programs, they can stand alone — they work without the use of the FileWriter or ReportWriter disks that created them.

FileWriter uses the usual data-base format designations — field, record and file, and these words are defined in the program's documentation for novice users. Typically, you use a data base to maintain information — for example, a record could consist of the contents of your address book. In this case your record would contain fields such as name, address, telephone number and birth date. A series of records contains essentially the same type of information, and these records combine to form a

file. You save the records to disk under a filename. With a data-base program, you can easily sort your records by any field. For example, you can create a list that has been sorted by birth dates and then resort the list to find all the people who have the last name Robinson. You can search by any field and sort by any field.

To create data bases using FileWriter, you lay the fields out on the screen — you type one period per character to represent field lengths and position any descriptive labels. You then depress the Start key to initiate FileWriter's Save function; this creates a data-entry screen for your program. The cursor moves across each line on the screen, and the program displays the number of fields it has accepted at the bottom of the screen. When you place information for each field on the screen, you can insert a descriptive symbol that marks the field as a date, numeric field only or a money field. If the field lacks a symbol, this means that it is alphanumeric and your program will not use it in any calculations. When you perform entry error checking later on, you can use these symbols to determine whether the right type of information was entered for each field.

If you are creating the data base but others will be responsible for entering data and keeping the data base up to date, you can build in a variety of safeguards to ensure against missing information or inappropriate data entry.

To ensure that critical information is entered, you can prevent the users of your data base from proceeding until they have entered the necessary information. This is a must for fields that provide information that is used to calculate other fields. You can design your data base so that the program tells users to enter only numbers or only alphabetic characters in certain fields.

You can also restrict the number of

Summary
FileWriter, when you use it with its supporting program ReportWriter, allows you to design your own stand-alone programs. You can use FileWriter to design a data-base program, and when you have entered data into your data base, you can use ReportWriter to design a program to produce a wide variety of reports using this data. These programs do not require you to be a skilled programmer, although some previous experience with data-base applications is helpful. The documentation is not easy for Atari computer owners to use because it was designed for use with the Commodore 64.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One disk drive*

Suggested list price: $59.95 each

CodeWriter Corporation
7847 North Caldwell Avenue
Niles, IL 60648
(312) 470-0700 (in Illinois)
(800) 621-4109 (elsewhere)

keystrokes entered into a field and can restrict the size of entered values within your specified range. For example, if your program is maintaining a parts' list and your parts' numbers range from 5000 to 6000, you can allow numbers only within that range to be entered. You can also test for position in the alphabet and ensure that certain characters are not entered.

When you design your program with FileWriter, you can decide upon certain criteria that entered data must meet to be accepted by your program. To do this, you set up FileWriter's Reject If command. Your program then tests each entry and rejects it if it does not meet your criteria. For example, if you tried to type letters into a date field, your program could reject them if you have set up the date field to accept numbers only.

Your program can also respond with any error message you want to use. You just type in the error messages when you create the data base. This feature allows you to custom-design your program for a particular application.

You cannot, however, print columns of data-base information without using the ReportWriter disk. The FileWriter program can only print each record exactly as it appears on the screen. Although this is better than nothing, it is limited. ReportWriter works as a support program that allows you to print your information in any format you desire.

Using ReportWriter you can create a program by first designing a data-entry screen, using the same techniques that you use to create a data-entry screen with FileWriter. ReportWriter allows you to further manipulate the data you have entered in the program that you created with FileWriter. Although it uses the same data, ReportWriter enables you to produce report formats that are not possible with your FileWriter-designed program.

You can use ReportWriter's Accept If command to determine which records or parts of records you want to include in a report. For example, you can create a report that extracts information from voter-registration information and prints out the records that meet the requirements of your Accept If command. You could design this command to accept only males who are over 25. Alternatively, it could accept data with which you could create a report to show the ratio between males and females over age 55.

CodeWriter Corporation emphasizes ease of use and flexibility in its advertising. The claims are fairly accurate. You can design a large variety of data bases and can do so in plain English, not programming language. It is an attractive choice of data-base generator for those who know just a little about programming and data bases. If you can program, you will be able to alter the code of the program you create to make it perform additional functions.

You can probably create a data-base program in a couple of hours, although this will take you less time as you learn more about FileWriter and how to make best use of its functions. The first time you run your program, it must initiate the disk before you can begin to enter data. This process takes time — if you include this time in the creation process, you can count on an additional half hour.

Once you understand the general concepts of these programs, you can respond easily to their prompts. Because help files are always present on-screen, users who return to this package after some absence should have little trouble remembering how to get things going.

If you save a screen and then decide to edit it, you are once again faced with

the Create Screen procedures. The messages fill several screens with explanatory text, and you lose some time going through them again. You cannot avoid these messages, but you can depress the Select key to make the screens go by quickly. It's not a big problem — just a minor inconvenience.

Both programs handle errors satisfactorily. If you press the System Reset key, you can reboot the programs. Pressing any other keys at other times has no effect on the programs. If you are entering formulas, the programs check to make sure that you are using the correct syntax. Of course, the programs cannot prevent you from making logical errors.

The manuals we received for FileWriter and ReportWriter made them difficult to learn to use. The manuals were written for versions of these programs running on the Commodore 64. A piece of paper with supplementary information for Atari users was included in the documentation packet. Some of the programs' operations that ran on the Commodore 64 are not available to you if you are using an Atari computer. These operations were noted on the supplemental paper. The company marked most references to the supplemental paper by placing asterisks in the manual's margins, but it omitted some important references.

The documentation was laid out as a tutorial and was not designed to be used as a reference guide. It's too bad the publisher chose this approach — after all, a user is only a novice once. We surmised that new users could be easily overwhelmed by the manual's Commodore lingo and Atari-related additional directions that were not integrated into the body of the documentation. The documentation would also have been greatly improved by the addition of more example application programs.

CodeWriter Corporation informs us that it now ships documentation produced specifically for the Atari. We regret that we were not able to review this revised manual; however, it almost certainly offers improvements over the old version.

CodeWriter Corporation has a toll-free number that is available for you to call after you send in your warranty registration card. When we called the company, our questions about the programs were answered promptly. We had some problems when we saved the data-entry screen to disk — hearts appeared on the screen, but they disappeared when we reloaded the finished screen. According to the company this problem has now been resolved, and we were advised to return our package in exchange for an updated version. This new version also contains several enhancements.

FileWriter is a powerful program that can produce outstanding results if you have a good understanding of data-base applications. Once you have used it to design your own data-base program, and entered your data, the use of your data is almost unlimited when you use the ReportWriter program to manipulate it.
—*Cassie Stahl*

EDUCATION

*Computers are playing
an increasing role in
education, and school
can be where your Atari
is. The programs in this
category enhance the
educational process.
They range from
spelling tutors to
introductions to
computers.*

REVIEW

The Learning Phone

The Learning Phone cartridge for the Atari computer gives this computer the ability to communicate with the PLATO computer system. It is an excellent new product and sure to be popular among Atari users.

To understand why The Learning Phone is significant, we need to introduce you to PLATO. Without the Control Data PLATO network, the cartridge is useless. PLATO began in the early 70s as a software package for the Control Data 6000-series mainframes — gigantic number-crunching machines. PLATO is an educational system; indeed, the acronym stands for Programmed Logic for Automated Teaching Operations. To use the PLATO system originally, you required special terminals that had

512 × 512 resolution, special function keys and many other features.

Over the years, PLATO has evolved. Its educational aspect has remained unchanged; there are now hundreds of thousands of hours of courseware available that run on the PLATO system. An unheralded aspect of PLATO, though, has grown into its most popular feature: it has a highly refined intersystem-communications ability.

PLATO now has a society of users. Up to 800 users can communicate with one main computer, the PLATO system, at any one time. Many PLATO systems exist, all interlinked, and a sophisticated communications network runs across the country and provides local dial-ups for PLATO users.

Inside PLATO, you can find many things to do. You can access the large library of courseware; if you are interested in a particular topic, you can probably find something about it in the

PLATO library. Parents and teachers can find courses for their children in many subject areas.

PLATO's educational programs include Sentences, which takes a sentence you give the computer — "the girl jumps over the bridge," for example — and animates it, with graphics, on the screen. It also tells you when your sentence structure is incorrect. Or, perhaps a laboratory simulation of a distillation process would interest you; you can even "blow up" the "equipment" if you overheat it. Many schools let their students run through this type of PLATO simulation first, before they perform experiments with real equipment — mistakes on a computer don't cost anything. Build A Monster provides a humorous introduction to fractions by allowing you to build a monster by mixing fractional amounts of ingredients (bat's wings, eye of newt) properly.

Besides running its educational programs, you can use the PLATO system to communicate with other users. Multiple ways exist for you to do this. First, you can talk directly to an individual user via TERM-talk. In this mode of communication, every key you press is sent directly to the other terminal and vice versa. Two moderately good typists can easily have long conversations.

You can send a personal note, consisting of one page of text, to another user. (Another term for this type of communication is *electronic mail.*) The other user is notified when he or she has an unread Personal Note waiting. The user can then reply with another note, call you up directly if you are currently signed into the system, forward your note to someone else or take advantage of many other options.

You can also access Groupnotes. Groupnotes are PLATO's equivalent of a bulletin-board system. Each

Groupnote file covers a different topic, and there are thousands of Groupnote files. This Groupnotes system is more sophisticated than those of CompuServe or The Source; years of feedback from PLATO users have optimized it.

Each Groupnote file contains several Base Notes, and each Base Note is numbered and has a title. When you enter the Groupnote file, you are presented with a list of titles. Each note then appears with a string of up to 99 responses. This is a simple system to use. Over the years, it has been refined and features have been added.

There are many popular Notesfiles. Are you interested in microcomputers in general? Try Micronotes, which contains discussions about micros, many news items and a wide user base to answer your questions. Interested in the Atari? Try Atari. Another popular Notesfile is Apple. The interests of PLATO users go far beyond computers, though. Try Parents for questions and answers about parenting. If you are into political discussions and debates, try Forum; there you can enter debates concerning the Soviet Union, Central America, gun control and other timely topics.

For general foolishness, try Pad, which has everything from bad jokes to animated notes, or Jokesonyou. Science-fiction fans meet in Sfnotes, and there are always lively discussions in Music and Movies.

If you participate in these Notesfiles, you will soon become part of the PLATO society. You will become known and start receiving personal notes from other users.

The final thing you can do on PLATO is play games, sometimes with other people. The best games we have ever found have been against human opponents. What PLATO does is moderate games between players. For instance try Moria and Labyrinth. Go and explore a multilevel dungeon that

InfoWorld
Report Card

The Learning Phone

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	■	☐

Summary
The Learning Phone cartridge provides you with a well-designed easy-to-use means of accessing the PLATO system. Once you are connected, you become part of the PLATO society and can communicate with other users, play games and make selections from PLATO's excellent catalog of educational courseware.

System Requirements
☐ *Atari computer*
☐ *16K RAM*
☐ *Modem*
☐ *Atari 850 interface*

Suggested list price: $49.95 plus $5.00 per contact hour

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

resembles the popular Apple game Wizardry, but do it with people from all over the country "at your side," who are ready to swing a sword or lend a hand in times of need. Fabulous treasures, from emeralds to magical items, await you. This is one of the best Dungeons and Dragon-style games we have played, and it's most addictive.

You might also like Empire. This is a Star Trek-like game for four teams of players: the Federation, Romulans, Orions and Kazars. High-speed keyboard action and great graphics, incredible dogfights of up to 31 players and suspense await you as you and your team attempt to take over the galaxy. There are even four Notesfiles for the different teams.

Well, that's our summary of PLATO. Until recently, you could access PLATO only through an expensive, specialized PLATO terminal that had high-resolution graphics, special keys and other features.

Control Data Corporation (CDC runs PLATO) has decided, however, that home users should have access to PLATO, too, after regular business hours. It set up the Homelink program, and the first computer to have a PLATO terminal program written for it was the IBM Personal Computer. This program proved to be a success, and now Atari has released its Homelink package, The Learning Phone.

To access PLATO, you need the local dial-up number and sign on (which are supplied when you order the CDC package), The Learning Phone cartridge and either the Atari 850 interface and a modem or the Microbits front-ports modem. We strongly recommend that you use a 1200-baud modem if you can possibly get one; there is so much to see on PLATO that a 300-baud modem is most frustrating to use.

The Learning Phone provides an emulation of PLATO's 512×512

resolution on the Atari computer's 320×192 resolution screen. It does an amazingly good job of this, too. The Atari designer spent some time working out the algorithm to compress graphics, and the work really shows. PLATO text (in the Notesfiles) shows up on a 64×32 grid. Normally, the Atari computer can only display 40×24 characters, but by using the highest resolution graphics mode and black-on-white graphics characters, Atari has come up with an acceptable emulation. You do need a black-and-white TV or a monitor or a sharp color TV that has the color turned off.

If there is ever a section of screen you just have to see in full resolution, then you can do so using the Zoom mode, in which the Atari shows only a part of the full PLATO screen but shows it at full resolution. You can scroll around the PLATO screen using the joystick to determine just which section to see. This can be a real lifesaver with some of the detailed graphics PLATO offers.

A PLATO terminal has many keys in addition to those of a Qwerty keyboard; and you need to use them frequently. For instance, pressing the LAB key from a base note in a Notesfile takes you from that base note to the first response. The Help key gets you on-line help from nearly anywhere. To learn about PLATO, you need only press Help frequently. PLATO also has an entire on-line Help section, called Aids, which can do everything from teach you a little about the system to give you a full course on PLATO programming.

On the Atari computer's keyboard, these special keys are simulated by holding down the Start key and pressing the first letter of the PLATO key. For instance, LAB is Start-L, DATA is Start-D and so on. This system is simple and convenient to use.

The documentation supplied with

The Learning Phone package is sketchy but sufficient. PLATO was designed to be a system that you needed no manuals to use; all the instruction comes through on-line displays. The manual can get you dialed into PLATO and start you into a few of the more popular PLATO functions; that is all it needs to do. The on-line help, which is of the highest quality, can take you from there.

Signing on to PLATO is simple. Dial the local number and plug in the PLATO cartridge; you are then asked for your name and group. Type these in from the information supplied to you and select your password; now you are ready. From this point, you can explore PLATO in any number of ways.

The Learning Phone seems to handle errors well. Most errors, of course, arise from line-transmission problems, but the cartridge seems to recover well from them.

To be sure, the Atari does not have the resolution of a PLATO terminal; and sometimes the keypresses can be awkward, especially when you are first getting used to the system. Greatly counterbalancing these minor considerations is that this package provides the first full-scale public access to PLATO. Compare the cost of The Learning Phone with that of a terminal costing $1100 per month! All in all, The Learning Phone is one of the most important developments for Atari computer owners.

While you use PLATO, you are charged $5 per contact hour, plus the initial $50 sign-up fee. This fee is reasonable and competitive with other services. PLATO does not charge extra for 1200-baud communication, as do other services.

PLATO offers one of the best support organizations anywhere. It has a toll-free hot line that you can use to report problems or ask questions. You can also work with on-line consultants; a few keypresses will page a consultant on line to answer your questions.

In summary, we feel that the PLATO system has a great deal to offer home users, from games to communications to education. The Atari Learning Phone is a well-designed method of accessing the PLATO system and works well; we have had no problems with it. We feel that The Learning Phone will prove to be a popular item for Atari computers once the power and possibilities of PLATO are widely known.
—*David and Sandy Small*

REVIEW

Educational Games

The three game programs reviewed here, Spelldiver, Agent U.S.A. and Bannercatch are all from a company called Scholastic, which suggests their educational basis. Rest assured, though — these three programs are sure to provide many hours of entertainment as well as education for the whole family.

The first game, Spelldiver, is a word-recognition game. You are a scuba diver on assignment to uncover words consisting of huge underwater letters that are overgrown with "lettermoss." When you, controlled by the joystick, swim over the lettermoss, it begins to disappear, allowing you to view the letters beneath. The letters are so huge, however, that you can see only a part of the letters that form the words on the screen at one time. To view the whole word, or as much as has been uncovered, you press the joystick's fire button to see the Sonar screen. The aim

InfoWorld
Report Card

Educational Games

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	■

Summary
These three programs can aptly be labeled educational games. Within the framework of game playing, Spelldiver teaches word recognition and spelling, Agent U.S.A. teaches U.S. geography and Bannercatch teaches binary code. These games are suitable for entertainment and educating all family members, not just the children.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One disk drive*
☐ *One or two joysticks*

Suggested list price: $29.95 each

*Scholastic, Inc.
730 Broadway
New York, NY 10003
(800) 325-6149*

of the game is for you to guess the word as quickly as possible; seldom will all the lettermoss disappear before you begin to guess the word.

Spelldiver allows you just one tank of air, and when the air supply runs out, you have to surface and take your guesses at the word. The Sonar screen also displays your air supply and the number of pearls you have collected. You find these pearls in oysters below vowels — the oysters below consonants are empty — and every pearl you collect gives you extra chances to guess at the correct word. Small fish known as "flipper-nippers" make the game action livelier. If one of these fish bites you, you are briefly paralyzed, which costs you time and, therefore, part of your precious air supply.

You gain points for each letter that you guess correctly, pearls that you collect but don't use and the remaining air left in your tank when you make a correct guess. Your upward swim to the boat, from where you make guesses, is made dangerous by the presence of sharks that try to bite your oxygen line. If they succeed, not only do you not get points for remaining air, but also without air, you cannot go back down to uncover more lettermoss should your guess be wrong.

Spelldiver actually consists of separate games. The first is called Gabdoc's Notes Home. Gabdoc is a being from another planet who crash-landed on earth long ago. He carved huge letters to communicate with his mother millions of miles away, and his notes, all 30 of them, are found in the manual. Some of the words in the notes have, over the centuries, fallen into the ocean, and these are the words you must uncover. As each note contains about 20 words that you must uncover, many hours of fun are available in this subgame.

The second game is Power Spelling.

Here, 2000 commonly used words are offered randomly, and you can choose the length of the words (from 3 to 10 letters) that you are given.

Spelldiver's third game is Do It Yourself. Here you can enter your own words — up to 20 words of up to 10 letters in length — into the program. The use of this game for a school spelling list is obvious; only your imagination limits the words that you can use.

Spelldiver is designed to assist in learning word recognition and spelling. It does this well — so good is the action and so excellent are the graphics that you can easily forget that this is an educational game. Because your air runs out as you play; the program exerts gentle pressure on you to recognize a word as quickly as possible. Spelldiver calls on your memory skills and phonics, and its vocabulary is large enough to challenge the whole family.

Spelldiver is intended for ages 6 and up. We tested several six-year-olds, and they did catch on quickly. A demonstration program that contains captions takes you carefully through all the actions and explains how to play the game. An adult will need to assist little ones at first, as they may not be able to read all the captions on the demo or read the manual, but comprehension is quick.

You use a joystick and its fire button to control most of the action, although you do need to use the keyboard for actually spelling out the words. You choose the demo or one of Spelldiver's three subgames by pressing the Select key. Once you have made your choice, you press the Start key to begin the game. Pressing the System Reset key brings you to the beginning to use the Select or Start key.

We were unable to find any errors in the program and appreciate that the System Reset button is designed to

simply reset the program. Accidentally pressing this key all too often causes significant problems in software, but not with Spelldiver.

Spelldiver is well documented and has a manual that gives a good overview of the game, as well as specific instructions. The manual is not specific to Atari computers, but the package contains a reference card that provides a quick game review and specific setup intructions for Atari computers. Scholastic also provides a small and, therefore, easy-to-lose slip of paper that contains special setup instructions for the Atari 600XL and 800XL computers.

The danger of misplacing these supplementary instructions is partly overcome by the program's excellent package design. Spelldiver comes in a heavy, molded-plastic case that's designed to hold the disk and all paperwork permanently. It fits comfortably on a bookshelf and provides good protection for the contents.

The second game program from Scholastic is Agent U.S.A. which is intended to teach basic U.S. geography and other skills. This game is so fast-paced and so engrossing that you almost lose sight of its underlying educational value. In it, you are a secret agent who has a mission to save the U.S.A. from becoming totally taken over by "fuzzbodies" — citizens who have been "fuzzed" by the FuzzBomb, a mutant TV device that is menacing the nation.

To accomplish your mission, you take local or long-distance trains from city to city, searching for the FuzzBomb and defuzzing fuzzbodies along the way. As you travel you must also stop yourself from getting fuzzed by fuzzbodies. To protect yourself, you must accumulate crystals that can defuzz fuzzbodies and destroy the FuzzBomb. You have ten of these

crystals at the beginning of the game, and you can cultivate more by planting them and then harvesting your crop.

You share some of your crystals with citizens in cities you pass through to arm them against the fuzzbodies. So armed, you hope, they may help defuzz you, should you get fuzzed yourself.

In state capitals and in Washington, D.C., you find information booths in the train stations that give you information on the spreading menace and the current location of the FuzzBomb. Also, in each train station you find ticket booths where you can get the tickets for your various train journeys.

Agent U.S.A. is lots of fun. It is designed for ages 9 and up, but without doubt, this game is a challenge for people of any age. You need lots of patience and optimism, particularly when you, the agent, are fuzzed and look to the randomly generated efforts of a citizen to defuzz you.

During all this excitement, you are traveling all over the U.S.A., learning the names of the states and the major cities in each state. Besides the geography lesson, you learn how to read timetables such as those used by railroads, airlines and bus companies. Agent U.S.A. can teach you a lot without you realizing that you are learning.

Like Spelldiver, you control the action with your joystick and fire button and use the Start, Select and System Reset keys in the same way. Also, during the game, pressing Start freezes the action; pressing Start a second time causes the action to continue.

One minor bug did show up when we were playing this game — the action would sometimes freeze for no apparent reason when we were in the ticket booth. This wasn't a big problem because freezing the action is already a built-in feature of the game — we simply pressed Start to resume the

action. Agent U.S.A.'s documentation and packaging is essentially the same as that for Spelldiver. You may need to rely more heavily on the documentation for Agent U.S.A., though, because the game program doesn't include the benefit of an on-screen demonstration program.

The third game program is Bannercatch. You and a partner are challenged by Max, a robot character, to a game that requires the two of you to try to capture Max's flag and take it to your territory before Max does the same thing to you.

You and your partner each control two humanoid robots, and Max controls four robots. Successfully beating Max three times more than he beats you moves you up to the next level of play, where Max has smarter robots. Bannercatch has five levels of play, and at the top level, you have a chance to finally see Max himself.

You play Bannercatch on a large field across which you can scroll. The field is divided into 64 sectors, nine of which are yours and nine of which are Max's; the remaining sectors comprise the Safe Zone. The screen display is split, and joystick #1 controls the left side and joystick #2 controls the right. You can control only one of your robots at a time, and pressing the fire button on your joystick toggles you from one robot to the other.

If you tag one of Max's robots when it is inside your zone, it goes to jail. Outside your area, tagging sends one of Max's robots to jail only if it has your banner at the time. The same rules apply if Max's robots tag you. The only way to get a robot out of jail is to send another robot to the jail to free it.

If the action becomes too fast, you can freeze the game by pressing the space bar. The game freezes automatically any time that you or Max capture a flag, so you have a chance to

determine a plan of action. You press the space bar to resume action.

One advantage Bannercatch gives to human players is the ability to trick Max into giving away information, such as the location of his jails, flag and what his robots are up to. You do this by tricking him into "thinking" you are one of his robots and then asking him questions. Asking questions is not easy — you must ask your questions in binary code, and Max answers in the same way. Of course, this can be difficult initially for young children — it can even be just as difficult for adults — but everyone soon catches on with practice.

This whole game is a terrific teaching tool — it not only teaches you binary arithmetic but you also learn the art of cooperation. You cannot play Bannercatch solo, and you cannot win without full cooperation and teamwork. This, of course, is the whole idea behind Bannercatch. Earning points for tagging, capturing and winning are a lot of fun, but learning the skills involved in cooperation and teamwork are applicable skills in every facet of life.

Bannercatch, like Agent U.S.A., is designed for ages 9 and up, and it provides plenty of challenges for adults, too. We found no bugs; like the other games, pressing the System Reset key does no more than let you start from scratch. Documentation and packaging are similar to that for the first two games.

As for support, no mention is made of any warranty or any kind of manufacturer support. Moreover, each disk is write-protected so you can't make backup copies. We suggest you protect yourself by running the games at the store before you take them home. If all seems OK, take them home and enjoy.

These three games are excellent buys. They provide lots of action while

they teach you valuable skills. Their rules are easy to learn, but the games themselves are difficult to master. They have superior graphics and good sound and come with clear documentation. None contain bugs that could potentially hamper children in their use of the software.

—*Richard A. Anderson*

REVIEW

Chatterbee

Chatterbee, a spelling tutor, is a fine piece of educational software that does exactly what you expect it to do the first and every time you use it. It copies the format of a standard spelling bee exactly and not only uses the graphics and color capabilities of your Atari computer but, with the aid of a speech synthesizer that imitates the human voice, it also uses the computer's sound capabilities. Required hardware includes 40K of RAM, a single-sided single-density disk drive and a monitor with audio capability if you are not using a TV. Additional software required is an Atari CXL4002 BASIC Computing Language ROM cartridge.

The most unusual feature of Chatterbee is its speech synthesizer. You do not need additional software because a modified version of S.A.M. (Software Automatic Mouth) is part of Chatterbee. If you have never heard a speech synthesizer before, you may be a bit confused at first. It tends to sound like a Norwegian uncle who is suffering from a head cold. S.A.M.'s greatest difficulty is with the letter *s*, which sometimes comes out an *n*. Although

this may take some getting used to, you will be surprised at how quickly you or your children will adapt to the "voice" with its unusual "accent."

The idea of a spelling bee is to test your knowledge of how words are spelled. Chatterbee does this in a direct manner but manages to provide an element of entertainment, as well. The disk is self-booting, and you begin with a menu that gives you an opportunity to adapt the program to the user. Chatterbee presents words in groups of five or ten words per round, and each game comprises ten rounds. You can choose to play a game of either 50 or 100 words. You then choose the level of difficulty.

The different vocabulary levels correspond to school grade levels, with 300 words provided for each of the first six school grades and 100 words for the next seven grades. This means that Chatterbee is not just for children but is useful for all those who want to improve their spelling. We found plenty of words at level 25 (college freshman) that would challenge most adults, including those with postgraduate degrees.

Chatterbee starts at the level you choose but automatically adjusts upwards or downwards in level of difficulty to meet your abilities. The publisher claims that the 2500-word vocabulary has been chosen from recommendations made by educators across the country. Words such as *it* and *she* appear in level 1 where you would expect to find them, but *auditorium* appears in level 15 and is followed by *hem* in level 16. This is an indication that the words in each level are not simply based on their relative complexity, length or difficult spelling but appear in the order that most students would come across them in school.

Other computer spelling aids we have seen flash the word briefly on the

InfoWorld

Report Card

Chatterbee

	Poor	Fair	Good	Excellent
Performance	□	□	□	■
Documentation	□	□	■	□
Ease of Use	□	□	□	■
Error Handling	□	■	□	□

Summary
Chatterbee is an excellent spelling tutor that not only uses your computer's color and graphics capabilities, but also, with the aid of a software speech synthesizer, uses its sound capabilities too. It's enjoyable to use and has a large enough vocabulary to challenge both children and adults.

System Requirements
□ *Atari computer*
□ *40K RAM*
□ *Atari CXL4002 BASIC Computing Language ROM cartridge*
□ *One single-sided, single-density disk drive*

Suggested list price: $39.95

*Tronix
8295 South La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529*

screen and then require the player to write the word from memory. Alternatively the player must unscramble a word displayed on the screen with the letter order mixed up. Chatterbee not only uses audio but also presents the word as a teacher would in a spelling bee or test. The program first gives the word alone. It then uses the word in a sentence, and finally, it gives the word alone once again. An example from from level 1 is:

    she
    Dick said, "She is a girl."
    she

Another example, this time from level 25 (and this is one of the easy ones):

    efflorescent
    Efflorescent means flowering.
    efflorescent

A nice touch is that you can have the word or sentence repeated as often as you want by pressing the Option key. Distractions or simply the Norwegian uncle's accent make this a necessity on occasion.

You can encounter two kinds of errors when you use Chatterbee. The first kind is the spelling error, which is your problem, and Chatterbee lets you correct this type of error nicely. The proper procedure is to type in the word correctly and then press the Return key. If you discover you have made an error before you press Return, simply pressing the Delete/Backspace key lets you go back and correct the error. (The sound "Oops!" accompanies each backspace stroke.) When you enter a word incorrectly, the computer voice tells you that you have made an error and asks you to try once again. The computer can tell you that you have erred several different ways, and this variety of response makes the program more interesting. You are allowed three tries, and then the computer gives you the correct answer. Here, too, the computer can give you the correct

answer in several ways. The program repeats, in the next round, any word you cannot spell correctly after three tries. This reinforces the learning process and provides an incentive for users to pay attention when the correct spelling is given.

The second type of error is the kind that can throw the whole program off, and Chatterbee doesn't handle it well at all. The only way we found to create a program error was to enter far too many letters or to make corrections too many times with the Delete/Backspace key. The usual result was that the program gave us the answer when we should still have been getting more chances to do it ourselves. Sometimes the situation was so bad that pressing any key at all caused Chatterbee to give us the answer and display the next word, only to have that process repeat itself again and again. When that happened we just rebooted the program and started again. As Chatterbee generates the words randomly within each level and as you can place yourself at any desired level to start, restarting does not necessarily mean a repetition of the words you have just spelled.

The program rewards correct spelling by graphics, sound and a score. The screen features a bee that droops his antennae and looks sad should you misspell a word. Get the word right, and his antennae shoot straight up and he flashes a big smile. At the same time, the voice says: "You're right!" or makes one of the other positive responses. Your score is highest if you spell the word correctly on the first try, and it goes down with each subsequent try. More difficult words are also awarded higher scores. Scoring is not competitive as it is in most other games, but you still get a good feeling when you roll up a high score, and that is additional positive reinforcement for children who need all the

encouragement possible.

We think Chatterbee is an excellent educational-software purchase from which both children and adults can benefit. It is pleasant and enjoyable to use, the graphics are nonthreatening, the pace is your own and the comments the voice makes are encouraging and ego building. The vocabulary is about twice that possessed by the average adult and, for its price, it is difficult to imagine an educational-software purchase that can give you better value for your dollar.
—*Richard A. Anderson*

REVIEW

Learning with Leeper

Learning with Leeper is designed to introduce preschool children to computers. The program comprises four games that teach reading readiness, number concepts and eye and hand coordination. Learning with Leeper comes on a cartridge and runs on any Atari home computer.

Once they have been shown how to load the program, small children can easily put the cartridge in the computer and select one of the four games without adult supervision. You select a game by moving the little Leeper figure into one of the four corners of the screen and placing him on top of the graphic representation of the desired game. You then press the fire button on the joystick.

The first game, Dog Counter, teaches number concepts. The student is shown several dogs, which appear on the left side of the screen. The right side of the screen displays blocks of numbers that have a corresponding number of bones depicted on the side of the block. The aim of the game is to choose the block that carries just enough bones to provide one for each of the dogs on the left side of the screen. The player moves Leeper up an elevator shaft to a number and presses the fire button. If the student chooses the right number, all the dogs are fed. If the number is not high enough, the dogs that do not have bones stand up and bark. If the child selects a number that is greater than the number of dogs, empty dishes appear and bones appear in the dog dishes. The correct number flashes regardless of whether the student's choice was wrong or right.

The second game, Balloon Pop, develops reading skills. Players must match the letter that is displayed on the right side of the screen with one of the letters displayed on the bottom of the screen. The student must guide a hot-air balloon toward the correct letter on the bottom of the screen. The screen flashes when the player chooses the correct letter.

The third game is Leap Frog. The player guides a green frog through a maze; that frog is followed by a caterpillar. The frog is supposed to work its way out of the maze before the caterpillar catches up with it. If the frog stops and the caterpillar catches up with it, the caterpillar just turns around on itself — it doesn't die, it just sits there. The mazes get harder each time the student guides a frog through one successfully.

The fourth game employs a Screen Painting mode. This game is not easy to use and probably should have been left out. Most children who are 3 to 6 years old will find it difficult to move the cursor — the control feels as if it is made of lead. By pressing the Select button, the student can call up four

InfoWorld
Report Card

Learning with Leeper

	Poor	Fair	Good	Excellent
Performance	□	□	■	□
Documentation	□	□	■	□
Ease of Use	□	□	■	□
Error Handling	□	□	■	□

Summary
Learning with Leeper is a series of four educational games for preschoolers. The games provide a fun introduction to computers and teach some basic reading and number concepts at the same time.

System Requirements
□ *Atari computer*
□ *16K RAM*

Suggested list price: $34.95

Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858

pictures on the screen. You fill the pictures with color in the same way as you would using a BASIC program. This means that the area is filled from the upper-left corner; the filling color moves to the right until it comes in contact with another color. It does not always fill the entire area — it sometimes fills one portion of an area and leaves other portions black.

Players cannot crash this program. When the student inserts the cartridge, most of the keyboard's keys are disabled. The program accepts inputs only from the command keys (Option, Start and Select) and from the joystick.

It is difficult to exit from some of the games, though. For example, the player must finish several rounds of play in the hot-air-balloon game. This is not too much of a problem, but it can be annoying.

The games need little if any documentation. If the player's parent or teacher is brave enough to plug the cartridge in the first time, he or she can probably figure out what to do and then help the student. A guide for adults explains the action of the keys and also contains a synopsis of each game. The documentation, a piece of heavy paper folded in half and printed on each side, is adequate for these simple games.

Learning with Leeper comes with a 90-day warranty that is activated when you send in the enclosed warranty card. The warranty notice mentioned disks, not cartridges, though. After 90 days, if you have problems, you can enclose and return the "disk" (we assume this means cartridge) to the company for a replacement.

These games present several important concepts to young users in an easy manner. Even the youngest child can move the joystick, and players do not need to be fast or clever, just willing to try out a game. If they select an incorrect item, the program displays the

correct answer. The games do not discourage children; instead, they reinforce positive behavior — players never "die" or shoot an opponent.

This is a program that will delight and teach your children for some time. Because they can change from one game to another easily, even children who have short attention spans should enjoy using this cartridge. Learning with Leeper is a nice piece of software that allows children to enjoy using the computer without having too many demands placed on them.

—*Cassie Stahl*

REVIEW

Storybook Friends

The three Storybook Friends educational programs reviewed here are published by Edupro. They are referred to as Microgroup programs; the first two, Addition and Subtraction and Number Relationships, are part of a program subgroup called Math-Hunt, and the third, called Storybook Animals and Things, is part of a program subgroup called Word-Draw. All the programs are designed for the Atari 400 and 800 computers and are suitable for children ages 5 to 9. Cassette versions require 16K, and disk versions require 24K minimum RAM.

Addition and Subtraction consists of four games. In the first game you can choose simple addition or subtraction problems. The second game is similar to the first except that the problems are slightly harder because the numbers are larger. The third game is described as a "track" game because the players work

their way from the left side to the right side of the screen. The fourth game asks players to count in multiples of 2, 3, 4 or 5. The numerals are found in a maze or in a box, and you need to select them in order.

The second program, Number Relationships, also consists of four games. In the first game, the players must compare either two integers or two fractions and determine whether the first is larger, equal to or smaller than the second. You do this by using the symbols >, = and <. In the second game, players find numbers (for example, two) and numerals (such as 2) that are greater than (>) a given value but less than (<) a second value. You choose the numbers and numerals from a box that is full of numbers and numerals. The third game displays numerous boxes each containing varying numbers of stars (*). You must select the value sign — that is, >, = or < — that indicates the relationship between the number of stars in the first box and the number in the second one. In the fourth game, players fill in the missing numerals in a given progression. You can choose either a fixed variable or a more difficult, changing variable before play begins.

Storybook Animals and Things also consists of four games. The first displays names of storybook characters in a crossword fashion, and you choose whether you want to have either vowels or consonants left out of these names. Examples without vowels are: Thr.. L.ttle. P.gs; D.sh.r; Cl.ff.rd; and R.n T.n T.n. Leaving out consonants makes the game much more difficult. The second game is similar to the first except that it uses generic names, such as sn.k., h.r. and r..st.r. The third game is an anagram where the words are spelled only from left to right, but the large amount of letters makes it challenging for young children. You can choose

from several subject categories: country things, city things, house things and play things. The last game has verses or well-known quotes such as Th.rt. d..s h.th S.pt.mb.r, and the player fills in the missing letters.

The process used to solve the problems or fill in the blanks is not difficult for a young child. Using a joystick, you can move the cursor to the blank. Once there, the possible answers scroll through the location. When the correct answer appears, the player pushes the fire button on the joystick control. The response is ignored in most cases if it is an incorrect response. In some cases, the player's cursor is returned to a "start" location. If the answer is correct, the computer responds with a sound.

Documentation consists of two 16-page manuals that contain simple instructions for adults — they are not designed for children to read. One manual is used for all Word-Draw games, and one is used for all Math-Hunt games. The manuals provide instructions for normal play and make suggestions for more advanced applications. The games themselves are so easy to use that the documentation is not essential, but nevertheless it is clearly written and useful.

These games differ from most other software on the market because children can play simultaneously rather than sequentially. These three programs are designed for up to four players. Players have their own joysticks and their own cursors. In games requiring a numeric response, the cursors are displayed on the screen in the form of an A, B, C or D. If the response is to be alphabetic, the cursors are numbered instead of lettered. (Edupro also provides alphabetic or numeric decals for the joysticks.)

When the screen contains multiple problems, each child can try to complete

InfoWorld
Report Card

Storybook Friends

	Poor	Fair	Good	Excellent
Performance	□	□	■	□
Documentation	□	□	■	□
Ease of Use	□	□	□	■
Error Handling	□	□	□	■

Summary
Addition and Subtraction, Number Relationships and Storybook Animals and Things are three educational programs in Edupro's Storybook Friends series. The first two programs provide children ages 5 to 9 with randomly generated math problems, and the third provides spelling practice. All programs use a game format, and in addition to teaching, encourage cooperative effort.

System Requirements
- [ ] *Atari computer*
- [ ] *16K RAM, cassette; 24K RAM, disk*
- [ ] *Atari 410 or 1010 cassette recorder or one single-sided single-density disk drive*
- [ ] *Joystick*

Suggested list price: $39.95 each

Edupro, Inc.
445 East Charleston Road
Palo Alto, CA 94306
(415) 494-2790

as many problems as possible in competition with other children. The games also promote cooperation, though. When the screen is divided into separate areas for each child, as is sometimes the case, each child is encouraged to assist others when they have finished with their own area. The programs also display a counter, or clock, against which each child can compete separately or as part of a team effort, rather than competing against each other. We watched children from ages 5 to 9 use the games, and cooperation really did develop as suggested. Having watched children attempt to blast each other out of existence with most other games, we find the cooperative activity that these games provide to be most refreshing.

We found the use of color and graphics disappointing, but the children who used the programs showed no similar reaction. They were involved and excited, and our conclusion is that our own judgments in this area are not as important as theirs — after all, the games were designed for children. The programs use two-tone color combinations, such as pink on red, light green on dark green or black on a colored background. Graphics, other than box outlines, are nonexistent. Some life is put into the programs by flashing screens when a round is completed.

We experienced no problems with this software. All instructions are simple and straightforward.

You should be careful when you buy Edupro software, though, because the packaging is confusing. The company uses one jacket for all its products, and it affixes a sticker to the front of each jacket to describe the particular product that the package contains. Printed on the jacket is "...software designed for up to 8 simultaneous players"; however, the sticker on each of the

three programs we reviewed read "Up to 4 players." Edupro produces numerous other series of programs, so it is important to read the sticker and examine the manual before you buy an Edupro program.

Edupro has an admirable backup support policy. For 30 days following purchase, it will replace, without charge, any defective or damaged disk. The company doesn't write-protect its disks so you are encouraged to make a backup copy immediately after purchase. That is the ultimate in backup support.

These programs are clearly labeled to be used with Atari 400 and 800 computers. In addition to possible compatibility problems with the XL series of Atari computers, the lack of four joystick ports on some of the XL series limits the four-player potential of these games.

Our overall response to these Edupro packages is good. They are easy to master, and because the problems are randomly generated, they are always new to child users. They are good learning tools for both math and spelling, but the way in which they create a cooperative work environment makes them truly outstanding.
—*Richard A. Anderson*

REVIEW

In Search of the Most Amazing Thing

In Search of the Most Amazing Thing may be just the adventure game to keep you busy during long periods of spare time. You can sharpen your mapmaking

skills, learn to converse in foreign languages, pilot a hot-air balloon and avoid the many pitfalls this elaborate adventure game poses. You'll need an Atari home computer to play the game.

The disk has information on both sides, so you must set aside several weeks, or months, to play the game to completion. You play the role of young Tanglefoot Terry. Terry, as his parents call him, never did well in school. He hated his parents' farm and thought its clone cows, called spotted woggles, were stupid. They gave chocolate milk in the winter; in the fall they gave apple cider. Life on the farm was generally dull; there came a day when that changed. Terry awoke to see a spaceship sitting in the middle of the spotted-woggle field. He entered the ship and found two notes. One was addressed to him and one to his parents. The notes were from his Uncle Smoke. Terry thought carefully after reading the note from Smoke. It was a challenge to find the Most Amazing Thing. Of course, Terry took him up on the challenge — or you wouldn't have a game to play. As Terry flew away in the ship, he noticed that one of the spotted woggles was gone. This was the first time he had seen one wander off. Things would never be quite the same again.

Terry travels to a fantasy land called Metallica. To understand the varying scenarios of Terry's adventure, you must first read a short book that accompanies the software. As Terry, you will fly the B-Liner spaceship; propel yourself through space with a jet pack; survive by finding and eating food; maintain a map of the areas you cover; converse with foreigners in their native language; and amuse, delight and write songs for the locals — you'll immerse yourself in another world. Through all this, you're searching for the Most Amazing Thing.

The action in an adventure game must be demanding and changeable. This game is both. After you find the Most Amazing Thing, it changes shape and hides in a new location. You won't get bored looking for it again. The most uninteresting part of this game is when you wait for the disk-drive functions to finish. Almost every new scenario uses the drive, and you must wait a while for a new scene to appear.

The game starts by displaying a screen that shows Smoke's apartment, the store and the auction. You must wake Smoke slowly; if you wake him too quickly, he admonishes you. Taking a gift from Smoke, you head down to the auction to sell the gift and make some money. You use the money to buy supplies at the store to outfit the B-Liner. After all this preparation is complete, you take the elevator back to the top of the planet and enter the B-Liner. The B-Liner has a cabin containing a computer, a control panel, a bunk bed and a couple of tanks for the jet pack. By moving an arrow around the screen, you select one of these items so you can work with it.

While not difficult to play, this game requires you to make decisions, organize your activities and take notes. Note taking is as important as trading with the natives. The books suggests that this game be played by a class. By working together and agreeing on techniques for mapmaking, students can be introduced gently to computers. This game is not difficult to play once you resolve the initial problems, but the manual's explanations are not as detailed as you might like; however, as a true adventure-game enthusiast, you are supposed to enjoy deciphering the rules for yourself. Learning how to use the different items purchased at the store is part of the game.

A program designed for people aged 10 and older should handle errors much better than this program does. Errors

InfoWorld Report Card

The Most Amazing Thing

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
In Search of the Most Amazing Thing is an elaborate adventure game that runs on Atari home computers. This game will keep kids busy for a while, doing a variety of things. It also introduces them to the concept of cultural differences. We recommend it highly.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *BASIC cartridge*
☐ *One disk drive*
☐ *Joystick*

Suggested list price: $39.95

*Spinnaker Software Corporation
One Kendall Square
Cambridge, MA 02139
(617) 494-1200*

are followed with a message that instructs you to contact Spinnaker Software and report the error. It's much quicker to just reboot the system. In a classroom, where both the teacher and the students are being introduced to computers, error handling could appear to be more ominous than it really is. Creators of games designed for people with minimal experience should pay careful attention to detail in their error-trapping procedures. What would you do if you were told you'd made an "error of 170?" This message is the program's way of telling you that it was unable to locate a file you specified. This probably means the file is located on the reverse side of the disk. How nice it would be if the program would just tell you to take the disk out and flip it over! A simple message could save a teacher (or you) quite a bit of frustration.

In Search of the Most Amazing Thing comes with a small book written by James Morrow. By telling the story of Terry, the book offers a simple introduction to a complex game. While it does not contain directions or setup procedures, it helps you understand the game's goals and story setting.

The small manual that comes with the game has directions, a synopsis of the book and a letter from Smoke Bailey. One page contains instructions for loading the program with an Apple, Atari, Commodore or IBM computer. The next page contains information about saving the game. Hints are given for getting started. If you follow the hints, you will be able to do much more than if you just start experimenting. Additional tips tell you how to move around the various scenes in the game.

The game also includes the Metallica store catalog, which lists everything from a robot toothbrush to a radio-controlled pencil sharpener. It also lists useful items such as software that

locates every one of the cultures in Darksome Mire, one at a time. The different cultures like to hear the original songs that you create for them using MUSIX software. By drawing a design on the screen, you create a song that you can trade for chips. Chips can buy clues from the cultures; those clues will bring you closer to finding the Most Amazing Thing.

The documentation will get you started; you must provide the rest of the materials to be successful. If you don't take notes, you'll end up hopelessly lost and completely bored. A map is located in the back of the manual. By comparing your notes to this map, you can locate your position on the big map at any time. Charting your travels is fun.

Despite its unhelpful error messages, this game is fun to play. The plot and character development add to the game and invite you to enter a simulated world. Give yourself plenty of time and say good-bye to reality for a while. Enter the fantasy land of Metallica and begin your quest.
—Cassie Stahl

REVIEW

AtariLab

AtariLab is a series of modules for studying science that have been developed by Dickinson College. The series is designed to be used at home or in schools and has a suggested age range of 9 to adult. The first in the series is the Temperature Module, which comes as part of the AtariLab Starter Set. The Starter Set includes the

AtariLab interface (necessary for all AtariLab modules), a temperature sensor, a thermometer, the Temperature Module software cartridge and a manual.

The AtariLab interface is a box, about the size of a paperback, that plugs into controller jack 2 of the computer. The interface has eight input phono jacks that you can use to connect sensors to the computer — you only have to use one of these when you use the Starter Set. Each jack is color-coded. When you use the Temperature Module, the temperature sensor (color-coded blue) plugs into the blue jack on the interface. You can purchase an additional sensor (orange), which plugs into (you guessed it) the orange input. Future modules will use these input jacks to connect light sensors, push buttons and photo gates and to power lights and small electrical circuits.

The Temperature Module is excellent. It enables you to learn about temperature by performing experiments using household materials and an Atari computer.

To use the module, you insert the Temperature Module cartridge into the computer and turn the computer on. From then on, the program displays step-by-step instructions. As you complete each step, a check mark appears next to it. The first step is to plug in the AtariLab interface. Next, you plug the temperature sensor into the interface, and you're ready to start experimenting.

