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THE FIRST EDITION

HOW TO USE MS-DOS

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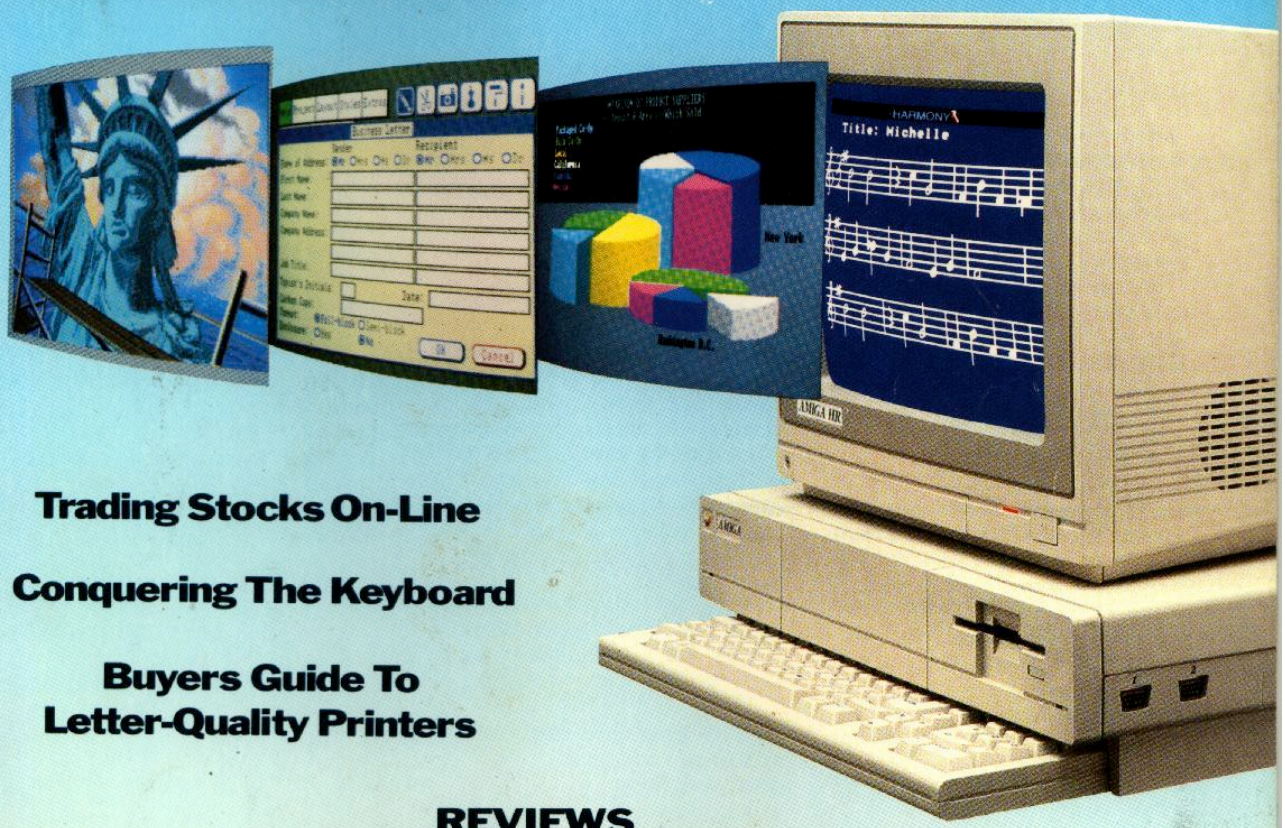
AMIGA

Commodore's Everything Machine?



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Buyers Guide To Letter-Quality Printers

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August 1985

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A HAYDEN PUBLICATION

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COVER: *Photography of Amiga machine by Aaron Rezny. All screen shots were created on an Amiga prototype.*

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EDITOR'S NOTE

It was last winter that we began working on this month's cover story on Commodore's Amiga, one of the most impressive personal computers we've seen in some time.

At that time, Managing Editor Fred Abatemarco met with Commodore's Chief Executive, Irving Gould, President Marshall Smith and Vice-President Clive Smith—the man behind the marketing of the Amiga—and told Commodore we were interested in taking a detailed advance look at the computer, based on a glimpse we'd had several months earlier.

Finally, in April, we saw the Amiga again, in prototype form. It was a knockout. We assigned a group of staffers (nicknamed "The A-Team") from our East and West Coast offices to take a thorough look. Hands-on analysis was handled by Lee Thé, our technical guru in San Jose. Our Silicon Valley supersnoop David Needle contacted sources in and out of the business for information and opinions about the Amiga and its likely impact. Meanwhile, West Coast Executive Editor Sandy Reed studied files and notes preparing to put the story down on paper (or on diskette, in our case).