The screen displays a menu of four choices — Set Up Experiment, Bulb, Demo and Calibrate. You can use either the keyboard or a joystick to make your selection. You choose Calibrate if you need to improve the accuracy of the temperature sensor. An appendix of the manual is devoted to the calibration procedure, but most users will not need to concern themselves with calibration.

The Bulb option allows you to use the computer as a thermometer that displays both Fahrenheit and Celsius scales. Demo gives a demonstration of how the computer can take temperature readings over a period of 20 seconds and display the results graphically. If you choose the Set Up Experiment option, another menu appears.

From this second menu you can choose either the Fahrenheit or the Celsius scale and select the total amount of time (from 10 seconds to 24 hours) for your experiment. When you are content with your choices, you can select the Begin Experiment option from this menu. A graph appears on the screen, labeled with temperature (in the scale you have chosen) and time (up to the total amount of time you have chosen).

You start your experiment by pressing a key on the keyboard or by pressing the red button on the joystick. As the experiment proceeds, the screen displays the temperature graphically. When time has elapsed, you are told to press Escape. This returns you to the second menu, which now shows an additional option, Display Data.

If you choose the Display Data option, you see the program's final menu. Choices here include See Graph, Print Graph, Save Data and See Table. See Graph displays the graph that you saw during the experiment. Print Graph allows you to print the graph using an Epson graphics printer.

Save Data allows you to save the results of your experiment on a disk. You can retrieve these results by using a program written in one of several languages such as BASIC or Logo. An appendix in the manual explains the format of these files and how you can retrieve information in these files.

See Table shows a table of time and temperature values for the duration of your experiment. To repeat your

InfoWorld
Report Card

AtariLab

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	◾

Summary
The AtariLab Starter Set with Temperature Module is an excellent hardware/software combination for studying science. It can be used by children and adults, at home or in schools.

System Requirements
☐ *Atari computer*
☐ *16K RAM*

Suggested list price: $89.95

*Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000*

experiment, or to set up a new experiment, press the Escape key. You will be returned to the second Set Up Experiment menu.

It is difficult to make a mistake when you use the Temperature Module cartridge. If you did not set up your experiment the way you wanted it, you can change the setup quickly. If you decide that you want to stop an experiment while it's in progress (after all, 24 hours can be a long time to wait), you can do so by pressing the Select key.

Most of the time, only certain keys produce any response when you press them. For example, you can choose a menu item by moving the joystick or by pressing the arrow keys. Pressing other keys does nothing. The exception to this is the System Reset key. Pressing this at any time is like turning the computer off and back on again. Be careful about using it!

Certain things that you do produce an error-code message. For example, if you try to print a graph but your printer is not turned on, you see the messages "I/O Error 138" and "See Manual." Appendix H of the manual is a troubleshooting guide that can help you decipher the code and tell you the symptom, the possible cause and the remedy for your problem. In this example, you need to turn on the printer.

The software is excellent and is easy to use by itself, but the manual provided with the Starter Set makes this an outstanding package. In its more than 100 pages, it gives an overview of AtariLab in general, an introduction to the scientific method and ideas for many experiments. Most chapters end with suggestions for reading or other projects. Sample tables and graphs, which you can reproduce, are included, as are sample programs in BASIC and Logo.

The first few projects gently lead you into experimenting with temperature using AtariLab. You are given a thorough description of the project, with background information, purpose of the experiment and lists of necessary materials. You follow step-by-step instructions for the experiment, filling in the data in your manual or laboratory notebook. You are asked questions to guide your investigation and are given ideas for additional experiments on the same topic. As you gain proficiency with AtariLab, you will be able to design your own experiments.

Topics of the projects include dew point, response time of the sensor, heat energy in ice and the heat lost or formed in chemical reactions. One project is devoted to graphing how temperature changes over time.

The Temperature Module does have limitations. The temperatures you measure must be in the range of 0 to 40 degrees Celsius or 32 to about 100 degrees Fahrenheit. If you wish to measure higher temperatures, you must write your own programs. The sensor is less accurate at high temperatures, however. Above 35 degrees Celsius, it is accurate only to within 1.5 or 2 degrees. Also, some fluctuation in sensor readings occur because of the nature of the input jacks of the Atari. This fluctuation appears as a difference of about 1 degree Celsius. You can overlook these limitations for the purposes of many experiments because you are measuring changes in temperature, rather than making exact temperature readings.

With the introduction of AtariLab, we are seeing a change in the way computers can be used in science education. Rather than mere drill and practice, and better than simulation of the natural world, AtariLab lets you learn science by performing experiments. The computer helps you

collect and analyze your data and can do so faster or over a longer period of time than most manual methods allow. We recommend the AtariLab Starter Set highly and look forward to seeing future AtariLab modules.
—*Carol Low*

REVIEW

BASIC Building Blocks

It is difficult to learn to program from a book. It can be almost as hard to find someone who will take the time to sit with you and teach you, step by step, how to program. The next best thing might be to have a robot by your side to coach you along. BASIC Building Blocks turns your computer into that robot and starts you off to a nice understanding of BASIC.

BASIC Building Blocks includes a debugging tool called the BASIC Design Tool along with on-screen documentation in the form of a tutorial. You also have access to BASIC at all times. You can thus study a concept, see it on the screen in the form of a BASIC listing and watch it as it progresses through the debugger. You can then decide whether you want to return to BASIC or the tutorial.

Because the program contains all documentation on the screen as well as in a manual, you don't have to read the manual to get started. The on-screen tutorial is written clearly and explains each new concept carefully and in small manageable steps. It teaches you each technique separately; and you can stay with a technique until you feel you have mastered it. You can step forward and

backward in the program, and you learn how to switch between the tutorial and the debugger or between the tutorial and BASIC. The moves that take you from one environment are simple to learn to use. Once you have learned these simple steps, they become second nature and you can concentrate on learning how to program.

The tutorial offers 12 lessons that parallel the chapters of the manual. The 12 lessons/chapters cover the fundamentals of programming in BASIC, and these lessons place emphasis on strings and FOR-NEXT loops. Each lesson, or chapter, contains interesting and instructive programs to guide you through the examples. Each sample program is a nice example of a specific technique.

Chapter 1 discusses the bare essentials of programming in BASIC. Here, beginners learn about line numbering, variables, the REM (remark) statement and the END statement. This chapter also explains the Stop command's use as a debugging tool, and you learn to use it in conjunction with the program's BASIC Design Tool (BDT) to find errors in your programs.

The second chapter thoroughly covers the commands you must use to enter and exit from the BASIC Design Tool part of the program. Chapter 3 explores the use of branching and introduces the GOTO statements. This chapter also discusses the concepts of the LIST and NEW statements in enough detail to allow you to begin writing programs. It covers input and output commands, branching, arrays, functions, strings and disk input and output in detail. You even learn what a bubble sort is all about. You can also learn how to use sound and graphics and how to program controllers, such as joysticks or paddles.

You can run your own programs through the BASIC Design Tool and

InfoWorld
Report Card

BASIC Building Blocks

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	■

Summary
BASIC Building Blocks is designed to teach you how to program in BASIC. With the aid of an excellent on-screen tutorial, the program steps you through the process of writing your own programs. The package also includes a stand-alone debugging program, the BASIC Design Tool, and teaches you how to use this to debug the programs you write.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *BASIC cartridge*
☐ *One disk drive*

Suggested list price: $79.95

Micro Education Corporation of America
285 Riverside Avenue
Westport, CT 06880
(203) 222-9087

find any bugs in those programs. To do this, you copy the stand-alone version of BDT, which comes on a separate disk, onto a disk of your own. You can then run a program in BASIC and watch it as it executes in the debugger. You can stop the debugger at any time and can flip to BASIC to watch the program run in BASIC. If you are in the debugging area and information is being sent to the BASIC screen, your debugging screen flashes to indicate what is happening. You can then simply press one button and move to the BASIC screen to see what has appeared.

We were not able to crash the program. It handles errors nicely and is well written.

The manual that comes with BASIC Building Blocks is informative and well written. Although you can get started without it, there are some things that only the manual can teach you. Printouts of each program are included in its appendix. This is handy when you start working on original material and need to remember how to perform a particular technique.

Every aspect of this program is professionally done, and its concept is excellent. Beginners can use it to learn how to write programs and how to debug them. If you have been away from programming for a while, this program can act as a refresher course. You are bound to pick up better programming habits after running through the different chapters. We were impressed with this program.
—*Cassie Stahl*

REVIEW

Dr. C. Wacko

Do you secretly wish that you could chuck that old job and become an arcade-games programmer? Basking in the glory of a well-executed game program, you would extol the virtues of character animation and discuss the latest in byte-saving techniques with fellow programmers. If this is your secret dream, dream no more. Dr. C. Wacko is here to teach you the secrets and guide you through the mystical world of player-missile graphics.

The package includes a disk that contains programs that are referenced by the book. You choose a program from a menu and follow along with the text in the book and scrutinize the programs as they are displayed on the screen. Most of the programs are short and easy to study.

The utilities help you design your monsters and test your animation routines. The package also includes a sound routine that lets you try out the different sounds your Atari can produce.

This deluxe package starts out by teaching you how to develop a concept for your game. It discusses the development of a theme, the goal of the game and the subsequent actions and compares writing a game to writing a novel.

An introduction to graphics modes Color and Plot and certain other tricks demonstrates the benefits of character animation. By using Color, you learn how to place characters on the screen where you want them.

Next, the package teaches you the rudiments of character graphics and takes you on a tour of the character set. Dr. C. Wacko teaches you how to convert these characters into binary

values and then back to decimal values. He then shows you how to create and place your own character set in RAM and make the computer use your characters in place of the standard Atari character set.

This character-graphics lesson is followed by examples that show you how to animate an image to create your first monster. You can use the Monster Creator utility to simplify this process. Dr. C. Wacko then teaches you how to move the image around the screen. He provides a short program that demonstrates his x, y updating formula and provides a utility for you to play with.

Moving along in his step-by-step fashion, he introduces you to program techniques that demonstrate how to move players with a joystick and create sounds and player-missile graphics. Finally, he presents you with a real game that uses these techniques.

Dr C. Wacko's Miracle Guide provides an excellent starting point for anyone who wants to program games. It still takes talent and a lot of work to write games, but it helps to know some of the tips of the trade. The package presents everything well and in an easy-to-read style. It presents items that you select from disk in the same order as they appear in the reference book — a nice touch of simple logic!

This package does not claim to turn you into an instant programmer; it merely claims to provide the tools you need to get started. It does a nice job of delivering information in a thoughtful and humorous manner.

The book prompts you to load certain programs from the disk and then discusses the various programming techniques that these programs use. After you have seen the demonstration, you can press the Break key and explore the program listing. The book is written in a format that makes it easy

for even novice users to follow along.

When a program is well written and contains no visible errors, it is more enjoyable to use. When you use this package, your Break key is not disabled; you need it after you have run a program so that you can break into the code for study purposes. If you make unintentional keystrokes the system does not crash — for the most part it simply ignores them. Sometimes it beeps.

This package comprises 70% documentation. The book is liberally sprinkled with cartoon characters that help Dr. C. Wacko explain the finer points of creating arcade games. Pages 4 and 5 hold the welcome message — really an introduction to all the silly characters Dr. Wacko uses to guide you through the maze of programming techniques. The disk would be worthless without the book.

The easygoing nature of Dr. C. Wacko is demonstrated by his silly (but effective) way of presenting facts. Plain, everyday charts are not enough for this guy. When the program displays charts, a goofy friend of his stands beside them and makes comments about the charts' contents.

This book has a table of contents, a diploma, several pages of graph layouts for your redefined character sets and several appendices.

Appendix A covers ATASCII codes and serves as your main reference tool. Several utility programs are covered in Appendix B. Appendix C has the Hyrtle the Turtle game, listed with directions on how to use it. This game ties all the elements discussed in the book into one arcade game.

The book has no index, but it is laid out in a simple manner. It folds flat for easy viewing from your data table and includes a pocket to store your Wacko disk.

We didn't locate a toll-free technical

InfoWorld
R e p o r t   C a r d

Dr. C. Wacko's Miracle Guide

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
Dr. C. Wacko's Miracle Guide to Designing and Programming Atari Computer Arcade Games! is more than a mouthful — it's a treasure. The funny character of Dr. C. Wacko leads you step by step through the intricacies of game programming, even providing you with insight into the world of player-missile graphics. You'll find this programming tool useful and fun.

System Requirements
☐ *Atari computer or XL computer with The Translator*
☐ *32K RAM*
☐ *Atari BASIC*
☐ *One disk drive*
☐ *Joystick*

Suggested list price: $24.95

Addison-Wesley Software Marketing 3 Jacob Way Reading, MA 01867 (617) 944-3700

InfoWorld
Report Card

Math Mileage

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	☐	■

Summary
Math Mileage encourages players to rev up their basic math skills while they race through a mental-math race-car course. Although this game is designed to reinforce the basic math knowledge of school-age children, adults will also find this game entertaining and challenging — it requires quick thinking rather than reliance on a calculator to complete basic equations.

System Requirements
☐ *Atari computer*
☐ *Joystick*

Suggested list price: cartridge, $37.95; cassette, $32.95

CBS Software
One Fawcett Place
Greenwich, CT 06836
(203) 622-2500

hot line to call for help. You probably won't need one, anyway. The package presents information in a logical manner and should be easy to follow. If you have a major problem, you could try calling the toll-free number listed for Addison-Wesley.

Our use of Dr. Wacko's guide has been educational. If you want to write an arcade game, get started here!
—Cassie Stahl

REVIEW

Math Mileage

Math Mileage is a computer game that challenges the basic math skills of your entire family. The game format is that of a road-rally race in which players advance a car through a series of math problems and attempt to arrive at the destination before their opponents.

The program uses a vertical scrolling technique, and each new screen displays a road that has mathematical operations at each fork. You are given a total and must decide which operations will allow you to reach the total in the least amount of turns. Each mathematical operation takes up one turn, and the operations involve different combinations of addition, subtraction, multiplication and division. The speed of the calculation is not as important as your accuracy. For each correct answer that you offer, you are moved ahead one screen. The easier levels of the game use only two mathematical operations at a time, which means you can do some mental math quickly and figure out which operation to choose. Usually one

operation is addition and the other is subtraction, or one is division and the other is multiplication. The quicker you calculate the formula, the easier it is to get ahead and win.

Some operations cause you to overshoot the goal. A fork with such an operation is marked by a flagman waving a green flag. A green flag also means that you might be on the verge of multiplying by zero. When you begin the game at the first fork, you can usually choose one route that will multiply by zero, and selecting this route costs you. You need to give a wrong answer only once to ruin your chance of having a perfect score.

The program displays a perfect score in gold on a road sign that sparkles. Anything less than a perfect score appears on the road sign without any sparkle.

Once players have mastered a level, they can attempt the same level under more difficult conditions by driving at night. The night course does not display your current score, so you have to keep a running total in your head. If you forget your current total, you can find it by flashing your car's headlights at one of the billboards as you approach it. This costs you valuable time that will be reflected in your score. You can select night driving on any level, but you should learn the route on the daytime course first.

After you finish the route, the Recap screen appears. This screen shows you the fewest number of forks that you can take to reach the goal. We took as long as 20 on one trip and were told that we could have made the trip in less than six tries! The Recap screen displays the time it took to complete the last race and the number of forks taken in white. The same information for previous courses is displayed in blue. The fewest number of forks taken is a clue — by looking at this number and its relation

to the operations offered in the race, you can usually work out a plan that will let you finish the race with less turns the next time you play.

Math Mileage is interesting because it does not follow the pattern of so many other computer games. No harsh and annoying beep sounds when you choose a wrong fork. Instead, a new road sign appears and the amount of the incorrect answer is subtracted from the total. If you want to quit after you have made an incorrect answer, you can press the Option key, and this lets you start a new game and again try for that perfect score.

In order to reinforce the mathematical skills learned in each race, players complete each one twice. You can select day or night racing immediately if you are the only one playing. If two players are involved, then both must complete their race before one can begin the next run with a new goal. You can add or subtract players on the Recap screen.

Math Mileage is simple to operate because it is on a cartridge. This also makes it more durable than a floppy disk and easier for young people to handle.

The game is well written and well executed. A small manual explains the differences between day and night driving and also explains how the score is accumulated. A quick-reference card is provided to answer most game questions you might have after reading the manual. You will find you do not need to refer to the manual all that often because most information is displayed on the screen.

Math Mileage forces you to perform basic math skills without the aid of any tools. It is an enjoyable game that is designed to test your children's basic math skills, but adults will find the game challenging, too.

—*Cassie Stahl*

SOUND

The programs in this category in some way deal with sound — either by using the computer to synthesize certain sounds or by modulating sounds so that computers can communicate with each other.

REVIEW

AtariMusic I and II

If you want to learn to read music, AtariMusic, for Atari computers, is an excellent way to teach yourself. The lessons comprise two packages — AtariMusic I, Notes and Steps, and AtariMusic II, Major Scales and Keys — and each package contains two diskettes. AtariMusic I assumes that you have no prior knowledge of reading music, but AtariMusic II assumes that you have successfully completed AtariMusic I. The packages are designed for ages 10 to adult, but, with adult guidance, younger chidren could also use them.

Each lesson builds upon the previous lessons and explains and demonstrates new material. You can experiment and play with the new ideas, and the programs then give you drill-and-practice exercises that lead to a final test for each section.

The pace of learning is entirely under your own control, and you can go back and review at any time. Although you may experience a few problems in getting around in these programs, AtariMusic is an effective and enjoyable way to learn to read and hear music.

AtariMusic I's first lessons cover note reading — you learn where the notes are on the staff. Next, the program introduces whole and half steps, along with sharps and flats. AtariMusic II introduces scales in all of the major keys. The final section, Hearing Scalewise Melodies, is not only a summary of what was learned in the entire course but is also an excellent introduction to ear training.

When you first load a program into your computer, it presents you with a series of selection menus and submenus. Although these menus are inconvenient and a bit overwhelming, they do permit

you to start at any lesson you desire.

Most of the lessons follow a common format. First, a short paragraph on the screen introduces you to the new idea. (Sometimes more paragraphs are added to expand upon the idea.) The program then demonstrates the information using graphics and sound. At this stage you can begin to play and experiment with the new ideas and information, usually using a joystick. In one lesson, for example, you can play with the difference between whole and half steps, first on a staff and then using a piano keyboard displayed on the screen. In another lesson, you experiment with changing the number of sharps or flats in a key signature while the computer writes out the associated scales for you on the staff. You usually hear the results of what you do in this play segment as you do it. The Atari sound is quite good — it has a range of 4½ octaves, and the notes are mostly in tune.

Next, you are given an open-ended, drill-and-practice exercise on the material that you have just learned. A good way to judge an educational program is to see how it handles both correct and incorrect answers. In AtariMusic, if you get the drill problem right, you are rewarded by the notes being sounded. The program greets a wrong answer with silence. Usually when you are wrong, the program gives you specific hints, such as "Hint — Every Good Boy Does Fine" if you miss a ledger line. AtariMusic is gentle and helpful with your errors.

Finally, the program gives you a test that is structured like the previous practice session. This time it gives you no hints, and you must get 13 out of 15 problems correct to go on to the next lesson.

The programs include three arcade-style games to give you further practice

with your new knowledge. In the first, Note Attack, you must destroy the missiles attacking your rocket. The missiles travel along the music staff, and you destroy them by identifying the notes that the missiles are on, using your joystick.

In the second game, Stepwise Transporter, you transport supplies up and down a music staff to your space shuttle by placing a note either a whole or a half step above or below a given note, as requested by your shuttle. If you are slow in getting the correct answer, a missile hits your shuttle. In the third game, Key Wars, you must identify key signatures quickly.

All three games are difficult, even if you understand the material thoroughly. Each game has ten levels, and each level is faster than the previous level. Action becomes fast and furious — a real challenge. A nice touch is that each game includes a two-player version.

The games do present some problems. You have no way of knowing how many hits your shields can take before they blow up. Perhaps this information is omitted in order to force you to keep your concentration on the music content of the game, but it is disconcerting not to know how close you are to exploding. In Stepwise Transporter, you need a breather between each level of play, but you are not given one.

Other problems exist when you use the AtariMusic programs. When you are using the joysticks, you don't usually hear any sound to confirm that you are moving something on the screen until you press the joystick button to enter your answer. Most Atari products produce some kind of confirming sound (a click, if you can't use a beep) to confirm what you see — something moves on the screen under your control. We miss this in AtariMusic. The joystick

InfoWorld
Report Card

*AtariMusic
I and II*

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	☐	■

Summary
AtariMusic I and II provide an excellent way to learn how to read music and to learn other beginning-music fundamentals. Both programs give you the opportunity to experiment and play with the concepts and information as you learn. A few annoying faults aren't enough to spoil these well-designed lessons.

System Requirements
☐ *Atari computer*
☐ *24K RAM*
☐ *One disk drive*
☐ *Joystick*

Suggested list price: $39.95 each

*Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000*

itself also seems touchy; you can easily overshoot your goal.

The methods that the programs use to step you through them can be confusing. Although the ways used to step through each lesson are consistent, you have to use too many different operations to get the same result. For example, to move forward you sometimes use the Start key; at other times you use the Return key, the space bar or the joystick button. The proper key to press is always shown somewhere on the screen — sometimes it appears in a command line and sometimes in the text.

When you use Hearing Scalewise Melodies, the computer plays a melody and asks you to match it. Since the first note is already given on the screen, the program asks you to begin your answer with the second note of the melody. This is frustrating because you have listened to the whole melody several times, and your instincts make you want to include the first note in your answer to make it feel complete.

These problems are not fatal to your success in using AtariMusic, but they can be annoying and confusing, especially when you are just starting to use the lessons.

A good feature as you work through the lessons is your ability to review the previous frame at any time by pressing the backspace key. You can return to the previous menu by pressing the Escape key.

AtariMusic's documentation is mostly on the screen as you go along; and it is quite thorough. The same booklet accompanies both AtariMusic I and AtariMusic II, and it tells you how to load the programs from disk. It also includes a checklist for recording your test scores, a brief glossary of musical terms and hints for getting around in the programs.

The error handling of both programs is excellent. The programs simply won't accept an inappropriate response or input — if you type a letter when a number is expected, nothing happens. The programs ignore inappropriate responses and don't even display them on the screen. When the program expects a W or H for a whole or a half step, pressing any other key produces a prompt telling you to type only a W or H.

AtariMusic's graphics are good, if a bit drab, and the music is easy to read on the screen. If you work and play with AtariMusic, you should be able to learn the music skills that these programs cover at your own pace and enjoy yourself while you are learning.
—*Bruce Frumker*

REVIEW

S.A.M.

S.A.M. is an acronym for Software Automatic Mouth. This speech-synthesizer program, which comes on a disk, can give your Atari computer a personality of its own — now you can let your computer express itself vocally. S.A.M., developed by Don't Ask Computer Software and marketed by Tronix, is available in versions for Apple, Atari and Commodore 64 computers. For this review we used the Atari version.

S.A.M. speaks to you in two ways. The package contains a program called Reciter that you can use to enter ordinary English text. S.A.M. pronounces 90% of the words you enter in this way correctly, but it has trouble with words that have the same spelling

but different pronunciations. The few words it mispronounces are misspelled — that is, according to any logical spelling system. Could you pronounce *cough, tough* and *though* using only 450 rules about the English language? S.A.M. tries and does quite well. We could understand virtually every word that it spoke, but new users may have a more difficult time.

Another program, Sayit, allows you to enter phonetic language. Use of the phonetic alphabet, or phonemes, allows you full control over the stress, inflection and pitch of S.A.M.'s speech. Stressing certain parts of a word can add dimension to the speech and makes it more interesting. S.A.M can then be demanding, persuasive or questioning. It can plead, beg and nag. It can talk fast or drag its words out slowly.

S.A.M. is easiest to understand when you enter the phonetic alphabet because you can determine where to place the stress points and how much stress should be used. The package includes a 1500-word dictionary to help you learn the phonetic alphabet that S.A.M. uses.

The package also contains some sample programs that allow you to listen to the different types of speech that S.A.M. is capable of producing. S.A.M. introduces itself and gives a couple of speeches: the "Pledge of Allegiance" and the soliloquy from *Hamlet,* for instance.

S.A.M. can also speak to you from your own BASIC or assembly-language program. If you want to use S.A.M. in a program of your own, you need to save its speech in a string and access it with the command A = USR(8199).

S.A.M. disables the Antic chip during vocal output; this causes the screen to go blank, which is unfortunate, but necessary. The Antic chip steals cycles from the Atari computer's 6502 chip, and this action considerably alters the sounds coming

from the program. When S.A.M. finishes speaking, the screen display returns.

S.A.M. is an easy program to use. After you boot the disk for the first time, the program asks you to save certain programs to another disk. This allows you to write-protect S.A.M., yet you can still access the Reciter, Sayit and Demo programs.

We didn't find any errors when we worked with S.A.M. The only time you get a beep out of the program is when you try to enter a word that it does not understand. If this happens, you must go back and correct your phonetic spelling before S.A.M. can speak your word.

The program's 40-page manual is easy to understand and use, and it should answer any questions that you have. S.A.M. is one of the few programs we have encountered that does what the documentation claims it will. S.A.M. speaks!

S.A.M. is protected from defects in materials and workmanship for 90 days from the date of purchase. If S.A.M. stops speaking to you for any reason after the 90 days, you can receive another copy by returning the original copy and $5 to the distributor. Tronix will send you a prompt replacement.

The company prohibits you from using S.A.M. in any software that is to be sold, reproduced or transferred to other parties without its written permission.

S.A.M. is well documented, and the manual is as easy to use as the program. Our Atari 800 computer and S.A.M. were able to communicate like a couple of old friends, and S.A.M. was speaking its first words only minutes after we followed the directions in the manual. This program is a pleasure to have around.
—Cassie Stahl

InfoWorld
R e p o r t C a r d

S.A.M.

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	■

Summary
S.A.M. (Software Automatic Mouth) gives your Atari computer the power of speech. It can speak as soon as you enter English text, and you can also make use of its phonetic alphabet and increase its pronunciation accuracy. S.A.M. can work with your own programs, too.

System Requirements
☐ *Atari 400 or 800 computer or XL computer with The Translator*
☐ *32K RAM*
☐ *One disk drive*

Suggested list price: $59.95

Tronix
8295 South La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529

InfoWorld
R e p o r t   C a r d

Tele-Talk

	Poor	Fair	Good	Excellent
Performance	☐	■	☐	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
The Tele-Talk modem program has many features, but several are poorly implemented and others do not work properly. Its object-file transmission methods are also incompatible with those that most bulletin boards support. Since modem programs that use standard file-transfer methods are available free of charge on bulletin boards and networks, you should investigate these thoroughly before you spend money on Tele-Talk.

System Requirements
☐ *Atari computer*
☐ *32K RAM*
☐ *One disk drive*
☐ *Modem with 850 interface*

Suggested list price: $49.95

Datasoft, Inc.
19808 Nordhoff Place
Chatsworth, CA 91311-9969
(818) 701-5161

REVIEW

Tele-Talk

We have used several modem programs written in various languages for Atari computers and have never used one with more features than Tele-Talk. Unfortunately some of this program's features are poorly implemented, and others do not work properly.

Tele-Talk allows your computer to appear as a terminal to other computers. In common with other programs of this type, it requires you to connect some type of modem to your computer and the telephone line. Tele-Talk's documentation mentions that you need a modem, but it does not delve into how you should connect it. This is probably better left to a local, qualified hardware dealer who can help you determine your needs. Almost any quality modem with an 850-interface should work with this program. Tele-Talk does not work with a direct-connect modem that does not require an 850, such as that sold by Atari.

Tele-Talk has two screens. You use its Interactive screen to transmit and receive data and the main-menu screen to select submenus that allow you to use such functions as time setting and initiating file transfers. Initially Tele-Talk looks good on screen and operates smoothly — you can even change the screen's background color to reduce fatigue during long sessions — but after you have used Tele-Talk for even a short period, any good feelings give way to irritation.

Tele-Talk's Timekeeping function keeps the time of day in 24-hour format as well as connect-time charges for each session. You can set the program's Time of Day function easily, but it has a problem at midnight — the clock skips

from 23:59:59 to 01:00:00. The routine that calculates session charges is also flawed. This routine computes the charge and updates the screen each minute, but it writes only the nonzero digits on the screen and omits trailing zeros, which can be confusing.

You manipulate the screen-color change and the Timing feature through keystrokes entered on the Interactive screen. Be warned, though, such local use of control characters on the Interactive screen can interfere with proper operation of some host systems.

One of Tele-Talk's distinguishing features is that you can transmit predefined text using a single keystroke. You can send ten 32-character strings to a remote computer by simultaneously pressing the Select key and a number key. You can use these buffers for sign-on sequences or for often-entered commands.

All terminal programs require users to know certain information about the host computer to which they want to make a connection. This information is crucial to proper operation of Tele-Talk and, to its credit, you can set this information through the use of easy-to-master menus. Some of the more-often-used settings that vary from system to system are baud rate, number of bits and parity type and whether the host uses XON/XOFF flow control. (These terms may sound confusing, but personnel at any system will know all the proper settings.) After you have entered these values into Tele-Talk, you can easily save them to disk and retrieve them later when you want to reconnect to the same service. The data you save includes ten preset text sequences.

Tele-Talk includes two types of file-transfer commands. First, it has a Text (printable characters only) mode, in which it saves text in memory until you have completed or temporarily suspended a transfer. It then transfers

your text to a device of your choice. You can review the text with a menu option. If you press the Control-1 key combination, you cannot stop the scroll, but Control-1 does have an effect — the next time you ask Tele-Talk for the menu, it will not display it until you press Control-1 again. You must edit text you save in this mode before you use it, because the program does not allow you to specify the top and bottom limits of the text you want to save.

Tele-Talk's second file-transfer method is through a block-transfer, error-checking system, similar to XMODEM and KERMIT (standard protocols) but, sadly, not like either. This limits the usefulness of Tele-Talk's file transfer because most bulletin boards support XMODEM for object-file transmission. Tele-Talk's block-transfer method sends the filename from the originator exactly as typed, so you can quickly and easily save the file. If, however, the sender used wild-card matching (put an * in the filename) to select a file, Tele-Talk sends the default filename with wild-card characters intact. This can cause problems, and you must check carefully to avoid error before you save the file.

Another Tele-Talk feature, which works well, is its Full-Duplex Typing option, referred to as Split Screen, in the program's manual. This option splits the screen and leaves the last three lines as a type-ahead buffer. You can then transmit this buffer as a block after you press Return. Using this feature, you can type up to 120 characters in response to a message you receive, without interfering with reception.

Tele-Talk's manual is complete — it contains a one-page glossary of terms and lists some of the better-known networks in the back. We could not make the program operate incorrectly with incorrect input — it just issued a

pleasant error tone. The software seems to check for any disk drive other than a standard Atari 810 speed disk and, if it finds one, displays a Boot error and reboots, after it has read about 30 sectors of the disk. You cannot copy the Tele-Talk disk with DOS, and its warranty allows for only a 90-day replacement period for defective disks. Datasoft will not replace accidentally damaged disks after the 90-day warranty period has expired.

Tele-Talk's price is no bargain. Modem programs are available free of charge on bulletin boards and networks (such as CompuServe). These free programs use a standard file-transfer protocol, and we recommend that you investigate these before you buy Tele-Talk.

—*Micheal D. Morrow*

GRAPHICS

*If pictures are worth
more than words to
you, take a look at these
graphics programs.
They're not just for
drawing pictures, either.*

REVIEW

Paint

Paint, a program for the Atari 800
computers, is a good toy that allows you
to transform your monitor and Atari
800 into a canvas and brush. To use
this program, you also require a BASIC
cartridge and one disk drive. Use of a
joystick is optional.

Paint consists of three parts: Simple
Paint, Super Paint and Art Show. You
choose which part of Paint you want to
use from the program's main menu,
which appears when you boot the disk.

Simple Paint is a painting program
for small children and beginners.
Lacking all the bells and whistles of
Super Paint, this section is great for
creating simple pictures. The lower left
corner of Simple Paint's screen displays
a set of four paint pots, each filled with
solid colors. Next to the paint pots is a

set of brushes, and next to the brushes
is an E icon that you can use as an
eraser. Above this line of icons is a clear
area — this is your "canvas."

To select one of the brushes at the
bottom of the screen, you simply place
the cursor over the desired brush and
press the fire button on your joystick.
You can set the color of each of the four
paint pots by using the program's Mix
command, and a set of disk utilities
allows you to load and save pictures to
and from the disk.

Super Paint, a more complex version
of Simple Paint, has enough features to
allow almost anyone to create
interesting pictures. Super Paint's
screen resembles that of Simple Paint,
but it contains six extra paint pots that
hold textured paints. Next to the paint
pots are a Help icon and a Zoom icon.

Super Paint's extra paint pots hold
an assortment of color mixes and
textures that give you added artistic
flexibility. Super Paint allows you to

select exactly what goes into each paint pot. If you change any of the first four paint pots, you alter the basic colors available. To alter one of the textured paint pots, you select the pot twice, and the program then presents you with a large palette of interesting color mixtures and patterns. You move the cursor around this collage of textures and patterns, and when you come across a combination you like, you press the fire button. The pot you are altering then changes to the selected texture. Hundreds of textures and color patterns are possible.

Although Simple Paint has only a few commands, Super Paint has an extensive set of commands. In addition to the Simple Paint commands, it has commands that let you draw lines, circles and rectangles. Several Fill commands are also available. The basic F-Fill command allows you to fill an enclosed shape with any color you want, provided the color you are filling with matches the color of the border. The I-Fill, or internal fill, allows you to fill any shape with any color regardless of the color in the border. The X-Fill (external fill) allows you to fill any shape as long as the filling color is different from the border color.

Super Paint has the same set of disk commands as Simple Paint. These instructions include K, which keeps a picture, and J, which junks (gets rid of) a picture.

This section of the program also has an extensive Help function, which has two parts. The first part consists of a list of commands and the key that is associated with the command. To select a command, you use the joystick to move the flashing cursor to the desired command and then press the button. If you are really lost, you can call up more help. The second Help screen contains all the commands and the keys associated with them.

You can control almost all of the functions in Super Paint with the joystick. Although you do need to use the keyboard to operate the Line mode and Circle mode, for example, the number of functions that require you to use the keyboard is minimal. On the other hand, if you prefer to use the keyboard, you can.

Super Paint allows you to choose from nine different brushes and nine different brush widths, giving you a total choice of 81 different brushes.

You also have two speed controls — one controls the speed of your brush when you are painting on the screen, and the other controls how fast the cursor, which controls your brush, travels across the screen. The latter feature is a great help because you can reduce the time you spend waiting for the cursor to travel to the right place on the screen before you can start drawing.

Finally, Super Paint has a Zoom command, which allows you to take a close-up look at your picture. This command is handy for fixing up imperfections in your picture or for adding small details.

The third section of Paint, the Art Show, allows you to display up to 24 pictures at a time in a slide-show format. This is the only way that Paint allows you to display your completed pictures — you cannot integrate your pictures into other programs.

Paint's 147-page, softbound manual is clear and well written and takes you step by step through the program's features. The first third of the book is devoted to the operation of the Paint program, and the remainder discusses computers and computer graphics. It contains sections on how computers work, applications of computer graphics, descriptions of computer artists, the history of art and a section that has ideas on how to use Paint.

Unfortunately, Paint's error

InfoWorld Report Card

Paint

	Poor	Fair	Good	Excellent
Performance	☐	■	☐	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
Paint, a painting program for Atari 800 home computers, allows you to produce colorful pictures and, if you wish, present them in a slide-show format. It's a great toy for children and has excellent documentation, but its graphics quality is not adequate for serious artists.

System Requirements
☐ *Atari 800 or XL computer with The Translator*
☐ *BASIC cartridge*
☐ *One disk drive*

Suggested list price: $39.95

Reston Computer Group
A Prentice-Hall Company
11480 Sunset Hills Road
Reston, VA 22090
(800) 336-0338

handling is not good. Within the first five minutes of using the program, we were able to make it fail.

We have other criticisms of this program, too. Some functions don't work too well — for example, the Circle command doesn't make good circles and tends to "freak out" at the edges. The cursor doesn't give you any clue as to where your brush will actually plot, and if you make a mistake on your picture, there is no easy way of erasing it. Paint also uses only a medium-resolution graphics mode, so detailed work is difficult.

All in all, Paint is only a fair package. The book that comes with it is excellent, but unfortunately it doesn't make up for the program's shortcomings. This program is an excellent toy for children, but, since Paint does not offer a high-resolution screen or brush control, serious artists will need a different drawing program.
—*Kevin Cheung*

REVIEW

pm Animator

pm Animator is intended to put one of the Atari's least accessible (and most powerful) abilities, player-missile graphics, within the reach of BASIC programmers. It provides some tools that are useful to experienced programmers, but the program's poor documentation and complicated implementation may hinder novices more than help them. To use pm Animator, you require 32K RAM, the Atari BASIC cartridge, one disk drive and a real desire to learn.

Using player-missile graphics may be the most difficult aspect of Atari programming. Most other computers, if they have graphics at all, use playfield animation: pictures are drawn and redrawn on the screen to simulate motion. Atari's hardware designers built in a more advanced means of animation. You can define up to four players and their associated missiles in memory, independently of the playfield. Their motion over the playfield does not affect what is drawn there — it is as if the players exist on a plane that is separate from that of the playfield, with that plane superimposed over the screen.

It is this player-missile ability that permits Pac-Man to move around a maze so nimbly, allows the Zylon fighters to swoop in and out with such dexterity in Star Raiders and makes moving armies such a snap in Eastern Front: 1941. Until now, though, the use of player-missile graphics has been limited to accomplished programmers working in assembly language. Tronix's pm Animator is designed to make player-missile graphics accessible to BASIC programmers.

Utilizing player-missile graphics requires several steps. You must design the player's image (usually on graph paper), then convert the representation into binary digits, load those numbers into memory and then send the right signals to the appropriate hardware registers (dedicated memory locations within the chips).

pm Animator automates these steps with a player-missile design program, a file program that allows you to construct elaborate player-missile data files and a BASIC subroutine that helps display and move the players in your programs. Several programs are also provided to demonstrate the power of pm Animator. These programs are on a copy-protected disk and come with an 80-page owners' manual and tutorial.

The editor and file-utility programs are the heart of pm Animator. Both are powerful and easy to use. The Grafix Editor helps you build a player, dot by dot, on a larger-than-life-size grid. As you draw with the joystick or cursor-movement keys, you can also see the player displayed as it will appear in your program. To facilitate the design of animation, the editor can display an animation sequence using the players you have designed. When you are satisfied with your design, you can instruct the editor to save the binary description to disk.

The Grafix Editor also has commands that let you change the color of your player using the keyboard, erase your player, reverse the bit pattern (which creates an inverse of your design), create and display a multicolor player by overlaying multiple players, copy your player from one frame to another and change the width of your player. You can select all these commands from a menu that is always visible on the screen. A menu of DOS commands is also available.

Although you can see only three player frames simultaneously, you can create up to 16 players at a time. If you want to use more frames in your animation, you need to use the File Editor program, which is like a graphics spreadsheet. Here you can combine, rearrange and edit data files created by the Grafix Editor to create a single data file of up to 32 frames.

Once you have generated the appropriate player data file, you have a choice: If you are a sufficiently accomplished programmer, you can incorporate the data directly into your own assembly-language programs. The files that pm Animator creates contain the player-missile data bytes in sequential form, ready to load into memory.

If, however, you are new to programming or are programming in BASIC, the hard part is yet to come. You've designed some really nifty players, and the File Editor has helped you put them together for animation, but how do you get them into your own programs?

pm Animator comes with a file, TOTAL.LST, that you can merge into your BASIC programs. This short subroutine contains some advanced assembly-language routines that facilitate player movement and animation in your program. The good news is that you can use these routines in any program you write without paying any license fees, even if you intend to sell your programs. The bad news is that you may need to be an experienced programmer to figure out how to use them.

You summon most of the routines with the BASIC USR command. The manual explains the use of this command and the parameters that each routine requires. Routines exist to clear memory rapidly, to load data files and to move data in memory.

The TOTAL.LST subroutine also sets up memory locations that you can manipulate with the BASIC POKE command to move your player around the screen. A note for more technical readers: Atari hardware has a built-in, horizontal-location register to position players, but it lacks a vertical-location register. pm Animator makes up for this lack with a nice vertical-blank routine that simulates a vertical-location register. This is an improvement over methods that assembly-language programmers use to simulate vertical motion, and it makes movement of players considerably easier.

The manual does a creditable job of explaining player-missile graphics and the associated Atari hardware, but its description of how to use the BASIC subroutines is horribly inadequate.

InfoWorld
Report Card

pm Animator

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	■	☐	☐	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
pm Animator steps programmers into the arena of player-missile graphics. Programming results are salutory, but you must have programming experience to use this package easily — its documentation won't help you along.

System Requirements
☐ *Atari 800, 800XL or 1200XL computer*
☐ *32K RAM*
☐ *DOS 2.0S*
☐ *Atari BASIC cartridge*
☐ *One disk drive*

Suggested list price: $44.95

Tronix
8295 South La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529

Nowhere does it provide a step-by-step example of how to set up a player using the data files you have generated, and because the demo programs on the disk don't use TOTAL.LST, you can't learn how to use the subroutine even by example. Even though we have designed player missiles from scratch in assembly language, we had a great deal of difficulty using the TOTAL.LST routines in BASIC. We expect novices would be completely at sea.

If you do manage to figure out how to use TOTAL.LST in your programs (and with some perseverance, you should be able to), you will find it possible to do almost any kind of player-missile animation, smoothly and at machine-language speed, from within BASIC.

pm Animator can be an excellent product or a disappointment, depending on your needs and expertise. Its two editing programs are well designed. They represent the state of the art in programming utilities, and they are easy to use. If you are an experienced programmer who uses player-missile graphics often, you will find pm Animator a real help.

If, however, you are a novice programmer or are unfamiliar with assembly language, you may find pm Animator disappointing. It's such fun setting up your player files that you'll be really anxious to get a program of your own running — and that's just when pm Animator stops holding your hand. Expect to put in some hours working with TOTAL.LST and the manual. If you get through them, you will have mastered one of the Atari machine's most difficult tricks — and you will then find that pm Animator is a valuable tool.
—*Leo G. Laporte*

REVIEW

MicroPainter

The Atari computer's exceptional graphics capabilities once seemed to be locked away deep inside it, only to be freed by the wizardry of accomplished programmers. MicroPainter was one of the first programs to make the Atari's colorful graphics accessible to everyone. Today, this granddaddy of computer-drawing programs is still exciting and fun to use. Datasoft bills MicroPainter as a computer coloring book — the package even comes with crayons and a little magnifying glass: real-world metaphors for the computer's electronic abilities.

When you boot the copy-protected MicroPainter disk, the first thing you see is the Option menu. This menu provides access to useful DOS functions such as calling up a disk directory; loading or saving a picture; and locking, unlocking, deleting or renaming a file. After you press the Return key, you see a darkened screen that has a blinking plus-sign cursor in the middle and a palette of colors at the top. This is the blank canvas on which you can create your micro masterpieces.

You can use a joystick or the cursor-movement keys to move your electronic paintbrush around the screen. The joystick is easier to use for broad strokes, and the keys are better for producing fine detail. The palette at the top of the screen holds your paint jars. You can choose from four solid colors (one of which is your background color) and three patterns: checkered, horizontally striped or vertically striped. You can use only four of the Atari's 128 colors on the screen at any one time.

Once you have selected a color, you can use one of three cursors to paint on

the screen. The plus-sign cursor draws like a paintbrush when you press your joystick button. When you use it in the Line mode (sometimes called the Rubber Band mode), the cursor changes to a bull's-eye shape. This mode lets you connect any two points with a straight line — press the joystick button once to fix the first point and move to the second point and press the button again. MicroPainter then automatically draws a line between the two points.

You use the X-shaped cursor to fill a shape with color. This mode is most like a coloring book — you draw an outline and then fill it in with paint. The MicroPainter disk provides a number of uncolored practice pictures by Picasso, Rousseau and computer artist Saul Bernstein.

The program has an Undo command that you can use to erase everything you've drawn since your last fill operation — a useful feature.

MicroPainter has another feature that makes it more than a simple computer coloring book. If you press the space bar, you can zoom in to see a portion of your painting magnified to seven times its size. With the tiny picture elements enlarged, you can paint the finer details without straining your eyes. Try that with oil paints on canvas! This Magnifying feature accentuates both the advantage and the disadvantage of drawing with a computer. The advantage is the flexibility with which you can apply color to the screen; the disadvantage lies in the screen's limited resolution.

MicroPainter draws and displays paintings in Antic Graphics Mode E, sometimes called Graphics 7+. The painting area is composed of 26,880 dots — 140 horizontally by 192 vertically. That sounds like a lot, but it's not enough to make smooth curves or prevent some lines from looking jagged. This limitation is due to the Atari

hardware, though, and not the program. Do not expect your masterpieces to look as smooth and polished as a Rembrandt — they are more likely to look like something from the pointillist school.

MicroPainter does its job well, but it lacks some features that the newer generation of drawing programs include, such as commands that enable you to draw circles and boxes. You can create boxes easily using MicroPainter's Rubber Band cursor, but circles are more difficult to produce. Because Atari joysticks only move in eight directions, it's tough to get the fine control you need to draw a circle. The only way is to use the Magnify mode and draw the circle one point at a time. This is not only difficult, but the results are also often far from satisfactory. This is the one major flaw in the MicroPainter program.

Joysticks make poor drawing tools. They are easy for children to manipulate, but it takes the patience of Job to use them to create anything that really looks good. Until recently joysticks were the only choice for drawing with computers, but now programs that use digitizing tablets are available. These tablets offer a more natural means of drawing and produce better results. Unfortunately, MicroPainter doesn't currently offer a choice — it's joysticks, keyboard or nothing.

MicroPainter does have advantages, though. Because it was the first Atari painting program, it is well supported in the public domain. Programs exist that enable you to print MicroPainter paintings on many brands of printers, to incorporate MicroPainter files in your own programs and so on. The MicroPainter data format has become a standard.

MicroPainter is easy to use. You can enter commands using the keyboard or a joystick. Datasoft thoughtfully

InfoWorld
R e p o r t   C a r d

MicroPainter

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
MicroPainter was one of the first programs to enable users to exploit the Atari computer's graphics capabilities. It has now become a standard for computer-drawing programs and is well supported in the public domain. Although it lacks some features that the newer drawing programs contain and although you can only use a joystick or the keyboard to enter commands, it is easy and fun to use.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *One disk drive*

Suggested list price: $34.95

Datasoft, Inc.
19808 Nordhoff Place
Chatsworth, CA 91311-9969
(818) 701-5161

provides a helpful 8½ × 11-inch quick-reference card to help you keep track of its many commands.