Back east, Assistant Editor Pat Honan canvassed Wall Street analysts for opinions and projections while our newest staff member, Associate Editor Robert Alonso, analyzed Amiga's proprietary disk operating system. Art Director Traci Churchill coordinated photography on both coasts, especially the photos on the cover, which are actual screen shots taken from the Amiga.

We found that the Amiga was, in many ways, an "everything" computer. For example, Electronics Arts' chief Trip Hawkins was excited about the Amiga because he sees it as the first personal computer with all the features you'd want in a home computer—outstanding sound, graphics, speed—without any major flaws. On the other hand, Ron Quake, at The Software Group, the firm that does the Enable integrated program for the IBM PC, described it as the perfect computer for small business—low in cost, fast, with optional IBM PC compatibility.

Developing this special report on the Amiga also proved interesting in some unique—even bizarre—ways. For instance, we attended secret meetings at a suite in a secluded hotel outside of Atlanta, where limousines shuttled potential retailers to and from the Comdex exposition.

Often, it seemed that when a question came up, it was at the same time—or even before—our best sources were about to address the same issue. For example, when we wondered what capabilities would be inherent in the IBM-compatible "Trump-Card" accessory for the Amiga, Commodore's official answer was along the lines of: "We'll get back to you; we're trying to figure that one out ourselves."

One of the non-technical discoveries we made was that there is another David Needle. It seems the senior systems architect at Amiga has a name in common with *Personal Computing*'s own senior editor. This got a little tricky when our David Needle would call Amiga; conversations with the switchboard operator would go something like: "Well, ask him to call me back, I'll be in my office." Brief pause, then . . . "You mean you're coming back here?" Another pause, then . . . "No, I'm the other one."

We tried not to lose sight of the somewhat muddled, multifaceted environment in which computing now stands. Manufacturers don't always see beyond the limits of their products. But even a product as remarkable as the Amiga is not an end in itself—but a means to one. Computer users, such as you, our readers, are the determining factors for the viability of any product. Its contribution to your life is only as valuable as its ability to serve your needs.

Our special report on the Amiga attempts to give you all the information currently available so that you can be the ultimate judge of this machine.

Charles L. Martin

CHARLES L. MARTIN, EDITOR

LETTERS

PRINTER CHOICES

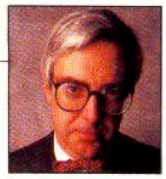
We were totally surprised and extremely disappointed that your article "Choosing your Second Printer" (BUYERS GUIDE, May) made no mention of the Texas Instruments OMNI 800 family of printers.

As the personal computer market emerged, TI was one of the first to recognize that ease-of-use would be important to the user who was not a computer programmer or operator. In January 1983, we introduced the Model 850 dot-matrix microprinter, with ease-of-use features such as a push-button control panel. This allowed the user to easily select printer modes and commands without having to study software manuals. This model was later enhanced as the 850 XL, which includes draft printing at 150 cps, correspondence quality at 40 cps, and flexible-form and paper-handling capabilities.

Your article included much discussion of dot-matrix printers now being able to generate fully formed characters. Texas Instruments pioneered this innovation in September 1983 with the introduction of the 855, the first letter-quality dot-matrix microprinter. This model, which prints letter quality at 35 cps or draft quality at 150 cps, utilizes solid-state font modules, analogous to daisy wheels except they don't wear out. Expanding the ease-of-use control-panel concept for this model, the user can select letter- or draft-quality, switch font styles, compress print, or change pitch/line spacing without learning software commands.

The article correctly states that many inexperienced PC buyers give insufficient thought to the printer and buy whatever is cheapest—a $400-$500 printer. The premium value and features of the TI printers make them the choice of the knowledgeable user or second-time buyer. At list prices from $599 to $1,299, they represent excellent value. You reviewed the 865 in your June issue and incorrectly stated that our graphics commands are not standard. All of our microprinters use industry-standard escape codes, including graphics. All the major software vendors also include TI printer drivers, which take advantage of the TI's unique printer features.

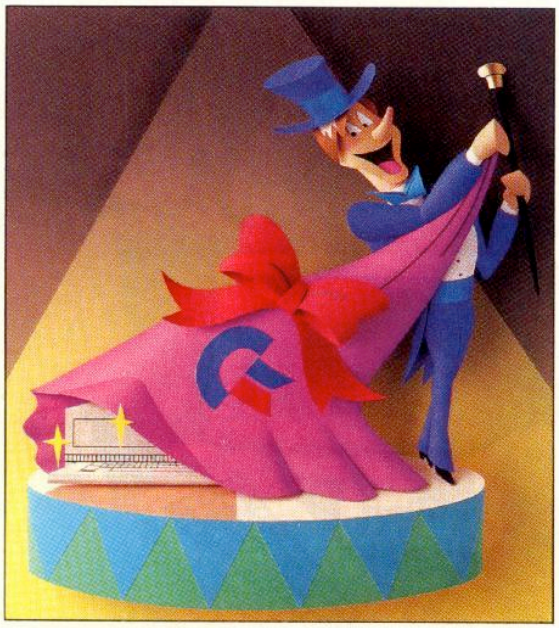
INDUSTRY WATCH by Richard A. Shaffer



Now, The 'New' Commodore

With its reputation, you have to wonder how Commodore has stayed in business. Under former President Jack Tramiel, it was the computer company you loved to hate. Its products were fine—inside. But the outsides looked so cheap that even customers didn't always realize what bargains they were.