MicroPainter protects you from most errors and responds with English-language error messages. The manual contains a list of these messages and recommendations for what actions to take when you see them. It is possible to inadvertently erase your picture if you press Reset, though. MicroPainter also does not warn you if you save a picture under a duplicate filename — it silently overwrites the previous file, unless you have had the foresight to lock it. Otherwise, MicroPainter is sufficiently errorproof for use by both five-year-olds and fumble-fingered adults alike.

Datasoft provides good documentation for MicroPainter. In addition to the quick-reference chart, the documentation comprises a 32-page manual that contains a "Five-Minute Demo" to get you started. This is followed by a clear explanation of the program's finer points. Children under eight or nine will need some adult help, but grown-up computer novices should have no trouble getting started because the program is so easy to use.

If you do have problems getting started, you will have to rely on your dealer's help. Datasoft does not supply a user support phone number.

MicroPainter is in the same position as VisiCalc and many other pioneer programs. Newcomers have imitated and, in many cases, improved on its capabilities, but as the first of its kind and as a standard, MicroPainter deserves some respect. Many old-timers refuse to use the newer products — instead they prefer to use their old-faithful friend, MicroPainter.

—Leo G. Laporte

REVIEW

B/Graph

B/Graph is a powerful menu-driven graph-generating and statistics program for Atari computers. The package consists of ten BASIC- and machine-language programs on two copy-protected disks. These programs perform two tasks: The statistical tools that B/Graph includes allow you to extract useful information from a mass of numbers, and its graphing modules give you a variety of means to display that information. B/Graph is proficient at both these tasks.

You can pass data to B/Graph in three ways. Of course, you can enter it by hand, but the program can also read files in ASCII or DIF (VisiCalc's data-interchange format). You can, therefore, easily write a program to generate data files for B/Graph, and B/Graph can read files created by VisiCalc and other programs that use DIF.

Once B/Graph has your raw data, you can use its extensive statistical abilities to analyze that data. These capabilities include exponential smoothing of data points; moving and geometric-moving averages; chi-square-, t- and F-distribution tests; and normal-, Poisson- and binomial-distribution probabilities. B/Graph also does regressions and correlations of data values. In short, B/Graph provides a complete arsenal of statistical programs.

Having generated the information you need, B/Graph then helps you display those numbers to their best advantage. You can generate line graphs, scatter plots and stock-market tic graphs, each graph containing up to three factors with as many as 100 data points each. B/Graph also generates vertical bar graphs that can display 48

bars and pie charts that can contain up to 16 slices.

An Imaging program allows B/Graph to label graphs with four sizes of lettering in three colors. B/Graph draws all graphs in two-color graphics (Mode 8), but it can simulate three additional colors using a technique called artifacting. On monochrome monitors, additional colors appear as stripes and solids.

If you are using a color TV, B/Graph allows you to easily modify the colors and luminances of both the foreground and background while you are viewing your graph. The program allows you to use nearly any combination of the Atari's 128 colors — it locks out only those combinations that would produce an illegible graph.

You can save the graphs you create to disk either as data files or as images that you can subsequently load and display using B/Graph's Slide Show program. B/Graph can also print your graphs using a number of common graphics printers. The current version of the program supports Centronics (Atari 825), Epson, Gemini, C. Itoh, NEC, Pro Writer and Seikosha AT/100 printers. You can also dump screens, although with somewhat less fidelity, to the Okidata Microline 92 printer. B/Graph's authors indicate that they intend to support additional printers and plotters in future versions.

Since B/Graph is such a large and complex program (it requires over 130K memory), it is impossible to describe all its features in a single article. Suffice to say, B/Graph performs most of the functions users of a business-graphing program expect. Its statistical operations are fairly fast, and its graphing modules produce high-quality graphs with minimal effort. B/Graph isn't perfect, though. It does have a few flaws of which you should be aware.

For example, it displays pie charts

on the screen not as circles but as ovals. They'll print as circles, but they don't look quite right on the TV screen. Apart from that aesthetic criticism, the graphs produced by B/Graph look quite as polished and professional as any we've seen.

We're less sanguine about the use of the Start, Select and Option function keys — the authors of B/Graph want them to do too much. When the program is displaying your graph during its Image Labeling program, if you press Start, B/Graph begins a screen dump; if you press Select, it saves your graph to disk; and if you press Option, the program returns you to its master menu. To change type styles, you must press Select and Start simultaneously. Have you ever tried to press two keys exactly simultaneously? The manual says it's easy with practice, but it's not — one slip and you print your graph or save it to disk, whether you want to or not.

A more severe problem exists when you use B/Graph's Graphing module. Once you exit from the module's data-entry portion, you *must* allow B/Graph to draw a graph. If you attempt to do anything else, you lose all your data. This is an intolerable flaw in an otherwise useful program.

Commodore Business Machines apparently knows of this bug and has corrected it, along with several others, in an upgraded version (1.1) that will be available to current users for a nominal fee. The upgraded version also adds 12 new functions, including compatibility with MicroPainter graphic files, so that users of this and several other drawing programs can further enhance their graphs.

Commodore provides a comprehensive manual with B/Graph. The manual features a foreword that discusses the general nature and use of illustrative graphs and a tutorial by Ian

InfoWorld
Report Card

B/Graph

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
B/Graph is a powerful graph-generating and statistics program for Atari computers. Despite its complexity, it is fairly easy to use, due in part to its extensive documentation. It does have some flaws, however, although future upgrades should eliminate these.

System Requirements
☐ *Atari computer*
☐ *48K RAM*
☐ *Atari DOS 2.0*
☐ *One single-density disk drive*

Suggested list price: $99

*Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
(215) 431-9100*

Chadwick, an accomplished writer and computerist.

B/Graph is a complex and advanced package, but the manual goes a long way toward making it easy to use. You'll even find a short course on statistics here. The B/Graph disk includes several example graphs and data files for use with the tutorial. Thanks to this and the tutorial, B/Graph should have educational as well as business uses.

Our only criticisms of the manual are that it could have a more extensive reference section and an index. The tutorial is so voluminous that it's often difficult to find a forgotten piece of information.

Overall, B/Graph is a powerful and useful package that, considering its complexity, is fairly easy to use. Its authors have managed to make good use of the Atari's superlative graphics capabilities, while transcending its other limitations.

This program does more than most programs written for business-oriented machines, and its extensive documentation and menu-driven command structure ensure that its power doesn't go to waste. Despite some flaws (ugprades will probably fix all the problems we have described), we recommend B/Graph for all Atari owners who would like to use their computers to generate, analyze and display numeric data.

—*Leo G. Laporte*

REVIEW

Movie Maker

Movie Maker is designed to bring Hollywood home by putting you behind your own animation camera — in this case, your Atari 800, 1200XL or 800XL computer. You can now become a director, writer and animator and create your own computer-animated movies.

Though Movie Maker is not a game, it is not quite a programming utility either. Rather, it's designed to let you harness the graphics ability of your Atari computer without having to learn programming.

Using the Compose section of the program, you can create a screenful of shapes that form the basis of your animation sequence. By telling the computer how to display these shapes, you create an animated picture.

Movie Maker does not have the full capabilities of a programming utility because you cannot easily incorporate the animation that you've created into a computer program. If you want a development tool to create graphics for a commercial program, you need to purchase the $4000 version of this program (which is probably the most expensive program available for the Atari computer). You will still need to do extensive work to incorporate your creations into a program, and you will have to master assembly language, too. These requirements probably limit most people to using Movie Maker for recreational purposes.

If you want to see what Movie Maker can do without investing a lot of time and effort, don't despair. By using the shapes already on the disk, you can create animation instantly. You merely select the shapes you want from an animation sequence, type A (for Action)

and press the space bar. You can move your chosen shapes across the screen using the joystick — it's instant gratification!

The real work begins when you create your own shapes. (That's why the canned shapes on disk are convenient to get you started.) Movie Maker comes with a nice graphics editor that you can use to create anything from simple box shapes to more complicated Disney-like characters. You can zoom into the picture to do detailed work, duplicate shapes or make minor changes. Mirror images of existing shapes are simple to make and are often effective.

You can change the speed of the animation at any time by typing in a number corresponding to the desired rate of frame change, and you can vary the color and luminance of the background and shapes just as easily.

After you create your shapes and put them into an animation sequence, you can record their movements in the Record portion of the program. You can then make such alterations as viewing and adjusting images individually or assigning each image a separate speed of movement. If you don't like how it all turns out, try changing individual components and viewing the movie again.The Record section also lets you create zoom and color changes as well as sounds.

Movie Maker's Smooth feature works automatically. You select the movie that you want "smoothed," and the program removes all flicker. The final product is slick and professional looking.

When you are ready to view the movie you have created, you select Play from the menu and type in the name of your file. While watching the movie, you can adjust the frame rate and select once-through or continuous viewing.

Lefties will appreciate the ability to easily modify the program so that they can turn the joystick box and press the button with their right thumb. A simple solution to a perennial problem!

After you have created your "actors," you can design the set. You do this by drawing the background. The program's built-in copying feature is particularly helpful here, as it allows you to draw a single detail and then duplicate it as often as you wish. You then save the background to disk, select the actors and the background that you want and record them together. You then need only make the actors do their thing, and you have a movie!

Because you are creating files that contain shapes and backgrounds, you can combine these shapes with different backgrounds to create endless animated scenes. With enough shapes on file, you can create complete stories from just a few files.

You select the sound effects for your movie from canned sounds that come with the Movie Maker disk. You can manipulate and combine these sounds to create unique sounds that you can insert wherever you want.

You can update your movie at any time. You can decide that you want to yank an actor out of a particular screen even after you have recorded the entire movie. Though you are limited to 300 frames per sequence, you can make a longer movie by running one program immediately after another.

Learning any new program of this complexity requires time and effort. Mnemonic commands ease the process a little, so once you become familiar with the standard commands you'll remember which key to press. It then becomes a lot easier to be creative. Artists who have done animation professionally will have an advantage, since learning the program is easier than using it effectively. You have to be talented at drawing, directing and writing to make a fancy movie.

InfoWorld
Report Card

Movie Maker

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
Movie Maker offers those with a creative bent the opportunity to become animators and film directors. A scaled-down version of a $4000 professional animation tool, Movie Maker is by nature complex, but you should be able to make a movie your first time out by using canned shapes. This is a truly enjoyable program to use.

System Requirements
☐ *Atari 800, 800XL or 1200XL computer*
☐ *One disk drive*
☐ *Joystick*

Suggested list price: $60

*Reston Computer Group
A Prentice-Hall Company
11480 Sunset Hills Road
Reston, VA 22090
(800) 336-0338*

The program incorporates the finest error-handling techniques. We could not cause it to fail, and it allowed us to restore color changes and other things that we had erased.

Though the manual that comes with Movie Maker has a few inaccuracies, it is generally well written. The manual begins with a step-by-step explanation that starts you on your first animated movie. It contains a summary of commands, which is also printed on a cardboard reference card. The glossary in the back of the manual contains definitions of the terminology, so you do not need to know any special computer or animation terms.

Considering the complexity of this program, the manual does a fine job of teaching the fundamentals of computer animation. Almost anyone who has computer aptitude will find it easy to learn the program.

The manual provides the phone number of the company's main office. We called on a Sunday and got a recording giving us a number to call in Philadelphia. When we called that number, we reached one of the programmers. He was friendly and helpful, although a bit surprised that we had his number — you should only count on weekday support.

Anyone who has a fantasy of becoming a famous animator will enjoy this program. It does everything that you could expect a home animator to do and allows you to create an entire movie in one afternoon, something that would be impossible using traditional animation methods.
—*Cassie Stahl*

PROGRAMMING

After you've had your Atari for a while, you may want to enter the realm of programming. The products in this category give you a variety of programming possibilities.

REVIEW

Atari PILOT

Virtually anyone can become a programmer with Atari PILOT. If you purchased your Atari computer with the idea of writing programs for your children and then found yourself bewildered by the complexities of Atari BASIC, you can take heart — Atari PILOT is quicker to learn and easier to use than Atari BASIC and is, at the same time, a powerful programming language.

PILOT (it stands for programmed inquiry, learning or teaching) was originally developed by Dr. John Starkweather at the University of California, San Francisco, to provide a tool for teachers to use for writing programs for their students. Between 1967 and 1974, Dr. Dean Brown at the Stanford Research Institute's Education Laboratory established PILOT as a good language for teaching programming to children.

Atari took PILOT, which until then had been used mainly for developing conversational programs, and added turtle graphics, a concept developed by Dr. Seymour Papert and the Logo group at the Massachusetts Institute of Technology. As a result of these developments, Atari PILOT programmers can not only easily write conversational programs but can also draw and generate sounds.

PILOT comes on cartridge. As a result, once you insert it into a cartridge slot on your computer, it becomes an integral part of the computer and only Atari PILOT commands and operating modes are operational.

Atari PILOT uses two types of commands. The first type are the program commands, which are the basic building blocks that make up a program. They are composed of one or

InfoWorld
Report Card

Atari PILOT

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	■

Summary
As a programming language especially suitable for at-home or in-school use, Atari PILOT is an excellent alternative to Atari BASIC. It's quicker to learn and easier to use. With it you can write conversational programs and draw and generate sounds. The manual, like the language, succeeds in initiating novices into the world of computer programming.

System Requirements
☐ *Atari computer*

Suggested list price: $79.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

two letters followed by a colon. Because Atari PILOT is often used in the construction of programs that provide interaction between the computer and the operator on a conversational basis, two good examples of Program Commands are T: and A:. The command T: commands the computer to type, and any text that you enter following this command appears on the screen. The command A: stands for accept, and means that the computer accepts any text following the colon as a response from the operator.

Other commands are M:, which instructs the computer to accept one or more inputs as matches, J:, which instructs the computer to jump from one area in the program to another; R:, for a remark about which the computer should take no action; GR:, which moves you into a graphics mode; and SO:, which creates sound tones. There are 15 such commands altogether, including some that you create by adding conditions to the basic program commands.

The second type of commands are the ten executive commands — they tell the computer to do something with a program. These commands include Auto, to create automatic line numbering; Run, to run a program; List, to list the program for your review; Dump, to display all string variables; and DOS, to take you to the disk-operating system.

When you use the programming command GR:, which puts you into the Graphics mode, you need to use an additional subcommand to tell the computer what you intend within the Graphics mode. Unlike the Programming mode, which displays a blue screen, the Graphics-mode display consists of a black screen (rather like a blackboard) that has a blue window below the black area. This window is for writing text, and you have room to enter

four lines. You can use three colors on your black background: red, yellow and green. You can use these colors to draw lines and fill in areas with solid color.

Atari PILOT has two drawing systems, and you use both of them in the same program. The first uses Cartesian coordinates. In this system, the screen is split by an x- and a y-axis. By naming a specific reference, such as −79,47, you designate a specific point on the screen as a reference point from which, or to which, to draw. The second system is called turtle geometry. The invisible turtle turns and moves. Lines extend from it, in whatever direction it happens to be facing at the time, and reference is always from the turtle, wherever it may be on the screen.

You can generate sounds by using the programming command SO:. Tones that you can make range from low C (one-and-a-half octaves below middle C) to high F# (one-and-a-half octaves above middle C). You can play chords that have up to four voices at one time. The programming command PA:, standing for pause, determines the length of the tones and tempo of the music.

Atari PILOT has two main types of variables — string variables and numeric variables. String variables make the personal dialogue between the computer and the user possible. Examine the following program, for example:

    10 T:WHAT IS YOUR NAME?
    20 A:$NAME
    30 T:HI $NAME. HOW OLD ARE YOU?

Line 10 instructs the computer to type the question, "What is your name?" on the screen. Line 20 accepts the operator's answer — for example, "Chris." In accepting this answer into memory, the computer also has now received notice that the string variable $NAME is to be defined as Chris until

told differently. Line 30, therefore, instructs the computer to type: "Hi Chris. How old are you?"

Combining the use of string variables with matching and conditional commands describes the heart of Atari PILOT. Consider the following:

```
10 T:WHAT IS THE WEATHER
LIKE TODAY?
20 A:
30 M:SUNNY, CLEAR, WARM,
HOT, BEAUTIFUL, NICE, GREAT
40 TY:YOU SHOULD GO TO THE
BALLPARK
50 TN:YOU SHOULD GO TO THE
MOVIES
```

This simple decision-making program begins with the computer displaying a question as directed by line 10: "What is the weather like today?" Line 20 accepts the operator's answer into memory. Let us assume the operator types the word *Hot*.

Line 30 tells the computer that it should consider any of the listed words to be a match. Line 40 tells the computer to type, "(Y=Yes): You should go to the ballpark" if it finds a match. Line 50 tells the computer to type, if no match is found, "(N=No): You should go to the movies." In our example, the computer does find a match, so it prints, "You should go to the ballpark" on the screen.

One interesting feature of Atari PILOT is the use of the Trace command. By using this command, you can follow the execution of your program step by step while the program is running. Rather than execute in a numerical sequence, most programs jump around because of the use of Jump commands and modules (the equivalent of subroutines in BASIC). Trace can help you to debug your program by letting you actually follow where the program goes once you start to run it. You have the ability to "freeze" and "unfreeze" the tracing

process, which means you can carefully examine the execution path.

Atari PILOT has two odd features, both of which involve arithmetic. The first is that there are maximum values for numbers beyond which the normal rules of math do not apply. The largest positive number that Atari PILOT understands is 32,767 and the largest negative number is −32,768.

The second odd feature is that Atari PILOT only understands integers or whole numbers — it does not consider fractions or decimals. For performing addition, subtraction and multiplication, this presents no problem. In division problems, however, Atari PILOT gives you a remainder and does not convert your answer to a fraction or decimal. For basic arithmetic problems, this is a positive feature, but it may be a problem if you attempt more advanced mathematics.

Error handling is accomplished in much the same way as in Atari BASIC. The Shift and Control keys, used with the Insert and Delete/Backspace keys, allow you to insert and delete single characters or whole lines of text at a time. The cursor-control keys (the arrow keys that you use with the Control key) allow you to move about on the screen quickly and easily.

If you make entries into your program that Atari PILOT doesn't understand, you receive, in many cases, a question or statement such as "***WHAT'S THAT?***" or "***IMMEDIATE ONLY***," rather than a code number that has no explanation, which is what happens in Atari BASIC. These features, combined with Atari PILOT's Trace feature, make error handling easy. Also, because Atari PILOT was released in 1980, enough time has elapsed for Atari to have uncovered and corrected any errors.

The manual that accompanies the Atari PILOT cartridge is entitled *Pilot*

Primer: The Pilot Programming Language Instruction Manual. It is nearly 200 pages in length and is written for users who have little or no prior knowledge of computer programming. The manual makes almost no assumptions about the user's expertise and even includes directions about connecting your hardware.

Chapters are well written and illustrated and move from simple to complex concepts. Each chapter contains exercises for users to perform on the keyboard to ensure understanding. As an additional teaching tool, a brief quiz follows each chapter summary.

Atari also publishes a second book entitled *Student Pilot: Reference Guide.* This 107-page book is ideal for individuals who are learning to program in Atari PILOT under the guidance of a parent or teacher. It lacks the depth of the main instruction manual, but it does cover all the main areas and makes maximum use of full color illustrations and screen displays.

Atari PILOT is a well-designed, versatile and quickly mastered language. It is an ideal language for writing educational-type programs that require the use of both text and graphics. It is undoubtedly one of the best languages for learning how to write programs and is an excellent tool for those who have been intimidated previously by attempts to program in BASIC or any other language.
—*Richard A. Anderson*

REVIEW

Atari Logo

Atari Logo is a fine version of Logo, a high-level programming language invented at MIT and used in many schools. Atari Logo can run on any Atari home computer with 16K of RAM or more. We tried out the Atari Logo ROM cartridge on a 48K RAM Atari 800 and on a 16K RAM Atari 600XL. Atari Logo ran well on both machines.

Many versions of Logo do not run on machines that have less than 64K RAM. Some versions that can run on machines with 48K RAM or less use only a subset of the Logo commands. Atari Logo, though, uses the full set of commands and requires 16K RAM with the 600XL, leaving 285 "nodes" of user space free. The node, a unit of memory used in Logo, is equal to five bytes. If you run Atari Logo on an Atari 800, you have 3551 nodes free.

For learning to program, Logo is a more appealing language than BASIC. Logo replaces the coordinate geometry that is tricky for beginners in BASIC with so-called turtle graphics. You can also define your own commands by linking two or more "primitives," or sets of elementary commands, that are built into Logo.

Logo Computer Systems, Inc. (LCSI) of Toronto, which developed Atari Logo, has added a number of new primitives to this version of the language. The Tell command lets users control up to four turtles on the screen at once. Each turtle looks like an overhead view of a real turtle, with a head and feet, but the EDSH command lets you redesign a turtle into a race car, a human or anything else you like. You create new shapes in the shape table, an 8 × 16 grid that represents parts of the

turtle, which makes drawing easier. By modifying and saving a number of these turtle shapes, you can even create cartoonlike animated scenes, such as a running man or a flying bird.

Atari Logo can detect when a turtle collides with another turtle or with a drawing created by a turtle. This collision detection lets you set up elaborate Rube Goldberg programs or even video games using Logo. You can also provide your programs with the ability to make use of joysticks or paddles and their firing buttons.

So far, we've described a number of functions that Atari BASIC does not have, but Atari Logo can also perform many of the tasks that BASIC usually accomplishes. You can save your work to disk or tape and retrieve that work later. Because Atari Logo fits in the computer's cartridge slot, you can use your Atari storage device exclusively for storing data. This, too, is a great advantage over other Logos.

Atari Logo also lets you add sound to your Logo programs using the TOOT primitive. Unfortunately, you can only generate two-channel music in Atari Logo instead of the four-channel music you can use in Atari BASIC, but you can define the sounds more accurately (according to their frequency) than you can with Atari BASIC.

List processing is another powerful ability of Logo. Atari Logo includes the whole complement of list-processing primitives, such as FPUT for "put something at the start of a list" or LPUT for "put something at the end of a list." Math primitives include SIN, COS, SQRT (square root) and basic math operands.

Atari Logo also supports recursion, that strange process that enables you to define a procedure in terms of the procedure itself. Recursion is a powerful concept that is not included in BASIC but which saves programmers valuable

time and space.

One of Atari BASIC's biggest faults is that it lacks a built-in text editor. Atari Logo has its own editor, which you call by typing "edit," followed by double quotation marks and the name of the procedure. The screen clears, "Atari Logo Editor" appears at the bottom and the procedure to be edited appears at the top. By pressing the computer's Control key and the arrow keys, you can insert or delete text or lines in the procedure. Pressing the Atari's Escape key takes you back to Logo's command prompt, a question mark.

Another useful feature of Atari Logo is the SETWRITE primitive. Let's say you are a teacher turning a student loose on Logo for the first time, and the student can't get things quite right. If you type SETWRITE before the student starts and SETREAD after the session, you can look at a record of the interactions between the student and the computer during the session.

Atari Logo is so chock-full of features, yet so easy to use, that Atari used it to introduce thousands of people across the country to computers in its Catch on to Computers program. Most of the attendees at a typical session were able to move the turtle around and change the screen's colors quickly and successfully. A few people were so afraid of doing anything at all that instructors had to coach them. All these novices received the instant feedback typical of Logo, and it did not fail under these conditions.

Turtle graphics are simple and a good tool for learning cursor movement and so on, but if you are an experienced user, they take some getting used to. You have to learn to think about geometry from the turtle's point of view. Atari Logo's documentation tells you in detail how to draw circles and squares, but if you want to draw a more complicated shape, such as a cloverleaf

InfoWorld
Report Card

Atari Logo

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	■	☐

Summary
Atari Logo is one of the best examples of the easy-to-learn Logo programming language that is rapidly gaining popularity over BASIC. Despite this version's lack of speed and error-handling problems, it is a solid product. It includes all the standard Logo commands and more, and it has excellent written documentation.

System Requirements
☐ *Atari computer*
☐ *16K RAM*
☐ *One disk drive*

Suggested list price: $99.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

that is built from the equation $X=SIN(2Y)$ in polar coordinates, you may find BASIC easier to use.

If Atari Logo has a clear handicap, it is speed. Logo can be slower than BASIC when plotting or when recalling a number from an address in the computer's memory. The Restore command, which frees available nodes by purging discarded procedures, takes about one second to purge each node: it's not exactly a speed burner.

On the other hand, Logo is well known for its helpful error messages. If you give Atari Logo a command it doesn't recognize, it responds "I don't know how to [command]," and if you give Logo a value without saying what it's for, Logo replies "You don't say what to do with [value]." It sure beats those terrible Syntax Error messages you get with BASIC.

Atari Logo doesn't score as well as BASIC on error handling, though. If you get one of your programs in a loop, pressing the Break key may not get you out, as it does in BASIC. Pressing the System Reset key does break the loop, but it also erases any procedures left in RAM. Because of this, before you execute any lengthy procedures, it's a good idea to save the procedures to disk or tape. Also, you may be surprised — and a bit irked — to find that you must also erase deleted variables with the ERN command if you want to reuse the variable name.

Unfortunately you also cannot make a printed copy of your Atari Logo designs. You can get a printed copy of any procedures you create, however.

The written documentation supplied with Atari Logo is truly impressive. You get two big manuals written by LCSI. The first is the 160-page *Introduction to Programming Through Turtle Graphics*, an entertaining tutorial that covers most of the important Atari Logo commands. When you're ready for it,

there's also a 216-page *Reference Manual* that explains each Logo primitive and gives examples of how you can use each one. The package also contains a 16-page *Quick Reference Guide,* written by Atari. The two large manuals are well indexed and attractively designed.

The warranty for the Logo package is Atari's standard 90-day agreement.

Atari Logo is an excellent product, and it enhances the value of Atari computers for learning in the classroom and in the home. It wins the battle with BASIC, hands down.

—Scott Mace

REVIEW

BASIC XL

Optimized Systems Software's BASIC XL is an enhanced-BASIC cartridge that is compatible with all Atari computer systems. Optimized Systems Software (OSS) is the successor of Shepardson Microsystems, the author of Atari BASIC and the Atari disk-operating system. This new product is its third-generation BASIC, and it improves on the features of its disk-based BASIC A+ and Atari BASIC. BASIC XL can run standard Atari BASIC programs, but it also includes a host of additional features and functions that significantly increase its ease of use and its programming power.

BASIC XL is a SuperCartridge — it does not take up any more RAM space than Atari BASIC, but it contains twice as much ROM. This means that although BASIC XL enables you to use many added features, you still have the

same RAM space available for your BASIC programs as you did with Atari BASIC.

OSS also sells a DOS XL disk-operating system for use with BASIC XL. Because DOS XL can reside in the same RAM area as the cartridge containing BASIC XL, your system then has only 768 bytes less than a cassette-based system. Standard Atari DOS takes up 5600 bytes of RAM and thus leaves less RAM space for your programs.

BASIC XL's excellent utilization of the additional ROM space immediately shows in the convenience and power of its editing functions. You begin typing in a program with NUM, and BASIC XL then generates the line numbers for you at the beginning of every line. If you want to add lines or merge another routine, but you don't have any free line numbers available in the appropriate program area, you can use BASIC XL's Renumber command to change all or a range of line numbers. This command also updates all direct references such as GOTO and GOSUB. If you decide to remove a range of lines, typing DEL easily deletes them. If you type LVAR, you can create a table of all your program variables and their occurrences. Previously, you had to run a separate program to achieve this.

When you use BASIC XL, you can still use the excellent, built-in Atari screen editor, which allows you to move your cursor anywhere on the screen, change a line and then press Return to enter that line. BASIC XL translates your lowercase input, and it checks your lines for correct syntax as you enter them, immediately responding with a text-error message if it cannot understand you.

When you want to save your program, BASIC XL lets you take a look at the directory of your disk and erase and rename files by typing simple statements such as DIR (directory) and

REN (rename). In fact, you can call almost all disk functions with simple English commands, such as Protect and Unprotect, and you do not have to put quotes around filenames, a small but pleasant convenience. You have all Atari I/O functions easily available, including block I/O functions for large amounts of data and a special record I/O format for creating your own data base.

When you have found space on your disk and saved your program (or typed CSAVE to save it on your cassette), you type RUN next. If your program does not work, typing TRACEON turns on BASIC XL's Trace function. BASIC XL then executes each line and prints it on the screen so that you can find the offending bug.

Most programs require some form of input from users. BASIC XL contains a variety of features that make it easy to customize for input — you don't need to use the typical ?. You can even add a query line to the Input statement. Its new Print Using command also makes it easy for you to align columns on your printout.

Your program must have a logical flow to do something useful. BASIC makes it easy for you to arbitrarily transfer control with GOTOs, with the result that it is often difficult to decipher the flow of a program at a later date. BASIC XL groups activities into blocks using the constructs IF . . . ELSE . . . ENDIF and WHILE . . . ENDWHILE. These constructs not only help a program's clarity but also improve its speed. BASIC XL also "pretty prints" your listing — that is, it prints your program with indented loops and conditionals so that you can easily isolate a particular level of nesting.

The Atari computer has excellent graphics abilities. BASIC XL includes a full set of player-missile instructions and examples of their use. If you have

InfoWorld
Report Card

BASIC XL

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Error Handling	☐	☐	☐	■

Summary

BASIC XL is an enhanced version of Atari BASIC, and it provides a host of new easy-to-use features and functions for program development. It comes with a reference manual and a tutorial on BASIC programming, which make it suitable for both novice and expert programmers.

System Requirements
☐ *Atari computer*
☐ *8K RAM*
☐ *Atari DOS*

Suggested list price: $99

Optimized Systems Software, Inc.
1221-B Kentwood Avenue
San Jose, CA 95129
(408) 446-3099

used Atari BASIC's Graphics and Color commands, using those of BASIC XL is not much more difficult. BASIC XL's overall speed combined with its Fast mode almost makes you doubt that it is an interpreter.

If you want to write adventure games, your program will have to manipulate a lot of text. BASIC contains text in a special variable called a string, which you can easily recognize by the $ at the end of its name. BASIC XL maintains the power of the Atari BASIC strings but, for those who want to translate Microsoft BASIC programs, it also includes the LEFT$ and MID$ and RIGHT$ instructions. If you type FIND, you can locate a string element (for example, a word, letters or a whole sentence) without making slow and messy element-by-element comparisons. This feature makes it easy to interpret typed-in responses. BASIC XL allows one-dimensional string arrays (tables of strings arranged in rows and columns).

Machine-language addicts will appreciate a host of new features, such as MOVE and DPEEK, in BASIC XL, and the logical operators now include AND, OR and EOR (exclusive or).

BASIC XL comes with a thorough and concise reference manual that has a good table of contents and partial index.The documentation also includes an extensive 176-page training course on BASIC programming, *30 Days to Understanding BASIC XL,* by Diane Goldstein and Bill Wilkinson. The documentation does a fine job of taking the reader from beginning concepts all the way to programming a game. Considering the wealth of features provided in BASIC XL, however, it would benefit from the inclusion of a separate quick-reference card.

BASIC XL provides enhanced features, but it still maintains full compatibility with the much simpler Atari 8K BASIC. Only the most unusual

entry into the BASIC interpreter crashes a program. If you don't use the special features of BASIC XL, you can save programs under BASIC XL and reload them under Atari BASIC. BASIC XL retains most published memory locations (De Re Atari and so on).

BASIC XL and other SuperCartridges cannot run in 80-column mode with the BIT-3 board unless you use a "wedge," which is available from OSS. (No problems arise when you use it in the 40-column mode.) A wedge is a small chunk of operating system that is loaded into RAM outside the memory area used by BASIC. The wedge adds routines to the system's routines that, in this case, are necessary for BASIC XL to operate in the 80-column mode.

We recommend OSS BASIC XL to all Atari computer owners — it's the BASIC that Atari should have had to begin with. This package is suitable for beginners — it has comprehensible error messages, checks syntax on line entry and includes a training course, too. Advanced programmers can find an array of features that make serious program development possible (a run-only version is available for commercial product distribution).
—*Harald E. Striepe*

REVIEW

Action!

In 1979 the Atari computer broke new ground with the combination of advanced hardware and an operating system that was squeezed into 7K of ROM. The emergence of a language

such as Action!, developed by Optimized Systems Software (OSS), illustrates the still-untapped potential of these Atari machines.

Action! is a structured, compiled language similar to Pascal and C. It features an excellent screen editor with two windows, a monitor program and a procedure and function library — all of which are contained in one OSS SuperCartridge.

Action! is a single-pass compiler language that recognizes procedures as well as functions. It compiles from memory or disk; the object code always resides in memory and is well optimized for the 6502 processor. Variable types are *byte* or *char* (unsigned 8 bit); *card* (unsigned 16 bit); and *integer* (signed 16 bit). You can declare structures of the basic types. All variables are static; you can initialize them at the time of declaration. You can also define the addresses of all variables, as well as those of external functions and procedures — for example, PROC SIO=$E459().

You can include machine-code blocks in line with high-level statements. Action! provides a full set of operators and control structures, as well as pointers and arrays. The Module directive permits modular compilation, and the precompiler allows simple text substitution.

The compiler evaluates constants during compilation rather than at run time. A run-time library contains graphics and I/O routines similar in syntax to those found in BASIC. All programs access this library; they normally cannot run without the Action! cartridge. A disk-based system library, however, permits you to create programs that can run independently. It includes a manual that describes the creation of ROM code and compilation with memory offsets.

An important feature of Action! is

the high level of integration between editor, compiler and monitor. This integration means that, when you develop programs, you can create, compile, find and fix your mistakes using just a few keystrokes — you don't experience frustrating delays in repeatedly loading separate programs to perform these tasks.

If you have previously written programs in Pascal or C, you will soon become familiar with Action! Its reference manual is aimed at intermediate programmers and thoroughly explains all aspects of the cartridge. It has neither an index nor a tutorial, however. The lack of a tutorial is unfortunate because Actions!'s interactive nature makes it an excellent tool for students of structured languages.

OSS supports its products by mail and telephone. You can receive additional help from the Action! users' groups.

Action! is convenient to install; you simply insert the cartridge into the proper slot on your Atari. Though 16K of RAM is enough to get going, you require a full 48K and a disk drive if you want to do serious program development. If you use OSS's DOS XL operating system (available separately), you will have the most memory possible for your program.

Once you've installed the cartridge, you have to prepare your original source file, using the editor. The Action! editor is so well designed that, with minor modifications, we would consider it a product in its own right. The editor alone is worth the price of the language. We use it not just for Action! source programs, but also to change assembly-language routines and BASIC programs.

Action! programs are text files that do not have line numbers. The editor treats the computer screen as if it were a

InfoWorld
R e p o r t C a r d

Action!

	Poor	Fair	Good	Excellent
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
Action! is a single-pass compiler language, similar to C and Pascal, that recognizes procedures as well as functions. Intermediate and experienced programmers will be able to write programs soon after starting to work with Action! The package lacks a tutorial, however, so beginning programmers may have trouble using it.

System Requirements
☐ *Atari computer*
☐ *16K RAM*

Suggested list price: $99

Optimized Systems Software, Inc.
1221-B Kentwood Avenue
San Jose, CA 95129
(408) 446-3099

large window into your text in memory. Lines can be longer than the 40 characters that is standard on the normal Atari screen. You use the cursor controls to move up and down or left and right; to type over text; to replace text; or to insert text at the cursor location.

You gain access to each of the editor's special functions by pressing the Shift and Control keys along with specified letter or symbol keys. For example, to move the cursor up a whole screen at a time instead of one line at a time, you press the Shift and Control keys at the same time as the cursor-up key. This is efficient, but it takes a while to learn all functions. You can quickly search for and replace text.

Action!'s designers cleverly combined Block Move and Copy functions to give users a simple way to correct mistakes. You press the Shift-Delete key combination to delete a line; you delete a group of lines by pressing this key combination repeatedly. The lines disappear from the screen but are kept in memory. You can simply move your cursor to another location, and press Shift-Control-P to recall them. If you delete a line by mistake, you use the same function to recover your text.

Action!'s windows are a real surprise. At first we thought they were gimmicks, but we quickly found them indispensable. You press Shift-Control-2 to open a second window on your screen by making the normal window smaller. You can set the ratios between the sizes of window 1 and window 2. The status-and-query line (which normally appears at the bottom of the screen) splits the screen horizontally to delineate the two window regions.

The two windows are independent, so you can edit two files at the same time. The Block Move procedure works between the windows. You can move lines by deleting a range of lines in

window 1, opening window 2 and dropping the lines in the correct position there.

It is easy to change source files or build new ones. Action!'s key-repeat rate is speedy.

We do have one criticism of Action!'s performance. If you load a file, perhaps adding it to a file already in memory, and you exceed the available memory, the system locks. You see an indication of a Memory Full error on the status line. You can't recover from this lockup; you are forced to turn off your system and start again.

Shift-Control-M switches you to the monitor (a small operating system), which you can control using single-line commands. The monitor gives you access to the compiler, allows you to examine or change values in memory and run programs or procedures. You can compile the program in the text editor or compile directly from disk. The resulting object program is always in memory.

Compilations are fast, especially if your source (original program text) is in the editor buffer, rather than on the disk. We found it best to break our programs into small modules, which we could then compile and debug individually from memory.

The compiler flags errors, and you can use one keystroke to return to the editor. When you return to the editor, the cursor is already positioned on the screen at the mistake you have made. The monitor can trace procedures and call individual routines. You can even examine and change variables by label. Finally, you can save your completed programs to disk or cassette and run them later without recompilation.

Action! produces fast and efficient code and is equally well suited for writing small utility programs, games or spreadsheets.

The programmer's aid disk contains

a floating-point library and many examples that illustrate Action!'s features. The run-time library disk allows you to create programs that run without using the cartridge. Both of these disks are available at extra cost. A license for commercial sale of your Action! programs is available for a small fee.

Action! is a well-integrated package. Intermediate and experienced programmers will find it easy to write Action! programs quickly.
—*Harald E. Striepe*

REVIEW

Monkey Wrench II

If you're unlucky enough to have to do a lot of programming in Atari BASIC, you have our condolences. BASIC runs slowly, has limited power and lacks a number of common programming aids. In short, it's barely civilized. Fortunately, fast relief is on the way in the form of an 8K ROM cartridge that fits in the right-hand slot of your Atari 800. The cartridge program is called Monkey Wrench II, and with its help, you may find that Atari BASIC doesn't seem so bad after all.

Monkey Wrench II does not speed up BASIC, nor does it extend the language; it just makes BASIC easier to use. It adds 18 commands to help programmers, and it contains a powerful Monitor program for examining and changing memory values. Your programs run in the same way as they do under simple Atari BASIC, but they are much easier to write. No matter what your level of

experience with BASIC programming, once you use Monkey Wrench II, you'll wonder how you ever got along without it.

As far as we know, Monkey Wrench II is the only cartridge that is designed for the right-hand slot of the Atari 800. Now that the 800 has been discontinued, Monkey Wrench II is likely to be the last right-handed cartridge for the Atari line. That's unfortunate, because the two-cartridge method is convenient, and it makes Monkey Wrench II useful to anyone with an 800, regardless of their system configuration. Unfortunately, you cannot use the Monkey Wrench II with a 400 computer because it has just one cartridge slot.

After turning on your 800 with BASIC in the left-hand slot and Monkey Wrench II in the right-hand slot, you see the usual BASIC "READY" prompt, followed by Monkey Wrench's copyright notice. As the manual puts it, "Now you're ready to monkey around with the commands." Your available RAM memory has been trimmed by 8K, but that's a small price to pay for the convenience of having Monkey Wrench II on line. Once you've written your program, you can remove Monkey Wrench II and recover the missing memory.

When you start working with Monkey Wrench, you notice two differences in the operation of the keyboard. First, you activate the cursor-movement keys without pressing the Control key. This makes it much easier to move around on the screen. Second, the keys are perpetually in the Uppercase mode, even if you press the Caps/Lowercase key. The idea is that, because BASIC program statements must be written in uppercase characters, it's best to disable lowercase capability. We like both these features, but if they bother you, you can turn them off by

InfoWorld
R e p o r t   C a r d

Monkey Wrench II

	Poor	Fair	Good	Excellent
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	☐	■	☐

Summary
If you're frustrated with programming in BASIC on your Atari 800, Monkey Wrench II could be the tool you've been looking for. An 8K ROM cartridge, it's designed to make BASIC programming easier. It adds 18 commands to the BASIC lexicon. A powerful Monitor program is part of the package.

System Requirements
☐ *Atari 800 computer; XL version available*
☐ *16K RAM*
☐ *DOS 2.0S*

Suggested list price: $49.95

*Eastern House Software
3239 Linda Drive
Winston-Salem, NC 27106
(919) 748-8446*

using >E and >U sequences, respectively.

All Monkey Wrench II commands begin with the > character. The commands are mnemonic, so they're easy to remember. To begin automatic line numbering, you type >A. The command >D deletes blocks of lines, and >R renumbers your BASIC program. To display variables used by your programs, you type >V; >VP makes a printed copy if you have a printer connected to your system.

Monkey Wrench II also offers some abilities that are more commonly found in text editors. You can search for a phrase in your program and automatically replace it with another word or phrase wherever it occurs. You can move or copy blocks of lines from one spot to another. You can even get a nicely formatted listing of your program: one printed line per command, complete with page breaks and page numbers.

Other helpful utilities provided by Monkey Wrench II include number conversion from decimal to hexadecimal and back, a RAM test, variable margins and a Disk Directory command. You can use the Start and Select function keys to scroll through your program, too.

In addition to these BASIC utilities, Monkey Wrench contains a Monitor program that allows experienced programmers to have memory displayed in hexadecimal or ASCII, examine the microprocessor's registers, alter memory or registers, jump to a memory location and execute the program located there or even disassemble memory values into assembly language. This program also lets you search for an ASCII or hexadecimal string in memory and calculate branch values, and it enables you to have output routed to your printer.

You can use the Monitor program to save or load memory to or from cassette.

Knowledgeable users can make copies of automatically booting cassettes (as long as the cassettes are not copy-protected).

The Monitor program is a powerful tool for assembly-language programmers and users who want to investigate the innards of their systems. As it can directly change values in memory, however, users can also wield the Monitor program to crash their systems or even destroy data on disk or tape, so use of the Monitor program is not recommended for the fainthearted. The confirmed hacker, undaunted by such dire warnings, will find lots of uses for this feature.

Although Monkey Wrench does its job competently, in some ways it's lacking in finesse. For example, the Renumber program uses the screen-graphics RAM as a scratch pad, so you can renumber only a limited number of lines (478 in Graphics Mode 0). If Monkey Wrench II finds a reference to a nonexistent line number during renumbering, it changes the reference to line number 32767. It does not, however, warn you that it has done this. It's up to you to check and see. Nor does it warn you if your program has line-number references that it cannot renumber — for example, commands that use labels for line numbers, such as GOTO MENU. You have to check for these potential problems yourself.

Monkey Wrench II usually performs with reasonable speed, but if you're operating on a particularly large program, some of the functions can become sluggish, particularly the Renumber, Search and Replace and Program Scroll functions. Monkey Wrench can take as long as 30 seconds to search for a phrase at the end of a long program. Considering the number of utilities provided in this small package, however, its performance is more than satisfactory.

When Monkey Wrench cannot understand the command you have given it, it beeps at you and prints a question mark. If the program encounters an error while one of its utilities is running, it returns to BASIC and displays an English-language error message.

Monkey Wrench II comes with a 25-page manual. It's no more than a quick reference, devoting about a page to each command and four pages to the more complicated Monitor program. The manual gives several examples for use of each command. Despite its brevity, the manual is clear and complete, and novices should be able to use Monkey Wrench after a quick read through.

The manual does not list a user-support phone number for Eastern House Software, but operation of Monkey Wrench II is so simple that we don't think it's likely you'll need help. Eastern House warrants Monkey Wrench II for 60 days, and after 60 days it will repair faulty cartridges for the cost of parts and shipping.

Monkey Wrench II is a useful tool for BASIC programmers. It does what it's supposed to do without any fuss, and because it's a cartridge, it's more convenient to use than other BASIC utility packages on the market. We recommend it to anyone who is faced with the sometimes grim prospect of programming with Atari BASIC.
—*Leo G. Laporte*

REVIEW

TOP-DOS

If you spend a lot of time working with DOS functions, you'll like TOP-DOS, and several of its features make it especially appealing to program developers. For example, you can change memory values while in DOS and then execute them immediately. You can also move from DOS to BASIC without destroying your on-screen work. TOP-DOS runs on Atari home computers.

At first impression, this program may be confusing for beginning users. As soon as you start up the program, the screen quickly fills with information; there is a lot for you to learn. If the information you see on the screen is somewhat confusing to you, you can have additional help information printed on the screen by typing a "?" after any command letter and then pressing Return.

An excellent feature of TOP-DOS is the R command, which allows you to directly examine and change memory values. The R command functions in much the same way as does the Debug function in Atari's Assembler/Editor cartridge.

TOP-DOS's Q command lets you store a sequence of commands and call them up using this one simple command. For example, you can use a single command to format three disks (one in each drive) and then write DOS to each disk and copy certain files to each drive. Normally this process would require your constant supervision.

One feature that we found handy was the ability to append multiple files into one large file. We accidentally entered a series of Logo procedures as separate files. TOP-DOS saved us a

InfoWorld
Report Card

TOP-DOS

	Poor	Fair	Good	Excellent
Performance	□	□	□	■
Documentation	□	□	■	□
Ease of Use	□	□	■	□
Error Handling	□	□	□	■

Summary
TOP-DOS has a lot to offer programmers and others who work with DOS functions on their Atari systems. It offers many timesaving features, but be prepared to spend a fair amount of time and effort learning to use it.

System Requirements
☐ *Atari computer*
☐ *32K RAM*
☐ *One disk drive*

Suggested list price: $49.95

Eclipse Software
1058-C Marigold Court
Sunnyvale, CA 94086
(408) 246-8325

great deal of time by allowing us to merge all the individual files into one large file without any trouble.

Another feature allows you to copy those files that are on the source disk only but do not exist on the destination disk. Another command allows you to copy those files that are present only on the destination disk.

Have you ever wanted a DOS that could format a disk in seconds? It's simple with TOP-DOS. You can instruct TOP-DOS to format only the VTOC (volume table of contents) — the rest of the disk is then not really formatted but behaves as though it were.

The Binary Load function contains several useful subfunctions. You can use the /N command just as you would use it in Atari DOS. It allows you to load a program but not execute it even if it has an INIT or RUN address. Other commands allow you to display the addresses of the program memory. Each segment that is loaded is displayed. You can also choose to have the file initialized but not run. By combining these options with the R command, you can make changes to your programs and try out quick ideas without using an assembler. Nice touch!

If you want to use several types of disks, you will like the feature that allows you to copy from single-density to double-density on single-sided disks and even to double-density double-sided disks.

If you accidentally leave a file open on your disk, you can find it and dispose of it using a special command. This allows you to make use of the disk sectors that were occupied by the open file.

You can change many parts of the program to fit your personal needs. The prompt is the symbol that tells you the computer is ready to accept input, and you can change your prompt to any character that you choose. The default

prompt is a small heart.

You can adjust the left margin to compensate for a television screen that overscans. You can select a new system drive from one of the eight that you can attach. You can also set your drive to default to a single- or double-density single-sided disk or to a double-density double-sided disk.

You can decide if you want the RS-232-MEM-SAV option on or off. This allows you to move from DOS to BASIC without destroying the RS-232 handler (controlling program). You can also decide if you want the Write/Verify option turned on or off.

Once you become proficient with using TOP-DOS, you can enter a whole command on one line. This saves time when you know what you want to do and can work without subsequent prompts.

TOP-DOS performs well in all areas. It is a well-thought-out program, created by someone who has obviously spent a lot of time working with Atari computers. This program coddles beginners with its on-line Help function, and it spoils advanced users with its single-line command input and fine command file.

We tried booting several disks to ensure that TOP-DOS was compatible with Atari programs. All of the programs we tested booted perfectly. This DOS occupies the same amount of memory as regular Atari DOS, and it should be compatible with all your existing software.

The best way to handle errors is to guard against them. TOP-DOS has this under control. The normal disk errors occur, but they are caused by users making such mistakes as having the wrong disk in the drive. TOP-DOS's manual contains a complete appendix to help you understand the error messages that you encounter, and you can also use the T command to obtain additional

information about any errors you run into.

An error message consists of several sections that depend on where the error originates. If it originates in the operating system or the memory-resident portion of TOP-DOS, the error is referenced with a number that you can look up in the manual. The TOP-DOS menu gives you short error messages on your screen when you enter commands incorrectly.

As we mentioned earlier, TOP-DOS may appear confusing at first. If you study the documentation and use the on-line Help feature, however, you should find the program manageable. The manual that comes with TOP-DOS is accurate, and it is loaded with information.

It uses technical language that may scare novice users — words such as *syntactic, hex address, query* and *MEMTOP* are sprinkled throughout the book — but because the users of this program will probably be experienced computer users, the manual's language and style are quite appropriate.

The manual even has a section entitled "How to Use This Manual." Examples are used liberally in the book, and suggestions are provided for using a command to obtain its maximum value.

An entire chapter is devoted to explaining terms that the manual uses, and a glossary is also included. The manual is helpful and can teach you how to get the most out of your TOP-DOS.

We called the company to ask about a certain feature and found we were talking to the program's author. He was helpful, interested in our use of his product and answered all our questions.

This is an excellent program for programmers who spend a lot of time working with DOS. You only need to make use of its most powerful functions

a couple of times for it to pay for itself by saving you time.
—*Cassie Stahl*

REVIEW

MAC/65

The MAC/65 macro assembler from Optimized Systems Software (OSS) combines convenience and great assembly speed with the power of macro instructions. Its source code is compatible with that of the older Atari Assembler/Editor and OSS's EASMD, and, like them, it features an integrated editor and a screen-oriented debugger.

MAC/65 allows you to perform interactive programming in almost the same way as you program Atari BASIC. Its SuperCartridge runs on any Atari.

MAC/65's power and flexibility do not limit the amount of RAM available for your source text. MAC/65 uses the same memory-switching technology as does BASIC XL and Action!

After inserting the MAC/65 cartridge and turning on your Atari, you see MAC/65's edit prompt. In the Edit mode, you can create and edit source programs, load and save source and machine-language files, call the assembler and debugger and change certain system parameters, such as the location of your text buffer.

BASIC users will be familiar with the screen-oriented line editor. Each assembly statement has to be on a separate line with a unique number. To edit a line, you simply move the cursor to the desired location with the cursor-control key, enter your changes and press the Return key. Features such as

InfoWorld
Report Card

MAC/65

	Poor	Fair	Good	Excellent
Performance	□	□	□	■
Documentation	□	□	□	■
Ease of Use	□	□	□	■
Error Handling	□	□	□	■

Summary
MAC/65 is an assembly-language-development package that runs on any Atari computer. It combines the power of macro instructions with ease of programming. We give it our highest rating.

System Requirements
□ *Atari computer*
□ *16K RAM*

Suggested list price: $99

*Optimized Systems Software, Inc.
1221-B Kentwood Avenue
San Jose, CA 95129
(408) 446-3099*

automatic line numbering, renumbering and deletion, search and search and replace add to MAC/65's convenience.

You can load and save files easily, and because MAC/65 can add or delete line numbers during the load and save process, it is compatible with any Atari editor. If you use the latter instead of MAC/65's line editor, however, you will soon miss MAC/65's Error Checking feature; the program responds to your typos with a text message. To correct them you simply move the cursor over the offending line and correct any errors on the spot, even while the Automatic Numbering feature is active.

MAC/65 also automatically changes lowercase characters to uppercase ones where appropriate. You can disable these features and use this editor for other text applications.

The command ASM calls the assembler. (An assembler directly translates mnemonics to machine code that a particular microprocessor can execute.) The assembler assembles the source text in the editor buffer. MAC/65 lists its output to the screen, showing the assembled object code as well as source code and comments. As the default, it does not place the resultant machine code into memory — an obvious safety feature. Directives in the source text override these defaults.

Additional arguments following the ASM command direct that the source text be taken from a disk file, the listing be sent to a printer or a disk file and the generated object code be stored on disk. You can use the full Cross Reference function to list the line and page numbers of all references to each label. This can become important for large projects. To save memory, MAC/65 stores the intermediate data required for this in a temporary disk file.

MAC/65 not only supports the full 6502 mnemonic instruction set as specified by MOS Technology (maker of the 6502), but also has the added instructions and addressing modes of the newer, pin-compatible 65C02 produced by NCR.

MAC/65 allows you to create labels (to name locations or constants) that are up to 127 characters in length. You can use .DEF or .REF to determine whether any of the labels you choose have been previously defined or referenced — this is useful if you want to know whether MAC/65 needs to include library files automatically during assembly. A full set of operators allow constants to be calculated during assembly and support MAC/65's sophisticated conditional assemblies (for example, one source file could be assembled in two different ways to create cassette as well as disk versions).

Several ".byte" type of directives help you easily create data regions that MAC/65 directly translates into Atari's Internal Storage mode for screen memory or floating-point numbers. MAC/65 flags errors to your specification, assembles with offsets and respects local label regions. You can turn listing, cross-referencing and object-code generation off and on and completely control listing output (tab spacing, page size and margins, printer form-feed character, titles and so on).

Finally, macro definitions allow programmers to define simple expressions, which are expanded during the assembly to a group of instructions. The OSS manual gives some complex examples in the form of an I/O library, which makes full use of all of MAC/65's features. Macros and "included" libraries can offer you significant time savings, because you only have to write and debug them once.

The third part of MAC/65 is the debugger, which you call by entering DDT. Dunion's Debugging Tool was published originally as a stand-alone program and was rewritten to fit into

the MAC/65 cartridge. It is a screen-oriented debugger that displays memory through a window that is filtered by a disassembler (or as a hexadecimal dump) and also displays breakpoint and register values. It can maintain its own screen independently from the program. DDT's Interpretive mode allows you to trace programs while you switch between the program screen and the screen that displays instructions and registers during execution.

MAC/65 is aimed at serious users, and its documentation reflects that. The manual is concisely written and well organized and referenced. It is not intended as a training guide for the beginning assembly programmer, though.

MAC/65 is an excellent and well-documented assembly-language-development package. It is also fast. Having editor, assembler and debugger available all at the same time encourages interactive development of small modules (in fact, we now miss that ability on the larger, 8088-type micros). Features such as error checking on entry, descriptive error messages and high assembly speed reduce frustration during program development, but they do not diminish the great powers of MAC/65's macro ability and set of directives.

Finally, MAC/65 can show its abilities on any Atari computer, from a minimum 600XL to a customized, 128K Atari 800 with double-density disk drives. It grows with a programmer's abilities while not being outgrown. We would not want our Atari to be without it.

—Harald E. Striepe

PERIPHERALS

Now it's time for reviews of peripherals — a variety of them. In this category, you'll find reviews of printers, keypads, touch tablets and more.

REVIEW

Edumate Light Pen

The Edumate light pen is a fine, inexpensive, high-resolution light pen. With the proper software, it could be an excellent tool for any number of uses. Unfortunately, the software supplied with this pen is of low quality and makes the light pen appear to be of lower quality than it really is. For users who intend to write their own software, however, this product is a winner at an unusually low cost.

The pen's manufacturer, FutureHouse, offers further software for the light pen in the form of four educational programs and is promising an advanced drawing program, capable of drawing circles and lines, switching colors and inverting drawn figures. This additional software is not supplied with the light pen, and we didn't test it.

This is a high-quality light pen. Atari's original light pen, which was announced with the Atari machines in 1978, was canceled when someone discovered that the Atari pen was "blind" to certain colors. The Edumate light pen fills this niche in Atari computer hardware.

When we tested the pen with the Atari Diagnostics package, which has a light-pen testing function, it performed beautifully — the pen returned coordinates to the computer accurately and updated rapidly even on the edges of the screen, which are the hardest areas for a light pen to handle. The Atari Diagnostics program is well written; it updates a player-missile cursor every one-sixtieth of a second based on light-pen information and gives an impressive display.

Unfortunately, the software that FutureHouse supplies with the pen is not of comparable quality. It uses no cursor, has a low-resolution graphics

mode and drags behind the light pen's current position — seemingly interminably. This is because, instead of using machine language to drive the cursor and the draw routines, the software is written in BASIC, and Atari BASIC is among the slowest BASICs available for microcomputers. If you are willing to write some machine-language software, we think you will be pleased with the results.

The Edumate light pen plugs into joystick port #4. (Since Atari 600XL and 800XL computers do not have port #4, users of these computers will have to modify the software from BASIC before it will run.) A disk or cassette is provided with the demonstration software. When we followed the documentation, we could not get the programs loaded because the documentation does not mention that you also require a BASIC cartridge. After finding this out, we plugged in BASIC and started running the software.

The software comes up with a menu of four choices, and next to each choice is a small filled-in white box. To make a selection, you point the light pen at a box and press the Start key. This operation is awkward because you need to use two hands, and it may be too much to ask of small children, for whom this product is supposedly also designed. If only the light pen could have a simple button or trigger added to it!

You do not get an on-screen cursor to provide you with immediate feedback for the light pen. This is a mistake, because it gives you the impression that the light pen is doing nothing. The high-speed player-missile cursor that is present in the Atari Diagnostics package is easy to implement and comes standard with other software; why doesn't FutureHouse provide it?

From the menu, you can select a

program from a slowly plotting menu of choices. This slowness is frustrating — especially since a light pen can enable you to go through menus at great speed.

The first program is a Draw program; a freestyle drawing routine in an 80 × 192, 16-color grid. For several reasons we feel that this is a bad choice of the 15 graphics modes available on the Atari computer. First, it requires the GTIA chip, which older Atari machines do not have. Next, it provides an extremely wide pixel, only one scan line deep, which gives the impression that you are building a drawing with long, flat bricks rather than with small dots.

Graphics 7½ or even Graphics 7 would be a better choice, even though they are limited to four colors. Although the mode in use offers 16 colors, in reality most of these colors are so close as to be indistinguishable from each other. Use of Graphics 7½ or 7 would also enable you to control intensity, which you cannot do with this program, and these modes would run on all Atari computers.

Let's assume you enter the Draw program. The screen goes black and when you wave the light pen, it has no effect — the system appears to have crashed, and the light pen does not appear to be doing anything. When this happened to us, after examining the program and light pen for some time, we guessed that the problem might be that the TV screen was too dark — there was no light pulse for the light pen to detect. We turned up the brightness knob until the screen gave a dim glow, and things started working. So, be warned that with a good color TV that is properly adjusted, the light pen will not work, and because you have no cursor to give you immediate feedback about light-pen functioning, you never know what is wrong.

The line you draw follows the light

InfoWorld
Report Card

Edumate Light Pen

	Poor	Fair	Good	Excellent
Setup	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Serviceability	☐	☐	☐	■

InfoWorld
Report Card

Edumate software

	Poor	Fair	Good	Excellent
Performance	■	☐	☐	☐
Documentation	☐	■	☐	☐
Ease of Use	☐	☐	■	☐
Error Handling	☐	■	☐	☐

Summary
The Edumate Light Pen is an excellent high-resolution pen. Unfortunately, the software that accompanies it is so poor that, at first glance, it detracts from the pen's good performance. If you are prepared to write your own software, though, this pen could provide you with an excellent tool at a low cost.

Features of unit tested
☐ _Edumate Light Pen_
☐ _Edumate software_
☐ _BASIC cartridge required_

Suggested list price: $34.95

FutureHouse, Inc.
P.O. Box 3470, Dept. C
Chapel Hill, NC 27514
_(919) 967-0861_

pen whenever you hold down the Start key. The line seems to crawl sluggishly behind the light pen because the software updates so slowly (BASIC strikes again), and if you move the pen at even a moderate speed, the drawn line moves in discrete jumps and makes a jagged drawing. Moreover, because there is no cursor, you cannot determine just where you will begin to draw when you press Start.

You can change colors by using any of 16 keys to select one of 16 colors. When you become sufficiently tired of this program, you can press System Reset to exit from it.

Although we feel this program might have some entertainment value for very young children, that is about the limit of its usefulness. The KoalaPad drawing program, in contrast, is far more advanced and can hold an adult's interest for hours. All in all, the Draw program is a bad demonstration for a good light pen. We would have judged the light pen to be of terrible quality if we had not used the Atari Diagnostic cartridge to check it.

The included software provides several other functions. First, you can alter the disk directory, which illustrates the possibilities of using a light pen to control the disk-operating system. Again, though, the functions are slow and clumsy to use, and there is no cursor.

Next, you can try 3-D ticktacktoe. Rather than showing all four levels at once (like every other version of this game we have seen), it shows only one level at a time, which makes the game virtually impossible to play. We soon lost interest.

You can also play checkers. This game is particularly annoying for two reasons: First, to move your pieces, you point to your piece with the light pen — and nothing happens. This is because the pieces are flat black, and so the light

pen cannot detect them. You must point at the area just outside your pieces, which is lit up, to make a selection. Second, the machine cheats.

Finally, if you are a masochist, you can try the game Hangman. Hangman is fairly well written, but it's slow. By this time, we were sufficiently used to the pace of the software that it didn't bother us much, but don't expect anyone to sit through more than one game.

The documentation for the pen and its accompanying software is adequate, but it does have some important omissions (as mentioned above, it doesn't mention the need for a BASIC cartridge or for turning up your TV's background brightness). The 9-page manual is not indexed, and it has no table of contents.

Virtually nothing can go wrong with this unit; only mechanical breakage could hurt it. It carries a 120-day parts and labor warranty; service is performed by shipping the unit to North Carolina. The staff at FutureHouse were friendly on the phone and were willing to answer questions. If you should buy the light pen and write software for it, the company would probably provide adequate support.

This is a fine light pen that is crippled by terrible accompanying software. Although FutureHouse has bent over backwards to avoid showing it, this pen is really an excellent product, and you can do great things with it — if you write your own software. With the software provided by the manufacturer, however, the product does not perform acceptably, and we certainly would not have bought it based on the demonstration software that we tested.

—*David and Sandy Small*

REVIEW

Atari Touch Tablet

The Atari Touch Tablet lets you create colorful computer graphics and art with your Atari computer. The tablet interprets the touch of your finger or a stylus on its surface as commands to give to the computer. It is a pointing device, just as a joystick or a light pen is, but the Touch Tablet has its own set of advantages and disadvantages.

The Atari Touch Tablet weighs one pound, is 9 inches wide and 7½ inches tall and has a tapered thickness, ¾ of an inch thick at the front and 1¼ inches thick at the rear. It is styled in silver and black to match the design of Atari XL computers and their peripherals. The pad's working surface is 6 inches wide by 4½ inches tall. This matches the ratio of width to height on most television screens and monitors. The Touch Tablet is larger than its chief competitor, the KoalaPad, whose drawing surface is 4¼ inches by 4¼ inches. Because of its larger size, we found the Atari Touch Tablet is easiest to use when you set it on a tabletop, not in your lap as the KoalaPad is often used. Also, because of the tablet's size, we recommend you use the stylus instead of your fingertip, because your knuckles can easily brush against the tablet surface and spoil your "aim."

The Atari Touch Tablet comes with a software program, called AtariArtist, on a read-only memory (ROM) cartridge. This program, written by Steven Dompier and Robert Leylands of Island Graphics, strongly resembles Micro Illustrator, a graphics program developed by Island Graphics for use with various joysticks, light pens and touch tablets.

Although the Atari Touch Tablet is primarily useful with the AtariArtist cartridge, you can also use the tablet to play Atari games that normally require you to use paddle controllers. Moving the stylus on the Touch Tablet surface imitates paddle action, so the cursor or other position indicator on the screen goes wherever you move your stylus or pen on the tablet surface. The Touch Tablet is not a suitable replacement for games that require you to use a joystick instead of paddles, though.

The Touch Tablet has two control buttons at the upper corners of its surface. These buttons let you make menu selections in AtariArtist and also act as trigger buttons for video games. With one exception, the two control buttons perform identical tasks, thus making it easy for either right-handed or left-handed people to use the tablet.

The Atari Touch Tablet package includes its own stylus, although you can use anything that can apply enough pressure on the pad to register with the pad's sensors. The supplied stylus is six inches long and has a black plastic, three-sided casing that tapers to a point. At the rear of the pad is a permanently attached, lightweight, 30-inch cord that plugs into a small hole at the back of the Touch Tablet. When the stylus is plugged in, you can use the small, red control button near the stylus' tip instead of the two large control buttons on the tablet. This is convenient when you're doing detailed drawing with AtariArtist and don't want to lose your place by searching for the tablet buttons.

Also, when doing detailed work, you can hold the tablet steady with one hand while you draw with the other and use the stylus button to allow you to draw without interruptions. This is a definite advantage over the KoalaPad, which, although it has a stylus, has no stylus button — you have to lift the stylus to press the tablet button.

InfoWorld
Report Card

Atari Touch Tablet

	Poor	Fair	Good	Excellent
Setup	□	□	□	■
Ease of Use	□	□	■	□
Performance	□	□	■	□
Documentation	□	□	■	□
Serviceability	□	□	□	■

InfoWorld
Report Card

AtariArtist

	Poor	Fair	Good	Excellent
Performance	□	□	■	□
Documentation	□	■	□	□
Ease of Use	□	□	■	□
Error Handling	□	□	■	□

Summary
The Atari Touch Tablet lets you create artwork and graphics and can be a substitute for game paddle controllers when you play games. With its accompanying software, AtariArtist, the tablet is a powerful graphics tool.

Features of unit tested
- □ *6 × 4½-inch drawing surface*
- □ *Two trigger buttons*
- □ *Stylus with control button*
- □ *AtariArtist software*

Suggested list price: $89.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

The entire Touch Tablet plugs into joystick controller port 1 on any Atari computer. Installation is a snap; if you can plug in a joystick, you can plug in the tablet.

We found the AtariArtist software to be crash-free and fairly easy to use. The AtariArtist cartridge loads as easily as any Atari cartridge. When you turn on the computer, you're greeted by the AtariArtist Welcome screen. At this point, you can press either the Atari's Start key, one of the two tablet control buttons or the stylus button to reach AtariArtist's main menu. Alternatively, you can reach an electronic Help screen by pressing the Help key (on later Atari computers) or by typing ?. The Help screen has some basic information to get you started.

To begin a drawing activity from the AtariArtist main menu, you first touch the stylus or other writing tool to the surface of the Touch Tablet. A small cross hair appears, and you can move it anywhere around the screen. When it's over the desired activity, you can press one of the three control buttons. The activities in the main menu are a series of boxes, and the name of the activity you select is highlighted in white. Each activity box also contains a letter — you merely have to type that letter to select that activity.

The program's primary drawing activities let you draw freehand, make points, create lines and draw empty or filled circles or boxes. The AtariArtist software also lets you draw a series of lines connected end to end, using the K-line activity. The Rays option lets you draw a series of lines with a common endpoint. You select the activity you want by pressing a control button, the menu then disappears, and you see a blank screen. You can return to the menu at any time by pressing a control button, if you are not using it to draw, or by pressing the Atari's Escape key.

You can vary the width of your electronic brush stroke by selecting from nine different brushes, which are displayed on the menu page. The box containing the currently active brush has a hash mark in its upper-right corner The same symbol denotes the active colors.

A Color menu box lets you select from 128 different colors (eight brightnesses of 16 colors) for each of four color registers. The number of registers limits you to four colors on the screen at one time. If you change one of the colors, you'll change any part of an existing picture that contains that color. The four default colors of AtariArtist are black, orange, green and blue; you start with black as the background.

The Color menu has some other interesting features. One option, Adjust Color on Picture, lets you change one of the colors merely by moving your cursor around the surface of the pad. In this fashion you can cycle through dozens of colors quickly until you find one that makes the picture look just right. The Color menu also lets you make one of the colors a "rainbow color" — a pulsating rainbow of rapidly changing colors. Another option lets you revert to the default colors at any time.

You also have 12 precreated patterns at the bottom of the AtariArtist menu. Each pattern is made up of the four primary colors you select: the patterns change as you change the primary colors.

You can activate two other features while you are using any of the above drawing functions. Mirrors lets you draw symmetrical, mirror images on the screen automatically; you can have the axes of the mirrors running diagonally or horizontally. As with all AtariArtist functions, you need only point to a menu and push the control button to activate it. The other function is called

Magnify. This lets you see a magnified small portion of the screen so that you can work on the smallest units of color, called pixels. The AtariArtist magnification is a little jumpier than that of the KoalaPad and requires a steadier hand.

Other AtariArtist menu choices let you erase screens and fill in closed areas with a selected color. The Erase option asks you to confirm your choice by pointing to the word *Yes,* which appears in the middle of the screen, and pushing the control button. Although the word *No* also appears, if you don't push the button while the cursor is directly on the *Yes,* AtariArtist interprets your answer as *No.* Smaller print on the same screen explains this, but we think young children may have trouble accurately zooming in on the word *Yes.*

While you're in the Fill activity, your cursor displays the small letters *Fill* below the cross hair — a nice touch.

A Storage choice lets you save your pictures or retrieve them. This storage has its advantages and disadvantages. On the positive side, because AtariArtist is on a cartridge, you can have your storage disk already in the drive when you start the program. As a bonus, if you create a work of art and suddenly realize you haven't turned on the disk drive, you can — if you have an Atari tape recorder — save your picture to tape (something the KoalaPad won't do). As a general rule, remember to turn on the disk drive when you start using AtariArtist.

The disadvantage of AtariArtist is that it can't display much of the catalog of disk pictures at once. It can only display three filenames on one screen; Koala can display a dozen filenames on one screen, in two columns. Because the Koala program comes on a disk (a cartridge version is also planned), the manufacturers can include some

precreated pictures, such as a sunset, to give you an idea of what you can do. AtariArtist has no such art included on its cartridge.

We also think that AtariArtist badly needs an Undo command. This feature, found on many other paint programs, lets you undo your last command and so alleviate disasters, such as filling the screen with an unwanted color — something that can easily happen if you're not careful. With AtariArtist, you have to start from scratch if you make an erroneous command.

AtariArtist's speed is adequate for any normal task. If you try complex tasks, such as drawing symmetrical shapes with Mirrors and Rays activated, the program slows down considerably. This could annoy artists, but we consider the AtariArtist program primarily an educational and entertainment product for families.

Other than AtariArtist, no software is yet available to run with the Touch Tablet, other than the games mentioned above. Four slots on the edges of the drawing surface hold some promise, however. You could place overlays in these slots to cover the tablet surface and convert it to any number of specialized uses. For now, though, the slots merely hold the protective plastic overlay that protects the tablet's drawing surface. This overlay has a thin red line running near its edges to identify the edges of the drawing area.

The Touch Tablet's manual concentrates on use of the AtariArtist software and includes a short tutorial. This information is presented well and includes good illustrations. It includes no technical information for programmers who wish to use the tablet, and it has no index.

Atari services the Touch Tablet through its centers in California, and you can also get repairs done at Atari service centers nationwide. The Touch

Tablet comes with the standard 90-day Atari warranty. The unit is not user-serviceable, but you can remove the top overlay, and, presumably, Atari can replace it if necessary.

The Atari Touch Tablet is good for graphic artists, though it is not as good as the KoalaPad is for young children. This is a trade-off caused by the pad's larger size. Its size gives users more room to move a finger around and to concentrate on detailed work with the stylus, but the tablet's size and some of its features also reduce its ease of use, especially for small children. On the positive side, because the AtariArtist software comes on a cartridge, you needn't buy a disk drive to use the Atari Touch Tablet. You can get involved immediately with one of the most simple and powerful graphics systems ever created for a home computer.

—Scott Mace

REVIEW

KoalaPad

The KoalaPad is a touch-sensitive device that you can use to position the cursor on the screen and direct its movement. The KoalaPad comes complete with the *Instant Programmer's Guide*, Micro Illustrator software and a stylus.

KoalaPad allows you to create images on the screen by simply moving the stylus or your finger across the pad. Pressing your stylus against the pad activates a pressure-sensitive matrix below the surface of the pad that signals the computer, causing it to draw on the screen.

This is a simple product to use. After plugging it into the computer's joystick port, you boot the Micro Illustrator disk, and you're ready to go. The menu that appears is easy to understand. You need no previous computer experience to use and enjoy the KoalaPad.

The pad contains two buttons. The right-hand button acts like a Shift Lock key — if you press it and then remove your finger, you can start drawing. If you use the left button, you must keep pressing it as you draw. Pressing either button can make a part of your drawing permanent or signal the computer to switch screen displays.

To make menu choices, you simply press the stylus against the pad and move it to your selection. Press one of the buttons on the pad, and you're ready to continue in the mode you want with the artistic tools that you want (brush tip, color and whatever else you choose).

You must use the keyboard to give instructions on only two occasions — when you want to assign a filename to your picture (which you must enter when you load the picture from the disk) and when you must answer yes or no during disk-formatting procedures.

The pad's active drawing area is a 4¼-inch square. It uses the Atari's Graphics Mode 7½, which provides a resolution of 160 × 96 pixels. This graphics mode provides four colors and one of the best screen resolutions of the Atari computer's 11 graphics modes.

Micro Illustrator offers four different screen displays. The two main screens are the drawing and command screens; the other two allow you to erase the drawing area and to access the disk drive for various functions.

On the command screen you see ten drawing modes, including a special Ray mode that allows you to create designs that radiate from one point. The other

drawing modes include Draw, Line, Continuous Line, Point, Frame, Box, Circle, Disc and Fill. This screen also displays five utilities — Erase, Storage, Mirror, Magnify and Color Menu (you can use four colors). Another menu, on the command screen, lets you select from nine brush tips, and a graphic representation of the brush tip in use acts as your cursor.

In the Draw mode you can draw a continuous line wherever your stylus touches the pad. This is the mode that allows you the most freedom in drawing because you can combine different brush tips to create different fonts.

The Line mode gives you the advantage of using the "rubber band" approach to drawing lines. You can place a line anywhere on the screen and preview its placement before making the position permanent; that is, you can stretch or contract a line in any direction to see how it looks. You press the pad's button to initiate the line and, when you are satisfied with your line, you press the button to fix the line in place permanently. Then you press the button again to continue drawing.

The Continuous Line mode works in a similar way to the Line mode, except that the next line you draw automatically begins where the last line left off. You don't need to press the button every time you want to continue the line, so you can draw simple shapes quickly.

In the Point mode, you can place dots instead of lines on the screen. Your choice of brush tip determines the size of the dot and its shape.

You can fill an area with any color by using the Fill mode. You place the cursor anywhere within the area you want to fill and press the button. The fill spreads until it reaches another line. Be warned, though, the color can leak out if the area you're filling is not enclosed. You can stop the filling process by

pressing any key or button and so save the picture if the fill spreads beyond its intended area.

You can draw the outline of perfect box shapes if you use the Frame mode, or you can create filled-in boxes using the Box mode. Similarly, you can draw the outline of a circle by using the Circle mode and create filled-in circles, or discs, using the Disc mode.

All the modes except Draw, Ray and Point work on the rubber-band principle. If you are drawing a box, for example, you place the first corner where you want it, then stretch the box to the size you want and finally place it on the screen by pressing the KoalaPad button.

You can use any of the designs mentioned in conjunction with the Mirror utility, which causes any shape you have drawn to be mirrored in the four corners of the screen.

To repair areas that leak when you fill them, you can use the Magnify utility, which enlarges a section of the original screen. It is also easier to modify or add to drawings if you can see them in greater detail.

Playing with the KoalaPad becomes addictive. It does everything it claims to do, and it does it well.

The only aspect of this product that bothered us was the Erase utility. You can only erase the entire screen and not just the last few strokes. We often wanted to erase one line only, but to do that, we had to erase it by using the background color to color over the mistake. With this approach, you run the risk of ruining other parts of the picture if your hand is not steady.

We accidentally discovered a feature of the KoalaPad that was not mentioned anywhere in the product manual. You can save a picture in such a way that you can then modify it using several programs from Datasoft — Graphic Master, Graphic Generator and Color

InfoWorld
Report Card

KoalaPad

	Poor	Fair	Good	Excellent
Setup	□	□	□	■
Ease of Use	□	□	□	■
Performance	□	□	□	■
Documentation	□	□	□	■
Serviceability	□	□	□	■

InfoWorld
Report Card

Micro Illustrator

	Poor	Fair	Good	Excellent
Performance	□	□	■	□
Documentation	□	□	□	■
Ease of Use	□	□	□	■
Error Handling	□	□	□	■

Summary
The KoalaPad is a touch-sensitive device that allows you to combine the graphics ability of your Atari computer with your own artistic abilities. You use a stylus or your finger to move over the pad's surface. The package contains Micro Illustrator software to help you create your pictures.

Features of unit tested
□ *4¼-inch-square drawing surface*
□ *Two trigger buttons*
□ *Micro Illustrator software*

Suggested list price: $99.95

Print. To do this, when your picture is displayed on the screen, you then press the Insert key and the picture is saved to disk in a file called Picture. You can then call up Picture when you use the other programs and modify your picture using the other programs' graphics and text abilities.

Although you can only do this with one picture at a time — your design is always called Picture, and any new picture you place in the file cancels out the old one — at least you can print out your designs using the Color Print program and an Epson printer. (You may be able to do the same with other printers, too.) If you don't use this undocumented feature, you can never print out your designs — your creations are visible only on the screen.

You can, however, upload your pictures to your favorite bulletin-board system, thus sharing your creations with all your on-line friends. You can also call the pictures up from BASIC and use them in your programs.

Included with KoalaPad is Koala Technologies' version of ticktacktoe — playing this game gives you practice with drawing on a grid and demonstrates the KoalaPad's programming techniques.

The Micro Illustrator software handles errors well. The only error message you are likely to see is "Error 144," which indicates that you are using a write-protected disk. You can remove the write-protect tab and try again.

The documentation that comes with the KoalaPad is excellent. The *Instant Programmer's Guide* steps you through a series of programming applications. The program is so well written that it probably does not need documentation, but the manual does provide helpful additional information for novice users. It also includes pictures to help guide you through its explanations.

Our only criticism of the documentation is that it omits any explanation of the special Save feature that we mentioned earlier. Because we found no errors in the documentation, we assume that Micro Illustrator's author included this feature for his own use. Such an explanation could justify its absence in an otherwise thorough manual.

We used the KoalaPad often enough to wear out the point of the stylus. Having a dull-pointed stylus doesn't really matter, though; you can use any object for drawing as long as it is not too sharp. Nevertheless, we contacted Koala Technologies and asked how we could obtain a replacement stylus. The company mailed us a replacement immediately — at no charge.

If you want to play around with ready-made shapes, two other programs are available from Koala Technologies — Coloring Series I provides geometric shapes, and Coloring Series II includes snowflakes and flower shapes. You can load these preprogrammed picture files into your computer and color them in. These programs appeal to the very young or to those who are looking for an electronic coloring book.

We have always enjoyed the graphics ability of the Atari, and we enjoy it even more with the KoalaPad. Drawing designs and printing them out using Color Print on our Epson is fun. If you like to — or need to — draw, we think you'll like the KoalaPad.
—*Cassie Stahl*

REVIEW

WICO Joysticks

The WICO joysticks are arcade-style game controllers for Atari computers. For this review, we tested four WICO joysticks: the Bat Handle, the Famous Red Ball, the Powergrip and the 3-Way Deluxe. Although similar, each joystick has slightly different features. Of all of them, we prefer the Bat Handle joystick for general use.

Each joystick has a 4-inch-square base and a 4-inch-tall handle. The bases are made of black-and-red matte-finish plastic and the handles of smooth red plastic. The base has a flat bottom and rubber feet for tabletop use. The front of the base is contoured for hand-held use as well, although we think the base and handle are too large for that. Each joystick weighs about 13 ounces.

Each joystick has a 5-foot cord that plugs directly into the controller port on the Atari. It has two firing buttons, one on the base and one on the handle, and you select the firing button you prefer by moving a sliding switch on the base.

Each of the joysticks offers a different handle shape. The Famous Red Ball joystick has a slender steel handle with a red plastic ball on the end. The Bat Handle joystick is shaped like a baseball bat. The Powergrip joystick has a handle shaped like a pilot's ridged handgrip. The 3-Way Deluxe joystick has three interchangeable handles: a bat-shaped handle, a ridged handgrip and a smooth handgrip with an elongated, curved top. These handles slide on and off a steel rod that is permanently attached to the joystick base. The sliding switch allows you to choose between using the firing button on the base and using both the base button and stick button.

The WICO joysticks are all self-centering. Their action is neither particularly stiff nor soft, but the 3-Way Deluxe gives more resistance than the others.

We asked several people to play different kinds of games with each of the joysticks, and each person came to prefer one of the handle shapes over the others. The Bat Handle was the most popular, possibly because it allowed the most different hand positions.

No one chose the Famous Red Ball joystick. Its design exaggerates the problem common to all these WICO joysticks: the handles are too long. It is more work to use a long handle, and the greater leverage makes it difficult to hold the joystick steady. On all but the Famous Red Ball, you can choke up on the handle (hold it close to the base), but the handles are not designed for this, so you lose some efficiency.

The joysticks are designed primarily for eight-direction games, and they are not suited to four-direction games, such as mazes and imitation 3-D games. In a maze game, you only need to move up, down, left and right, and so the in-between positions of these joystick give dead spots that can make it difficult for you to turn corners quickly. We tested the joysticks with Datamost's Paint Magic program and found it difficult to get fine control when drawing.

WICO builds its joysticks well; they are sturdy and durable. We did not notice any deterioration in their performance. WICO started in the business by building arcade joysticks, and its home joysticks are clearly built to take more abuse than they are ever likely to see.

The joysticks have a limited warranty: two years for the Powergrip and 3-Way Deluxe and one year for the Bat Handle and Famous Red Ball. The manual includes the address to which you can send your joystick for repair.

InfoWorld
R e p o r t   C a r d

WICO Joysticks

	Poor	Fair	Good	Excellent
Setup	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Performance	☐	■	☐	☐
Documentation	☐	☐	■	☐
Serviceability	☐	☐	■	☐

Summary
These four WICO joysticks — Bat Handle, Famous Red Ball, Powergrip and 3-Way Deluxe — are similar in design but have differently shaped handles. They are all robust and durable but their handles are too long and their eight-direction capability can be a hindrance when you play games that require you to make movements in four directions only. We prefer the Bat Handle.

Features of unit tested
☐ *Four joysticks, each with different handles*
☐ *5-foot cords*

Suggested list price: Bat Handle, $29.95; Famous Red Ball, $34.95; Powergrip, $29.95; 3-Way Deluxe, $32.95

WICO Corporation
6400 West Gross Point Road
Niles, IL 60648
(312) 647-7500

InfoWorld

Report Card

Commodore
1702

	Poor	Fair	Good	Excellent
Setup	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Serviceability	☐	☐	■	☐

Summary
Built by Commodore for use with the Commodore 64, the 1702 Color Video Monitor is an excellent choice for Atari home-computer owners, even though you have to pay extra for the appropriate connection cable. The images, color and sound that it produces are far superior to those offered by a television. Control knobs are easy to use because they are located on the front of the monitor.

Features of unit tested
☐ *14-inch color monitor*
☐ *5-DIN two-jack connection*
☐ *8-DIN three-jack connection*
☐ *Speaker*

Suggested list price: $279

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
(215) 431-9100

The joysticks' documentation is sparse, but it covers everything it should. The leaflet explains how to plug in the joystick and how to use the firing-button selection switch. It also contains a description of the WICO line of game controllers. The manual for the 3-Way Deluxe joystick describes how to change handles.

It is ironic that the person who had the most trouble with the WICO joysticks was an aggressive arcade-trained tester. He is used to having his joystick firmly nailed down, and he heaves it around with great energy. When he used the WICO joysticks, he had difficulty keeping them in his lap. He found it impossible to use the 3-Way Deluxe because the handle slipped up the steel rod and covered the firing button.

For general use, we prefer the Bat Handle joystick because it minimizes the faults of WICO's joystick design. It allows you to choke up to use a variety of hand positions, and the handle stays firmly attached. For some games, such as flight simulations, you might prefer the Powergrip joystick, though.
—*M. A. Olds*

REVIEW

1702 Color Video Monitor

The 1702 Color Video Monitor, although built by Commodore for hookup to the Commodore 64, is an economical and well-designed alternative to a television set for Atari home-computer owners too. We recommend it as a good buy.

You can use the monitor with either of the two common video-output standards: the industry's common 5-DIN, two-jack connection and the 8-DIN, three-jack connection that is featured on Commodore computers. We connected an Atari 800 to the monitor using a 5-DIN connector.

The 1702 comes with an 8-DIN, three-jack cable, so we had to buy a 5-DIN connector (at a cost of about $7) from a local computer dealer.

The monitor is easy to set up — you just unbox it and plug it into the computer. Connecting the interface cable to your computer is easy, because it only fits into the computer one way. If you have a Commodore 5-DIN connector, the jacks on the monitor end of the cable are color-coded, so plugging the cable into the monitor is simple, too. If your jacks are not color-coded, it will be obvious if you've reversed the jacks as soon as you turn the computer on — you won't get a picture. If this happens, it only takes a second to put the jacks right.

The two-jack cable you use with the Atari computer plugs into the front of the monitor, and the Commodore 64's three-jack cable plugs into the back of the monitor. A sliding switch on the back of the monitor allows you to select which input jacks the monitor will use. For example, we attached both an Atari 800 (which uses the 5-DIN interface) and a Commodore 64 (which uses the 8-DIN interface) to the monitor simultaneously and then used the switch to select which computer we wanted to use with the monitor. This worked out well. Although occasionally we could hear sound from the unselected system, the video signals never conflicted.

The monitor has good resolution — it produces a much sharper picture than does a television. Colors are more vivid than on the television, and the sound

quality is excellent — clear and resonant.

We experienced less eye fatigue when we used the monitor instead of the television for text-oriented programs, such as word processors and some adventure games. The monitor gives the characters sharper edges and makes it easier for the eye to focus on them.

The monitor is 14 inches high, 16 inches deep and 15 inches wide and has a 14-inch diagonal screen. The case is made of a tan-and-black plastic that matches other Commodore computer products. The power cord is about 8 feet long.

All the picture controls are on the front of the monitor, behind a small swing-down panel. The knobs are easy to grasp and easy to turn. Each of the tint, color, brightness and contrast controls has a slight click at its default setting, making it easy to undo overzealous adjustments. The front of the monitor also contains a small power-indicator LED and the power switch.

The manual is slim but good. It has clear, informative drawings of the monitor and its connections. It does not assume that users are knowledgeable and explains everything, including the purpose of every control, carefully.

The manual's description of the setup procedure is especially good. Excellent pictures identify the different jacks and cables, and it explains how inexperienced users can determine which kind of interface their computer has and which kind of cable to use. The manual does not give any technical specifications for the monitor, but most users probably won't miss this information.

The manual has a list of 19 important safety precautions related to installation, use and service. These precautions tell you what you can do to damage the set, what you can do to let the set damage you and when the set

needs service. The monitor, which comes with the standard Commodore 90-day warranty, is not user-serviceable. If any problems develop, the manual says that you should stop using the monitor immediately and take the set to your dealer or to a qualified technician.

Alternatively, you can ship it to a Commodore Computer Service Center — the warranty leaflet gives two addresses, one in Pennsylvania and one in California. The leaflet also gives a California telephone number you can call for service information.

The 1702 monitor provides you with a much better display for your computer than does a television. It produces good color and sound and sharp images. Best of all, it's price is reasonable. The 1702 monitor is an excellent monitor and a great buy.
—*M. A. Olds*

REVIEW

Atari CX85 Numerical Keypad

If you admire personal computers with a numeric keypad and your keyboard doesn't have one, the Atari CX85 Numerical Keypad may provide a partial solution. It doesn't and was never intended to work with all software, however, so be sure it meets your needs before you buy it.

The Atari Numerical Keypad is about the size of a small adding machine, and the keys are arranged like those on a standard 10-key adding machine. The keys are large and comfortable to use and the 5 key,

InfoWorld
R e p o r t   C a r d

Atari CX85

	Poor	Fair	Good	Excellent
Setup	☐	☐	☐	■
Ease of Use	☐	☐	■	☐
Performance	☐	☐	■	☐
Documentation	■	☐	☐	☐
Serviceability	☐	■	☐	☐

Summary
Atari's CX85 Numerical Keypad is not the answer if you are searching for a universally compatible keyboard accessory, but it may be a welcome addition for some users. It was originally designed to work with only two numeric software programs, but you can adapt it for use with some others. Because its applications are limited and its documentation is inadequate, we advise buyers to test the keypad with desired software before they purchase it.

Features of unit tested
☐ *Standard 10-key styling*
☐ *Four function keys*
☐ *Keypad Handler software*
☐ *Keyboard overlay*

Suggested list price: $124.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

located in the center, even has the raised bump you would expect to find on an adding machine. A minus and a +/Enter key are located to the right of the 10 numeric keys. To the left are four function keys, which have different functions depending upon the particular program you are using or how you may have reconfigured the keys for your own needs.

The keypad plugs into the #2 joystick port on your computer and has no separate electrical supply. Plugging it into the front of your computer console can be a bit awkward if you have limited work space.

It is important to note that the Atari keypad was designed to work with only two software programs — The Bookkeeper and VisiCalc. This is not to say that the keypad cannot work with other software, but be warned that it may not, and test the keypad and/or the software before you buy them. We tested the keypad with two other financial software packages from Continental Software. The first, Home Accountant, would not work with the Numerical Keypad and the second, The Tax Advantage, worked just fine. Again, don't assume anything.

When you use The Bookkeeper, your use of the keypad's four function buttons is different from their use with VisiCalc. With The Bookkeeper, the first button is the Escape button, which you use to move back to previous menus. You use the second button to signal "no" when the computer asks you to verify an entry. The third button handles delete functions, and the fourth is the "yes" button for verifications. When you use VisiCalc, you use these same buttons for cursor control; from top to bottom their functions are cursor up, down, right and left. They work in the same way as the arrow keys on your console. The keypad has no Control key.

Both The Bookkeeper and VisiCalc programs boot automatically. To use programs of this type, you first load the Keypad Handler, (a program that also boots automatically), and once loaded, you replace that disk with your program disk. You then press the Return button, whereupon your program automatically boots.

Another way to use the Numerical Keypad is to reconfigure it to meet your own needs. Having said that it can be done, let us caution you. Our reward for attempting to reconfigure the keypad was a crashed Keypad Handler disk.

The problem with the reconfiguration process arises from the keypad's documentation. It consists of two small manuals, the first of which is the users' guide. This manual contains general information about the keypad and instructions for setting it up and using it with programs such as The Bookkeeper. It also attempts to describe the procedure for reconfiguration using either Atari BASIC, Atari Macro Assembler or the Atari Assembler/ Editor.

The instructions contained in the users' guide are totally unacceptable. After we had already crashed the disk trying to accomplish the job with Atari BASIC, we contacted Atari. The company sent us ten mimeographed pages of instructions that covered the correct process using the Atari Macro Assembler and Assembler/Editor only. Atari publishes supplementary instructions such as these when it gets a lot of calls because people are having problems.

The second manual that comes with the Numerical Keypad package is entitled *Technical Reference Notes*. It provides reconfiguration data beyond that contained in the users' guide — for example, it deals with BASIC and Macro Assembler. It also includes wiring data, which may prove useful for those people

who want to repair their own hardware.

We must express our disappointment with this keypad. Although it may be useful for some people, it is not a general expansion to the basic keyboard. It is too limited in its application to software. Also, its documentation falls far short of what should have been provided. Each of the two manuals is only 11 pages in length. If Atari were to show a little more concern for the nontechnician, it could produce a manual that would make reconfiguration easy. Remember, Atari's 90-day warranty covers defects in materials or workmanship. Programs and manuals are specifically exempted from any warranty, so don't count on Atari to reimburse you if you ruin your software when you follow the instructions in its manuals.
—*Richard A. Anderson*

REVIEW

ATR-8000

Looking for an exceptionally easy-to-use CP/M computer, at surprisingly low cost? Or a low-cost MS-DOS computer that can use IBM software? Perhaps one box that can handle all your Atari computer-interfacing needs? Then the ATR-8000, manufactured by SWP of Arlington, Texas, is for you.

The ATR-8000 comes in three configurations. In the first, it is an intelligent peripheral for Atari computers, capable of connecting them to serial-interface devices such as modems and printers, parallel-interface printers and up to four floppy-disk drives. The second configuration, which

does not require an Atari computer, is a 64K, Z80-based, CP/M 2.2 computer; it can also do anything the first configuration can. The third configuration is a 256K, 8088-based, MS-DOS 2.1 computer, also capable of being either an Atari peripheral drive or a CP/M computer.

Let's take the three models, one at a time, and keep in mind that these represent upward-compatible expansions; for instance, the 64K ATR-8000 can still be an Atari peripheral.

The Atari peripheral model ATR-8000 consists of a Z80 microprocessor, 16K RAM and 4K ROM. It is designed as a multifunction peripheral.

All Atari devices communicate across a serial bus — a cable that runs from the main Atari computer to each peripheral. This serial bus uses a nonstandard protocol (not RS-232) and can only communicate with intelligent peripherals, each of which requires its own small microprocessor.

Unfortunately, the requirement that the peripherals have their own processors drives up the cost of those peripherals. A processor requires several support circuits; this also adds to the cost of the peripheral. Some typical examples of devices that require their own processors and circuitry are the Atari 810 and 1050 disk drives and the Atari 850 interface module.

The ATR-8000 is designed to handle all the needed peripheral functions with one microprocessor, the Z80. The ATR-8000 replaces the controllers of the above-mentioned disk drives and all of the 850 interface's functions and provides disk drive, serial-port and parallel-port printer connections. Because the ATR-8000 uses only one microprocessor instead of several, the cost of connecting peripherals to the Atari is substantially lowered.