Among dealers, Commodore was synonymous with abuse. Among suppliers, Commodore had a reputation for chiseling. Among software developers, it was known for its lack of support. And among members of the press, Commodore was known for test-balloon product announcements, introductions of supposedly major new products that somehow never made it to market.



SCULPTURE BY AJIN

Now there is a new Commodore, a reborn company with new management, new plans and new products. Will anyone believe it isn't the same old Commodore?

These are hardly the best of times for a computer-company renaissance. What Commodore needed most was for Apple's Macintosh to be a success, like the Apple II, so that Commodore could sell its Amiga as a Mac with color and lots more. But the Mac hasn't done well enough for Commodore to benefit much from its momentum. In addition, Commodore lacks Apple's strength in the education market. In corporate America, Commodore will find the businessman less willing than ever to buy anything but an IBM. At all levels, computer sales are soft as the industry pauses, waiting to see, touch and use the many new machines that have been introduced.

The task is so difficult that Wall Street is betting that Commodore will fail. The company's shares, which once traded for more than $60 apiece, were trading earlier this year for a mere $10. That is about what the shares would be worth if Commodore paid its bills and pulled out of the home-computer business.

But there are strong signs of hope at Commodore. One is falling inventory levels; the company is finally beginning to get rid of its legacy of outdated machines. Another is management. In a year, new leader Marshall Smith has put together a new team. He chose two managers who held lesser positions during the Tramiel era–John Kelly and Adam Chwaniec–to oversee finance and technology, but most of his lieutenants are from outside Commodore. Smith brought in, as president of U.S. operations, Thomas J. Rattigan, the man who turned around Pepsi's international bottling operation. Richard Geiger, new general manager of Commodore/Amiga, directed advanced development at Apple; Frank Leonardi, who helped build Apple's dealer network. is now in charge of sales for the business systems division.

Nick Bessey, the United Kingdom general manager, launched IBM's PC in Europe; John Winters helped put AT&T into consumer products; Clive Smith, formerly of the Yankee Group, was a respected computer-industry strategist.

Commodore also has revised its strategy, trying to transform itself from just a home-computer company into a company that makes a broad line of personal computers for a variety of markets. Since having come on board, Smith has pushed Tramiel's disappointing legacy—the Model 16—into the Latin American market. He resurrected the Unix machine based on the Z8000. He sent inexpensive clones of the IBM PC into Europe. He introduced a follow-on machine for the Commodore 64. And he bought Amiga.

The conventional wisdom is that technology doesn't matter any more, but Amiga has caught the fancy of those who have seen it, in much the same way that Mac did a year or so ago. The excitement could be contagious. Already the enthusiasm—and some of the biggest cash advances since IBM entered the personal computer industry—have prompted software publishers such as Electronic Arts, Island Graphics, Microsoft and SubLogic to write for the Amiga.

One especially interesting technical development is an attachment for the Amiga designed to make it compatible with IBM's PC. The strategy of selling a machine that offers Mac-like graphics and IBM compatibility has been tried before and failed. Remember Mindset? Commodore's attachment will have to be truly compatible and sell for less than $500 retail. Even then, some potential business customers will regard it as an awkward solution. Given that the attachment will have to contain all the parts of a PC except the keyboard, video screen and some memory, others will wish that Commodore had used its engineering skills to build a very, very inexpensive PC clone instead of a mere Amiga attachment. But the task of creating a compatible attachment is difficult enough that there will be a number of sophisticated engineers eager for a few minutes alone with the attachment and a screwdriver so they can figure out just how Commodore managed to pull it off. If, indeed, the company is successful in doing so. ■

Richard A. Shaffer, former technology and science editor of THE WALL STREET JOURNAL, *is the publisher of the* COMPUTER LETTER, *a weekly industry newsletter.*

The Amiga shown with second disk drive and mouse. On the screen is a drawing of the Statue of Liberty done for Personal Computing by Jack Haeger of Commodore.

AMIGA BY COMMODORE

The Everything Machine?

Like its name, the Amiga personal computer from Commodore is both friendly and foreign. Friendly, as in easy to use—thanks to an icon-laden operating environment called Intuition. Foreign, as in a nonstandard operating system that is a bold departure from what has preceded it.