Let's discuss the disk-drive interfacing first. The older Atari disk

drives (that is, the 810 model) are single-density, single-sided, 88K-per-disk devices. Atari's newer drives (1050) are double-density, single-sided devices and have only 127K per disk. These are expensive drives, each with an on-board microprocessor and memory. Furthermore, they are not up to the competition's level of disk technology.

The ATR-8000 allows you to connect double-sided, 5¼- or 8-inch standard disk drives to the Atari computer. A standard disk drive is a 5¼- or 8-inch, single- or double-sided drive that has the industry standard 34-pin or 50-pin interface. These drives have no on-board microprocessor and contain only read/write electronics.

The ATR-8000 also allows you to store more data on each disk. How much more? Compare the following table with the Atari's 88K (810 model) or 127K (1050 model):

    5¼-inch single-sided: 160K
    5¼-inch double-sided: 320K
    8-inch single-sided: 640K
    8-inch double-sided: 1280K

The ATR-8000 uses a fairly standard double-density format of 18 sectors per track and 256 bytes per sector. The other double-density drives that exist for the Atari (made by Percom and Astra) also use this pattern. In contrast, the Atari 1050 double-density format is 26 sectors and 128 bytes per sector. Because the 1050 can store only 127K per disk side as opposed to the ATR-8000's 160K, the ATR-8000 not only enables you to use lower-cost drives, but you are also able to use them more efficiently and get more out of each disk. As you can see, the ATR-8000 is an Atari enthusiast's disk-storage dream come true.

The overall cost of an ATR-8000-based system is also lower than that of an Atari peripheral-based system. Standard disk drives cost less than Atari's intelligent drives, so the cost of

adding a second or third standard drive is less than that of adding an extra Atari drive, as long as you're using the ATR-8000.

The ATR-8000-based system has some advantages that are not immediately obvious. First, because you can store much more data per disk, you do not need to use, or buy, as many disks. Second, because you can keep more of your work on one disk, you do not need to swap diskettes as often. Finally, standard disk drives, such as the Tandon or Shugart series drives, are more reliable than the Atari 810-series drives.

The ATR-8000's single-density format mirrors the Atari format, so the ATR-8000 can read any Atari disk and is fully compatible with copy-protected software. We have never had a problem interchanging disks.

One laudable feature of the ATR-8000 is its ability to configure itself automatically. For instance, imagine you have connected two 8-inch and two 5¼-inch drives to the ATR-8000. When the system is powered up or reset, it polls the drives connected to it to determine their size and automatically resets its internal tables. Hence, you can swap drive configurations around, and the system can readjust itself without your intervention. You simply hook on the drive cable, turn everything on and go.

Disk drives are connected to the ATR-8000 via a 34-pin ribbon cable and edge connectors; this is a standard connection scheme. You can find such cables at most computer shops, or you can make them using standard parts. (By the way, an 8-inch drive with its 50-pin connector can also use this 34-pin cable. You can order the ATR-8000 with a small interface block that converts the 50-pin, 8-inch connector to the 34-pin, 5¼-inch connector.) The only task for the novice is to set the

disk-drive number — from 1 through 4 — connect the drives and begin to work.

At a cost of $20, SWP supplies a new disk-operating system, called MYDOS, with the ATR-8000. MYDOS is roughly patterned after Atari DOS but has features that take fuller advantage of 8-inch drives and double-density. MYDOS is a fully debugged upgrade to Atari DOS that we recommend for ATR-8000 users. We were pleased when we ran a disk directory on an 8-inch double-sided diskette and saw the message, "3996 Free Sectors" — we were used to "707 Free Sectors" from the Atari drives. The fact that each sector holds 256 bytes of information instead of 128 is icing on the cake; there are really 7003 128-byte sectors on the disk.

MYDOS also allows you to use subdirectories, which are useful on drives with high capacity. These subdirectories allow you to split the files on your disk into groups, thus letting you make more intelligible filenames. Sub-subdirectories up to 64 levels are allowed, so you can make a filename that really describes a given entry — BASIC:GAME:SPACE:STARTREK: VERSION3, for instance, might be the filename for the third version of a Star Trek game in a Space Games catalog, in the game catalog under BASIC programs.

The printer port is also a 34-pin edge connector. It attaches to a 36-pin Centronics parallel printer connector through a ribbon cable. You can use a TRS-80 Model III printer cable, available at your local Radio Shack store, or you can make the cable yourself, as we did. We then had no problem running Epson MX-80, Okidata Microline 92 and Okidata Microline 84 printers, without modification. It is a pleasure to find a standard printer interface that does not take hours of work to use; the ATR-8000's designers

have satisfied the requirements of a wide range of printers.

This printer port has a special feature. Anything printed out from the Atari computer is spooled. That is, the ATR-8000 stores whatever is printed from the Atari in its internal memory and then begins to write to the printer. The advantage of this is that the Atari can feed out print information as fast as it is able because it is not waiting on the printer; the ATR-8000 is. Hence, the computer can complete a print in a small amount of time, and while the ATR-8000 is finishing the printout, you can be doing something else with the computer. We found this feature particularly useful when we were generating long mailing lists from a data-base program. Each set of names was sent to the ATR-8000 at high speed, and the ATR-8000 then ran the printer while we prepared the next set of names at the Atari computer.

Many spooler devices are available for different machines. Generally, a 16K spooler costs around $149; this spooler is just another feature in the already inexpensive ATR-8000.

The ATR-8000's serial port is a standard RS-232 port, brought out to a 24-pin edge connector. It connects via a ribbon cable to a standard DB-25 connector. You can connect this DB-25 connector to a modem, printer or other serial-interface device.

The ATR-8000's designers thought ahead about a potential problem and gave the customer an easy means to resolve it. The RS-232 standard provides for two types of connections, which can conflict with one another, and so you often have to use a special or "inverting" cable to connect two devices. In the ATR-8000, just under the cover, is a small jumper block that you can reconfigure easily to invert the signals. You can thus use a standard, straight ribbon cable for many different

devices and just change jumper blocks.

We plugged our ATR-8000 into a Hayes Smartmodem 300, and the setup worked the first time. It was much easier to hook up than the Atari 850 serial port.

The ATR-8000 does not fully replace the Atari 850 interface module in terms of serial connections. It comes close to emulating all of the 850's functions, but its emulation is not exact. You may have to modify your modem program to make it work properly with the ATR-8000. Also, the MYDOS operating system is required to run the serial port, so Atari programs that will not allow MYDOS to load will not function with the ATR-8000. Most modem programs for the Atari now have ATR-8000 versions, however, so this is not much of a disadvantage.

Finally, the 850 interface is nearly impossible to obtain these days, so even partial emulation of the 850 by the ATR-8000 really fills a need.

In summary, the Atari peripheral version of the ATR-8000 is a powerful, high-performance and completely debugged device. It is pleasant to use and easy to hook up. If you are thinking of expanding your Atari system, give the ATR-8000 serious consideration; it can save you money over the cost of purchasing peripherals and give you much improved performance.

Remove the 16K chips from an ATR-8000, plug in 64K chips and change a few jumpers, and you have an excellent CP/M 2.2 computer. This machine is an Atari peripheral until you instruct it to become a CP/M computer, so everything we have said about the ATR-8000 in its peripheral configuration applies here.

If you do not own an Atari but have a terminal capable of running at 9600 baud (as nearly any terminal can), then you can use the ATR-8000 as a CP/M machine directly. SWP offers a cable that connects the ATR-8000 to a standard DB-25 connector; you just plug the latter into your terminal.

To use the ATR-8000 from the Atari, you must first load a terminal program to change the Atari into a terminal for the ATR-8000. Several versions of this program are available. One supports a scrolling 40-column screen, much like the Osborne 1 scheme. Another supports an 80-column screen with a graphics mode that is usable, provided you have a black-and-white TV or monitor. The last supports the BIT-3, 80-column board for the Atari 800 and is the terminal program that we used.

Assuming you use the ATR-8000's disk drives to load the program, the sequence works like this:
1) Power up the Atari and ATR. The ATR is a peripheral, running the disk drives; the Atari is the computer.
2) Load the terminal-program disk via the ATR's disk drives; the Atari becomes a terminal.
3) Load a CP/M disk into one of the ATR's drives.
4) Instruct the ATR to start up from the CP/M disk. The ATR becomes the primary computer, and the Atari is now the peripheral terminal.
This illustrates the computer-peripheral interchange that the ATR uses for CP/M.

With a non-Atari terminal, you begin at step 3 and directly start up the system. We used the ATR for some time with a Hazeltine 1410 terminal, and it functioned flawlessly.

The ATR-8000 is one of the most useful CP/M computers we have ever used and is certainly the easiest to connect. This is a rare accomplishment for CP/M; most CP/M systems do not have any of the disk abilities of the ATR-8000. We could make a good case for buying the ATR-8000 just to transfer data between different disk

formats or disk sizes, for instance.

The disk connector attaches up to four 5¼- or 8-inch disk drives. The 5¼-inch drives can be 48 or 96 tracks per inch (tpi) (35, 40 or 80 tracks), and the drives can be single- or double-sided. The ATR-8000 connects to most standard floppy-disk drives.

The ATR-8000 automatically determines several things about the disk drive and the disks in the drive. It determines the drive size and head-step rate at start-up time. When you access the disk, it determines density, format and sector size and adjusts the CP/M internal tables accordingly.

With other floppy-disk-based machines, you usually cannot change disk formats so easily. You must change several parameter blocks inside CP/M, adjusting them to the new format. The ATR-8000 does this automatically. Few and far between are machines that can handle both 5¼- and 8-inch drives; nearly everything is different about these two disk sizes, so making CP/M adjust automatically between them is a respectable accomplishment. If you want an inexpensive CP/M system that is easy to hook up and use, the ATR-8000 is a fine choice.

If you have a foreign-format disk, you can still have the ATR-8000 read it by using the DISKDEF program. This program gives a menu of many different disk formats (Osborne 1, Kaypro, Xerox 820 or IBM, for example) and lets you configure a given disk drive for a given format. You then can freely copy information between disks. If you have had problems interchanging data between machines, the ATR-8000 may be a low-cost solution for you. We have used various types of foreign-format disks, all without a problem.

If you stick with the standard ATR-8000 disk formats, you will find that you can store a much larger amount of information per disk than you are used

to. This is because the ATR-8000 uses the most efficient disk format, involving 1024-byte sectors. In this format, most of the disk is taken up by data, not by sector headers and other overhead information. A double-sided 8-inch disk will store 1.3 megabytes, and a double-sided 5¼-inch disk will store 360K. This format has another great advantage: speed. CP/M does everything internally in 128-byte sector blocks. With 1024-byte physical sectors, every eighth time CP/M asks for disk data, the ATR-8000 has to go to the disk. The other seven times, the information comes straight out of memory at high speed, just as it would from a RAMdisk arrangement. You will notice a speed up in the operations of many different programs under this system.

We must also mention the superb data separator in this system. A data separator is one of the key components in a disk system; it often determines whether a marginal disk can be read. The ATR-8000 uses a novel and effective design involving a PROM; this setup allows it to correct disk-read problems and give a clean signal to the disk controller. We were able to read several disks on our ATR-8000 that we could not read on other systems that used inferior data separators.

The ATR-8000 also provides a mechanism for making patches to its operating system. For example, you might wish to change the serial port's baud rate. Instead of having to do strange things with DDT, as in many CP/M systems, you use a straightforward editor called DDSYSGEN. You look up the name of the function you need to change (IBAUD in this example), then type in the function name and the new value — all of which you can garner from the manual. Write this new system to disk, and you have finished. We would be

hard pressed to design an easier system to use.

We compared the ATR-8000 to another CP/M system we own, a Superquad S-100 system. The Superquad can run either 8- or 5¼-inch disks, but not both. To change the type of disk it uses, you must get out a soldering gun and add capacitors to the board, get a high-speed scope and resync the phase-lock loop data separator and so forth. The ATR-8000 can use either 8- or 5¼-inch disks in any combination at the same time.

With the Superquad, you must tell it the various details about your disk drives — such as size and step rate — by making a patch to the BIOS. If you are not an assembly-language programmer, you can forget even trying to do this. With the ATR-8000, you need to tell it nothing about your disk drives; the ATR-8000 figures out everything it needs to know automatically and internally patches itself as necessary.

Even hooking up the Superquad to a terminal requires a special connector and an adapter (a TTL to RS-232 driver). The ATR-8000 just plugs into a standard Atari or DB-25 connector. Finally, on the Superquad system, no provision exists for a one-drive system, so it is virtually impossible to do such things as copy from disk to disk. On the ATR-8000, if you specify a one-drive system, you are then allowed to use drives A-D and are prompted to swap disks as necessary.

In short, the ATR-8000 is a perfectionist's machine; its design circumvents the usual shortcomings of CP/M.

Both the serial and parallel ports are accessible from CP/M, and they work in the same way as they would under the Atari operating system.

The ATR-8000 allows Atari users to use inexpensive peripherals and save

money and also to access the vast library of CP/M programs. We have used a variety of CP/M 2.2 software with the ATR, including WordStar, SpellStar, SuperCalc, dBASE II, MBASIC, CBASIC and the Infocom series of games. We have had almost no trouble with the system, and the problems we have had can probably be traced to old disk drives and problems in the local power supply. The system is far more reliable than the Atari computer we use to access it.

The final expansion to the ATR-8000 is called the Co-Power 88 with 256K. This is an 8088 processor with 256K of memory — a familiar processor that IBM and IBM-compatible computers use. This is an expansion for the ATR-8000, not a separate computer. (This expansion is also available for many other CP/M computers, such as the Kaypro, Osborne and Morrow Micro Decision, for users who wish to use MS-DOS and IBM software.)

You can use the Co-Power in one of two ways. The first is as a RAMdisk for CP/M 2.2. This is how we most often use the Co-Power board; we load WordStar and the file we wish to edit into the RAMdisk, and the RAMdisk becomes drive A. Then, any disk access goes not to disk but to RAM instead; disk access is faster by 10-20 times. When we use the board with WordStar, for instance, the various menus appear with no discernible delay, and scrolling back and forth between the top and bottom of a large document takes little time, compared to the time a floppy-disk-based system would require for the same action. Also of significance is that the CP/M BDOS and CCP are stored in this drive A, so Control-C reboot happens nearly instantaneously, instead of the usual 2-5 second delay you experience with floppy-disk-based systems.

The other option is to use the 8088

system as an MS-DOS computer. You simply load the proper disk and then execute the MS-DOS boot under CP/M — the system comes up under MS-DOS. If you define the disk drives to be IBM-compatible, you then have no problem reading IBM-format disks.

How much IBM software can the system run? It cannot run anything that depends on some unique feature of the IBM computer. For instance, Lotus 1-2-3 and the Microsoft Flight Simulator both require direct access to the video-graphics memory of the IBM computer. Thus, these programs cannot work with the Co-Power board. If you have programs that are written to run under generic MS-DOS, however, they can work with the Co-Power board.

The key is to stay away from anything that is IBM-specific. In reality, this is not too onerous a restriction. Because of the large number of IBM compatibles on the market — only some of which can run all of the IBM's software — software manufacturers provide generic versions of the more popular IBM programs. For instance, you will have no problem running WordStar-86, the new SuperCalc and many other MS-DOS programs on the Co-Power board. With the ATR-8000's larger memory (256K), WordStar does not have to go to disk as often, and this version of SuperCalc handles much larger spreadsheets than does the 64K (CP/M) version. Many, many MS-DOS application packages are available, so we will summarize by saying that if the program is MS-DOS-compatible, it should work with the Co-Power board.

SWP also supplies CP/M-86 with the Co-Power board.

The ATR-8000 documentation is not the best we have ever seen; however, it is far from the worst. The documentation concerning the Atari functions is complete, and MYDOS has clear and concise documentation

supplied with it. The descriptions of CP/M functions, however, are a bit vague, and a few diagrams in the CP/M manual are incorrect. The supplied software is mostly menu-driven, however, and if you follow the on-screen directions, you will never know that the manuals have problems.

The documentation comprises two manuals, one for the Atari functions (86 pages, spiral-bound); and one for the added CP/M functions (37 pages). Add to this the Digital Research CP/M documentation and the MS-DOS users' manual (from Microsoft), and you have the machine pretty well covered.

We found the MS-DOS manual to be adequate, although it is aimed at an experienced audience. The manual can get you to your application, and that is what we consider important.

SWP's documentation is complete and covers everything users need to know about the ATR-8000 and CP/M. It does not cover some of the more arcane functions of the software, nor does it contain much concerning the internal hardware of the ATR-8000; if you want this, a listing of the CP/M BIOS, the system ROM and schematics are available from SWP. The documentation is well written and is organized into logical sections. A table of contents lets you get to the information you need fairly quickly. If SWP would just remove the wrong diagrams, the documentation would be above average in quality.

We contacted SWP several times. Based on our discussions with other users and on our own experience, we give high marks to SWP's willingness to support this machine. It has three full-time staffers to answer the phone, and they are most knowledgeable about the machine. If they cannot answer a question, you can easily get in touch with the software designer and get an answer. SWP has a good reputation

with dealers because of its willingness to ship replacement machines to dealers without waiting to receive the original, defective machine.

If you need service, you return the machine to the company. Under the 90-day warranty, it will pay all parts and labor and one-way shipping. We once had an RS-232 driver chip fail in our ATR-8000. We sent it in and had the machine back promptly. Outside of the warranty, you are charged by the hour and for parts. SWP is willing to just swap boards if you have a major problem, to save time. Because the ATR-8000 contains just one large printed circuit board, this involves little work.

It is difficult to break an ATR-8000. About the only thing that can be installed wrongly is an edge connector — you could put it in upside down. The only result of that will be that whatever you connected via the cable attached to that edge connector won't work; nothing will be damaged. All the other connectors are keyed and cannot be installed improperly.

The ATR-8000 as a peripheral is a useful and low-cost device with which you can expand your Atari computer. It lets you use inexpensive disk drives, enhance disk-storage ability and run a modem and printer. We know of no bugs in the system.

The ATR-8000 in its guise as a CP/M 2.2 machine is one of the finest CP/M machines we have ever used. After a year's experience with it and many other machines, we prefer the ATR for almost any application. Its power in disk-interchange applications and its superb design make it a system we would recommend for many CP/M applications.

The ATR-8000 as an MS-DOS machine is a good machine in two ways: it allows you to use a high-speed RAMdisk under CP/M, and it supports MS-DOS, giving you access to yet another large library of software — that for IBM computers.

The ATR-8000 in all three forms is a relatively inexpensive, well-designed and well-supported machine. We highly recommend it for Atari owners and for those interested in trouble-free, flexible operation of CP/M and MS-DOS programs.

—David and Sandy Small

REVIEW

EPROM Development Package

The Walling APROM, SixPack and Datarase are three separate products that together represent a powerful storage technique and utility for advanced Atari programmers. The products are shipped together as an EPROM Development Package; however, you can purchase them separately. The documentation consists of a 29-page booklet that covers the use of all three products. Although there are not at present many applications that require the use of these devices, we feel that they will be popular with advanced programmers.

The APROM is an EPROM programmer and an Atari cartridge, rolled into one. It gives advanced users some interesting abilities, such as permanent storage for frequently used routines.

The APROM is the size of a typical Atari cartridge. At the top of the cartridge is a zero-insertion-force socket that has 28 pins and is intended for 2764 or 27128 EPROMs that have

access speeds of 300 nanoseconds or faster. The APROM cartridge lets you program or read this EPROM in the Atari computer's address space from $8000-$9FFF, in hexadecimal notation.

In simpler terms, having the APROM gives you a programmable permanent memory that is situated in the right-hand cartridge space. This means you can build a library of programs that you can access from the APROM's 2764 or 27128 EPROM whenever you have the APROM cartridge plugged in.

The APROM concept is an interesting one. One of the perennial gripes of Atari programmers is that you cannot examine a disk directory (that is, you cannot find out what files are on a disk) without exiting from BASIC and going to DOS. This maneuver is slow. Using the APROM cartridge, though, you can write an assembly-language program to set up a disk directory, store it in the APROM and then have the ability to view a disk catalog from BASIC.

Many users are familiar with a cartridge called Monkey Wrench, and it has some functions that are similar to those of the APROM. Monkey Wrench provides many functions that you can use in BASIC, including renumbering program lines and block deletion of code. The difference between the APROM and Monkey Wrench is that you can customize the APROM to handle the functions you want, whereas Monkey Wrench has a static set of functions.

Walling provides an operating system, called AOS, that can handle various commands stored in the APROM's EPROM in an elegant manner. Rather than having to type G1010 or some other assembly construct, you can call up commands by name. AOS looks up the name in the EPROM and runs the selected assembly-

language program. For instance, if we type DIR, we get a directory of the programs stored on the APROM's EPROM. If we type DD, we get a disk directory from drive 1 and so forth.

AOS also provides low-level routines that allow you to store assembly-language programs in the cartridge, check the cartridge's EPROM for erasure, verify EPROM burning (programming) and more. At the lowest level, this device provides a well-manufactured EPROM burner for the 2764 and 27128 21-volt EPROMs; the software provided allows you to store immediately accessible commands in those EPROMs.

The package's manual is detailed. It gives complete descriptions of all the AOS commands and tells you how to add commands. Anyone familiar with Atari assembly language should have no trouble following these directions. We assembled the Disk Directory command and moved it to the APROM with absolutely no trouble.

We certainly wish we had had this product a few months ago, when we needed to burn several 27128 EPROMs. This system makes such a burn an easy task; the system we were working with, an MPC EPROM burner, was not made to handle 27128s, and the process was a fight the whole way through. The Walling APROM is a well-designed unit that makes this process a breeze.

The product has a 90-day parts and labor warranty. It contains no user-serviceable components, so for any repairs, you must send the unit back to Tempe, Arizona, for Walling to fix.

We see all sorts of potential for this device when more software becomes available. The maker has provided a device that you can tailor for several different functions — for example, 16K of assembly-language routines could make a whole new language out of Atari BASIC, which is only 8K long to begin

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EPROM Development

	Poor	Fair	Good	Excellent
Setup	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Performance	☐	☐	☐	■
Documentation	☐	☐	☐	■
Serviceability	☐	☐	■	☐

Summary
The EPROM Development Package comprises the APROM cartridge, which is an EPROM programmer, a SixPack cartridge, which is a 48K storage device that has sockets for 3 EPROMS, and the Datarase EPROM eraser. The package works reliably and has great potential for use by professional Atari programmers and experienced hobbyists.

Features of unit tested
☐ *APROM cartridge*
☐ *SixPack cartridge*
☐ *Datarase EPROM eraser*

Suggested list price: APROM, $99.50; SixPack, $34.95; Datarase, $34.95

*Walling Company
4401 Juniper
Tempe, AZ 85282
(602) 838-1277*

with. Although we suspect the potential market is rather small for this product, we think professional Atari programmers and hobbyists will find it useful.

The SixPack is a 48K cartridge for the Atari computer. Its circuit design is quite a feat, because fitting even three 28-pin EPROMs into a cartridge the size of an Atari cartridge is difficult. Adding circuitry to bank switch 8K blocks is even more difficult.

The SixPack has three 28-pin sockets that can accept either 2764 (8K) or 27128 (16K) EPROMs. This allows you to store up to 48K on the cartridge. If you have two SixPacks and the double-cartridge Atari 800, you can save up to 96K on cartridge. Here the numbers become important, because 96K is the storage capacity of an Atari disk.

With a small amount of programming to fool the Atari computer's disk-operating system, you can make the 96K cartridge be an exact copy of an Atari disk. At this point, you can run a "disk" program completely from the cartridge. There are all sorts of stand-alone applications in which this ability could be valuable. One example we encountered was a trade-show demonstration that used Atari computers to drive games for passersby. The demonstrators had to start up the computers from a disk drive — always a fragile device — and the disks themselves were always failing and causing trouble. If they had had the Walling SixPack, they could have stored the entire demonstration program in the indestructible EPROM.

The SixPack could also be useful for storing exceptionally long games. Many software manufacturers want to release games for Atari computers on cartridge, because so many users do not have disk drives, and cassette tapes are unreliable. Unfortunately, the largest commercially available cartridge today only stores 16K, the equivalent of two 2764 EPROMS. The Walling SixPack triples this value and thus triples the amount of storage a game designer has to work with. For instance, we could quite easily store the game ZORK I, from Infocom, complete with all its massive text files, in two SixPacks.

The Datarase is an EPROM eraser. For those of you who don't know, EPROM stands for eraseable, programmable, read-only memory. In other words, an EPROM is a chip that you can program with certain data and then erase. You erase data from EPROMs by exposing them to ultraviolet light for a few minutes.

The Datarase is a small, portable EPROM eraser that can erase two EPROMs at the same time. It is a good device to have because commercial EPROM erasers are difficult to find and are not portable; the large one we own cost well over $70, for instance.

In our use of the Datarase, it erased EPROMs reliably; in fact, it erased them much more quickly than the other ultraviolet lamp we have. Perhaps this is because the manufacturer optimized the distance between the ultraviolet light and the EPROMs we put in the Datarase unit.

Walling is actively supporting these three products. The staff we spoke to on the phone were friendly and knowledgeable. We received two newsletters that discuss various minor bugs that the firm has fixed. Walling offers to update present systems for a small fee. For us, a newsletter is a sign that a company is planning to continue its support for a product for some time.

The APROM EPROM programmer cartridge, the SixPack cartridge and Datarase unit are products that advanced Atari users ought to consider. For hobbyists, software manufacturers and dedicated Atari function designers,

these products offer abilities that no other Atari cartridges do. We had absolutely no trouble with the package; we wrote and erased several EPROMs. We are impressed with Walling's design and its vision of applications for the future.

—David and Sandy Small

REVIEW

Atari 1010 Program Recorder

After deciding to buy an Atari home computer, your next consideration is likely to be the purchase of a program-storage device — that is, either a floppy-disk drive or a cassette recorder. A cassette recorder has some advantages over a disk drive. First, a cassette recorder, or program recorder as Atari calls it, costs several hundred dollars less than a disk drive. Second, it has fewer moving parts, requires fewer adjustments and is cheaper to repair; and third, a cassette recorder does not require a DOS (the disk-operating system that computers using a disk drive require in memory), which means that more of your computer's memory is available for your software.

The disadvantage of a cassette recorder is that it takes longer to save and load programs — a cassette recorder may take five minutes to load a program that a disk drive could load in seconds. Also, you can't name cassette programs, and you can't easily find out which programs you have saved on an unmarked cassette.

Despite these shortcomings, a cassette recorder still does the job and

is, therefore, a viable choice. Atari is now offering the Atari 1010 Program Recorder, an improved redesign of its original Atari 410 Program Recorder.

The 1010 Program Recorder has two basic functions — it lets you save and load programs. Because you can save many programs to the same cassette tape, the 1010 recorder has keys that advance and rewind the tape, as well as a tape-position counter. It operates in much the same way as does a sound- or music-recording machine — the Advance and Rewind keys enable you to locate the exact position of the program you want.

Like other new products in the Atari XL line, the 1010 Program Recorder doesn't take up much space — it stands 3 inches tall and is 7 inches wide and 6 inches deep. It weighs about the same as two or three paperback books, and its brown-and-white appearance matches the other XL home-computer products.

In addition to program storage, you can use the 1010 Program Recorder with programs that have sound tracks. You can play a sound track through a television or monitor speaker in concert with a program that is already in the Atari computer. The program in the computer starts and stops the 1010 as needed, providing sound or voice instruction to the user. The sound-track approach is a feature that you often find in the Atari educational series of programs, as well as in several games.

To test the 1010's loading and saving speeds, we used a small program that contained about 3K of code. The 1010 Program Recorder took about a minute to save and load this program. To give a reasonable contrast, the Atari 810 disk drive took around five seconds to save and load the same program.

The 1010 Program Recorder is easy to set up. First, you plug the transformer into a wall socket and plug its connecting cable into the back of the

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Atari 1010

	Poor	Fair	Good	Excellent
Setup	□	□	□	■
Ease of Use	□	□	□	■
Performance	□	□	■	□
Documentation	□	□	■	□
Serviceability	□	■	□	□

Summary
The Atari 1010 Program Recorder is an inexpensive purchase for home-computer enthusiasts who need to be able to save and load programs, but it does not have the speed of a disk drive. This recorder is easy to use and set up, costs much less than a disk drive and is a suitable purchase for casual users of Atari home computers.

Features of unit tested
☐ *Two I/O connectors*
☐ *Tape-position counter*
☐ *Advance and Rewind keys*

Suggested list price: $99.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

1010 Program Recorder. You can plug the input/output (I/O) connecting cable directly into any of the standard I/O connectors already connected to the computer, or into the computer itself. Improving on the design of the 410 Program Recorder, Atari has given the 1010 two I/O data connectors instead of one, so that users can connect additional components, such as printers or modems, to the computer via the 1010 Program Recorder.

The documentation for the Atari 1010 Program Recorder concentrates on setup. The manual includes 13 color photographs of the recorder in different phases of its setup and use. First-time users should be comforted to see such details.

Three pages of instruction outline the steps for saving and loading programs in BASIC, and a one-page section covers cassette maintenance. The final section does a good job of telling you how to clean the recorder, but it gives no guidelines as to how often you should do this.

Including covers, the documentation comprises 16 pages. It provides more than adequate instruction for basic use of the Program Recorder, but it gives you no information about any advanced uses (sound tracks, for example). Atari's attitude seems to be that users will find that information with their application and program-language instruction books.

In general, we don't advise untrained users to attempt to repair computer equipment, and our attitude toward the 1010 Program Recorder is no exception. Although you can easily follow the cleaning instructions, don't try to correct a recorder malfunction, should one develop. Take the Program Recorder to one of Atari's nationwide network of factory-authorized service centers. The Program Recorder comes with a standard 90-day warranty and a telephone number you can call for warranty and service information.

Overall the 1010 Program Recorder does its job efficiently. We found it to be reliable and we have no major complaints. Occasional Atari computer users should find its performance adequate for their needs.
—*Richard Bretschneider*

REVIEW

Rana Systems 1000 Floppy Disk Drive

One of the limiting factors any Atari home-computer users will come up against, sooner or later, is the relatively small amount of storage space on an Atari-formatted floppy disk. The average microcomputer's 5¼-inch floppy disk holds about 200,000 characters (200K) of information. The standard Atari floppy disk holds approximately 90,000 characters (90K).

What is the reason for the Atari disk's limited storage ability? Well, the Atari is almost four years old — that's old for a computer. Also, changing the way that the standard Atari disk drive reads and writes information on a disk would make most, if not all, of the currently available software inaccessible to the new drives. So, what can you do if you want more storage space on your floppy disk?

The folks at Rana Systems would tell you to buy their new Rana 1000 Disk Drive for Atari home computers. The Rana 1000 can read and write floppy disks in the standard 90K format, in the new Atari 1050 disk drive's high-density format (130K) or in a true

double-density format (180K).

The increase in storage capacity that the Rana 1000 offers is nice, but the designers at Rana Systems did not stop there. They designed the disk drive to give users considerable control over its operations.

The base of the front panel of the drive is lined with touch-sensitive switches, power and Busy indicator lights and an alphanumeric LED display. If you touch any one of the switches, its function is activated, and the system displays a status code. The switches control or display the selected drive density (high, medium or low), the current error condition, the drive number and the write-protect state of the drive.

The Error Condition indicator helps you determine whether the disk drive or the computer is malfunctioning. In the past, only the computer could pass on this information. The error conditions are coded, and the codes are explained in the Rana Systems 1000 *Installation Guide.*

The write-protect control lets you turn off the drive's ability to write to the floppy disk that is currently in the drive. It also tells you when the disk contains a write-protect tab. It does not, however, allow the drive to write a write-protected disk or modify locked files.

When none of the above functions are activated, the LED display shows the number of the current track being read. This information can be useful to a programmer who is trying to locate a bad section of a disk.

Much smaller than the Atari 810 disk drive, the Rana 1000 is molded in tan plastic; the color is similar to that of the original Atari computer components. The door mechanism is slightly unusual, requiring a push-in-and-up release to open and a pull-down-and-out action to close — this takes a

little getting used to. The power switch, located on the back of the drive, is thin and looks as though it might snap off if you bump it.

One consideration must be made by anyone who anticipates using the higher-density storage of this drive with existing software. To use the 180K double-density format of the Rana 1000, your software must be able to use Rana Systems' SmartDOS (shipped with the Rana 1000) or another disk-operating system that supports the 180K format (such as Optimized Systems Software's DOS XL). Alternatively, your software must support the higher-density format by itself. We found some notable examples of incompatibility: both Visicorp's VisiCalc and Synapse's Filemanager 800+ load their own DOS's and were unable to use disks formatted for higher density by the Rana 1000.

We experienced one additional problem when we turned off the drive between uses but left the computer on and DOS active. When we turned the drive on again, the computer was unable to read from or write to the Rana 1000. This problem does not occur with the Atari 810 disk drive. If you leave the Rana 1000 turned on at all times, you don't have to worry about this problem.

All this notwithstanding, we found the Rana 1000 fairly easy to set up and use. The physical installation of the drive is identical to that of the Atari 810 drive. The Rana 1000 connects to any of the Atari peripheral connectors and uses a separate transformer/power supply.

Setting the drive-identification switch is slightly more complicated than installing the drive, mostly because that switch controls so many options. The four-pin DIP switch is located on the drive's back panel; it has eight different possible settings. These settings are fairly well explained in the Rana Systems 1000 *Installation Guide.*

InfoWorld Report Card

Rana Systems 1000

	Poor	Fair	Good	Excellent
Setup	☐	☐	■	☐
Ease of Use	☐	☐	☐	■
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Serviceability	☐	☐	■	☐

Summary
The Rana Systems 1000 Disk Drive is a solid and innovative addition to the increasing line of Atari-compatible products. Although current users of Atari drives may have some problems getting used to its differences, and there may be problems with specific software packages, new users will be pleased with its complete and clear documentation. This is a recommended buy for programmers who need more storage space on their disks.

Features of unit tested
☐ *Atari-compatible disk drive*
☐ *Reads and writes 90K (standard Atari format), 130K (Atari 1050 disk-drive format) and 180K disks*
☐ *SmartDOS Version 6.1*

Suggested list price: $449

Rana Systems
21300 Superior Street
Chatsworth, CA 91311
(818) 709-5484

Two guides come with the Rana 1000 — the previously mentioned *Installation Guide* and the SmartDOS instruction guide. The spiral-bound SmartDOS manual is about 70 pages long and does a good job of explaining how to use SmartDOS. The instructions and illustrations are written for beginning computer users and often take some time to get to the heart of a situation. The manual is clear, though, and does eventually get to the point.

The *Installation Guide* is 30 pages long and is fairly complete. This guide contains the instructions for installing and configuring your drive, an explanation of the features of the drive, error-code explanations and drive care and servicing information.

The Owner Care section of this guide explains some common problems. It includes a warning about using abrasive cleaning kits and gives general guidelines for maintenance of any floppy-disk drive. For problems beyond the ones that the Owner Care section covers, the Factory Service section lists two toll-free phone numbers for technical consultation, as well as instructions on how to ship a damaged drive to the service location.

Balancing its few faults with its innovative design and function, the Rana Systems 1000 Floppy Disk Drive should be a tempting purchase for both old-time and new Atari computer users.
—*Richard Bretschneider*

REVIEW

Atari 1030 Modem

The Atari 1030 modem is Atari's newest, direct-connect device that lets your Atari computer talk to other computers and many commercially provided information services. The 1030 offers a few improvements over its predecessor, the 835, and is adequate for everyday 300-baud data communications use.

The first innovation of the 1030 is that, unlike the 835, it does not need the Atari 850 interface module to work with Atari computers. Like all recent peripherals for Atari computers, the 1030 contains the same serial input/ output (I/O) connector ports as does the Atari computer itself, and you need no special cord to plug the 1030 into Atari's I/O devices. Atari packs a 3-foot serial-connector cord in with the 1030.

Installation of the 1030 is the simplest ever for an Atari modem. You just hook up the modem to the computer through its serial port, and you're ready. Because the modem has an extra port, you can even put the 1030 anywhere in a chain of serial-port peripherals, such as disk drives or printers. (You cannot connect Atari's older tape recorder, the 410, to the serial bus at the same time as the 1030, however.)

The second surprise in store for 1030 modem owners is that the modem comes with its own software in ROM. If you turn on the modem and then the computer, and if the computer has no cartridges installed, the ModemLink software comes up on the screen in about eight seconds.

The third obvious difference between the 835 and the 1030 is the 1030's styling, which matches the

coffee-and-cream styling of the Atari XL computers and other newer peripherals. The 1030 measures 9 × 6½ × 1½ inches. When you set it up, allow an inch or so behind it for the stiff serial cable to wind around.

Because the 1030 is a direct-connect modem, you can plug both your phone and the modem into the phone line at all times. To do this, you first unplug the telephone line from your phone using its modular RJ-11 connector cable, then plug that cable into the clearly marked TEL LINE slot on the back of the modem. Next to that is a 6-inch, permanently attached length of RJ-11 cable, just long enough for you to plug in your phone and place it on top of the modem.

This arrangement presents two problems, though. First, many newer, non-Bell phones plug into the phone line at the handset and not at the base. Obviously, you can't always talk six inches away from the modem! The second problem is that, typically, computer users like to be able to move their phone around the room, or even between rooms. We solved both problems by buying a $3, two-way RJ-11 connector and a length of cable, which we hooked up to the phone.

Unlike other Atari power cords, the transformer is specially made for use only with the 1030, and the transformer itself is in one piece that has a two-prong plug. If your Atari system is plugged into a power strip, you must plug the 1030 transformer in at one end, but this shouldn't be much of a problem.

On the front of the 1030 is the on/off switch. Next to that is the on/off LED indicator, which shows you at a glance if the modem is on. Last is the Ready indicator, which lights up when the 1030 is receiving a carrier tone from another modem.

A modem takes computer signals and turns them into a series of beeps that the phone line can understand and transmit. A modem also turns such beeps back into computer signals. The 1030 performs such tasks without error (as long as you have a reasonably clean phone line). Being a direct-connect device, it may not work within offices that have private exchanges (PBXs) or in hotels.

The aspect of the 1030 that leaves something to be desired is the included software. It does what it's designed to do well, yet it lacks the sophistication needed to transmit or capture files of data.

When ModemLink loads, you are greeted by a main menu that has four options. If you select the first option, to dial from a keyboard, the software asks you to enter the entire number. After you do so and press the Return key, the modem dials the number for you and highlights the numbers as dialed in inverse video. If you listen carefully, you can hear a beeping within the modem as well.

The second option, called Manual Dialing Complete, lets you dial the number directly at the phone and then alerts the computer that you have done so.

The third option reads, "Answer — Call received," and it lets you accept a call from another computer with the touch of the 3 key. The fourth and final option lets you toggle between the older pulse dialing and newer touch-tone dialing. Every phone line is one or the other.

When ModemLink detects a carrier tone, the Ready indicator on the front of the modem lights up. You then follow the sign-on instructions of the service in question. If ModemLink doesn't detect a carrier within 30 seconds, it highlights the message "No connection — Press Return to continue." Return takes you back to the start-up menu.

InfoWorld
Report Card

Atari 1030

	Poor	Fair	Good	Excellent
Setup	☐	☐	■	☐
Ease of Use	☐	☐	☐	■
Performance	☐	☐	■	☐
Documentation	☐	☐	■	☐
Serviceability	☐	☐	☐	■

Summary
The Atari 1030 modem is a direct-connect device that is well styled and easy to install. It comes with its own ModemLink software installed in ROM, which although it performs adequately lacks some features. With the right software, this modem could provide you with a truly intelligent communications system.

Features of unit tested
☐ *300 baud*
☐ *Direct-connect*
☐ *ModemLink software*

Suggested list price: $139.95

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

When you are connected to another computer, the Help key on all Atari XL computers becomes available. On older Atari computers, the Select key activates the Help menu. This Help menu should more appropriately be called an Options menu, because it lets you choose between echo on or echo off, a 37-character or 30-character screen and so on.

Most useful is the modem's memory buffer, which lets you capture 865 lines of text in a 48K RAM computer (55 lines in a 16K RAM one) that you can then scroll through. The problem is that you can only store the contents of the memory buffer in the computer's random-access memory (RAM). When you turn the computer off, you erase RAM. You cannot save the contents of a buffer to a disk or tape. This is a grievous oversight.

Fortunately, public-domain software that allows you to capture or send data to and from disk or tape is available, and much of this software, written for the Atari 835 modem, can run with little modification on the Atari 1030 version. Two of the most popular programs are Jonesterm and AMODEM 4.2; you can find information on them elsewhere in this book or from local Atari users' groups.

The ModemLink software also lacks a dialing directory — a place where you can store numbers, and have the computer dial them for you. This would have been another nice feature.

Also, the 1030 ignores the fact that various computers use different transmission configurations, including such configurations as 7 vs. 8 bit, 0 vs. 1 or 2 stop bits and even parity vs. odd or no parity. Even so, the 1030 seems to work with most Atari systems — that is, at 8 bits and no parity, which is most common.

On the bright side, the 1030 recovers nicely when you are

disconnected, even if the other computer is the one that is disconnecting. You consistently get the message "Line disconnected — Press System Reset for menu." Some modems just send you garbage characters, making you wonder if you've really finished.

The 1030 manual is up to the usual Atari standards, which is to say that it's adequate but not dazzling. It has no index. The setup instructions are amply illustrated, and the back of the manual contains question-and-answer and definition sections.

Atari offers its standard 90-day warranty with the 1030 modem, and servicing is available at all authorized Atari service centers or through the national mail-in centers in California. You cannot service the device yourself.

One note: The more times you plug and unplug the RJ-11 connector, the more worn the bendable plastic connector becomes. If you use it too much, part of the plastic breaks off — it's best to set up your system and let it sit.

It is best to think of the Atari 1030 with ModemLink as an educational tool with which to explore the world of telecommunications. The right software can turn it into a truly intelligent auto-dial, auto-answer communications system or even let it run an electronic bulletin-board system.
—*Scott Mace*

REVIEW

Atari 1025 Printer

Atari's release of the new XL home computers has been accompanied by the release of several new Atari printers. Of these printers, the 1025 dot-matrix printer is a low-cost model that has many high-cost features. New users and longtime users who want to add a printer to their system would do well to consider the 1025.

The 1025 has many basic features that first-time computer users will appreciate. It is an 80-column printer that can print on single-sheet or fanfold paper. It uses a standard typewriter ribbon, and you can set it up and have it working with your computer in a matter of minutes.

The 1025 printer doesn't take up much space on your desk — it measures 6 inches tall, 14 inches wide and 10 inches deep, and it weighs just a little more than the average disk drive. Its case has the same black-and-white color scheme that the Atari XL home-computer line uses.

The 1025 printer does not use the once-common Atari 850 interface modules. Instead it uses a printer cable that plugs directly into a standard input/output data connector on the computer or the disk drives.

Like other dot-matrix printers, the 1025 produces characters by printing small dots in recognizable patterns. Today this is a common, almost-universal method for printing text from home computers. The 1025 normally prints 10 characters within each horizontal inch of text. It can also print five characters per inch in its Expanded mode and 16.5 characters per inch in the Compressed mode.

The 1025 does lack a few features

that users will eventually want, though. First, it cannot produce graphics — it is a text-only printer. Second, the 1025 does not use true descenders in its character set. This means that it does not print the descending tails of letters such as *y, g* and *j* below the text line. Instead, it prints these characters slightly higher than their tailless counterparts. Although this format is not ugly, it is inappropriate for professional documents.

The Atari 1025 is not a fast printer. It only prints in one direction: from left to right. We measured its speed to be between 15 and 20 characters per second. This is considerably slower than the speed of 80-100 characters per second that you can find on more expensive printers. For users, it means that a page of text (around 1800 characters) takes about 2 minutes to print.

On the positive side, the 1025 printer is remarkably reliable. The print remains readable, and the printer does not omit characters or print anything that you do not expect.

Although the 1025 is slow and lacks some advanced features, it is still an ideal printer for new users. Attaching it to your Atari computer is a simple process. Atari achieves this simplicity by eliminating many of the switches and cables that more advanced printers require.

The 1025 has only two switches — a power switch and a printer switch. The power switch is located on the back of the printer and the printer-enable switch is on the front of the unit. Rather than having the cryptic "On-line/Off-line" message that usually appears on enabling switches, this switch has a simple label that reads "ON/OFF." If the switch is off, the printer cannot accidentally print characters. The only remaining control is a knob on the right-hand side of the printer. Turning

InfoWorld
R e p o r t   C a r d

Atari 1025

	Poor	Fair	Good	Excellent
Setup	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Performance	☐	☐	■	☐
Documentation	☐	■	☐	☐
Serviceability	☐	☐	■	☐

Summary
Atari's 1025 dot-matrix printer is slow and cannot produce graphics or professional documents, but it is a fine machine for first-time computer users because it is so easy to set up and to use.

Features of unit tested
☐ *Dot-matrix printing*
☐ *80 columns*
☐ *17 cps*
☐ *5, 10 and 16.5 cpi*
☐ *Connects directly to Atari XL computer or disk drive*
☐ *Single-sheet or fanfold paper*

Suggested list price: $399

*Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000*

this knob advances the printer paper.

The 1025 printer's manual goes into great detail, including color pictures and flashy graphics, on how to connect the printer, install and change ribbons, insert paper and check out an installation. It does not tell more advanced users how to list programs to the printer or program the printer. It also does not include a list of the ASCII or ATASCII codes that the printer recognizes. It does contain a note about setting up the printer to use a European character set, and it lists the European characters — without explaining which standard characters the European characters replace.

Including covers, the documentation is only 16 pages long and contains mostly pictures. It will leave users experimenting to find out much of what they want to know about their new printer.

Atari's designers have eliminated one of the worst frustrations of computer users by making the 1025's print ribbon extremely easy to find, buy, install and remove. This printer uses a low-cost, standard typewriter ribbon, instead of expensive ribbon cartridges.

The printer comes with a standard 90-day warranty. Atari has a nationwide network of factory-authorized service centers to help with more serious problems.

The Atari 1025 printer is a fine beginning purchase for home-computer enthusiasts because it is so easy to use and set up. Although its price is higher than prices for other printers of similar quality, you should remember that this printer does not require an interface — the Atari 850 interface can add an additional $300 to the price of a non-Atari printer.

—Richard Bretschneider

REVIEW

Microline 92 Printer

The Okidata Microline 92 printer is fast and versatile. It offers a broad selection of print qualities, fonts and formats. Unfortunately, not much software for the Atari computer works with the Microline 92. Nevertheless, it would be an outstanding choice for Atari computer owners who need to do a lot of printing or who need economical high-quality printing and who are willing to take a little extra trouble to do so.

With the Microline 92, you can choose from data-processing-quality printing, emphasized printing or enhanced printing (two different kinds of boldface) and correspondence-quality printing. Each print style is available in 10 cpi (characters per inch), 12 cpi, 17½ cpi and 5 cpi (double width).

The printer uses the full 96-character ASCII set, and you can also use all-points-addressable (APA) graphics to define your own characters. It has true descending characters and full-size superscripts and subscripts. You can use vertical and horizontal tab settings.