The much-heralded Amiga is a technological marvel. Its silicon credentials are sophisti-

A Comparison Of Amiga Specifications

SPECIFICATION	AMIGA	IBM PC	IBM PC/AT	MACINTOSH	IIE, IIC
Operating System	AmigaDOS	PC-DOS	PC-DOS	Macintosh Operating System	ProDOS, DOS 3.3
Expansion Slots	2 (memory expansion and bus expansion)	5	8	0	8, 0
Storage	880k 3.5" drive	360k 5.25" drive	1.2Mb 5.25" drive	400k 3.5" drive	143k 5.25" drive
Processor	68000	8088	80287	68000	65C02
Clock Speed	7.8MHz	4.77MHz	6MHz	7MHz	1.02MHz
Color	Yes	Not standard	Not standard	No	Yes
Total Max. on screen	4,096 32	4,096 256	4,096 256		16 16
Ports	joystick, mouse, left and right RCA phone jacks, RS-232, Centronics, connections for 3.5" drive, three video ports (TV,RGBA, RGBI)	None	None	2 serial, mouse, 2nd drive	cassette, game, two serial, color video, disk drive
Maximum Resolution	640 by 400 (interlaced)	640 by 480	640 by 480	512 by 342	280 by 192, 560 by 192
Price	$1,295, CPU, keyboard, 256k, 3.5" drive, two button mouse; $495, RGB monitor.	$2,295, CPU, keyboard, 256k two 5.25" drives; $2,995, Professional Graphics Controller; $1,295 Professional Graphics Display.	$3,995, CPU, keyboard, 256k, 5.25" drive; $2,995 Professional Graphics Controller; $1,295 Professional Graphics Display.	$2,795 (512k)	$895, CPU, keyboard; $729, Duo Disk Drive; $229, monitor; $250, extended 80-column card; $1,195, IIc; $100, monitor.

cated, slick and superior. The machine holds the promise of being a vanguard toward a new kind of computing—computing based on a technology so powerful as to be nearly transparent between the user and his or her needs. Yet, such promises have been breached in the past and the waters the Amiga is intended to bridge are definitely troubled ones. Is it, indeed, the "everything" machine? Or will Amiga be merely another footnote to the history of personal computing?

The perspective of Steve Gibson, a software author who developed the Gibson Light Pen for the Apple IIe and Atari home computers, points up the enigmatic nature of Amiga. "Just phenomenal" is how he describes its capabilities. But he—among other developers—is waiting a year before he thinks about writing software for it, because Amiga is, first and foremost, "an unproven machine."

(All evaluations and specifications in this report were drawn from prototype Amigas and plans that were not finalized by the manufacturer or independent developers.)

This report was written and edited by Fred Abatemarco and Sandra R. Reed with additional writing and reporting by David Needle, Lee The, Patrick Honan and Robert Alonso.

On paper, at least, the Amiga's capabilities appear nothing short of spectacular and capable of changing traditional thoughts about what a $1,295 computer can do. You can have an almost unlimited number of windows performing different tasks on the Amiga, according to Richard C. Geiger, who runs Amiga as general manager of Commodore's so-called West Coast Development Center in Los Gatos, California. Perhaps no user has a need for 50 windows on a screen, the most attained by Amiga engineers. But the capability to run, for example, a communications program that is down-loading, or sending electronic mail, while you work on a spreadsheet in another window, and print out a just-completed document through another window, is not an unlikely scenario.

The Amiga is blazingly fast. Its 7.8-megahertz 68000 microprocessor can crunch numbers more speedily than you can input them. It can walk and chew gum at the same time—thanks to a built-from-scratch proprietary operating system that incorporates true multitasking. It's got windows and split

screens. It can be the most creative companion your home stereo or videocassette recorder ever had. It can sing a solo or in harmony. Its built-in sprites, image-manipulation capabilities and palette of 4,096 colors produce stunning animation and graphics. And this, we're told, is just for openers. "There is a whole range of ways in which we haven't begun to tap the capabilities of this machine," says Clive Smith, vice-president of corporate planning and development at Commodore. "We can grow for the rest of the decade. Essentially, the Amiga is a cornucopia. Whatever you want to make of the Amiga— it is there."

Smith, as the in-house impresario of the Amiga, has been charged with the parallel duties of shepherding the machine to the market and broadening Commodore's reason for being. As he describes it, the Amiga stacks up as a trio of "breakthroughs." First, at $1,295 for a 256k system (but no monitor), the Amiga represents a substantial computing value. Fully loaded with a $495 color monitor and

Experiencing The Amiga Firsthand

Revolutionaries don't always look the part. Take the Commodore Amiga. Superficially, the Amiga looks like a "normal" computer. But it's not. Amiga will cheerfully support computing in styles utterly familiar to Apple II, IBM PC and Macintosh users—then do tricks that would dumbfound the other machines. Everywhere you look, Amiga asks you what you want instead of telling you.

Devoid of new-wave styling touches—or almost any other—the Amiga occupies its share of a desk with the self-effacing demeanor of a proper gentleman's gentleman. The ABS plastic case, keyboard and monitor echo the standard three-box design so familiar by now. While not strikingly small, the Amiga does take up about six inches less width on the desk than an IBM PC. The keyboard can slide under the machine's front panel, when not in use, to further conserve precious desk space.

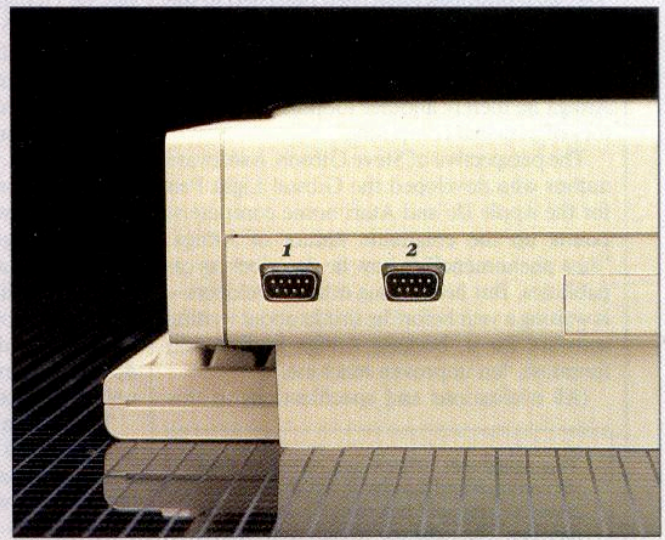
The Amiga looks like a normal computer. It's not.

Self-effacement comes to a peak with the input devices. A two-button optomechanical mouse sits beside the keyboard. It is plugged into one of the two controller ports that are located on the right side of the system unit. You can use the mouse to pull down menus and to point and click on the screen. Since the mouse only uses one port, the other port can be used for joysticks, paddles, light pens and drawing tablets. It is probably safe to say that many devices and games that make good use of this extra port will be available. Two-player games are an immediate possibility.

Unlike the Macintosh, the Amiga does not force you to use the mouse for input. Everything the mouse can do—including pointing and button-clicking—can be done from the keyboard. Open-Amiga and Close-Amiga keys are fitted to each side of the space bar to duplicate the mouse's two buttons. The Amiga has something to offer just about every kind of user. Touch typists will be delighted by the full-feature keyboard with its 10 ideally placed function keys. And spreadsheet users will feel comfortable with the responsive 10-key numeric keypad.

The Amiga's keyboard incorporates the full key travel and tactile feedback of the Apple IIc keyboard, but works a little more quietly. The function keys are set one next to another in a row just above the normal keyboard keys. This leaves room for function-key overlays. Another advantage is that programs can make use of the location of the Func-

The memory expansion port (ctr) accepts 256k of extra RAM.



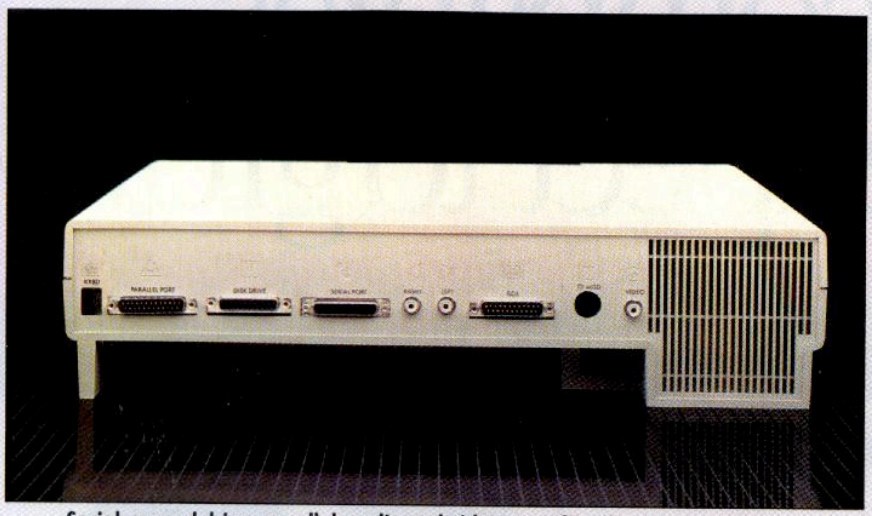
Two programmable ports accept a variety of controller devices.