The Microline 92 comes with a fixed-pin feed that accepts 9½-inch-wide tractor-feed paper and friction-feed paper up to 8½ inches wide. You can also buy a roll-paper stand or an optional tractor-feed unit that accepts paper of various widths.

The printer uses a parallel interface. The Atari 850 interface module has a parallel port for a printer, but it takes a different type of plug so you need to use an adapting interface cable. We attached the printer to the interface module using an Atari parallel-interface printer cable from Microtek. This cable can

pass data from the computer straight through to the printer.

The printer is not difficult to set up for use with Atari computers. The connection cable plugs into the interface module with a 15-pin parallel connector and into the back of the printer with a 36-pin parallel connector.

You must set a dial on the front panel, to specify what paper length you will use, by using the table in the manual to translate inches into the 0-to-9 scale on the switch. (For 8½-inch paper, you set the dial to 7.)

You also need to change some small switches inside the printer's case. We called the Okidata toll-free technical-assistance hot line to find out these switch settings: switches 1-4, off; switches 5 and 6, on; switches 7 and 8, off. Setting the switches is not a complicated procedure. You remove the case, insert a long Phillips screwdriver into two deep, dark shafts in the case and unscrew the mounting screws. After setting the switches, which are easy to find, you replace the case. You have to put the screwdriver down each shaft and get it into the end of the screw — no mean feat — and then tighten it.

The instructions for setting up the printer are excellent. All the procedures are laid out in careful lists of steps in the accompanying manual. The instructions are accompanied by diagrams of the printer and all its components, with the relevant parts emphasized.

You can load the paper either from the rear of the printer or from the bottom if you have a slotted printer stand. The paper goes in easily either way.

The ribbon from the Okidata is like an old-fashioned typewriter ribbon, with two spools instead of a cartridge. We had some trouble getting the ribbon between the printhead and the ribbon guard. Installation required several

minutes of patient prodding and manipulating and gave us ink-covered fingers.

The Okidata printer is exceptionally easy to use. All the operating controls except the power switch are on the front panel. The platen knob is on the right side of the machine, where it should be for right-handed people.

You can easily write BASIC programs that print on the Microline 92 and use all of its capabilities. Each of the printer's bells and whistles (as the manual calls them) is regulated by control codes. When the printer encounters one of these codes, it interprets the code as an instruction instead of as text, so the codes do not appear on your printout. For example, to turn on 12-cpi printing, you transmit CHR$(28) in an LPRINT statement. All text the printer receives then prints in the new size.

Some options require more than one control character. For example, the vertical-format unit (VFU) and the horizontal tabs require strings that describe the regions on the page. These control codes are all easy to use. You can embed them in your text lines simply by putting CHR$ functions in your LPRINT statements.

The excellent manual has detailed examples of each option and a table of all control codes, and its tutorial leads you gently through the formatting process.

We tested the printer with the AtariWriter word processor. AtariWriter does not automatically let you use all the features of this printer. Printing documents that don't use any special formatting features, such as underlining, is easy — you just follow the instructions in AtariWriter's manual and select option 3 (Atari 820) in the Printer menu.

Using the printer's formatting features with AtariWriter is more

InfoWorld
Report Card

Microline 92

	Poor	Fair	Good	Excellent
Setup	☐	☐	■	☐
Ease of Use	☐	☐	■	☐
Performance	☐	☐	☐	■
Documentation	☐	☐	☐	■
Serviceability	☐	☐	☐	■

Summary
The Okidata Microline 92 is an excellent parallel-port printer for Atari computer owners who do a lot of printing and want to produce high-quality printouts. It is fast and reliable and can produce a variety of print styles and formats.

Features of unit tested
☐ *Impact printing*
☐ *160 cps*
☐ *Bidirectional printhead*
☐ *5, 10, 12 and 17½ cpi*
☐ *Centronics parallel interface*
☐ *Fixed-pin feed*

Suggested list price: Microline 92, $599; Tractor Unit, $50

*Okidata Corporation
532 Fellowship Road
Mount Laurel, NJ 08054
(609) 235-2600*

difficult, though. You have to embed the appropriate control codes in the text file using AtariWriter's Control-O printer-control command. For example, to underline text, you must type Control-O, the number *27,* Control-O, the number *67,* the text to be underlined, Control-O, the number *27,* Control-O and the number *68.* This procedure is awkward but not unbearably so. You soon become familiar with the control codes you use most often. Alternatively, you can bypass this procedure by using a printer-driver file that tells AtariWriter what the printer's control codes are, and you can then use AtariWriter's usual formatting commands.

Printer drivers were available from APX (Atari Program Exchange), but that group is now in an uncertain state. You may be able to get a printer driver from an Atari users' group.

The Microline 92 printer is a whiz. The printhead is bidirectional, and it prints regular data-processing-quality text at 160 cps. At this speed, it can print an entire page full of characters in just 45 seconds. Enhanced or emphasized text is overprinted with a half-dot offset; it prints at 80 characters per second (cps) with two passes of the printhead per line. Correspondence quality prints at 40 cps.

All the faces and fonts produced by the printer look good. Even the "quick and dirty" data-processing face is legible and has nicely shaped characters. The correspondence-quality printing is outstanding — it is not quite as sharp as the type produced by a daisy-wheel printer, but it's not far off. Its graceful typeface has attractive letters; you can even produce different digits and the zero has no slash through it.

The printer is as well designed as its typefaces. It's built like a tank — solid and tough. The manual promises 4000

hours mean time between failures and 15 minutes mean time for repairs. We poked and switched and couldn't get anything to go wrong mechanically.

Okidata has taken pains to reduce the wear on the printhead, the most vulnerable part of a fast printer. The mechanism has a heat sensor that can slow or stop printing if the printhead starts to overheat. The ribbon for the printer contains a lubricant to extend the printhead's life, which is 200 million characters, according to Okidata.

We have only two complaints about the printer. First, it is loud; it makes a high-pitched sound that goes right through walls. A sound hood would solve this problem. Second, we tested the printer with both 15-pound and 20-pound paper, and we discovered that the Microline 92 cannot feed 20-pound paper smoothly unless you have the tractor unit. This quirk is not mentioned in the documentation.

When we called Okidata's toll-free technical-assistance number, a representative told us that the printer would indeed accept 20-pound paper if you use the tractor unit and she also recommended the tractor unit for all users, because it allows for varying widths and weights of paper.

The printer is 14½ inches wide, 12 inches deep and 5 inches high. It weighs about 17 pounds and comes with an 8-foot power cord. The off-white, textured-plastic case has a clear panel in the access cover.

The printer has a 90-day limited warranty, and extended service contracts are available. Any Okidata-authorized service center makes repairs, or you can send the printer to Okidata. The warranty card lists several service centers and gives a number to call for more information.

Okidata encourages you to ask for technical assistance if you need it. The manual includes two numbers (one toll-

free) that you can call for help. You are unlikely to need help once you learn the settings for the small internal switches, though, because the excellent manual has instructions for all the procedures you need to perform. It has reference sections for more experienced (or daring) users, and a technical appendix provides detailed specifications.

Well written and easy to read, the manual is coherently organized. Its presentation is good: clear typography and design, nice stiff paper, divider tabs, legible diagrams, useful charts and easy-to-spot headings. It is bound in a standard three-ring binder for 5½ inch by 8½ inch paper.

We recommend the Okidata Microline 92 wholeheartedly if you do a lot of printing and are willing to make an extra effort to get Atari software to use all the Okidata features. It may not be for you if you don't do much printing or if you don't need correspondence-quality type, though.
—*M. A. Olds*

REVIEW

Gemini 10X Printer

The Gemini 10X is a dot-matrix printer that works with any computers that are Centronics-port compatible. A serial-interface option is also available. Its operation is similar to that of other popular printers, but the Gemini has one advantage over those other printers: its price is lower.

The Gemini 10X measures 15.2 × 12.4 × 5.8 inches, so it's small enough to put on a desk with your computer. Its 819-byte buffer means

that its memory is adequate to speed you up when you are making small listings. It also has a provision to expand the buffer to 4K or 8K.

The 10X can handle a user-defined character set. This is handy if you want to use special fonts and symbols. The character set does not use the same memory as the buffer.

The 10X is a fast printer. When running in normal print mode, it runs at 120 cps; that is, the Gemini 10X prints 120 characters per second excluding the time needed for line feeds, which take one tenth of a second.

The printhead is bidirectional and logic seeking. Bidirectional means the printer prints both forwards and backwards, which saves on carriage-return time, and logic seeking means that it searches for the most efficient way to print a line.

The character matrix of the 10X has a high resolution. Normally the printer uses a 9 × 9 dot matrix to produce each character, but it can also produce print using 18 × 9 and 18 × 18 dot matrices if it is using emphasized printing. The 10X can also print graphics with a resolution as great as 240 × 144 dots per square inch.

Several character sets are available to you when you use the 10X. It has the 96 standard ASCII characters, but along with these are a set of 96 italic characters, 64 special characters, 32 block-graphics characters, 96 downloadable characters and 88 international characters.

As for font sizes, you can not only use the normal 10 cpi (characters per inch) font but you can also choose the elite (12 cpi), condensed (17 cpi) and enlarged (5, 6 or 8.5 cpi) fonts. You can print emphasized characters or double-emphasized (double strike) characters. The 10X can also print superscripts, subscripts, backspaces and do continuous underlining.

InfoWorld
Report Card

Gemini 10X

	Poor	Fair	Good	Excellent
Setup	☐	☐	☐	■
Ease of Use	☐	☐	☐	■
Performance	☐	☐	☐	■
Documentation	☐	☐	■	☐
Serviceability	☐	☐	☐	■

Summary
The Gemini 10X dot-matrix printer is fast, easy to use and reliable, and it performs as well as or better than similar printers that are more expensive. It is designed to work with computers that have a Centronics-compatible parallel interface, although a serial-interface option is available.

Features of unit tested
- ☐ *Dot-matrix printing*
- ☐ *9 × 9, 18 × 9 and 18 × 18 dot matrix*
- ☐ *240 × 144 dots per square inch in graphic mode*
- ☐ *120 cps*
- ☐ *Bidirectional logic-seeking printhead*
- ☐ *5, 6, 8.5, 10, 12 and 17 cpi*
- ☐ *819-byte buffer*
- ☐ *Centronics parallel interface, serial interface available*
- ☐ *Friction and tractor feed*
- ☐ *ASCII, italic, international and graphic characters*

Suggested list price: $399

Star Micronics, Inc.
200 Park Avenue
New York, NY 10166
(212) 986-6770

Among the 10X's many special features is a self-test mode that allows you to check the operation of your printer without having to turn on your computer. The 10X allows you to define the left and right margins and the tab stops.

The printer supports macro instruction. A macro is a set of user-defined characters or codes that you can call using a single command. At first you might wonder why macro support is such a desirable feature, but you'll quickly see how helpful it can be when you're programming a difficult BASIC printing routine.

When printing, you can set the 10X to skip over perforations. As a result, BASIC program listings are much easier to read.

As for the printhead and the hardware, the 10X can take fanfold paper, roll paper or single sheets. It also has both friction and tractor feed. It uses a standard spool-type ribbon that is much cheaper than a conventional computer printer ribbon. The printhead has a recommended life of 100,000,000 characters and the hardware has a recommended life (mean time between failure) of 10,000,000 lines.

The Gemini 10X is fairly easy to use. If you have already mastered the use of printer control codes — which are universally difficult to learn — you'll find that the 10X's codes are easy to use. Loading the paper and taking care of paper jams is pretty simple, but, like anything else, it takes some getting used to. It is slightly difficult to reposition the tractor and lock it, but repositioning the tractor is not an everyday occurrence.

The Gemini 10X's documentation comes in an attractive spiral-bound book that has a built-in bookmark. The manual takes you step by step through the printer's special features and operation. It also gives program listings

throughout to demonstrate the functions of the printer. If the listings in the main body of the book don't work with your computer, the manual gives equivalent listings for the Apple II and II Plus, Atari 400 and 800, Commodore 64, VIC 20, IBM Personal Computer and Osborne and TRS-80 computers.

On the whole, the manual is well organized and easy to use. The index leaves something to be desired, however. We had a hard time looking up control-code descriptions. The setup guide is also in a strange place — the back of the manual. None of these are serious flaws.

The Gemini 10X comes with a 180-day warranty, which is more than adequate. We found the 10X to be an extremely reliable printer that has few faults. Its performance is nothing short of excellent. If any problems do arise with your printer, many dealers exist that can fix or replace it. If you are not close to a dealer, you can send your faulty printer back to Star Micronics, and it will fix or replace it.

Setup for the 10X is fast and easy — unpack the printer, plug it into your computer and then into the wall, and it works. The only problem you could possibly encounter would be incompatible cables, and that is fairly unlikely because Centronics cables are available for most computers.

This printer is fast, easy to use and pretty much free from faults. Program listings that it produces are clean and easy to read; and the graphics are superb. This printer performs as well as higher priced, more popular printers on the market and is definitely a cost-effective alternative. If you are considering buying a printer, the 10X deserves a good look.
—*Kevin Cheung*

REVIEW

Atari 1027 Printer

Atari has introduced several new printers to accompany its line of Atari XL home computers and among them is the Atari 1027, an inexpensive letter-quality printer. Users who have longed to use a letter-quality printer with their systems but have held off because of the expense of previous models may find that the 1027 was worth waiting for.

The 1027 is a letter-quality printer in the classic sense. Many dot-matrix printers these days advertise "near letter quality" or "document quality" print, but there is no replacement for the real thing. Dot-matrix printers print characters on paper by using different patterns of small dots to create each individual character. A letter-quality printer has a print element, usually a wheel or a ball, that contains a small carving of each character. As the printer prints, the element spins and strikes the paper with the proper character, much like a standard typewriter. This process creates a clean document that is indistinguishable from that created by a typewriter.

The cylindrical print element on the Atari 1027 rotates horizontally on a rod in front of the paper. This cylinder, which is made of rubber, has six rows of about 20 characters per row. An ink roller, which is located on the side furthest from the paper, inks it as it rotates.

The Atari 1027 is limited to printing on standard bond paper. It does not provide pins to hold form-feed paper, and its 8½-inch paper chute is not wide enough to accommodate form-feed sheets.

Like the other new printers in the XL line, the 1027 printer doesn't take

up much space on your desk. It stands 3 inches tall, is 16 inches wide and has a depth of 6 inches. It weighs just a little less than the average disk drive and its black-and-white molding matches that of the XL home-computer line.

The 1027 does everything that you would expect from a letter-quality printer. Although it cannot create all the special characters that many competitive dot-matrix printers feature, it does have one of the finest underlines we have ever seen on a home-computer printer.

The 1027 printer is easy to attach to your computer system as it does not use the Atari 850 interface module that previous Atari printers required. Instead, the printer cable plugs directly into any of the standard input/output data connectors on either the computer or the disk drives.

The new Atari XL computer devices are among the easiest to assemble of any we have seen. You simply plug in the printer, plug in the connecting cable and clip in a new ink roller. Atari has eliminated many of the switches and cables that more advanced printers require. The 1027 has only one switch, the power switch, which is on top of the printer for easy access. It has no on-line/off-line switches, so it is ready to print when you turn it on. You turn the knob on the right-hand side of the printer to advance the paper. A paper-release switch, similar to that of a typewriter, is located near the power switch.

Letter-quality printers are not renowned for their speed, and the Atari 1027 sets no new speed records — we have seen faster printers, and we have seen slower printers. It does print in both directions, alternating left to right, then right to left. It also has an annoying half-step line feed that is unusually slow.

We measured the printing speed at

Summary
The Atari 1027 printer is a low-cost, letter-quality printer that has been designed to accompany the Atari XL line of home computers. It is easy to set up and use, and you do not need to purchase an additional interface. Although it sacrifices speed in the interest of economy, it is a remarkably good printer for its price.

Features of unit tested
- ☐ *Raised-type cylinder printing*
- ☐ *3 cps*
- ☐ *Bidirectional printing*
- ☐ *Connects directly to Atari XL computer or disk drive*
- ☐ *Single-sheet paper*

Suggested list price: $399

around 3 characters per second (cps). This is quite a bit slower than the 10-15 cps found on most low-cost, letter-quality printers and the 80-100 characters per second print speed found on many, more expensive, dot-matrix printers. To users, 3 cps means that a page of text, around 1800 characters, takes about ten minutes to print.

On the positive side, the 1027 printer is remarkably reliable. Its print is exceptionally readable, and the printer does not lose characters or print anything that you haven't requested.

Documentation for the Atari 1027 printer is heavy on setup and light on use. The manual contains 14 different color photographs of the printer in different phases of its setup and use. This is overkill for such a simple device, but for first-time users, it can be comforting to see. A one-page section, organized in question-and-answer format, tells you what to do if difficulties arise. This section covers most of the problems that first-time users will experience and also gives you all the information you need to maintain the printer.

The manual's final page includes the optional control codes that the printer recognizes. These codes give you access to a European character set, but you can use them only if you are using BASIC programming to print on the 1027. The documentation makes no mention of the AtariWriter or any other word-processing program. The Atari Program Exchange offers a printer driver for the 1027 printer, but this merely allows the program to use the 1027's underlining ability.

The documentation is 12 pages long, including covers, and consists mostly of pictures. Most intermediate and advanced users will have to experiment to find out much of what they want to know about this printer.

Although it is inadvisable for an untrained person to work on any computer equipment, it is nice to note that this printer eliminates one of the worst enemies of computer users — an ink roller replaces the print ribbon. A large variety of ribbons, both loose and cartridge, exist, but they all usually require you to disassemble much of the upper print mechanism to install them. The 1027's ink roller clips in behind the print element in as much time as it takes to describe the process.

The printer mechanism needs to be lubricated approximately every four months. You can easily apply the oil (which is included with the printer) through a small door on the printer's top left-hand side.

Atari has a nationwide network of factory-authorized service centers to help you with more serious problems. The printer comes with the standard 90-day warranty.

The Atari 1027 printer is a fine beginning purchase for home-computer enthusiasts who seriously want to produce business-quality documents. It is easy to use and easy to set up. It is cheaper than other letter-quality printers, although it does sacrifice speed for economy. Because it does not require an interface, which can add an additional $300 to the price of a non-Atari printer, the 1027 printer is a bargain.

—*Richard Bretschneider*

APPENDICES

Company Names and Addresses

Here's a list of some of the companies offering Atari hardware, software and services:

Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
(415) 960-0410

Addison-Wesley
Software Marketing
3 Jacob Way
Reading, MA 01867
(617) 944-3700

Adventure International
P.O. Box 3435
Longwood, FL 32750
(800) 327-7172

Alien Group, The
27 West 23rd Street
New York, NY 10010
(212) 741-1770

Alphacom, Inc.
2323 South Bascom Avenue
Campbell, CA 95008
(408) 559-8000

Amdek Corporation
2201 Lively Blvd.
Elk Grove Village, IL 60007
(312) 364-1180

Amiga Corporation
3350 Scott Blvd., Bldg. 7
Santa Clara, CA 95051
(408) 748-0222

Anchor Automation
6913 Valjean Avenue
Van Nuys, CA 91406
(213) 997-6493

Arrays, Inc./Continental Software
11223 South Hindry Avenue
Los Angeles, CA 90045
(213) 410-9466

Artworx Software Company, Inc.
150 North Main Street
Fairport, NY 14450
(716) 425-2833

Astra Systems
2500 South Fairview, Unit L
Santa Ana, CA 92704
(213) 804-1475

Atari Corporation
1312 Crossman Road
P.O. Box 61657
Sunnyvale, CA 94089
(408) 745-2000

Avalon Hill Game Company
Microcomputer Games Division
4517 Harford Road
Baltimore, MD 21214
(301) 254-5300

Axiom Corporation
1014 Griswold Avenue
San Fernando, CA 91340
(213) 365-9521
(800) 232-9466

Batteries Included
17875 Sky Park North, Suite P
Irvine, CA 92714
(714) 979-0920

Big Five Software
14640 Keswick Street
Van Nuys, CA 91405
(213) 782-6861

Bizcomp Corporation
532 Mercury Drive
Sunnyvale, CA 94086
(408) 733-7800

Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170

CBS Software
One Fawcett Place
Greenwich, CT 06836
(203) 622-2500

CE Software
238 Exchange Street
Chicopee, MA 01013
(413) 592-4761

Chemical Bank (Pronto)
55 Water Street
New York, NY 10041
(212) 310 6161

CodeWriter Corporation
7847 North Caldwell Avenue
Niles, IL 60648
(312) 470-0700
(800) 621-4109

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
(215) 431-9100

CompuServe, Inc.
Consumer Information Service
5000 Arlington Center Blvd.
Columbus, OH 43220
(614) 457-8600
(800) 848-8199

Control Data Publishing Company
P.O. Box 261127
San Diego, CA 92126
(800) 233-3785
(800) 233-3784

Creative Software
230 East Caribbean Drive
Sunnyvale, CA 94089
(408)745-1655

Culverin Corporation
1440 Yankee Park Place
Centerville, OH 45459
(513) 435-2335

Databar Corporation
10202 Crosstown Circle
Eden Prairie, MN 55344
(612) 944-5700

Datamost, Inc.
20660 Nordhoff Street
Chatsworth, CA 91311
(818) 709-1202

Datasoft, Inc.
19808 Nordhoff Place
Chatsworth, CA 91311-9969
(818) 701-5161

DesignWare
185 Berry Street, Bldg. 3, Suite 158
San Francisco, CA 94107
(415) 546-1866
(800) 572-7767

Developmental Learning Materials
(DLM)
One DLM Park
Allen, TX 75002
(214) 248-6300

Dow Jones/News Retrieval Service
Dow Jones & Co., Inc.
P.O. Box 300
Princeton, NJ 08540
(609) 452-1511
(800) 257-5114

Dynacomp, Inc.
1427 Monroe Avenue
Rochester, NY 14618
(800) 828-6772

Eastern House Software
3239 Linda Drive
Winston-Salem, NC 27106
(919) 748-8446

Eclipse Software
1058-C Marigold Court
Sunnyvale, CA 94086
(408) 246-8325

Edupro, Inc.
445 East Charleston Road
Palo Alto, CA 94306
(415) 494-2790

EduWare Services, Inc.
28035 Dorothy Drive
Agoura Hills, CA 91301
(213) 706-0661

Electronic Arts
2755 Campus Drive
San Mateo, CA 94403
(415) 571-7171

Epson America, Inc.
2780 Lomita Blvd.
Torrance, CA 90505
(213) 539-9140
(800) 421-5426

Epyx Computer Software
1043 Kiel Court
Sunnyvale, CA 94089
(408) 745-0700

First Star Software
22 East 41st Street
New York, NY 10017
(212) 532-4666

Funsoft, Inc.
28611 Canwood, Suite B
Agoura, CA 91301
(818) 991-6540

FutureHouse, Inc.
P.O. Box 3470
Chapel Hill, NC 27514
(919) 967-0861

Happy Computers
P.O. Box 1268
Morgan Hill, CA 95037
(408) 779-3830

Harcourt Brace Jovanovich
1250 Sixth Avenue
San Diego, CA 92101
(619) 699-6335
(800) 543-1918

Hayes Microcomputer Products
5923 Peachtree Industrial Blvd.
Norcross, GA 30092
(404) 449-8791

Imagic
981 University Avenue
Los Gatos, CA 95030
(408) 399-2200

Indus Systems
9304 Deering Avenue
Chatsworth, CA 91311
(800)54-INDUS
(800)33-INDUS

Infocom, Inc.
55 Wheeler Street
Cambridge, MA 02138
(617) 492-1031

Jay Gee Programming Company, The
7185 Blue Hill Drive
San Jose, CA 95129
(800) 772-3545
(800) 227-1617 ext 217

Koala Technologies Corporation
3100 Patrick Henry Drive
Santa Clara, CA 95050-8100
(408) 986-8866

Kraft Systems
450 West California Avenue
Vista, CA 92083
(619) 724-7146

Krell Software Corporation
1320 Stony Brook Road
Stony Brook, NY 11790
(516) 751-5139
(800) 245-7355

Leading Edge Products, Inc.
225 Turnpike Street
Canton, MA 02021
(617) 828-8150 in Massachusetts
(800) 343-6833 elsewhere

Learning Company, The
545 Middlefield Road, Suite 170
Menlo Park, CA 94025
(415) 328-5410

LJK, Inc.
7852 Big Bend Blvd.
St. Louis, MO 63119
(314) 962-1855

Luck Software
1160 Niblick Road
Paso Robles, CA 93446
(805) 238-2585

Macrotronics
1125 North Golden State Blvd.
Turlock, CA 95380
(209) 667-2888

Mannesmann Tally Corporation
8301 South 180th Street
Kent, WA 98032
(206) 251-5500

Maximus
6723 Whittier Avenue
McLean, VA 22101
(800) 368-2152

Microbits Peripheral Products (MPP)
225 West Third Street
Albany, OR 97321
(503) 967-9075

Micro Education Corporation of
America (MECA)
285 Riverside Avenue
Westport, CT 06880
(203) 222-9087

Microfun
2699 Skokie Valley Road
Highland Park, IL 60035
(312) 433-7550

MicroProse Software
10616 Beaver Dam Road
Hunt Valley, MD 21030
(301) 667-1151

Miles Computing
7136 Haskell Avenue, Suite 212
Van Nuys, CA 91406
(818) 994-7901

Mindscape
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667

Minnesota Educational
Computing Consortium (MECC)
3490 North Lexington Avenue
St. Paul, MN 55112
(612) 481-3500

Muse Software, Inc.
347 North Charles Street
Baltimore, MD 21201
(301) 659-7212

NEC Home Electronics, Inc.
1401 Estes Avenue
Elk Grove Village, IL 60007-5463
(800) 323-1728

Okidata Corporation
532 Fellowship Road
Mount Laurel, NJ 08054
(609) 235-2600

On-Line Computer Centers of OKC
10944 North May
Oklahoma City, OK 73120
(405) 751-2781

Optimized Systems Software, Inc.
1221-B Kentwood Avenue
San Jose, CA 95129
(408) 446-3099

Parker Brothers
50 Dunham Road
Beverly, MA 01915
(617) 927-7600

Percom Data Corporation
11220 Pagemill Road
Dallas, TX 75243
(800) 527-1222

Practical Programs, Inc.
P.O. Box 93104-N
Milwaukee, WI 43203
(414) 278-0829

Precision Software, Inc.
3003 Summer Street, Fourth Floor
Stamford, CT 06905
(203) 326-8649

Program Design, Inc. (PDI)
95 East Putnam Avenue
Greenwich, CT 06830
(203) 661-8799

Rana Systems
21300 Superior Street
Chatsworth, CA 91311
(818) 709-5484

Reston Computer Group
A Prentice-Hall Company
11480 Sunset Hills Road
Reston, VA 22090
(800) 336-0338

Scarborough Systems, Inc.
25 North Broadway
Tarrytown, NY 10591
(914) 332-4545

Scholastic, Inc.
730 Broadway
New York, NY 10003
(800) 325-6149

ScreenPlay
P.O. Box 3558
Chapel Hill, NC 27514
(919) 493-8596

Sega Enterprises, Inc.
5555 Melrose Avenue
Los Angeles, CA 90038
(213) 468-4810

Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858

Softsync, Inc.
14 East 34th Street
New York, NY 10016
(212) 685-2080

Source, The
Source Telecomputing Corporation
1616 Anderson Road
McLean, VA 22102
(703) 734-7500
(800) 336-3366

Spinnaker Software Corporation
One Kendall Square
Cambridge, MA 02139
(617) 494-1200

Springboard Software
7807 Creedridge Circle
Minneapolis, MN 55435
(612) 944-3912
(800) 328-1223

Star Micronics, Inc.
200 Park Avenue
New York, NY 10166
(212) 986-6770

Strategic Simulations, Inc. (SSI)
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043-1983
(415) 964-1353

Street Electronics Corporation
1140 Mark Avenue
Carpinteria, CA 93013
(805) 684-4593

Sublogic Communications
Corporation
713 Edgebrook Drive
Champaign, IL 61820
(217) 359-8482

Sunburst Communications, Inc.
39 Washington Avenue, Room CF01
Pleasantville, NY 10570
(914) 769-5030
(800) 431-1934

SWP Microcomputer Products, Inc.
2500 East Randol Mill Road
Suite 125
Arlington, TX 76011
(817) 469-1181

Synapse Software
5221 Central Avenue
Richmond, CA 94804
(415) 527-7751

TeleLearning Systems, Inc.
505 Beach Street
San Francisco, CA 94133
(415) 928-2800

TG Products
1104 Summit Avenue, Suite 110
Plano, TX 75074
(214) 424-8568

Thorn EMI Computer Software, Inc.
3187-C Airway Avenue
Costa Mesa, CA 92626
(714) 751-3778

TMQ Software
82 Fox Hill Drive
Buffalo Grove, IL 60090

Trak Microcomputer
1511 Ogden Avenue
Downers Grove, IL 60515
(800) 323-4853

Transtar
P.O. Box C-96975
Bellevue, WA 98009
(206) 454-9250

Tronix
8295 South La Cienega Blvd.
Inglewood, CA 90301
(213) 215-0529

USI
71 Park Lane
Brisbane, CA 94005
(415) 468-4900

Votrax
1394 Rankin
Troy, MI 48083
(313) 588-0341

Walling Company
4401 Juniper
Tempe, AZ 85282
(602) 838-1277

WICO Corporation
6400 West Gross Point Road
Niles, IL 60648
(312) 647-7500

Bibliography

For further reading, we suggest:

Books

The Book of Atari Software. The Book Company, 1983. This annual compendium of Atari software has bite-size reviews and gives letter grades to products.

Home Applications and Games for the Atari Home Computers. Banse, Timothy P. Little, Brown Microcomputer Bookshelf, 1983. The program listings in this book include some fascinating games as well as practical programs such as a jogger's logbook and a car-pool expense calculator.

The Easy Guide to Your Atari 600XL/800XL. Blackadar, Thomas. SYBEX Computer Books, 1984. This is the first book written specifically for the 600XL and 800XL; it shows you how to set up the computers and use the new XL features.

Inside Atari BASIC. Carris, William. Atari Corporation, 1983. The best book for beginners who want to learn some BASIC in a hurry; they can also learn some neat BASIC tricks.

Zap! The Rise and Fall of Atari. Cohen, Scott. McGraw-Hill Book Company, 1984. The first "history of Atari," this book is peppered with anecdotes about Atari's early days and the technical whiz kids who helped Nolan Bushnell build an empire. The saga continues through Atari's spectacular financial losses to the arrival of James Morgan in 1983. The author takes a generally disparaging view of the video-game phenomenon; time will tell whether he is right.

The Art of Computer Game Design. Crawford, Chris. Osborne/McGraw-Hill, 1984. The author of The Eastern Front: 1941 unveils some of his game-design secrets and thoughts on video games.

Atari Basic Faster and Better. Evans, Carl M. IJG, Inc., 1983. This book takes intermediate BASIC programmers into assembly-language programming and related areas.

Free Software For Your Atari. Heller, David and Dorothy. Enrich/Ohaus, 1983. This is the definitive book (as of late 1983) on Atari user groups and public-domain (free) software; it also has a good section on telecommunications.

Dr. C. Wacko's Miracle Guide to Designing and Programming Your Own Atari Computer Arcade Games. Heller, David F., Johnson, John F. and Kurcina, Robert, Addison-Wesley, 1983. This book-and-disk combination is a romp from beginning to end. The contents include cartoons, odd characters and great little BASIC programs; the disk that is included saves you from having to type in the programs.

Rainy Day Activities for the Atari. Mayer, Nancy. Reston Publishing Company, 1984. This one's great for kids ages 3 to 9; it's spiral-bound and lies flat. Though you have to type in the programs, they are short and intriguing.

The Computer Tutor: Atari. Orwig, Gary W. and Hodges, William S. Little, Brown Microcomputer Bookshelf, 1983. Atari BASIC and Atari Microsoft BASIC program listings. This annual compendium of Atari software has bite-size reviews and gives letter grades to products.

The Atari Users Encyclopedia. Phillips, Gary and White, Jerry. The Book Company, 1983. This tutorial for beginners contains lots of program listings.

Your Atari Computer. Poole, Lon, with Martin McNiff and Steven Cook. Osborne/McGraw-Hill, 1982. After two years, this is still the bible for Atari users. It needs updating to include XL computers, but it has a lot of information on Atari BASIC, sound and graphics and a great index.

Designs From Your Mind with Atari Graphics. Rowley, Tom. Reston Publishing Company, 1983. This book provides a good introduction to Atari graphics. It covers the basics and beyond.

Atari BASIC Programs in Minutes. Trost, Stanley R. SYBEX Computer Books, 1984. The program listings in this book include home finances, real estate, record keeping and education.

The Secret Guide to Computers. Walter, Russ. Russ Walter, 1984. Who says computer books have to be grim? Walter's books are not specifically for the Atari, but this one is wild, wacky and informative.

Magazines

Antic, The Atari Resource is the premiere monthly magazine for Atari owners. It covers the Atari exclusively and includes program listings in each issue. *Antic* also publishes anthologies from time to time.

A.N.A.L.O.G. Computing is the 'number 2' monthly; while *Antic* is usually pro-Atari, *A.N.A.L.O.G.* makes complaints about Atari. You need both publications to keep up with new products.

Atari Connection is the official Atari magazine; it contains good human-interest features and new product information.

Hi-Res was originally produced for the Atari only; now it covers both Atari and Commodore home computers.

The following publications cover Atari computers, along with other popular home computers.

Compute! has good columns on programming by people such as Bill Wilkinson, the inventor of Atari BASIC and founder of Optimized Systems Software, and David Thornburg, inventor of the KoalaPad. *Compute!* also publishes some good books on Atari programming.

Creative Computing features a monthly column called "Outpost: Atari." It also has a good hardware price index.

Users' Groups

Birmingham Atari Computer
Enthusiasts*
Tom Nielsen
346 Shades Crest Road South
Birmingham, AL 35226
(205) 933-8101 X6934 (W)
(205) 987-9208 (H)

Wiregrass Microcomputer Society*
William H. Brown
109 Key Bend Road
Enterprise, AL 36330
(205) 347-2623 (W)
(205) 347-7564

Entari Users' Group
Dale Radtke
108 Crestview Drive
Enterprise, AL 36330
(205) 255-3506 (W)
(205) 347-0409 (H)

Computer Users of the Shoals
David R. Curott
UNA - Box 5050

Florence, AL 35632
(205) 766-4100 X284 (W)
(205) 764-2662 (H)

Huntsville Atari Computer Users'
Group*
Harold R. Blevins
514 Jeffrey Drive N.W.
Huntsville, AL 35806
(205) 453-3809 (W)
(205) 837-2437 (H)

Montgomery Atari Computer
Enthusiasts
Kenneth E. Breland
213 West Vanderbilt Loop
Montgomery, AL 36109
(205) 277-3125 (H)

Atari Computer Club Of Anchorage
Mike Wheeler
P.O. Box 104343
Anchorage, AK 99510
(907) 274-2533 (W)
(907) 248-0242 (H)

A.I.S. Microcomputer Users' Group
Stephen J. Mormilo
21-662 H Apricot Street
Elmendorf AFB, AK 99506
(907) 552-4054 (W)
(907) 753-6383 (H)

Fairbanks Atari Computer
Enthusiasts
Richard L. Fleagle
717 Bentley Drive West
Fairbanks, AK 99701
(907) 474-7217 (W)
(907) 456-1725 (H)
(907) 456-1677 (BBS)

Northern Arizona Computer Club
Mark Mackelprang
Box 122
Fredonia, AZ 86022
(602) 643-5592 (H)
(602) 643-2018 (W)

Computer Wizards*
Frank Barajas
530 South Dobson Road #359
Mesa, AZ 85202
(602) 966-4275 (W)
(602) 969-9502 (H)

Payson Atari Computer Enthusiasts
Dick Watson
P.O. Box 919
Payson, AZ 85541
(602) 474-3221 (W)
(602) 478-4218 (H)

North West Phoenix Atari
Connection*
Marvin Munford
P.O. Box 36364
Phoenix, AZ
(602) 869-2129 (W)
(602) 254-0229 (H)

Obu Atari Users' Group
Bryan Harmon
320 North 7th Street
Arkadelphia, AR 71923
(501) 246-6238 (H)
(501) 246-4531 X595 (W)

Blytheville Atari Computer Users'
Group*
Jeff Goldensoph
1421 B Hemlock Drive
Blytheville, AR 72315
(501) 762-7632 (W)
(501) 532-8467 (H)

Ft. Smith Atari Users' Group*
Ernest Serrano
2672 South Enid Street
Ft. Smith, AR 72901
(501) 646-4557 (H)
(501) 646-0197 (BBS)

Little Rock Atari Addicts*
Keith A. Steensma
Building 7 #139
900 McCain Park Drive
North Little Rock, AR 72116
(501) 753-2499 (H)

Escape
Richard Sherer
76 Rancho Del Mar
Aptos, CA 95003
(408) 688-6538 (W)
(408) 688-3474 (H)

Island Computer Enthusiasts*
William D. Peterson
P.O. Box 1566
Avalon, CA 90704
(213) 510-0303 X217 (W)
(213) 510-1807 (H)

Bakersfield Atari Computer
Enthusiasts
Donnel C. Lester
3712 Rickey Way
Bakersfield, CA 93309
(805) 861-4185 (W)
(805) 831-6784 (H)

Santa Barbara Atari Computer
Enthusiasts*
Chuck Brantingham
5386 Ogan Road
Carpenteria, CA 93013
(805) 965-5709 (BBS)

Diablo Valley Atari Computer
Enthusiasts*
Dan Shouey
3025 Bertram Court
Concord, CA 94520
(415) 676-2797 (H)

Cordelia Area Computer Group
Michael G. Bordua
572 Silverado Circle
Cordelia Village, CA 94585
(707) 646-4330 (W)
(707) 864-1401 (H)

Redwood Atari Group*
Leonard Harrison
8498 Linden Avenue
Cotati, CA 94928
(707) 525-1400 X2406 (W)
(707) 795-5806 (H)

Atari Kids of Claremont*
Dennis Wong
23602 Decorah Road
Diamond Bar, CA 91765
(714) 595-9730 (H)

Los Angeles Atari Computer
Enthusiasts*
Bob Keimach
15760 Ventura #900
Encino, CA 91436
(818) 986-8366 (W)
(818) 988-8373 (BBS)

Gaming Activists Methodically
Exchanging Services (GAMES)
David A. Youngs
80 Olde Forest Lane
Eureka, CA 95501
(707) 443-8576 (H)

Mare Island 3D Computer Group
James T. Tomasko
723 Cypress Circle
Fairfield, CA 94533
(707) 646-4330 (W)
(707) 425-2513 (H)

El Molino Computer Club
Sean Mallary
9484 Westside Road
Forestville, CA
(707) 887-2417 (W & H)

Atari Computer Association of
Orange County*
Tom Mannos
P.O. Box 9149
Fountain Valley, CA 92708
(714) 770-0372 (W & H)

Fresno Atari Computer Enthusiasts
George Smith
2530 West Alamos
Fresno, CA 93705
(209) 488-1335 (W)
(209) 222-7310 (H)

California Atari Users' Club &
Urbane Society (CAUCUS)*
Russ Berry
P.O. Box 15201
Fresno, CA 93702
(209) 225-1106 (W & H)

Atari Computer Users' Exchange of
West Garden Grove
Maureen Henderson
P.O. Box 5125
Garden Grove, CA 92645

Atari Hackers Anomalous (A-HA)
Kenneth S. Smith
365 Hillsboro Way
Goleta, CA 93117
(805) 687-6405 (W)
(805) 968-4044 (H)

North Valley Atari Computer Users'
Group (A Users' Group For Teens)
Ira Gluck
12824 Neon Way
Granada Hills, CA 91344
(213) 363-9005 (H)

Kern Valley Atari Users' Group
James L. Griffith
P.O. Box 1833
Mountain Mesa
Lake Isabella, CA 93240
(619) 379-3465 (H)

Long Beach Atari Computer
Enthusiasts
Philip C. Olson
2408 Eckleson
Lakewood, CA 90712
(213) 531-9741 (H)

Livermore Atari Computer Users'
Group*
Mel Gregonis
c/o Lawrence Livermore Labs
Box 808, L-065
Livermore, CA 94550
(415) 422-4039 (W)
(415) 447-1241 (H)

Delta Atari Users' Group*
Doug Eaton
1720 South Hotchins #20
Lodi, CA 95240
(209) 334-9016 (H)

West Los Angeles Atari Users'
Group*
Greg Waldorf
P.O. Box 84-396
Los Angeles, CA 90073
Bent Scheid, Phone Contact
(213) 537-2837 (H)

Junior Atari Computer Enthusiasts*
Boris Blum
1031 North Curson Avenue
Los Angeles, CA 90046
(213) 654-2039 (H)

The Royal Order Of Digital Knights
James A. DeMoss
PSC Box 1906
March AFB, CA 92518

Atari Computer Training
David Stevenson
1060 Bates Road
McKinleyville, CA 95521
(707) 839-3873 (H)

A-Magic
Peter Killian
2756 Branco Avenue
Merced, CA 95340
(209) 722-6791 (H)
(209) 726-2389 (W)

Modesto Atari Computer Club*
Raymond Lang
P.O. Box 3811
Modesto, CA 95352
(209) 578-0662 (W)
(209) 521-8766 (H)

Atari Users' Group of South Santa
Clara Valley
Jim Xavier
15250 La Rocca Drive
Morgan Hill, CA 95037
(408) 779-9550 (H)

Napa Atari Programming
Association
Michael J. Velasco, Sr.
2141 Shurtleff Avenue
Napa, CA 94559
(415) 561-5007 (W)
(707) 255 8015 (H)

Hooked on Atari Computer
Keyboard Society (HACKS)*
John King Tarpinian
6055 Cahuenga Blvd. #2
North Hollywood, CA 91606
(818) 760-1831 (H)

The Digital Circut
Jake Lemmer
2180 Wayne Road
Palm Springs, CA 92262
(619) 320-4968 (H)

Bay Area Atari Users' Group*
Gene McCreary
P.O. Box 50459
Palo Alto, CA 94303
(408) 743-6450 (W)
(408) 629-7494 (H)
(408) 578-2390 (BBS)

JPL Atari Computer Enthusiasts
David Evans (180-202)
4800 Oak Grove Drive
Pasadena, CA 91109
(213) 354-2099 (W)
(213) 790-3109 (H)

Around Here Atarians
Darryl May
226 Palm Drive
Piedmont, CA 94610
(415) 658-5780 (H)

The Redding Area Computer
Enthusiasts
Jon Fredricks
P.O. Box 6007-169
Redding, CA 96099
(916) 246-3282 (W)

Riverside Users' Group for Atari
Computers
Anthony J. Mottola
6240 Jones Avenue
Riverside, CA 92505
(714) 620-7511 X3461 (W)
(714) 688-8767 (H)

South Bay Atari Computer
Enthusiasts*
James Jengo
5025 Range Horse Lane
Rolling Hills Estates, CA 90274
(213) 437-2801 (W)
(213) 378-5523 (H)

Atari Computer Club Encompassing
Suburban Sacramento (ACCESS)*
Francine Kozkodin
P.O. Box 1354
Sacramento, CA 95806
(916) 363-2601 (W)
(916) 961-7987 (H)
(916) 363-3304 (BBS)

Salinas Valley Atari Computer
Enthusiasts
Dale Meisenheimer
20 Russell Road #98
Salinas, CA 93906
(408) 443-4914 (W)
(408) 449-7750 (H)

San Diego Atari Computer
Enthusiasts*
Donald Jay Perkins
P.O. Box 203076
San Diego, CA 92120
(619) 276-6746 (W)
(619) 479-6253 (H)
(619) 447-8143 (BBS)

Atari Bay Area Computer Users'
Society (ABACUS)*
William Zinn
1410 21st Avenue
San Francisco, CA 94122
(415) 753-8483 (W)
(415) 587-8062 (BBS)

S.F. Chips
Carl Bacani
100 Lake Street #2
San Francisco, CA 94118
(415) 239-5393 (W)
(415) 668-2064 (H)

Lowell Atari Users' Group
Sam Kwong
1655 47th Avenue
San Francisco, CA 94122
(415) 661-7123 (H)

San Leandro Computer Club*
Tom Bennett
17642 Via Rincon
San Lorenzo, CA 94580
(415) 932-7008 (W)
(415) 276-4466 (H)

S.L.O. Pokes Atari Computer Users'
Group*
Charles Stancarone
P.O. Box 4156
San Luis Obispo, CA 93406
(805) 528-4758 (H)

Fresno Atari Computer Sector*
Harry Perkins
834 West Street
Sanger, CA 93657
(209) 875-9534 (H)

Lompoc/Santa Maria Atari
Computer Users' Group*
Willie Moore
P.O. Box 2286
Santa Maria, CA 93455

Spring Valley, La Mesa Atari
Computer Users' Group
Don Franken
10836 Wagon Wheel Drive
Spring Valley, CA 92078
(619) 462-9754 (H)
(619) 469-7927 (BBS)

Thousand Oaks Group Atari
John M. Martin
1421 Thousand Oaks Blvd.
Thousand Oaks, CA 91360
(805) 497-1220 (W)
(805) 497-2025 (H)

Atari Anonymous - A Users' Group*
Cindy McAuley
Foothill Computer Center
949 West Foothill Blvd.
Upland, CA 91766
(714) 985-2101 (W)
(714) 946-5235 (BBS)

Bob & Mike's
Our Gang Computer Club
Mike Maffei
117 Rutherford Drive
Vacaville, CA 95688
(707) 448-5486 (H)

Solano Atari Computer Enthusiasts
Bruce Chmieleski
5699 Cherry Glen Road
Vacaville, CA 95688
(707) 425-1017 (W)
(707) 447-1191 (H)

Val-Nap Atari Computer Users
Thomas J. McCabe
2291 Sacramento Street
Vallejo, CA 94590
(707) 646-4301 (W)
(707) 642-6502 (H)

Ventari
Timothy Grimme
1569 Raccoon Court
Ventura, CA 93003
(805) 647-1402 (W)
(805) 647-4268 (H)

Victor Valley ACE*
Victor D. Knoth
16190 Wimbleton Drive
Victorville, CA 92392
(619) 269-2862 (W)
(619) 245-6688 (H)

Willits Computer Users' Group
Karsten Henckell
P.O. Box 1213
Willits, CA 95490
(707) 459-5954 (W&H)

Starfleet Atari Computer Users'
Group*
Mike Ireson
8292 Ammons Circle
Arvada, CO 80005
(303) 423-9478 (H)
(303) 758-6223 (BBS)

Eastern Colorado Computer Group
Frank DePastene
16486 East 17th Place #118
Aurora, CO 80011
(303) 366-7644 (H)

Pike's Peek & P.O.ke Atari
Computer Enthusiasts (P3 ACE)*
Ronald McDonald
P.O. Box 16751
Colorado Springs, CO 80935-6751
(303) 599-5517 (H)