256k memory expansion card ($200), a $2,000 Amiga package seems perfectly positioned to run rings around the most steeply discounted 512k Macintosh—in terms of price and performance. Compared with IBM PC-class machines, the Amiga offers speed, graphics and memory-addressing capabilities that are not available at much greater cost. And alongside Apple II family computers in the same price range, Commodore's Amiga is clearly a superior machine (See chart.)

Breakthrough number two, says Smith, is the Amiga's "intrinsic performance characteristics"—in particular, its color graphics, sound and animation capabilities. None on par with Amiga are available in another personal computer.

Finally, Smith crows over Amiga's open architecture and the fact that expansion cards, hard disks and the like can be developed easily for the machine and added by users over time. "Its boundaries are not defined yet," Smith says, "and will not be for a long time."

Essentially, Amiga's magic resides in a trio



Serial, second drive, parallel, audio and video ports line the Amiga's back.

On the front panel, you can pluck off a lid next to the built-in 3.5-inch disk drive and pop in the proprietary 256k memory board to bring the machine up to 512k. On the right side, you can get at a connector on the edge of the motherboard, which allows expansion devices or boxes to be plugged into the full-speed motherboard bus. The 68000 microprocessor used in the Amiga can accommodate 8 megabytes of main memory. Another much-desired use for the bus is to connect a hard disk drive to the system or to connect Commodore's so-called "Trump Card" which will allow the Amiga to run IBM software. Even with all this expandability, the Amiga does not require that you use a screwdriver. All the memory and peripheral expansion go into built-in, directly accessible sockets.

tion keys by displaying their function in a corresponding location on the screen. The Shift, Return and Backspace keys have the proper size and placement to please anyone who has experience with IBM selectric keyboards. However, the Caps-Lock key is inconveniently interposed between the A and Crtl keys at the left end of the home row, which makes reaching the Crtl key more difficult and accidentally hitting the Caps-Lock key much easier.

The Amiga's user interface, called Intuition, is an icon-laden feature that works with the operating system and the hardware to manage many tasks at once. Users will see parts of Intuition when they move windows around on the screen, resizing them as necessary to open more programs; or when they use the Clipboard feature to move information between windows. Behind the windows are Intuition's screens. Programs can have unique screens or can use Intuition's "default" screen, called WorkBench.

In back, the Amiga has a standard RS-232-compatible port and a Centronics parallel port. These will be handy for communications and printing. The composite video and audio sockets take standard RCA plugs commonly used in hi-fi systems. For a personal computer, the Amiga offers superb stereo sound through left and right RCA audio plugs. The Amiga is not limited to any specific kind of video hookup, either. You can connect it to a television set, an RGBI monitor, or an RGBA monitor. Even the keyboard plugs in with a telephone-style modular jack. The only non-standard port is used for the addition of external disk drives in any combination of 3.5-inch and 5.25-inch units.

Inside the Amiga, you will find carefully etched lines that connect the mini-metropolis of chips. The motherboard includes 192k of ROM. This large ROM area provides AmigaDOS and applications programs with fast, simple access to such capabilities as sound and graphics. Although the 68000 in the Amiga operates at a brisk 7.8 MHz, the discernible speed appears to be much faster. The reason for this is that the Amiga comes equipped with three custom chips that allow the microprocessor to devote almost all of its time to computing. The chips control disk drive access and create the graphics and sound output. They do their magic in the half cycle that the microprocessor is busy processing data or instructions. This means that whenever the data bus is freed up by the 68000, the support chips take over and increase the efficiency of the system.

The Amiga shares features with other machines—like standard ports and promised compatibility—and also expands on features that were introduced on other machines. You get drives that look like the Mac's, yet store twice as much information; pull-down menus that function like the Mac's, but are much more flexible—you can pull down submenus from main menus—and graphics that include 4,096 colors and programmable sprites. Almost all of these features were pioneered by other computer companies, but, with the Amiga, Commodore has tried and succeeded in taking each one a step further. Once you let the glare-protected, high-resolution RGB monitor warm up, comparisons to other personal computers fade away.

—Lee Thé

of innocuous-looking custom chips on the motherboard, nicknamed Daphne, Agnes and Portia, or Huey, Dewey and Louie. These chips contain DMA (Direct Memory Access) channels and "intelligent" circuitry that, essentially, bypass the central 68000 microprocessor whenever possible. (See related stories.) This is the secret to Amiga's speed and its ability to do multiple operations simultaneously, and forms the technological foundation upon which a new wave of computing could successfully ride.

But Amiga, unlike another pace-setting computer of its time—the year-and-a-half-old Macintosh, doesn't completely burn its bridges. The most significant hardware option Commodore plans to offer this year is the so-called Trump Card—a $500 add-on card that adapts the Amiga to run IBM PC software on either a 3.5-or 5.25-inch disk drive.

"What you have is a machine two to three times as powerful as the IBM PC/AT at one-third the price, with optional [IBM] PC compatibility," says Martin Alpert, chairman of Tecmar, Inc., a major supplier of memory-expansion products for personal computers. "I think the Mac was the first viable non-look-alike [incompatible with the IBM PC]; Amiga is the second."

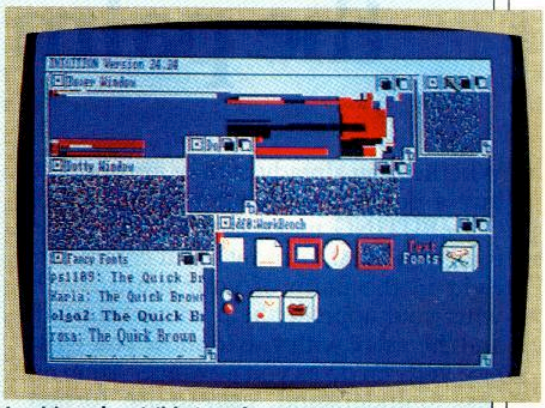
The Amiga will come bundled with its operating-system disk, a version of BASIC, a demonstration program to show off the hardware's animation and graphics capabilities and a tutorial program. A separate pair of programs that dealers may bundle includes Textcraft, a simple-to-use word processing program and Graphicraft, an entry-level paint program.

In all, about two dozen additional software products are expected to be available for Amiga—both from Commodore and from independent developers—by the time it shows up in stores in August. The bulk of these programs are decidedly of the games, or recreational variety, with an emphasis on animation and music or sound effects, although some effort has been made to provide business packages. (See related listings.)

To its possible detriment, however, is the fact that Amiga is being launched without benefit of the "name" developers with which veterans are most familiar. The Software Group of Ballston Lake, N.Y. will have the Enable/Write word processing ready for Amiga's debut. But Lotus, Ashton-Tate, MicroPro, Software Publishing, and others that are germane to the MS-DOS, Apple II and Macintosh computing scenes, will not have any Amiga products from the start. Amiga customers will have to make their buying decision based on a handful of lesser-known software and the memory that a

Amiga's Multitasking DOS

The Amiga computer by Commodore was designed to offer the ease of a Macintosh and the flexibility of an IBM PC. One of the reasons that it succeeds is its innovative disk operating system. AmigaDOS allows entry either through the menu and mouse operating environment, called Intuition, or through the command line interface. This means that you can choose which way you would rather operate the machine. If you are intrigued by pulling down a menu and choosing with the click of a button, you can do things that way. But if you like the more traditional way of using an operating system—typing a command and getting a result—then you can gain access to DOS through a command line similar to MS-DOS's "A>" prompt. AmigaDOS doesn't force you to do things in unfamiliar ways.



Intuition: the visible interface to AmigaDOS.

But, certainly the most innovative characteristic of AmigaDOS is that it can run more than one program at the same time. It is also capable of handling more than one user at a time. The multi-processing capabilities of the Amiga even accommodate several programs running under different priorities. For example, you can assign a printing task a lower priority than the program that you are using—such as a word processor. The printing task will work in the background whenever there is free processing time. These periods of free time occur either when the program is waiting for input or is waiting for the disk drive.

Giving tasks different priorities and having them run in the background will fulfill some of the original promises of computing. It will give you more time to be productive. AmigaDOS opens up the door to very fast, efficient computing. With these new capabilities, you can have the computer do all the mundane and time-consuming things in the background. You can recalculate a spreadsheet in one background task, do a data base sort in another, and run another application without even noticing that work is being done in the background. Essentially, AmigaDOS lets you do several things at the same time without any perceivable loss of computing power.

Like MS-DOS, AmigaDOS can handle subdirectories. This means that each diskette can be subdivided into smaller sections that are called directories and can contain files in the same way that the main directory contains files. This facilitates an orderly way of storing files.

According to Rick Geiger of Commodore Amiga, AmigaDOS supports hard disk drives and RAM drives. Commands and routines to handle these are built in. The effective use of a RAM drive will require Amiga's extra memory card, though. The reason for this is that many applications can take up to 200k or more just for program code. With the addition of the 256k expansion unit, though, it is very practical to use the extra memory for lightning-fast drives.

Just as the Macintosh set the standard for judging a computer's ease of use, AmigaDOS sets the standard by which the functionality and power of disk operating systems will be judged. It takes computing to a new and exciting level of personal productivity.

—Robert Alonso

laundry-list of promised software for the Macintosh was a long time in materializing.