Fort Collins Atari Users' Group
Kim Pomeroy
616½ East Laurel
Fort Collins, CO 80521
(303) 491-8251 (W)
(303) 484-6127 (H)

Atari Computer Club of Denver
Guy K. McDaniel
5407 West 4th Avenue
Lakewood, CO 80226
(303) 238-2366 (H)

Boulder Atari Users' Group
Diane L. Stewart
363 Matchless Street
Louisville, CO 80027
(303) 666-8222 (H)

Loveland Atari Computer
Enthusiasts
Brad Thrush
629 West 8th
Loveland, CO 80537
(303) 669-1418 (W & H)

The Council of Elrond
Vincent E. Ellis
619 Gaylord Avenue
Pueblo, CO 81004
(303) 544-3683 (H)
(303) 542-6110 (W)

DP Directions
Allen Harberg
Box 562
Bloomfield, CT 06002
(203) 726-5572 (W)
(203) 659-0492 (H)

Central Conntectcut Computer
Club*
Martin Goldstein
149 Creamery Road
Chesire , CT 06410
(203) 753-3243 (W)
(203) 272-2848 (H)

Atari Users of Southern
Connecticut*
David Liebreich
112 Hawthorne Drive
Fairfield, CT 06432
(203) 372-8932 (H)

Atari Computer Users' Group at
American Can Company
Joyce Fubini
American Can Company
American Lane - 1A6

Greenwich, CT 06830
(203) 322-3911 (H)
(203) 552-2461 (W)

Ace of West Hartford
Nelson Rivera
175 Sigourney Street
Hartford, CT 06105
(203) 522-9322 (H)

Middletown Micros
Steven Chabotte
Box 192
Wesleyan Station
Middletown, CT 06457

A Users' Group G.H.A.
Thimothy M. Beaudreau
9 River Street
Rockville, CT 06066
(203) 875-9252 (H)

Computer Enthusiasts of
Connecticut
Glenn Werner
1160 South Curtis Street
Wallingford, CT 06492
(203) 269-0846 (H)

Naugatuck Valley Atari Club
James Baltrush
45 Fox Street
Waterbury, CT 06708
(203) 574-5642 (H)

"Kid X" Users' Group
Andy Eddy
87 Meadow Street
Winsted, CT 06098
(203) 567-0841 (W)
(203) 489-3987 (H)

Lower Delaware Atari Users' Group
Cory S. Bixler
Rt 1, Box 364D
Ellendale, DE 19941
(302) 678-6167 (W)
(302) 422-8399 (H)

Antic Users' Group of Dover
Robert F. Voras, Jr.
RD #3, Box WA32
Felton, DE 19943
(302) 678-6508 (W)
(302) 284-3243 (H)

Brandywine Area Support in
Computing (BASIC) for
Atari 400/800(TM) Users
Robert Styles
2627 Boxwood Drive
Wilmington, DE 19810
(302) 475-3939 (H)

The Downtown Washington Atari
Computer Users' Group
Frank Huband
1206 North Stafford Street
Arlington, VA 22201
(202) 357-7829 (W)
(703) 527-4770 (H)
(202) 726-8342 (BBS-ARMUDIC)

Coral Springs Atari Users' Group*
Mark D. Pallans
10122 N.W. 3rd Place
Coral Springs, FL 33065
(305) 763-1777 (W)
(305) 753-1189 (H)

Dade City Atari Club*
Debi Ballard
Rt. 3, Box 754
Dade City, FL 33525
(904) 588-3743 (H)

Miracle Strip Atari Users' Group
John J. Hughes
25D Foster Drive
Eglin AFB, FL 32542
(904) 882-2518 (W)
(904) 651-2098 (H)

Atari Computer Club of South
Bevard
John Day
70 Bluebird Blvd.
Indian Harbour Beach, FL 32937
(305) 494-4633 (W)
(305) 777-3668 (H)

West Broward Atari Users' Group*
Alan Ehrlich
9411 N.W. 10th Street
Jacaranda Lakes, FL 33322
(305) 350-4290 (W)
(305) 472-6211 (H)

Atari Computer Owners' and Users'
Resource Group
T. D. Wilson
7009 Willow Run Loop
Lakeland, FL 33803
(813) 644-7086 (H)

Atari Computer Club of the Palm
Beaches
Marvin A. Cox
4106 Fern Street
Lake Worth, FL 33461
(305) 967-8895 (W & H)

Miami Atari Computer Users' Group
George Gardner
12121 S.W. 95st
Miami, FL 33186
(305) 274-7608 (H)

Dade Atari Users' Group
David Dingley
9430 Montego Bay Drive
Miami, FL 33189
Bruce Proud, Treasurer
(305) 233-9379

D.A.T.A
Brad Stone
1625 N.E. 163rd Street
North Miami Beach, FL 33162
(305) 931-8281 (H)
(305) 945-1014 (W)

Jacksonville Atari Computer
Enthusiasts*
Russell A. Grokett
1187 Dunbar Court
Orange Park, FL 32073
(904) 272-0371 (H)

The Insane Programmers of Sarasota
Al Light
4083 Orleans Lane
Sarasota, FL 33582
(813) 371-3060 (H)

Tallahassee Atari Users' Group
Barry Garrett
1307 Parga Street
Tallahassee, FL 32304
(904) 644-3204 (W)
(904) 576-4026 (H)

Tampa Bay Area Atari Computer
Users' Group*
Randal C. Gibson
812 West River Drive
Tampa, FL 33617
(813) 988-4503

Atari Boosters League East*
Hadley Nelson
P.O. Box 1172
Winter Park, FL 32790
(305) 671-0317 (H)

Atari Computer Users' Group at
Southern Company Service
David Moser
Southern Company
Service Department
64 Perimeter Center E
Atlanta, GA 30346
(404) 399-3122 (W)
(404) 447-8177 (H)

Atari Users' Group of the C.S.R.A.
Computer Club*
Harold Johnston
3222 Crane Ferry Road
Augusta, GA 30907
(404) 738-1236 (W)
(404) 863-2665 (H)

North Atlanta Computer Club
Paul A. Webb Jr.
1005 Foxfire Drive
Lawrenceville, GA 30245
(404) 448-8282 (W)
(404) 979-8856 (H)

Computer Hobbyists of Rome*
John Barcik
7 Wells Drive
Rome, GA 30161
(404) 235-1056 (W)
(404) 291-7704 (H)

Rainbow*
Harry Goeller
2326 Shirley Drive
Savannah, GA 31404
(912) 354-6533 (H)

CONTACT*
Gary Pearcey
696 Rollingwood Place
Stone Mountain, GA 30087
(404) 897-7491 (W)
(404) 923-6265 (H)

Lilburn-Stone Mountain Computer
Club
James Kerr
5702 Shadow View Drive
Stone Mountain, GA 30087
(404) 923-8189 (W)
(404) 923-7712 (H)

Waycross Area Computer Club*
William Hand
RT 5, Box 442-B
Waycross, GA 31501
(912) 285-7286 (W)
(912) 285-3640 (H)

Hawaii Atari Computer Klub
Kim Eakin
92-549 Awawa Street
Ewa Beach, HI 96706
(808) 488-2171 (W)
(808) 672-8152 (H)

Pacific Aces
Tom Martin
546 Kline Road
Wahiawa, HI 96786
(808) 655-0204 (W)
(808) 624-2132 (H)

Boise Users' Group*
Arthur Bross
1030 El Pelar
Boise, ID 83702
(208) 336-0500 (W)
(208) 344-8773 (H)
(203) 383-9547 (BBS)

Alpha Centari*
Kelly Hymas
Box 87
Newdale, ID 83436
(208) 356-3666 X242 (W)
(208) 458-4581 (H)

Pocatello Atari Users' Group*
Darrell Rainsdon
1025 Fairbanks
Pocatello, ID 83201
(208) 234-0110 (W)
(208) 237-5127 (H)

Little Egypt Atari Fans
J. Ray Wood
709 Locust Street
Benton, IL 62812
(618) 439-9505 (W)
(618) 439-9790 (H)

BASE*
Jim Knight
6 Carraway Court
Bloomington, IL 61701
(309) 662-4311 X665 (W)
(309) 663-5971 (H)

Suburban Chicago Atarians*
Ray Hendrickson
12611 South Ada
Calumet Park, IL 60643
(312) 597-2792 (H)
(312) 544-7228 (BBS)

Chicagoland Atari Users' Group
(CL.A.U.G.)*
Peter Pacione
2952 North Meade
Chicago, IL 60634
(312) 364-1900 (W)
(312) 889-2674 (H)
(312) 889-1240 (BBS)

Zentarians
Desta Elliott
2153 West Cullom
Chicago, IL 60618
(312) 745-2556 (W)
(312) 525-3779 (H)

Decatur Atari Computer Group
Joseph R. Aman
4971 Stewart Drive
Decatur, IL 62521
(217) 877-9953 (W)
(217) 428-8498 (H)

Vincennes Atari Computer
Enthusiasts*
David M. Lane
1730 South 12th
Lawrenceville, IL 62439
(618) 943-2344 (W)
(618) 943-3551 (H)

Mcdonough County Atari Users'
Group*
Mary Kubasak
604 West Carroll
Macomb, IL 61455
(309) 833-3886 (W)
(309) 837-3649 (W)

SIACE
Fred Thompson
600 Saluki Drive North
Marion, IL 62959
(618) 997-3180 (H)

Illinois Consolidated Computer
Club*
Jon Denny
121 South 17th Street
Mattoon, IL 61938
(217) 235-4474 (W)
(217) 258-6233 (H)

Peoria Atari Computer Enthusiasts*
Larry Stagen
205 South Shore Drive
Morton, IL 61550
(309) 444-3167 (W)
(309) 263-1123 (H)

Atariasts
Thomas E. Ihle
335 North 22nd Street
Murphysboro, IL 62966
(618) 687-2882 (H)

Computer Squad*
Suzi Subeck
2625 Corinth Road
Olympia Fields, IL 60461

Rockford Atari Computer Club*
Jim Nordstrom
10062 Gentian Drive
Rockford, IL 61111
(815) 654-4508 (W)
(815) 633-7418 (H)

Q.C. Atari Computer Club*
William T. Halse
1213 11th Street
Silvis, IL 61282
(319) 326-7156 (W)
(309) 792-2025 (H)

Lincolnland Atari Group*
Randall R. von Liski
2620 Lemont Drive
Springfield, IL 62704
(217) 782-0244 (W)
(217) 787-8041 (H)

Lake County Atari Users' Group
Dwight R. Johnson
409 South Gimwood Avenue
Waukegan, IL 60083
(312) 688-2490 (W)
(312) 623-3815 (H)

Wayne City Atari Users' Group*
Leon O. Greenwalt
Route 242 South
Wayne City, IL 62895
(618) 895-2423 (W & BBS)

Illiana A.C.E.*
George W. Flora
1 South Westville Lane
Westville, IL 61883
(217) 443-5640 (W)
(217) 267-3417 (H)

Central Dupage Users' Group
Timothy S. Siml
1114 Marcey
Wheaton, IL 60187
(312) 260-5171 (W)
(312) 668-5485 (H)

Western Software Center Computer
Club for Owners of Atari Computers
(For employees of AT&T
Technologies)
Doug Van Tol
534 Farnham Lane
Wheaton, IL 60187
(312) 510-2626 (W)
(312) 682-0979 (H)

AURA*
Bob Cobb
P.O. Box 156
Wood River, IL 62095
(618) 463-1333 (W)
(618) 254-4065 (H)
(314) 894-9243 (BBS)

Wells Atari Computer Owners*
Jon C. Smith
319 South Liberty
Bluffton, IN 46714
(219) 824-2900 (W)
(219) 824-4482 (H)

Hoosier Amateur Computer Society
Steve Willoughby
Box 87
Crane, IN 47522
(812) 854-1018 (W)
(812) 854-7418 (H)

Atari Computer Owners' Resource
Network
Robert E. Meyer
7315 Turkey Run
Ft. Wayne, IN 46815
(219) 461-2384 (W)

Indianapolis ABI Atari Users' Group
Katharine Rima Schnepf
7324 North Ritter Avenue
Indianapolis, IN 46250
(317) 845-6413 (W)
(317) 849-5462 (H)

West Indy Computer Alliance
Randall C. Jordan M.D.
3640 Middlefield Drive, Apt. D
Indianapolis, IN 46222
(317) 635-7401 X1697 (W)
(317) 924-4392 (H)

Central Indiana Atari Group*
Dr. Forest Meiere
7811 Clarendon Road
Indianapolis, IN
(317) 255-5805 (H)

Atari Lovers of Illiana Equal to None
(ALIEN)*
Stephen J. Galovic III
7091 Broadway

Merrillville, IN 46410
(219) 887-3591 (W)
(219) 769-7733 (H)

Indiana Michigan Atari Group
Exchange
Bruce Andresen
P.O. Box 1742
South Bend, IN 46634
(219) 256-5768 (H)

The Terra Haute Atari Users' Group
David Brown
1319 North 19th Street
Terre Haute, IN 47807
(812) 235-2518 (H)

MAGIC*
Gene Merritt
311 South 3rd Street
Ames, IA 50010
(515) 232-4798 (H)
(515) 961-8881 (BBS)

N.W. Iowa Computer Club
Wayne Chrestiansen
1104 6th Avenue South
Estherville, IA 51334
(712) 362-7288 (W)
(712) 362-5903 (H)

Hawkatari*
John K. Wiese
2565 22nd Avenue
Marion, IA 52302
(319) 377-8722 (H)

Blackhawk Atari Computer
Enthusiasts*
Michael R. Seavey
729 Wildwood
Waterloo, IA 50702
(319) 292-4385 (W)
(319) 235-9292 (H)

Des Moines Atari Computer
Enthusiasts
Bill Sheppard
825 14th
West Des Moines, IA 50265
(515) 279-2500 (W)
(515) 223-4444 (H)
(515) 225-9827 (hot line)

High Plains Atari Computer Club
Dr. Mike Currier
242 Rarick Hall
Fort Hays State University
600 Park Street
Hays, KS 67601-4099
(913) 628-5847 (W)
(913) 628-1467 (H)

Lawrence Atari Computer Club*
Paul R. Kopsick
P.O. Box 1415
Lawrence, KS 66044

Kansas City Atari Computer
Enthusiasts*
Ken Warner
12905 West 101st Street
Lenexa, KS 66215
(913) 888-4000 (W)
(913) 888-5200 (H)

Mid Continent Atari Users' Group*
Dennis Boyce
115 East Oak Valley
Manhattan, KS 66502
(913) 532-5696 (W)
(913) 537-4745 (H)

Wichita Atari Computer
Enthusiasts*
Wade Ward
825 North Harding
Wichita, KS 67208
(316) 689-8545 (W & H)

The Eight-Bit Machines
Eric Schwinghammer
2342 Lulu
Wichita, KS 67211
(316) 261-5989 (W)
(316) 267-2441 (H)

CURSOR*
Rupert H. Holmes
Box 172-A, Route 3
Calvert City, KY 42029
(502) 444-6311 X488 (W)
(502) 395-7806 (H)

Computer Users of E-Town
David Vandermolen
Route 5, John Avenue
Elizabethtown, KY 42701
(502) 737-9259 (H)
(502) 737-6466 (W)

Atari Computer Club of the
Bluegrass
Michael Martin
Route 1, Box 131
Jeffersonville, KY 40337
(606) 744-3464 X339 (W)
(606) 498-2967 (H)

Atari Exchange Club
Steve Hinkle
5310 Juanita Lane
Louisville, KY 40272
(502) 937-2667 (H)

Richmond Microcomputer Users'
Group - Atari Interest Group
John O. Wernegreen
Eastern Kentucky University
220 Memorial Science Building
Richmond, KY 40475
(606) 622-3421 (W)
(606) 623-7540 (H)

Baton Rouge Atari (Computer)
Group*
Bob Loudon
Computer Electronics
1955 Dallas Drive
Baton Rouge, LA 70806
(504) 359-4282 (W)
(504) 926-7710 (H)
(504) 273-3116 (BBS)

New Orleans Atari Users' Group*
Paul Strauss
8223 Plum Street
New Orleans, LA 70118
(504) 865-5145 (W)
(504) 861-8772 (H)

Atari Programming Enthusiasts of
Slidell (APES)*
Paul J. Parker
130 Mathews Drive
Slidell, LA 70458
(504) 528-2265 (W)
(504) 643-6498 (H)

Programmer's Anonymous
Ralph W. Trynor
20 State Street
Gorham, ME 04038
(207) 839-6880 (W & H)
(207) 839-2337 (BBS)

A-MUG*
Thomas O'Brian
Hands On Computers
Box 1088
Westbrook, ME 04092
(207) 854-1155 (W)
(207) 854-2687 (H)

ARINC Microcomputer Club*
Bruce Morgenstern
ARINC Research Corp.
2551 Riva Road
Annapolis, MD 21401
(301) 266-4735 (W)

ATACOM Users' Group of
Baltimore*
Gary G. Sparkes
6 Skylark Court Apt. E
Baltimore, MD 21234
(301) 765-3605 (W)
(301) 882-9220 (H)

Potomac Atari Computer Users
Fred Ward
7106 Saunders Court
Bethesda, MD 20817
(301) 983-1990 (W)
(301) 299-5330 (H)

BAUD
Joel Plotkin
7304 Durbin Terrace
Bethesda, MD 20817
(301) 486-1454 (H)

Westinghouse Atari Group*
C.R. Windmiller
5 First Avenue South Ferndale
Glen Burnie, MD 21061
(301) 765-3394 (W)
(301) 766-4977 (H)

APL Atari Users' Group*
Lynna Babs Spornick
Applied Physics Labs
Johns Hopkins University
8-136 Johns Hopkins Road
Laurel, MD 20707
(301) 953-7100 X3425 (W)
(301) 498-0077 (H)

Computer Home User Group
Joseph Barbane
3600 Earlston Court
Mitchellville, MD 20716
(301) 436-7107 (W)
(301) 464-0757 (H)

ABACUS
Cam Whetstone
P.O. Box 337
Perry Hill, MD 21128-0337
(301) 765-6335 (W)
(301) 486-2609 (H)

McACE
J. Sprigg Duvall
11124 Post House Court
Potomac, MD 20845
(202) 686-2860 (W)
(301) 299-3329 (H)

Atari SUBSIG
Raymond Tillman
8322 Dubbs Drive
Severn, MD 21144
(301) 688-7344 (W)
(301) 551-2625 (H)

Edison Atari Users' Group
Larry Filippelli
5805 Old Temple Hills Road
Temple Hills, MD 20748
(202) 767-6609 (W)
(301) 423-5705 (H)

Honeywell Atari Enthusiasts*
James Stacchi
131 Scituate Street
Arlington, MA 02174
(617) 671-3161 (W)
(617) 643-1456 (H)

Stone & Webster Engineering Atari
Group
David Nasanofsky
245/4 Summer Street
Boston, MA 02107
(617) 589-8734 (W)
(617) 961-2549 (H)

Computers North
Robert P. Herman
419 Washington Avenue
Chelsea, MA 02150
(617) 284-5151 (W)
(617) 884-0747 (H)

MACHO
Paul Norton
336 Springfield Street
Chicopee, MA 01013
(413) 594-6395 (H)

Boston Computer Society Atari
Users' Group*
H. Jeff Goldberg
9 Sullivan Terrace
Framingham, MA 01701
(617) 626-1111 (W)
(617) 877-2164 (H)
(617) 969-9660 (BBS)

Berkshire Users' Group (Atari)*
Jim Brown
Box 593
10 Berkshire Heights
Great Barrington, MA 01230
(413) 528-0744 (W)
(413) 528-1438 (H)

Merrimack Valley Atari Computer
Enthusiasts*
Gerard Marchand
159 Weare Street
Lawrence, MA 01843
(617) 686-1322 (H)

SMAUG*
Dana Pierce
Video Connection
North Dartmouth, MA 02747
(996)-3910

Pre Computer
Andrew J. Brown
4B Airport Road
North Quincy, MA 02171
(617) 786-2663 (W)
(617) 328-1993 (H)

Istari
Chad Leigh
93 Shirley Street
Pepperell, MA 01463
(617) 433-2108 (H)

North Star Atari Computer Users'
Group
Roger E. Melvin
P.O. Box 1087
Pocasset, MA 02559
(617) 563-6477 (H)

North Shore Atari Computer Users'
Group*
Joseph R. Birkner
P.O. Box 2052
West Peabody, MA 01960-7052
(617) 890-8700 (W)
(617) 535-3749 (H)

Battle Creek Atari Users' Group*
Gary Goscenski
2267 Gethings Road
Battle Creek, MI 49017
(616) 968-9067 (H)

Detroit Atari Users' Group
Hans Uddyback
1671 Wellesley
Detroit, MI 48203

Grand Rapids Atari System
Supporters
Ron Kramer
3829 Marlboro N.W.
Grand Rapids, MI 49504
(616) 791-0531 (W)
(616) 791-9430 (H)
(616) 241-1971 (BBS)

Holland Atari Users' Group*
Dick Hartmann
260 Roosevelt
Holland, MI 49423
(616) 772-4635 (W)
(616) 399-5798 (H)

Capitol Hill Atari Owners Society*
Lance Ward/Ike Hudson
P.O. Box 16132
Lansing, MI 48901
(517) 484-5533 (W)
(517) 483-4253 (Ike)
(517) 393-1357 (H)

(517) 351-3092 (Ike)
(517) 373-6788 (BBS)

Southeast Michigan Atari Users'
Group*
Doug Mitchell
38476 Ann Arbor Trail
Livonia, MI 48150
(313) 562-3178 (W)

West Shore Atari Computer Users'
Group
Bill Westphal
5404 West Hesslund
Ludington, MI 49431
(616) 845-6211 (W)
(616) 845-7458 (H)

Huron Atari Computer Club*
Glen Steele
P.O. Box 398
Milford, MI 48042
(313) 685-1313 (H)

Muskegon Atari Computer Users'
Group
Tom Garzelloni
4835 Wilfred
Muskegon, MI 49444
(616) 846-5980 (W)
(616) 739-8629 (H)

Ace of Port Huron
Debbie Koontz
3458 Ravenswood
Port Huron, MI 48060
(313) 364-7951 (H)

Tri-City Atari Users' Group*
Joseph J. Manelis
5560 Tamarix Lane
Saginaw, MI 48603
(517) 790-4675 (W)
(517) 790-0993 (H)

Hooterville Hackers*
Larry Adams
7604 Red Arrow #34
Watervliet, MI 49098
(616) 463-4221 (W)
(616) 463-6079 (H)

Michigan Atari Computer
Enthusiasts
Marshal Dubin
P.O. Box 2785

Southfield, MI 48037
(313) 375-9047 (H)
(313) 544-0885 (Bulletin Board)
(313) 978-1685 (MACE hot line)

Twin City Atari Interest Group*
Phil Siefert
48 Kelley Road
Chaska, MN 55318
(612) 448-7042 (W)

St. Paul Atari Computer Enthusiasts
Edgar Finegan
1867 Simpson Avenue
St. Paul, MN 55113
(612) 631-5726 (W)
(612) 645-9678 (H)

Coastal Area Atari Users' Group*
David E. Warner
P.O. Box 5098
Biloxi, MS 39534
(601) 377-4266 (W)
(601) 388-8284 (H)
(601) 388-3490 (BBS)

Mississippi Atari Users' Group
Bobby G. Yates
1805 Hospital Drive Apt. L-1
Jackson, MS 39204
(601) 376-2818 (W)
(601) 372-8821 (H)

Mississippi Atari Computer Resource
Organization
Ed Harris
107 Tower Drive
Vicksburg, MS 39180
(601) 638-7018 (H)

Heart of America Atari Computer
Users' Group
Roger L. Brenizer
908 Westover Road
Belton, MO 64012
(816) 363-2696 (W)
(816) 331-0096 (H)

Nodaway Atari Group (NAG)*
Rego Jones
Route #2
Maryville, MO 64468
(816) 582-8428 (H)

Atari Computer Enthusiasts
St. Louis West
David Arnold
12584 Villa Hill Lane
St. Louis, MO 63141
(314) 469-1797 (H)

Southwest Missouri Atari Users'
Group
Gil Gilmore
P.O. Box 791, Jewell Station
Springfield, MO 65801
(417) 862-5502 (W)
(417) 887-7283 (H)

Sandhills Computer Enthusiasts
Karen Stange
2818 Big Horn
Alliance, NE 69301
(302) 762-8279 (H)

Omaha Atari Computer Federation*
Glen Flint
P.O. Box 993
Bellevue, NE 68005
(402) 592-0157 (BBS)

Atari Computer Club of Lincoln
Jack Baillie
2215 Hanover Court
Lincoln, NE 68512
(402) 471-2486 (W)
(402) 423-9212 (H)

Southern Nebraska Atari Computer
Enthusiasts
Mike Fischer
Peru State College
Peru, NE 68421
(402) 947-4791 (W)
(402) 872-9745 (H)

High Sierra Atari Users' Group*
Joe Elcano
303 East Emerson Way
Sparks, NV 89431
(358)-7560 (H)

Southern Nevada Atari Computer
Club (SNACC)*
D.A. Matlock
P.O. Box 27617
Las Vegas, NV 89126
(702) 363-6066 (W)
(702) 733-9488 (BBS)

New Hampshire Atari Computer
Club*
Paul Johnson
P.O. Box 5288
Manchester, NH 03108
(603) 669-6210 (W)

Granite State Hackers
David Winn
45 Allds Street
Nashua, NH 03060
(603) 889-6651 X284 (W)
(603) 889-8682 (H)

Seacoast Personal Atari Computer
Enthusiasts (SPACE)
Richard M. Holt
7 Elm Avenue
Pease AFB, NH 03801
(603) 430-2426 (W)
(603) 436-8604 (H)
(603) 749-6968 (BBS)

New Jerseys Computer Club of
Bayonne (NJCCB)*
Michael Elia
1 Oak Court West
Bayonne, NJ 07002
(201) 823-4781 (H)

Micros of Monmouth (MOM)*
Joe Petrillo
23 Winding Lane
Bloomfield, NJ 07003
(201) 338-8014 (H)

Home User Group, New Jersey
Ed Picciuti
90 Mountain Avenue
Cedar Knolls, NJ 07927
(201) 267-7745 (H)

Diamond Graphics Users' Group
Danny Small
36-10 Northern Drive
Fairlawn, NJ 07410
(201) 794-1085 (H)

Software Programmers of
Piscataway
Bill Page
P.O. Box 266
Flagtown, NJ 08821
(201) 457-3278 (W)
(201) 369-3212 (H)

Northern New Jersey Atari
Computer Group
Ken Roser
72 Rockwood Road
Florham Park, NJ 07932
(201) 377-4776 (H)

Jersey Atari Computer Group*
Richard Kushner
58 Dewey Avenue
High Bridge, NJ 08829
(201) 582-4794 (W)
(201) 638-8732 (H)
(201) 549-7591 (BBS)

Computer Marvels of Millstone
Paul Saccone
3 Giant Maple Court
Hightstown, NJ 08520
(201) 446-6465 (H)

Hoboken Atari Computer
Enthusiasts
Ronald J. Clark
908 Washington Street
Hoboken, NJ 07030
(201) 420-2131 (W)
(201) 656-4508 (H)

Supermarkets General Corp.
Personal Computer Club
Robert J. Kuzma
16 Winter Street
Iselin, NJ 08830
(201) 499-4176 (W)
(201) 636-3667 (H)

The Micro Computer Club
Eugene Cosnoski
93 Seabreeze Way
Keansburg, NJ 07734
(212) 553-4328 (W)
(201) 787-8242 (H)

Bayway Atari Computer
Enthusiasts*
Joseph T. Bocklage
P.O. Box 222
Linden, NJ 07036
(201) 474-7763 (W)
(201) 249-9180 (H)

Atari Users' Group of Livingston
David Kerven
39 Filmore Avenue
Livingston, NJ 07039
(201) 992-4834 (H)

Bell Labs Atari Computer Club
Herb Lehner
Bell Labs 600 Mountain Avenue,
Rm. 2B302
Murray Hill, NJ 07974
(201) 582-2774 (W)
(201) 725-9394 (H)

Rutgers Recreational Services
Computer Club
Richard W. Twitchell
Rutgers Gymnasium, Room 202
College Avenue
New Brunswick, NJ 08903
(201) 932-7578/8204 (W)
(201) 238-0916 (H)

Central Jersey Users' Group*
Michael Farber
12 Hunterdon Avenue
Spotswood, NJ 08884

Teaneck Atari Users' Group
Mark Hirmes
331 DeMott Avenue
Teaneck, NJ 07666

Jersey Atari Computer Society*
Irv Feinberg
21 Meetinghouse Court
Vincentown, NJ 08088
(609) 268-9388 (H)
(609) 234-9240 (BBS)

VIP Honda Car Club - Atari Users'
Group
Bill Martin
P.O. Box 356
White House Station, NJ 08889

Albuquerque Atari Computer
Enthusiasts
Thomas A. Marshall
625 Monte Alto Drive N.E.
Albuquerque, NM 87123
(505) 844-0327 (W)
(505) 296-5754 (H)

Latari
Steven P. Cole
344 Kayenta Drive
White Rock, NM 87544
(505) 667-2168 (W)
(505) 672-1368 (H)

Capital District Atari Computer
Enthusiasts
Rod Lemon
P.O. Box 2233
Albany, NY 12220
(518) 473-7893 (W)
(518) 477-2450 (H)
(518) 458-2761 (BBS)

Atari Youth of Ardsley
William Bushel
P.O. Box 58
Ardsley, NY 10502
(914) 693-4832 (H)
(1pm - 10pm ET)
(914) 693-4832 (BBS)
(11pm -12pm ET)

Atari Programming Club
Robert Greenberg
2175 Bay Blvd.
Atlantic Beach, NY 11509
(516) 239-5009 (W & H)

The Atari Linx
Joseph Lucyk
71 East Lakeland Street
Bay Shore, NY 11706
(516) 242-5259 (H & BBS)

Micro Users' Resource Group
Terry Wheeler
7115 10th Avenue
Brooklyn, NY 11228
(212) 986-8600 (W)
(212) 748-3186 (H)

Brooklyn Atari Society for
Information Communication
(BASIC)*
Peter Fazio
2724 East 23rd Street
Brooklyn, NY 11235
(212) 646-6384 (H)

Lincoln - Students Users' Group
Eddie Fishman
2676 West 3rd Street
Brooklyn, NY 11223

North Buffalo Atari Users' Group*
John Y. Arrasjid
185 Commonwealth Avenue
Buffalo, NY 14216
(716) 876-7010 (W)

ACE of Syracuse*
Ken Benson
322 Dickerson Drive North
Camillus, NY 13031
(315) 492-5011 (W)
(315) 487-0463 (H)
(315) 451-7747 (BBS)

East Suffolk Users' Group
Kenneth J. Talbot
30 Bethany Drive
Commack, NY 11725
(516) 451-4282 (W)
(516) 543-4739 (H)

ACE
Eric Lituchy
20 Wichard Blvd.
Commack, NY 11725
(516) 543-1791 (H)

Computer Line Atari*
Mark Zemanek
502 Dencary Lane Apt. L
Endwell, NY 13760
(785)-4362 (W, H & BBS)

QUACS
Bob Slitzan
195-19 Northern Blvd.
Flushing, NY 11358
(212) 357-5522 (W)

Artists Who Use Computers at the
School of Visual Arts
Jerry Pozniak
48-30 189 Street
Fresh Meadows, NY 11365
(212) 357-7670 (H)

Finger Lakes Atari Group
Robert Butts
R.D. #2, Box 41
Geneva, NY 14456
(315) 789-6470 (H)

Drakewood Micro Chips
Ronald W. Singer
3487 Roosevelt Hwy.
Hamlin, NY 14464
(716) 964-2955 (H)

Atari Computer Owners of
Rochester NY (ACORN)

Neal Eckhardt
P.O. Box 200
Henrietta, NY 14467
(716) 454-1700 X472 (W)
(716) 359-2672 (H)

SMAUG
Robert A. Austen
3 Adams Street
Hicksville, NY 11801

Play View Video Comp - Users'
Group
Steve Greenbaum
9 Mountain Avenue
Highland Falls, NY 10928
(914) 446-9603 (H)

Great Escapers Users' Group of
Kings Park
Allen Levy
64 Ravenwood Drive
Kings Park, NY 11754
(516) 724-8307 (H)

Hacker's Haven*
Ashwin Philip
16 Marco Polo Drive
Latham, NY 12110
(518) 783-8433 (H & BBS)

Atari Users' Club - LICA
Jack Schnee, M.D.
259 Continental Drive
Manhasset Hills, NY 11040
(212) 297-5600 (W)
(212) 627-6961 (H)

Business Atari Users & Developers*
Robert J. Arzola
P.O. Box 3608
New York, NY 10185
(212) 639-5412 (W)
(212) 639-5442 (H)

Atari Star Users' Group*
Richard S. Abramson
915 Oak Lane
North Woodmere, NY 11581
(212) 486-5870 (W)
(212) 791-1156 (H)

Rockaway Atari Computer
Enthusiasts
David Schmier
122-10 Newport Avenue
Rockaway, NY 11694
(212) 945-2055 (H)

A Bunch of Atari Computer Owners*
Gerald L. Ortoli
90-A Partition Street
Saugerties, NY 12477
(914) 385-3196 (W)
(914) 246-7193 (H)

Starship
Paul T. Drahushuk
P.O. Box 133
Stottville, NY 12172
(518) 828-7502 (H)

Schenectady County Atari Computer
Enthusiasts
John E. Conley
11 Sunnyside Road
Scotia, NY 12302
(393)-8345 (H)

Brockport Atari Computer Jr. Users'
Group
Bob Garg
838 Gallup Road
Spencerport, NY 14559
(716) 352-6308 (H)

Staten Island Atari Users' Group
David Barlas
811 Bement Avenue
Staten Island, NY 10310
(212) 447-4225 (H)

Rockland Atari Computer Users'
Group*
Richard Bloch
29 Riverglen Drive
Thiells, NY 10984
(914) 429-5283 (H)

Atari Computer Users' Group of
Westchester*
Dr. Roland B. Herman
4 Charlotte Street
White Plains, NY 10606
(914) 946-4134 (H)

Bit's Byte's & Piece's*
William R. Wheat
1103 Arrowbend Drive
Williamson, NY 14589
(315) 589-5281 (H & BBS)

Personal Computers Group
Samuel C. Wen
30-15 50th Street
Woodside, NY 11377
(212) 545-8700 (H)

W.N.C. Atari Users' Group
Larry Simpson
64 Rumbough Place
Asheville, NC 28806
(704) 298-3910 (W)
(704) 255-0731 (H)

Triangle Computer Club*
Thomas A. Garren
802 Madison Avenue
Cary, NC 27511
(919) 467-1787 (W)
(919) 467-6281 (H)

Charlotte Atari Users' Group*
Jason Lex Thomas
P.O. Box 221133
Charlotte, NC 28222
(704) 333-1276 (W)
(704) 568-6213 (H)

Atari Computer Users' Society of
Fayetteville*
Terry Kerr
P.O. Box 1117
Fayetteville, NC 28302
(919) 485-3318 (W)
(919) 485-2380 (H)
(919) 822-4949 (BBS)

Piedmont Triad Atari Users' Group*
Francine A. Strayhorn
6104 Knight Road
Greensboro, NC 27410
(919) 294-6920 (H)

N.D.S.U. Atari Power
Rick Hauser
3201 North 1st Street
Fargo, ND 58102
(701) 237-8381 (W)
(701) 237-0962 (H)

Forx Atari Computer Enthusiasts*
Robert A. Carr
1179 B Maxwell
Grand Forks AFB, ND 58205
(701) 594-3458 (W)
(701) 594-9706 (H)

Minot Atari Computer Users' Group
Frank Misuraca
531 6th Street N.E.
Minot, ND 58701
(701) 857-4730 (W)
(701) 838-0261 (H)

Dak-tari
Joseph Santorelli
101-3 Summit Drive
Minot AFB, ND 58704
(701) 727-3262 (W)
(701) 727-9103 (H)

Debug Computer Users' Group
Richard Mitterholzer
139 North Lawn Street
Bluffton, OH 45817
(419) 358-7941 (W)
(419) 358-1387 (H)

Atari Computer Enthusiasts of
Brook Park*
Rick De La Pezuela
6180 Delores Blvd.
Brook Park, OH 44142

A-BUG-BYTE
Charles Angel
85 East Bayview Avenue
Brookville, OH 45309
(513) 833-5848 (H)

Scioto Valley Aces
Scott Lytle
162 Plyley's Lane
Chillicothe, OH 45601
(614) 289-2331 X4061 (W)
(614) 772-6956 (H)

Medina Atari Systems Hackers
(MASH)*
Landon McKenzie
486 Shorefield Drive
Chippewa Lake, OH 44215
(216) 524-2255 (W)
(216) 769-3925 (H)

Cin'tari Atari Computer Enthusiasts*
Roger F. Miller
1628 Bising Avenue #3
Cincinnati, OH 45239
(513) 521-2966 (H)

The Independent Computer Users'
Group
Brian Donovan
3310 Hardesty Avenue
Cincinnati, OH 45208
(513) 871-9243 (H)

Atari Computer Enthusiasts of
Cleveland*
Bruce Frumker
Cleveland Museum of
Natural History
Wade Oval - University Circle
Cleveland, OH 44106
(216) 231-4600 (W)
(216) 321-6749 (H)
(216) 271-9273 (BBS)

Atari Computer Enthusiasts of
Columbus Ohio*
William Eckert
6632 Lisamarie
Columbus, OH 43229
(614) 895-4515 (W)
(614) 891-9785 (H)

Cuyahoga Valley Atari Computer
Club
Robert Miller
3858 Akron-Cleveland Road
Cuyahoga Falls, OH 44223
(216) 928-9805 (H)

Day-tari*
Steven M. Schoemann
5579 Maefel Lane
Dayton, OH 45415
(513) 268-6893 (W)
(513) 275-9218 (H)

Miami Valley ACES*
Stan Mahurin
P.O. Box 24221
Dayton, OH 45424
(513) 237-1601 (W)
(513) 845-3252 (H)

Maumee Valley ACES
Doug Berry
708 Downs Street
Defiance, OH 43512
(419) 782-7622 (W)
(419) 784-0977 (H)

Tri County Computer Club*
Randy Raymond
344 East Patterson Street
Dunkirk, OH 45836
(419) 759-3557 (H)

Fremont Atari Computer Enthusiasts
Greg Albee
122 Cottage Street
Fremont, OH 43420
(419) 332-9381 (H)

Atari Peekers*
Claudette Tischler
2055 Reveley Avenue
Lakewood, OH 44107
(216) 826-4000 X2450 (W)
(216) 226-5644 (H)
(216) 228-PEEK (BBS)

Lake County Atari Computer
Enthusiasts (LA' CACE)*
Richard Strecker
5782 Andrews 106-B
Mentor On The Lake, OH 44060
(216) 257-1502 (H)

Atari Resource Club
Duane Olexa
P.O. Box 212
65310 Willow Grove Road
Neffs, OH 43940
(304) 243-1540 (W)
(614) 676-3378 (H)

Newark Area Computer Users
Robert A. Schweitzer
996 Lawnview Avenue
Newark, OH 43055
(614) 344-3183 (W & H)

Tri-County Atari Users' Club
Alan R. Dock
4 Circle Drive
New Bremen, OH 45869
(419) 628-2324 (W)
(419) 629-2438 (H)

Western Atari Computer
Organization
David Markley
6702 Ravenna Court
Reynoldsburg, OH 43068
(614) 861-0642 (H)
(614) 860-3949 (W)

Sidney-Shelby Computer Users'
Group*
Eugene Horowitz
800 West Russell Road
Sidney, OH 45365

Solon Atari Computer Club
Ken Bluhm
7335 SOM Center
Solon, OH 44139
(216) 248-4664 (H)

Atari Computer Enthusiasts of
Springfield*
Rosemary Clark
2735 Conestoga Street
Springfield, OH 45503
(513) 322-4911 (W)
(513) 399-5493 (H)

Atari Computer Club of Toledo*
Robert P. Wrobel
606 Carlton
Toledo, OH 43609
(419) 385-2449 (W & H)

Blackhawk Computer Science
Association*
David N. Grove
843 Walbridge Avenue
Toledo, OH 43609
(419) 242-1823 (H 9am-9pm)

Atari Microcomputer Network
Amateur Radio Operator's Users'
Group*
Jack McKirgan II
WD8BNG-NET Coordinator
4749 S.R. 207 N.E.
Washington C.H., OH 43160
(614) 869-3597 (H)

Atari Computer Enthusiasts Club of
Ohio*
Ron Coleman

10285 Caskie Road
Wayne, OH 43466
(419) 288-2865 (W & H)

Bartlesville Users' Group*
Raymond L. Schindler
1814 Dewey
Bartlesville, OK 74003
(918) 661-9120 (W)
(918) 336-9559 (H)

Tulsa Computer Society Atari
Enthusiasts*
William P. Lee
1221 South 33rd Street
Broken Arrow, OK 74014
(918) 495-6906 (W)
(918) 258-1940 (H)

Duncan Area Atari Computer Users*
John K. Borchardt
911 Primrose Street
Duncan, OK 73533
(405) 251-3982 (W)
(405) 252-0733 (H)

Idabel Atari Whiz Kids
Brian Fagan
303 Manchester Drive
Idabel, OK 74745
(405) 286-6035 (H)

ACE of Oklahoma, Norman
(ACE, ON)
Larry Barklage
P.O. Box 6076
Norman, OK 73070
(405) 321-3170 (W)
(405) 364-7646 (H)

Atari Computer Club of
Oklahoma City, Inc.*
Jeff Jones
P.O. Box 32672
Oklahoma City, OK 73123
(405) 755-7967 (W & H)

Ponca City Atari Users' Group
Tom Hoyer
208 Westbury Road
Ponca City, OK 74601
(405) 767-2492 (W)
(405) 765-2382 (H)

72 Crystal Drive
Warwick, RI 02889
(401) 738-5141 (H)

The Low Country Atari Users' Club
Joseph Ingarra
2197 Pierpont Avenue
Charleston, SC 29407
(803) 766-9513 (H)

Midlands Atari Computer Club*
Rick Stora
410 Willow Winds Drive
Columbia, SC 29210
(803) 799-1010 (W)
(803) 731-9881 (H)
(803) 772-0851 (BBS)

Greenville Regional Atari Computer
Enthusiasts (GRACE)*
Alvin Tompkins
508 Butler Spring Road
Greenville, SC 29615
(803) 242-1050 (W)
(803) 292-3246 (H)

Shaw Atari Computer Enthusiasts*
James E. Matthews
585-B White Oak Street
Shaw AFB, SC 29152
(803) 668-2205 (W)
(803) 666-3535 (H)

Sumter Atari Computer Users'
Group
Bruce Blumberg
114 Henrietta Drive
Sumter, SC 29150
(803) 481-8511 (W)
(803) 775-6509 (H)

Atari Micro Computer Users' Group*
Kevin Kingsmore
201-B Robinhood Circle
Union, SC 29379
(803) 427-5179 (H)

Pmbase of Cleveland, Tennessee
Bob Carney
2175 Chambliss Avenue
Cleveland, TN 37311
(615) 479-5966 (W)
(615) 476-1910 (H)

Chambersburg Area Atari Users'
Group
John B. Flood
440 East King Street
Shipensburg, PA 17257
(717) 263-6738 (W)
(717) 532-3454 (H)

Southeastern Pennsylvania Atari
Computer Enthusiasts
Jonathan Day
P.O. Box 2291
Warminster, PA 18974
(215) 355-1439 (H)

NAVAIRDEVCEN Atari Computer
Users' Group
Glen Savage
240 Parry Road
Warminster, PA 18974
(215) 441-2691 (W)
(215) 674-1748 (H)

Abe's ACEs*
P.O. Box 228
Whitehall, PA 18052

North American Computer Society
- Atari Users' Group
Francis J. George
149 South Grant Street
Wilkes-Barre, PA 18702
(717) 826-5097 (W)
(717) 829-5169 (H)

Philadelphia Area Computer Society
- Atari Computer Users' Group*
Bill Richardson
40 Balfour Lane
Willingboro, NJ 08046
(215) 887-3779 (W)
(609) 835-2789 (H)
(215) 836-5116 (BBS 5 PM - 8 AM)

First Atari Club of Rhode Island
(FACRI)*
John Flanders
5 Pleasant Street
Newport, RI 02840
(401) 846-7092 (H)

Atari Anonymous Users' Group of
Rhode Island
David W. Fuller

Central Catholic Computer Club
Joe Muha
4111 Harvey Avenue
Munhall, PA 15120
(412) 462-5685 (W)
(412) 462-5685 (H)

Philadelphia Electric Company
Employee's Computer Club for Atari
Computer Enthusiasts
Dominic Costantino
150 Plowshare Road
Norristown, PA 19403
(215) 270-3803 (W)
(215) 631-5084 (BBS)

Atari Users of Temple University
Glenn E. Snelbecker, Ph.D.
Educational Psychology Dept.
RA 217, TU 004-00
Philadelphia, PA 19122
(215) 787-6109 (W)
(215) 836-1320 (H)

Pittsburgh Atari Computer
Enthusiasts*
Frank Nagle
300 Washington Road P.H.
Pittsburgh, PA 15216
(412) 434-4286 (W)
(412) 561-1776 (H)
(412) 745-0800 (BBS)

Compustars*
John D. Hoffman
888 North Hanover Street
Pottstown, PA 19464
(215) 755-4519 (W)
(215) 327-3467 (H)

Berks/Reading Area Computer
Enthusiasts (BRACE)*
James Lory
3221 Stoudt's Ferry Bridge Road
Reading, PA 19605
(215) 929-8452 (W)
(215) 929-6284 (H)

The East Scranton Atari Users'
Group*
Shawn Tigrett
8 Prescott Place
Scranton, PA 18510
(717) 344-7941 (H)

Southcentral Pennsylvania Atari
Computer Enthusiasts*
H. Richard Basso, Jr.
102 Forest Drive
Camp Hill, PA 17011
(717) 787-2707 (W)
(717) 761-3755 (H)

Northeastern Pennsylvania Atari
Computer Enthusiasts
Jeff Brandes
496 Grandview Street
Clarks Summit, PA 18411
(717) 586-9498 (H)

Pacatranyi Empire*
Erik M. Latranyi
RR #5 Box 59
Danville, PA 17821
(717) 275-2364 (W & H)

Windway Atari Computer Assn.
Richard N. Allen Sr.
Rt. 3, Box 655
Felton, PA 17363
(301) 667-3594 (W)
(717) 993-3002 (H)

Discovery Atari Computer Users'
Group of Delaware Valley
Hal Feldman
309 David Drive
Havertown, PA 19083
(215) 853-3766

Red Rose Atari Members (RAM)*
David A. Rodriguez
424 North Mary Street
Lancaster, PA 17603
(717) 393-5673 (W)
(717) 299-1502 (W)

Computer Hobbyists of Indiana,
Pennsylvania (CHIP)*
Roger L. Lippert
R.D. 1 Box 167AA
Marion Center, PA 15759
(412) 357-4000 (W)
(412) 397-8914 (H)

Games
Kevin Brady
2120 Dalton Street
McKeesport, PA 15132
(412) 678-5443 (H)

Portland Atari Club*
Joe Engel
4035 North Vancouver Avenue
Portland, OR 97227
(503) 222-6300 (W)
(503) 282-0881 (H)
(503) 245-9405 (BBS)

Bend Users' Group (BUG)
Raymond Golden
1260 S.W. 17th #30
Redmond, OR 97756
(503) 923-0333 X301 (W)
(503) 548-1628 (H)
(503) 448-1628 (BBS)

Atari Users Along the Umpqua
John Williams
408 North River Drive
Roseburg, OR 97470
(503) 672-4337 (H)

Pacific Atari Computer Enthusiasts
Richard Tsukiji
1385 Cleveland Loop Drive
Roseburg, OR 97470
(503) 672-4272 (H)

North Allegheny Computer Club
Victor Khersonsky
9557 Castleton Drive
Allison Park, PA 15101

Valley Atari Computer Club*
Carol Hatton
R.D. #2 Coleman Drive
Beaver, PA 15009
(412) 728-0378 (H)

Bettis Atari User Devotees*
Barry Z. Hyatt
3448 Forest Road
Bethel Park, PA 15102
(412) 462-5000 X6102 (W)
(412) 833-0018 (H)

Levittown Atari Computer
Enthusiasts
Daniel A.M. Dilvorenzo
362 Lafayette Street
Bristol, PA 19007
(215) 788-1197 (H)

Terra Resources Company
Computer Club
James C. Elledge
5416 South Yale, Suite 400
Tulsa, OK 74135
(918) 492-2231 (W)

Tulsa Regional Atari Computer
Enthusiasts
Kay Greer
1422 South 73rd East Avenue
Tulsa, OK 74112
(918) 250-8649 (W)
(918) 834-3887 (H)

Weatherford Computer and
Electronics Club - Atari Div.
Mark Moore
Rt 5 Box 103
Weatherford, OK 73096
(405) 772-7823 (H)

Bonneville Atari Group
Verne G. Newsom
22889 S.E. Naomi Drive
Boring, OR 97009
(503) 665-8708 (W)
(503) 658-2375 (H)

Valley Atari Computer Enthusiasts
Jerry Isaac
1180 East Ellendale
Dallas, OR 47338
(503) 623-8260 (H)

Atari Computer Enthusiasts of
Eugene*
Mike Dunn
3662 Vine Maple Drive
Eugene, OR 97405
(503) 344-6193 (H)
(503) 343-4352 (BBS)

Medford Area Users' Group
James M. Caldwell
1420 Summit Loop
Grants Pass, OR 97526
(503) 474-5470 (W)
(503) 479-1761 (H)

Rouge Area Atari Computer
Enthusiasts
David Garvin
P.O. Box 4474
Medford, OR 97501-0175
(503) 779-5589 (W)

Power Systems Atari Users' Group
Bart Borden
Box 2730
c/o Cleveland Utilities
Cleveland, TN 37311
(615) 472-4521 (W)
(615) 263-1733 (H)

North River Atari Users' Group
James E. Law
8486 Cross Timbers Circle
Hixson, TN 37343
(615) 870-6539 (W)
(615) 842-5471 (H)

East Tennessee Atari Users' Group*
Hal M. Dougherty
2029 Bloomingdale Parkway
Kingsport, TN 37660
(615) 288-2119 (H)

Atari Users' Group of Knoxville
Dan Irby
P.O. Box 30146
Knoxville, TN 37930
(615) 574-4644 (W)
(615) 693-7503 (H)

Quest
Mrs. W.N. Baxter
298 Wallace Road
Memphis, TN 38117
(901) 454-2645 (W)
(901) 685-8363 (H)

Independent Society of Atari
Enthusiasts*
Billy Butler
Rt 1, Bradley Creek Road, Box 84
Milton, TN 37118
(615) 273-2314 (H)

West Texas Atari Computer Users'
Group
Richard Stevens
3112 South Manhattan
Amarillo, TX 79103
(806) 374-3221 (H)

Austin Atari Computer Enthusiasts*
David Mann
7108 Spurlock Drive
Austin, TX 78731
(512) 250-3540 (W)
(512) 346-4940 (H)

Lone Star Atari Confederacy
Helen Rubel
7001 Whispervine Creek
Austin, TX 78736
(512) 447-5204 (W)
(512) 288-2032 (H)

Command Console*
Shaune R. Stark
Room W-1132, Jester Center West
Austin, TX 78784
(512) 495-2970 (W & H)

Corpus Christi Computer Club*
Jim Watson
801 Orleans Drive
Corpus Christi, TX 78418
(512) 888-3162 (W)
(512) 937-5607 (H)

Sun Metro Atari (Computer) Users'
Group
Wendell E. Gragg
3372 Guthrie
El Paso, TX 79935
(915) 543-5878 (W)
(915) 598-9435 (H)

Greenville Atari Computer
Enthusiasts
Joe Don Allbritten
E-Sytems PO Box 1056
Greenville, TX 75401
(214) 457-4254 (W)
(214) 527-3875 (W)

Houston Atari Computer
Enthusiasts (HACE)*
Richard Bottos
10814 Britoak
Houston, TX 77079
(713) 972-5905 (W)
(713) 464-9324 (H)

Computronix Atari Family
Enthusiasts*
Marcy Milsop
8502 Apothecary Lane
Houston, TX 77064
(713) 937-1239 (H)

Midland Microcomputer Association*
Scott D. Johnson
4400 Humble Avenue
Midland, TX 79703
(915) 699-3408 (W)
(915) 699-4470 (H)

Nacogdoches Atari Computer
Enthusiasts
Brandon Warlick
2016 N.E. Stallings
Nacogdoches, TX 75961
(409) 564-6247 (H)

Pasadena Atari Computer Club*
Kevin Cox
3312 Hays
Pasadena, TX 77503
(713) 473-0830 (W)
(713) 473-0103 (H)

Dallas Atari Computer Enthusiasts*
Jim Chaney
916 East Berkeley
Richardson, TX 75081
(214) 266-1538 (W)
(214) 231-4402 (H)
(817) 498-1751 (BBS)

Alamo Area Atari Computer Users'
Association*
P.R. Serafine, O.D.
3646-B Fredricksburg Road
San Antonio, TX 78201
(512) 699-8007 (H)
(512) 340-1473 (BBS)

San Marcos Atari Computer Club*
Preston Sullivan
113 North Johnson Avenue
San Marcos, TX 78666
(512) 396-4200 (W)
(512) 353-7344 (H)

10PM (Programming Masters)*
Mark Blythe
P.O. Box 92924
Southlake, TX 76092
(817) 488-8139 (H)

Temple Atari Computer Enthusiasts*
James E. Wesolowski
3202 Las Cruces Drive
Temple, TX 76502
(817) 778-7423 (W & H)

Randolf Area Atari Users' Group*
Duff McCutcheon
P.O. Box 2611
Universal City, TX 78148
(512) 652-2470 (W)
(512) 658-1180 (H)

Heart of Texas Atari Computer
Enthusiasts*
Mark Asbell
81005-2 Travis Avenue
West Fort Hood, TX 76544
(817) 287-3805/6270 (w)
(817) 532-2981 (H)
(817) 532-2981 (BBS 6PM-6AM)

Woodlands Atari Computer
Organization (WACO)*
Jeffrey S. Kerner
47 Wedgewood Forest Drive
Woodlands, TX 77381
(713) 626-2953 (W)
(713) 292-3006 (H)

Atari Computer Enthusiasts of
Salt Lake*
Susan Pope
5522 Sarah Jane Drive
Kearns, UT 84118
(801) 967-1037 (H)
Stephen Lewis

Atari Computer Users' Group of
Layton
James Florez
1036 North Nalder
Layton, UT 84041
(801) 546-2445 (H)

Intermountain Atari Computer
Enthusiasts
Dennis E. Murray
989 East 1050 North
Ogden, UT 84404
(801) 393-8602 9AM-11AM (W)
(801) 782-8042 (H)

The Vermont Atari Computer
Enthusiasts
David Messier
38 North Winooski Avenue
Burlington, VT 05401
(802) 862-6873 (W)
(802) 863-2733 (H)

Northern Vermont Atari Users'
Group
Keith Lord
148 Maple Street
Essex Jct., VT 05452
(802) 878-8106 (H)

Fairfax Atari Computer Enthusiasts*
Jeremy Brock
2665 Arlington Drive #202
Alexandria, VA 22306
(703) 768-0218 (H)

Pentagon Atari Computer Users'
Group (PENTARI)
Bob Fersch
1555 Wilson Blvd., Suite 601
Arlington, VA 22209
(703) 276-9279/525-2484 (W)
(703) 671-5474 (H)

G.R.A.S.P.*
Richard E. DeVore
8720 Courthouse Road
Chesterfield, VA 23832
(804) 748-3031 (H)

Woodbridge Atari Computer Users'
Group*
John C. Holtzhauer
15817 Vista Drive
Dumfries, VA 22026
(703) 670-6475 (H)

Cardinal Computing Club
Fred Malik
12166 Queens Brigade Drive
Fairfax, VA 22030
(703) 830-2132 (W & H)

Farmville Atari Computer Group*
Gerald P. Graham
1305 Gilliam Drive
Farmville, VA 23901
(804) 392-9266 (W)
(804) 392-8306 (H)

Peninsula Atari Computer
Enthusiasts of Virginia*
George M. Ware
468 Elizabeth Lake Drive
Hampton, VA 23669
(804) 865-3911 (W)
(804) 851-0485 (H)
(804) 722-0935 (BBS)

Novatari*
James Stevenson
4408 Manor Hall Lane
Fairfax, VA 22033
(703) 425-6698 (BBS)

The Fredericksburg Users' Group
Joan Strotman
2025 Farragut Drive
Stafford, VA 22554
(703) 659-3552 (H)

The Southside Tidewater Atari
Technical Users' Society*
Gene Rodriguez
4836 Honeygrove Road
Virginia Beach, VA 23455
(804) 480-1443 (W)
(804) 499-6021 (H)

Bellevue/Redmond Atari Computer
Enthusiasts*
James F. Adams
P.O. Box 6341
Bellevue, WA 98008-0341
(206) 828-0555 (W)
(206) 644-7477 (H)

Chewelah Atari Computer Users'
Group
Kelly R. Harris
Box 767-410 North Kruger
Chewelah, WA 99109
(509) 935-6716 (H)

Compuwriters
Roy L. Preston
120½ S.E. 2nd
College Place, WA 99324
(509) 529-2551 (H)

Seattle Puget Sound Atari Computer
Enthusiasts*
Thomas E. Newman
2206 Aqua Vista Court N.W.
Gig Harbor, WA 98335
(206) 967-5910 (W)
(206) 958-7649 (H)

Atari Computer Enthusiasts of
Kitsap County
Jon Chandler
3849 S.E. Conifer Park Drive
Port Orchard, WA 98366
(206) 871-3025 (H)

A2 D2*
John Hickey
4075 Tami Street
Richland, WA 99352
(509) 783-5426 (W)
(509) 627-3315 (H)
(509) 783-5427 (BBS,
after 7 PM & SUN)

Starbase
Dan Flanagan
4301 230th Place S.W.
Mountlake Terrace, WA 98043
(206) 774-1343 (H)

Icarus
Michael King
2116 200 Avenue West
Oak Harbor, WA 98277
(206) 679-3558 (W)
(206) 678-6210 (H)

"R" Atari Group
J. Farrell
1691 Beech Lane
Oak Harbor, WA 98277
(206) 257-2836 (W 3:15 - 11:30 PT)
(206) 675-5436 (H)

Atari Micro Power of Spokane*
Doug Dobbins
North 1410 Wall
Spokane, WA 99201
(509) 328-9414 (H)
(509) 624-2636 (BBS 8PM-6AM)

The Northwest Users Connection
Paul Connors
14613 N.E. 35th Street
Vancouver, WA 98662
(206) 256-4277 (H)

Yakima Atari Systems Hobbiest
Robert H. Rhines
906 South 42nd Avenue Apt. F
Yakima, WA 98908
(509) 248-6380 (W)
(509) 965-4419 (H)

Chippewa Valley Atari Users' Group
Neal Sipress
1735 Coolidge Court
Eau Claire, WI 54701
(715) 834-4667 (H)

Packerland Atari Computer Society*
Barry Dawes
815 Gregory Place
Green Bay, WI 54303
(414) 434-0665 (H)
(414) 434-0264 (BBS)

Milatari*
Gary Nolan
11230 West Bobolink Avenue
Milwaukee, WI 53225
(414) 464-1200 (W)
(414) 353-9716 (H)

Oshkosh Atari Users' Group*
Mike E. Jones
1418 Indigo Drive
Oshkosh, WI 54901
(414) 231-7553 (H)

Chy-Wy-'Tari
Roger L. McClure
138 Prairie Avenue
Cheyenne, WY 82009
(307) 632-9726 (H)

Computers Anonymous*
Ron Long/Bob Flory
c/o The Micro Center
1 Southview Center
Gilette, WY 82716
(307) 686-0006 (W)

*Newsletter available

Glossary

Access. (1) *V*, to read, write or update information, usually on an external memory device such as a disk; also, to reach the data in order to perform a read, write or update operation. (2) *N*, a single one of these operations.

Alphanumeric. Containing both letters and numbers, often including punctuation marks. Also refers to the screen mode that displays only letters and numbers (in contrast to graphics mode).

Alternate chararacter set. A set of 64 characters limited to graphic shapes and the lowercase letters. Normally, the Atari uses a standard 64-character set that includes capital letters and punctuation marks unless the alternate set is selected.

Amber screen. A type of monitor that displays text and graphics in amber on a black background. Some people prefer amber screens to black-and-white or green-and-black screens; they are popular in Europe. See *monochrome.*

Analog. Pertaining to signals that can take on any value in a continuous range, in contrast to digital signals, which can only vary in steps. Signals produced by physical processes are usually analog and must be translated into digital form by special boards before they can be processed by computers. See *digital.*

Application software. Software programs that are used for specific tasks other than just running the computer or developing other programs. Financial, word-processing and appointment-schedule programs are examples of application software.

Array. A grouped set of values arranged so that you can identify a specific value by its unique position in the group. For example, in an array showing maximum daily temperatures for the month, you could refer to the temperature on the last day of the first week by TEMP(1,7).

ASCII. (AZZ-key) Abbreviation for American Standard Code for Information Interchange. Almost all personal computers use ASCII to encode letters, numbers and other symbols into computer bit strings.

Assembler. A program that translates other programs written by people into a form more usable by the computer. See *assembly language.*

Assembly language. A type of computer language that requires the programmer to specify to the computer the exact machine operations that are to be performed. Programmers can create fast-executing, compact and efficient

programs using assembly language, but a lot of detailed time-consuming programming may be involved. Testing and debugging assembly-language programs can often be difficult.

Asynchronous communication. A method of transferring data that does not require the information to be sent at a constant pace. It is the standard method of communicating on most personal-computer networks where you read or send information, including public communications networks, bulletin boards and information utilities such as The Source or CompuServe.

Atari key. The key on the keyboard with the Atari logo (looking like a stylized letter *A* with inward curving sides and a vertical line up the middle). It switches the screen from normal to reverse video (dark characters on light).

ATASCII. Atari's version of the industry-standard ASCII code used to represent letters and other characters as numerical codes. In addition to the 128 codes defined in the ASCII standard, ATASCII adds 128 more graphics and control characters. See *ASCII*.

Back up. To make a copy of a file or program in case the original is damaged.

Backup. The copy of a file or program that you make in case the original is damaged. Because computers can erase information even more quickly than they can process it, it is essential to make regular backups as a part of any serious work with a file or program.

Bandwidth. The highest frequency signal that monitors and other displays can accept and show on their screens. A higher frequency indicates finer possible detail, but it

may also require special video cards and be more costly.

Bar chart. A chart that uses a series of horizontal or vertical bars to show relative values.

BASIC. A computer language designed for the easy, interactive development of programs. Because the Atari normally translates and executes a BASIC program line by line, it can show you any problems it has in understanding your commands, and get you to fix your statements. The Atari 600XL and 800XL have BASIC built in to their permanent (ROM) memory.

Baud. A measure of data-transmission speed. In personal-computer telecommunications, one baud is equal to one bit transferred per second. Common baud rates for data transmission over telephone lines are 300 and 1200 baud. In text transfer, the baud rate is equal to ten times the number of characters exchanged per second. Local connections between computers and terminals often run at 9600 or 19,200 baud. The term is also used to refer to the measurement of the speed of data transfer between a computer and a cassette-tape storage system.

Binary. The counting method computers use. Although decimal numbers use the ten digits 0 through 9, binary numbers use only 0 and 1. Each digit in a binary number represents two times as much as the digit to its right, so binary counts with the ones place, the twos place, the fours place, the eights place and so on.

Binary file. A file that contains an image of the actual data as it would appear in memory. Binary files are created with the binary Save command (or with the assembler cartridge) and are loaded with the binary Load command.

Bit. Abbreviation for binary digit, the smallest unit of information that can be stored in a computer. It can represent a single digit of 0 or 1, a single yes/no answer, a light or dark spot on the screen or one of two colors.

Boot. To start up DOS. If you are running BASIC, you put the DOS disk in the drive and then type "DOS." If not, you put the disk in the drive and turn the computer off and then on again. Booting actually means to run a small program that starts the process of reading in the rest of DOS and then running it. The term comes from an analogy with "pulling oneself up by one's bootstraps."

Break. The key on the Atari keyboard that you press to interrupt a program in progress, setting the machine back to where it waits for commands from the keyboard. It also cancels the current line in Immediate (command) mode.

Buffer. An area of computer memory reserved for temporarily storing data that is on its way to or from the disk or other device.

Bug. A mistake in a computer program. It is common to make mistakes either in the program logic or in the actual coding (wording) of a computer program when you first write it, so "debugging" is a normal part of writing computer programs.

Bulletin board. A computer-network service shared by people who use it to exchange information. You can call up the bulletin board to leave or read messages. Most bulletin boards are free of charge and are run as personal hobbies or for goodwill purposes by businesses and organizations.

Byte. A data unit of 8 bits. A byte can represent a single character, a

computer instruction, part of an address or part of a number.

Cable. In general, a wire or set of wires that runs between various units. Most cables consist only of the wires and the connectors at each end, but some have special shielding or circuitry inside. Cables are often not included in initial hardware packages but are necessary to buy if you need to hook up additional devices.

Canned. Referring to programs that are written for sale to many users, rather than custom-made. Because the cost of developing canned programs is typically spread among many users, they can offer good value. Because they must be written without knowledge of individual users' requirements, however, users must conform to the programs' ways of doing things.

Cartridge. Small plug-in boxes that hold read/write memory (RAM) or read-only memory (ROM). ROM cartridges tell the computer how to run programs and talk to the keyboard and screen. RAM cartridges provide space for the computer to temporarily store your data and programs that you write.

Cassette. Atari computers can store data on cassette tapes using the Atari 410 Program Recorder. The Save or CSave commands put data or programs on the cassette, the Load or CLoad commands read them back into the computer.

Chip. Strictly speaking, an integrated circuit (a minute piece of silicon or similar material in which circuits have been formed). Loosely used to refer to the packaged circuit as well.

CLoad. The command used with machines that have cassette data storage to load data back from cassette into memory.

Color monitor. A display unit similar to a color TV but without the tuner. Because the video signal doesn't have to be changed to a broadcast signal and back, color monitors can show better detail (including more characters per line) than can TV sets.

Color register. Five special locations on the Atari that store the possible hues (shades) and luminances (brightnesses) that can be used on screen at one time.

Compiler. A software package that converts a program or module from the high-level language written by a person into machine-language instructions that the computer can execute. After the compiled program has been saved in machine-language form, it can be used again without retranslation. Developing a compiled program is more difficult than developing one for an interpreter (which translates the program each time it is run), but compiled programs run faster.

Composite video. A video signal that has the picture, synchronization and any color information combined into one signal. Composite video requires only one signal wire, but combining and then splitting out the various parts of the signal causes a loss in fidelity in comparison to separate sync and picture or color information. The standard connector for composite video is the same RCA phono jack used for the connections on most stereo systems.

Controller. Abbreviation for disk controller, the chip or complete circuit that translates computer data and commands into a form suitable for the disk.

Copy protection. One of the various methods that attempts to let the computer read and run a program without making a copy of the program. Manufacturers would like

to protect their software to prevent unauthorized copying, but users want to be able to make backup copies just in case something goes wrong with their disk.

CP/M. A trademark of Digital Research, Inc., for its disk-operating systems.

CPU. Abbreviation for central processing unit (the "brain" of the computer). See *processor.*

Cursor. An underscore, box or other special symbol on the screen that shows you where the next character will be displayed.

Cursor keys. The four keys showing arrows inside white squares on the keyboard. If you hold down the Control key and press one of these keys, the cursor moves in the direction of the arrow.

Daisy-wheel printer. A type of printer that uses a flat wheel with letters on spokes radiating out from the center. This type of printer produces fully-formed, letter-quality output, but it is more expensive and slower than most dot-matrix printers.

Data. From the computer's point of view, anything that is entered into the computer to be stored, manipulated or displayed. The word is often used to mean just the information to be acted on, rather than the instructions and commands that tell the computer what to do.

Data base. A collection of data records organized so it can be updated, sorted and displayed in various ways.

Data-base-management system (DBMS). A program that maintains an organized collection of data records and contains procedures to update, sort and display the records in various ways.

Data bits. As applied to the internal workings of a computer, the number of bits that a computer normally expects for most of its arithmetic and logical operations. For personal computers, this is 8, 16 or 32 bits. As applied to data communications, it is the number of bits used for sending each character, not including the added check and timing bits.

Data capture. In general, the process of entering data into a computer. In most cases, this means typing it in on the keyboard. The term is also used for a feature of communications programs that makes a disk or memory copy of the data that goes in or out.

Data file. A file containing information that the computer will operate on, rather than one containing instructions to tell the computer what to do.

Data transmission. The process of sending computer data either over special communications lines or by way of the ordinary telephone network. To send data by phone, you must route it through a modem to make it compatible with the telephone network.

DBMS. See *data-base-management system*.

Dedicated. Refers to a computer system that is set up exclusively for a particular use, such as word processing.

Destination drive. In a disk- or file-copy operation, the disk that will receive the copy.

Development tools. Programs that create, test and debug other programs. Some common development tools include program editors, compilers, loaders, linkers, assemblers and debuggers.

Digital. Values or signals that are read as in one of a definite number of distinct states, instead of being any continuous value. Computers operate internally on binary, the digital system with just two states. For input and output, however, they can often work with digital values that have thousands or even millions of distinct possibilities.

Disk drive. The recorder/player mechanism that reads and writes information on disks. A disk drive must match the kind and size of disk being used and the disk controller that connects it to the rest of the computer.

Diskette. A term used by IBM and others for what most people call a floppy disk or flexible disk.

Diskette holder. A plastic box used for holding diskettes while they are not in use. The most popular diskette holders are similar to covered trays and hold from 20 to 100 disks.

Disk-operating system (DOS). A set of programs that tells the computer how to read and write information from the disks, read and execute programs and interact with the user through the keyboard and screen. DOS, as Atari calls it, is simple to use, with most commands accessed by selecting the right choice from a menu.

DOS. (DOSS) See *disk-operating system*.

Dot-matrix printer. A type of printer that forms each letter out of a pattern of small dots arranged in a two-dimensional grid. Letters produced in this way are less attractive than those produced by printers using fully-formed characters, especially if each letter contains only a few dots. Dot-matrix printers, however, tend to be less expensive, faster and more durable than many other types of printers.

Double density. A method of storing data on disks that places twice as much data on each disk as the original (single density) method.

Download. To record on a personal computer a file or program that has been sent by a bigger computer or a remote computer connected by a communications line or telephone.

Drill and practice. A type of educational software that concentrates on getting the student to work through many instances of the same type of problem.

Drive. See *disk drive*.

Editor. A type of program used to create and revise text files. Editor programs are usually simpler to use than full word-processing systems because they lack extensive formatting commands.

80-column display. As sold by Atari, its computers can show at most 40 characters on a line. You can buy plug-in boards for the Atari 800 that let it show 80 characters per line, and you can expect to see similar boards offered for the Atari XL line. An 80-column display is a great improvement for word processing and general business use. To display that many characters, however, you'll have to use a monitor instead of a TV set.

Electronic bulletin board. A computer system that you can call to leave or read messages. See *bulletin board*.

Electronic disk. See *RAM disk*.

Electronic mail. A service used to send messages via computer networks. One feature of electronic mail is that a message is stored by the network until the receiver is available to receive it. Several commerical electronic-mail networks exist; The Source and CompuServe

information utilities also offer this service.

EPROM. (EEE-promm) Memory chips that normally are only read from and that retain their data even when the power is turned off. They can be erased and reprogrammed, however, using fairly simple equipment.

ESC. The key on the Atari keyboard that generates the special control character "escape" (equal to CHR$(27)). It is used, among other things, to enter direction arrows in PRINT statement strings and to send special commands to printers.

Field. A group of characters that together are considered as a single value or the space for entering the value. For example, a field may be a blank line in a display for entering your name or a part of a disk record holding the last data accessed.

File. A collection of data stored under a single name. For example, a file may be the equivalent of a single file folder, a file drawer or an entire file cabinet. Files are made up of records equivalent to single forms or entries.

File manager. A program that accepts data according to a format and then prints it out in a list. Also, a term for programs that manipulate collections of files without paying attention to their contents.

Fileserver. On a network of connected computers, a network unit that provides disk file storage and retrieval for the network. A fileserver might be a computer with a hard disk or a special disk unit designed for this purpose.

5-inch. An accepted way of referring to 5¼-inch disks or disk drives. Because there are no other standard sizes between 4 and 8 inches, it is understood that the 5-inch designation is just shorthand for the more precise 5¼-inch.

Floppy disk. A type of computer storage much like a cross between audio recording tape and a phonograph record. Data is recorded in a magnetic coating that rides on a flexible round sheet of Mylar, encased in a stiff but flexible square plastic envelope. Like recording tape, the floppy can be recorded, read and rewritten many times; like a phonograph record, you don't have to play the entire disk to reach information at the end or any other point. Floppy disks are also called flexible disks and diskettes.

Floppy-disk drive. A mechanism for recording and playing back information on floppy disks. Drives come in models for each of the standard disk sizes, and in single- and double-sided varieties (meaning they record on one or both sides of each disk).

Format. (1) As applied to disks, to write the empty track pattern that must be added to a disk before information can be stored on it. This process also permanently erases any existing stored information. (2) As applied to text files, to arrange the text and put in the required printer control characters so the file prints out in an attractive fashion.

Friction feed. A method of pulling paper through a printer that is similar to how paper is pulled through a typewriter. With friction feed, the paper is pulled by rotation of the main paper roller (the platen) and the slight squeezing force between the main roller and a set of guide rollers. Friction feed is best for single sheets of paper (cut sheets), such as letterhead, but tends to slip on long sheets such as continuous forms, rolled or fanfold paper.

Full duplex. Referring to data communications in general, it means that data can flow both ways at the same time. In the setting for terminals and terminal-emulation software, it means the mode in which characters typed on the keyboard are sent along the communications line and are only displayed on the screen after they are echoed back from the other system.

Game paddle. The common name for what Atari calls Paddle Controllers. You twist the knob on these hand-held devices to control the position of the cursor or objects on the screen. Some people prefer joystick controllers, and some prefer paddles.

Graphics 0. The normal Atari screen display mode of 24 lines of 40 characters each. Two colors can be used.

Graphics 1. A display mode showing 20 lines of 20 characters each (24 lines without the text window). Up to five colors can be used.

Graphics 2. A display mode showing 10 lines of 20 characters each (12 lines without the text window). Up to five colors can be used.

Graphics 3. A display mode showing 40 pixels across by 20 pixels high (24 without the text window). Up to four colors can be used.

Graphics 4. A display mode showing 80 pixels across by 40 pixels high (48 without the text window). Up to two colors can be used.

Graphics 5. A display mode showing 80 pixels across by 40 pixels high with four lines of text at the bottom of the screen. Up to three colors and a background color can be shown, drawn from 128 possible combinations.

Graphics 6. A display mode showing 160 pixels across by 80 pixels high

(96 without the text window). Up to two colors can be displayed.

Graphics 7. A display mode showing 160 pixels across by 80 pixels high (96 without the text window). Up to four colors can be displayed.

Graphics software. Programs that either (1) make graphs and charts from existing data or (2) let you draw or sketch on the screen.

Green screen. A type of monitor that shows text and graphics in green on a black background. Some people prefer these to black-and-white monitors, because they seem to have less flicker and less glaring contrasts. See *monochrome.*

Half duplex. In data communications in general, it means that data can flow alternately in each direction but not both ways at the same time. In the setting for terminals and terminal-emulation software, it means the mode in which characters typed on the keyboard are also displayed on the screen, along with any messages sent back from the other system.

Hardware. The chips, circuits, board and cabinets that make up a computer, as distinguished from software, which tells the computer what to do.

Hex. Abbreviation for hexadecimal. The number system with base 16. This system contains the digits 0 through 9 plus the letters A through F for a total of 16 possible digits. Hex is is easy for people to use, and it is easily converted by the computer to the binary system it uses.

High-level language. A language for writing computer programs that is based on stating the logical operations desired instead of the exact steps the machine needs to do to accomplish the instructions. A single high-level language instruction can cause the machine to execute dozens or even hundreds of machine instructions. High-level languages must be translated into machine language for the computer to execute them, a task done by programs called compilers and interpreters.

Horizontal. As applied to software and also to markets for personal computers, pertaining to activity that is generally part of a wide range of business or leisure activities. Writing, arithmetic calculation, data bases and other information-storage and -retrieval systems are examples of horizontal activities. Software or complete systems designed for horizontal use must be more general and may not solve any particular problem as efficiently as a more targeted solution. Because of their bigger potential market, their cost may be lower and the same effort learning a single package may be used in several applications.

Hue. On the Atari, one of the 16 possible colors that can be selected for display on the screen. Hues can be combined with brightnesses for further differentiation.

IC. See *integrated circuit.*

Integrated circuit (IC). A semiconductor chip containing a particular combination of memory and logic circuits. The greatly increased power of ICs and their falling relative prices made personal computers possible.

Integrated program, integrated software. A program or series of programs that accomplish several standard functions and share data and general command structures among their various modes. The most popular integrated programs contain a combination of spreadsheet, word-processing, database, and graphing software.

Interface. (1) *V.* To form the connection between two systems or units that cannot be connected directly. (2) *N.* Denotes a program, circuit or card that performs the function of interfacing. One of the most common uses of the term is for the serial and parallel interfaces, cards or circuits that translate data between the internal form used by the computer and the form needed for communicating with printers, modems, networks and other external circuits. See *parallel* and *serial.*

Interpreter. A software package that translates a program from a higher-level language to machine form by translating each line in turn and then executing it. Interpreters make it easy to write and debug programs, because they can be built up from small parts and tested easily, but they take time to retranslate the program every time it is run even if there are no errors.

Joystick. A type of game-control input device. It looks somewhat like a miniature floor-mounted stick shift in a small box. A joystick is used as a direction-pointing device for games and graphic programs.

K. In general, refers to the specific number 1024 (a binary thousand). See *kilobyte.*

Kilobyte (K). 1024 bytes. Program lengths, memory size and disk capacity are commonly measured in kilobytes.

Language. A vocabulary and set of rules for constructing understandable expressions. Computer languages, such as BASIC or Pascal, have a restricted vocabulary and a formal set of syntax rules. Natural languages, such as English or Spanish, are more open-ended and ambiguous.

Light pen. An input device. It looks like a pen with a wire trailing from the top and is used to point to locations on a computer screen so that programs can "read" the indicated location. Light pens are used for drawing programs, for selecting from menus and for computer-aided-design programs.

Local-area network. A system in which computers exchange information within a single building or group of neighboring buildings. Local-area networks allow transfer of files among computers, and they are also often utilized to share the use of expensive devices such as large disk drives or printers.

Logo. A computer language designed to make it easy to learn computer programming; it contains a form of easy, graphic drawing commands. Many people advocate using Logo rather than BASIC as a first language, especially for children.

Luminance. The brightness of the colors used to display images on the screen. The Atari allows 8 luminance levels, expressed as even numbers from 0 to 14, with 14 being the brightest.

Machine language. The actual sequence of 1s and 0s used by the computer as instructions for executing a program. All other languages are translated into machine language before the computer runs them. Also called binary form.

Macro. A single word or phrase that stands for a group of computer commands. Some assembly languages provide a macro feature, allowing you to define words to stand for sequences of instructions.

Mass storage. Mediums such as disk or tape on which the computer can keep data and programs but which are not included in the memory space that the computer's CPU can directly address. Most kinds of mass storage also retain their contents when the power is turned off, so they can be used for storing programs and data between sessions. Although disk drives may seem expensive, both disks and tapes are far less expensive per byte of storage than the main memory (which is made of chips).

Megabyte. Literally, a million bytes. In practice, refers to the binary number that is formed by squaring a binary thousand (1024 squared or 1,048,576). It's most often seen as a measure of the size of memory or of disk-drive capacity.

Memory. In general, any data-storage device; specifically, memory is used to signify the semiconductor RAM chips that form the main read/write storage of the computer.

Memory map. A diagram showing which parts of the possible addresses are used for which purposes in a computer system. Normally, some of the area is reserved for special uses, such as permanent (ROM) memory, input and output and so on. Part or all of the remaining area contains RAM (read/write memory), and part may not have anything connected.

Menu. A list of choices presented by the computer from which you select the one you want. See *menu-driven.*

Menu-driven. Refers to software that depends heavily on presenting users with lists of choices from which to pick. Inexperienced users generally like this type of software, because they can see their choices clearly each step of the way. More experienced users often prefer skipping the menus and directly specifying their commands.

Modem. A device that changes computer data back and forth into forms that can be more easily transmitted by telephone or other type of communications link. To connect a modem to the Atari, including Atari's 830 modem, you need to use an interface box (the 850 for the Atari 800, for example). You can also connect other brands of modems that use an RS-232C-style connection to the Atari via the interface.

Monitor. A display unit that is much like a TV but without the tuner. You might want to use a monitor instead of a TV with an Atari because the monitor shows a sharper picture.

Monochrome. Literally, "one-color." Refers to displays that produce one color and black. Black-and-white screens, amber screens (amber on black) and green screens (green on black) are examples of monochrome displays. Less expensive than color displays, monochrome displays often give a sharper image. See *amber screen* and *green screen.*

Network. A system that lets computers exchange information and/or the use of expensive devices such as large disk drives or printers. Wide-area networks (WANs) or telecommunications networks are linked by phone lines or other long data links, while local-area networks (LANs) serve computers at a single location.

Paddle. (1) The Atari BASIC function that reads the position of a paddle or joystick connected to one of the controller jacks. The function returns a number from 0 to 228 representing the position of the paddle or stick. (2) Short for game paddle, one of the types of hand-held controllers that you can plug into the front of the Atari computer to move objects or control games. See *game paddle* and *joystick.*

Parallel. Referring to connections between the Atari and printers or other devices, sending data as groups of 8 bits at a time, each bit carried by an individual wire. Printers with parallel input are generally cheaper, but most Atari computers need an interface box and cables to connect to a parallel-interface printer.

Parity. An extra bit added to characters or groups of bits being sent between parts of a computer, stored in memory or exchanged between computers. The parity bit helps check whether the data received is valid by indicating the expected number of 1s in each character or bit group.

Peek. A BASIC function that returns the value stored at a given memory location. The converse BASIC operation that stores a value in memory at a stated address is a Poke.

Pin feed. A method of pulling paper through a printer. With pin feed, outward-pointing cone-shaped pins stick out from rings at the ends of the main paper roller (the platen) on the printer. When paper is fed through the printer, these pins pull on corresponding holes that are along the left and right edges of the paper. Pin feed is similar to tractor feed, but in the latter case the pins are on a separate shaft. Pin feed does a good job of keeping paper aligned when using continuous forms or fanfold paper, but it cannot be adjusted for different paper widths and is not suitable when the paper must be moved backwards as well as forwards.

Pixel. Abbreviation for picture element. The smallest dot that can be displayed on the screen. Both text and graphics screen images are made up of combinations of pixels. The more pixels per screen, the finer the images that can be drawn.

Print buffer. An area of memory (or an external box) that temporarily stores data that is to be sent to the printer. Once the program has dumped all the data to the buffer, it can go on to other tasks while the buffer slowly feeds the characters to the printer at the speed it can accept.

Power-line filter. A device into which you plug the computer, and which you then plug into the power outlet. Most power-line filters consist mainly of special clipper circuits that chop off the tops of any noise spikes that might come over the power line. The manufacturers of these devices claim that power-line noise is a major cause of unexplained computer-system crashes.

Processor. The part of the computer that interprets the commands, does the arithmetic and logic operations and controls the flow of data. Most Atari computers use the 6502 microprocessor chip (the same one used in the Apple II family and Commodore 64). Processors are often categorized by how many bits of data they can handle at once for their internal operations. The 6502 is an 8-bit processor, as is the Z80 used in most CP/M computers. The IBM PC uses a 16-bit processor.

Program file. A file containing instructions for what the computer is to do, rather than the data or information to be processed. Program files can either be the source-code files written by people, an intermediate form or the machine code (binary code) actually executed by the hardware.

Programming language. An artificial language designed to allow users to write instructions for computers. Unlike natural languages, such as English, programming languages have a definite vocabulary, a completely defined syntax and a clear standard for what is an acceptably formed

statement. See *assembly language, high-level language* and *machine language.*

Protocol. A set of rules for the exchange of information over a computer network. Personal-computer data networks generally use simple protocols originally designed for use by teletypewriters, a public-domain protocol called XMODEM or various protocols included in proprietary software packages. See *XMODEM.*

Public-domain software. Software that the author has distributed without charge, though use of public-domain software is often limited to private, non-commericial use. Most users' groups maintain libraries of public-domain software. Some public-domain software is equal or superior to commercial software, but some turns out to have serious bugs. Wider use of these programs is inhibited by a general lack of documentation and support.

Radio-frequency interference (RFI). A type of disturbance in TV or radio reception that is sometimes caused by computers or peripherals, such as printers. Newer computers must stay within certain limits for radiating the offending signals, but there still may be a problem with older units or where TV or radio reception is difficult. The FCC has set regulations for computers and similar devices limiting the maximum amount of RFI that they are allowed to emit.

RAM. See *random-access memory.*

RAM disk. A section of memory set up to simulate the operation of a disk drive. Because the computer can read and write to RAM so much faster than to a disk, this greatly speeds processing of programs that would ordinarily spend much time accessing the disk.

Random-access memory (RAM). Memory that the computer can both read from and write into. Random access means that the various locations can be read or written in any order, not just from bottom to top.

RBBS. Abbreviation for remote bulletin-board system. An electronic bulletin board accessible by telephone.

Read-only memory (ROM). A type of memory that a computer can read from but not change. ROMs also keep their contents intact when the power is turned off. Most Atari computers have the BASIC language stored in ROM, as well as information on how to start up DOS, read the keyboard and display information on the screen. You can also add ROM cartridges, containing games or other types of software.

Record. A single complete unit of information stored to or read from a disk. A *physical* record is the chunks of data that the disk actually reads and stores. A *logical* record is how the information is assembled for use in programs, and it can be smaller or larger than the physical record. Typically, a logical record represents a single filled-in form — for example, the work hours of one employee or a single sale in a retail data base. Records are made up of individual fields and are combined into files.

Return. The key on the Atari computer keyboard that you use to end a line of input. It generates a special character called carriage return (also known as CR or CHR$(13)).

Reverse video. Showing dark characters on a bright background, instead of the Atari's normal light characters on a dark background. You can turn reverse video on and off by pressing the Atari key.

RFI. See *radio-frequency interference.*

ROM. (ROMM) See *read-only memory.*

RS-232. The most common standard for connecting computers, terminals, modems and other equipment by a serial connection. Although a complete standard for this type of connection exists, most computer connections use only some of the approximately half-dozen control lines available — so it sometimes takes some expertise and work to get two of these "standard" connections to work together.

Sector. A section of space along the concentric magnetic patterns written on each disk, or the data that is stored in that section.

Serial. As applied to data exchanges, the process that sends each character or group of bits one after another down the same wire. Characters are distinguished either by timing methods or by appending special, longer start-and stop-bit patterns.

Serial interface. (1) A connection on a printer, modem or other device that expects to communicate with a computer by passing data down one wire in each direction. (2) On a computer, the matching circuit and connector that sends and receives data in that fashion.

Serial port. Used as a term for a serial interface, a connection for sending and receiving data over a single wire in each direction (plus a ground and often one or more control wires).

SIG. Abbreviation for special-interest group, meaning a group concerned with a particular application, machine or language. Many users' groups and clubs have special-

interest groups, as do several of the information utilities such as CompuServe.

Simulation software. The type of software that presents you with a set of facts concerning a particular situation or event, solicits your input for what to do next and then calculates the results of your decisions. Simulations are used extensively for industrial training and in educational and game software.

6502. The microprocessor chip (the "brain") used in the Atari line of computers. It is the same chip as is used in the Apple II family and the Commodore VIC-20 and Model 64.

Software. The programs and instructions that are not built permanently into a computer, but that are instead read in from disks or tapes or entered from the keyboard.

Source code. The text of a program as written by a person. The source code is then translated to machine-language form, either by a compiler or interpreter program.

Source drive. In a file- or system-copying operation, the drive from which the information is to be read.

Spreadsheet. A program that lets you work with numbers in chart form, with each value in the chart set either by direct input or as a calculated result of other entries. Because the entire chart can be easily recalculated after any value is changed, these charts are widely used for budgeting and forecasting.

Standard character set. A set of 64 characters that includes the capital letters, digits and punctuation symbols. This is the character set selected by the Atari on power up or reset. You can also select the alternate character set to show

lowercase letters or a variety of graphic symbols. See *alternate character set.*

Stop bit. In serial communications, an extra bit added after each character to tell the receiving system that the character has ended and following bits will be part of the next character. Most systems require one, one-and-a-half or two stop bits.

Touchpad. A book-size device that you touch or draw on with a stylus to send a position signal to the computer. Touchpads are especially good for drawing programs, for picking among choices and for some types of games.

Track. An invisible, magnetic circle pattern written onto a disk as a guide to where to store and read information. Standard Atari disks have 40 of these concentric circles, with track 0 being closest to the outside of the disk.

Tractor feed. A method of pulling paper through a printer. Tractors are rollers or tapes that have small outward-pointing cone-shaped pins that mate with holes punched along the left and right edges of the paper. The tractors can usually be adjusted to move the paper position to the left and right or to set the distance between them for different sizes of paper. Tractor feed is the best method for long forms and continuous sheets, such as fanfold paper, but it cannot feed individual sheets, such as letterhead or envelopes.

TV switch box. A small device that hooks to the back of a TV set to allow you to switch between using the TV with the normal antenna and using it as a display for the computer.

Typewriter-style keyboard. A keyboard with separate keys that move when pressed (full-travel keys), arranged according to the general layout used on office typewriters. The Atari models since the 800 generally have typewriter-style keyboards, but the Atari 400 uses a flat, nonmoving keyboard.

Users' group. An association of users of a particular computer or software package, or those interested in a particular application of computers. Some users' groups are sponsored by manufacturers, but most rely either on volunteers or entrepreneurs to keep them going. Users' groups commonly have regular meetings and publish newsletters, both of which are important methods for learning about the performance of various systems and software.

Vertical. As applied to software or markets for personal computing, pertaining to a specific type of business or leisure activity — for example, farming, medical practice or pawnshops. Software or complete systems designed for a particular vertical market can be tailored to the needs of that application, but they are likely to be more costly than products intended for a wider, horizontal market.

Voice. One of the four sound channels that the Atari generates internally and then blends together. You can program each voice with its own pitch, distortion and loudness.

Volatile. Used to characterize memory that loses its contents when the power is turned off. Ordinary RAM memory (read/write memory) is volatile, but ROM memory and disk and tape storage are not.

Word length. In character-oriented data communications, the number of bits used to represent each character (sometimes called the data bits). Seven bits are widely used for simple text transfer, but for sending formatted text files or machine-language programs, eight bits are usually required.

Word processing. Using a computer to edit, store and print out text. In the past, word processing could be done only on special systems, but now personal computers can do word processing quite well, with the right software.

Work station. A fancy word for a computer or terminal suited for use by one person at a time.

XMODEM. A protocol (set of rules) for transferring files by telephone. It was originally developed by Ward Christensen and others for use in a series of programs they distributed without charge, and it is now included as an option in most commercial personal-communications software as well. It provides for exchange of both text and program files and for extensive error checking and automatic resending of any sections that have not been received correctly.

The glossary in this book is based in part on Rosenthal's Personal Computer Glossary, *to be published by Prentice-Hall. Portions of the glossary have appeared previously in* InfoWorld. Rosenthal's Personal Computer Glossary © *1983 Steve Rosenthal.*

Index

InfoWorld, the authoritative microcomputer newsweekly that has been acclaimed by the *Washington Post* as "indispensable" and by *U.S.A. Today* as "the bible for microcomputer users," brings its insider's knowledge and computer savvy to an exciting series of *Essential Guides.* Each book in this important series focuses on one computer system and offers up-to-date critical reviews of the best hardware, software, and peripheral products available for that system.

INFOWORLD'S
ESSENTIAL GUIDE TO ATARI® COMPUTERS
by Scott Mace & the Editors of InfoWorld

Atari has produced many different kinds of computers, from game machines to advanced personal computers. *InfoWorld's Essential Guide to Atari Computers* covers the entire range of Atari products; it will be indispensable to the millions of current owners, and to anyone thinking of buying an Atari.

After illuminating the history of Atari and its development from video-game giant to producer of some of the most popular home computers, Scott Mace takes you on a guided tour of the world of Atari hardware and software. Examining the capabilities of the various machines, Mace provides instructions and tips for putting a system together, and explains what to consider when you purchase an Atari system, including where and how to buy your Atari, and how to choose between cartridge and disk drive.

The author examines many uses of Atari computers—familiar uses, such as BASIC and Logo programming, graphics, word processing, games, speech and music, and more advanced uses, such as data-base management, accounting, PILOT, FORTH, and machine language. The book includes extensive chapters on expanding your system; maintenance, service, and troubleshooting; free software and bulletin boards for user interaction. A discussion of Atari's future is followed by thorough reviews of hardware, software, and peripherals for Atari systems. Several appendices, including a directory of books and magazines for Atari users, and a glossary, complete the guide.

Just about everything you need to know about Atari computers is contained in this comprehensive, essential guide.

Scott Mace is a senior writer at *InfoWorld,* for which he writes a weekly column on entertainment software for home computers.

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