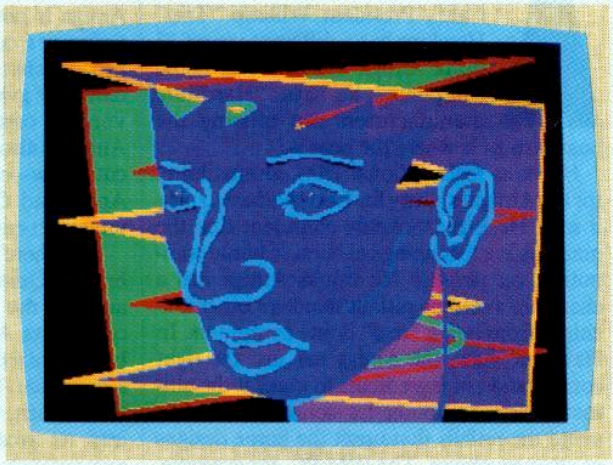
Does Amiga need a blockbuster software program to win corporate converts? The tandem histories of the Apple II and VisiCalc, IBM PC and 1-2-3, and the Macintosh *without* Jazz, suggest yes. And Commodore knows it. "The best software for the Amiga is not the software we will have on launch," Smith admits, "no matter how interesting that is."

The burden then, of carrying the Amiga through the business threshold, will fall initially on additional Enable modules—data base management, spreadsheet, graphics and communications expected out in October. Based on Enable's generally favorable reviews as an integrated package for IBM-style machines, some observers think Enable is up to its task. But there is no certainty at this point. In fact, Enable's word processing program was rapidly ported to the Amiga; it will take until early next year before any of the modules are fully tailored to take advantage of the machine's unique characteristics. Industry analyst Barbara Isgur, for one, feels that "anything short of 1-2-3 can't carry a new computer by itself. Enable doesn't have the recognition of some others."

Even if software issues were put aside, no computer—no matter how technologically

Art On The Amiga

Graphic artist Barbara Nessim doesn't concern herself with the technology found in the Amiga—or any other computer. They are just another artist's tool, she says, "something to help you create."



Nessim's work has been shown in art shows throughout the world, and in such publications as *Time*, *Esquire*, *Playboy*, *The New York Times*, *Seventeen* and *Redbook*. Her drawings done on a computer have appeared in numerous other publications. Nessim, who has worked on a variety of personal computers, including MS-DOS machines and the Macintosh, over the past several years, was impressed with her one brief experience with the Amiga. She appreciates its speed, enjoys having 32 colors available to work with at any one time, and finds its under-$2,000 price tag remarkable.

Amiga art: Nessim's "profile" and Haeger's "byte burger."

Her finished product, drawn with a mouse and using an early prototype of the Amiga and its paint program, is shown here. She explored features of the machine for about an hour before getting down to the actual drawing, which took about two hours more. Nessim primarily used line drawings and fill patterns. She found working with the menu, which included selections for shapes, colors, lines and brush sizes, to be easy. "First I drew points with flat sides and points overlapping. Then I drew a head looking to the left," says the Manhattan-based artist. "I don't need elaborate time to do my work. I draw from my head, so I just needed to bring my head and my hands."

Nessim found it fairly easy to use the mouse, but prefers the wrist action she gets with a stylus. Using the mouse, she says, is like "toe dancing with shoes up to your knees." A stylus and digitizer are among the peripherals Commodore plans for the Amiga.

Jack Haeger, Commodore-Amiga's art director, got his start in computer graphics, "just after the Pac Man craze", as a designer and animator of arcade games. Before that, he worked as an artist in Chicago and his works were shown in a number of galleries and appeared in *Playboy* and other publications. He used the Amiga to draw the Statue of Liberty pictured on this issue's cover and the opening page of this report and the "four byte burger" seen here. He also worked with a mouse, and began the Statue of Liberty drawing by sketching it from photos and then refining the sketch using selectable brush sizes. "Maybe I'll use a one-pixel brush for certain things, but a five-pixel brush for others," he says. Most of the drawing was done freehand ("freemouse"?); but for the scaffolding, Haeger used a feature of the program that draws straight lines between two points.

To add more detail to his drawing, Haeger used a feature that allowed him to select two colors and then gave him a range of colors between the initial two. He used this on the green shades of the statue and the "sky and the clouds where I could get a range from a blue to an orange, for example."

Like Nessim, Haeger views the computer as a tool, an independent medium for producing art. "I feel comfortable using the computer as easily as I do using acrylics or air brushes or whatever it takes to get the job done," he says. Both agree that the Amiga, given its price and performance, shines brightly in the spectrum of artists' tools.

—Patrick Honan

stunning—has posed an alternative to the standard set by IBM among business users. Amiga is not going to try where others have failed. Instead, it is being positioned as a *complement* to the PC/MS-DOS world. That is, a machine with business applications—such as word processing and highly styled presentation graphics—in its own right, *plus* an as-needed compatibility link via the Trump Card accessory.

Commodore's stated target markets for the Amiga are small-business users and, secondly, home- or office-bound professionals. "The IBM compatibility feature will be very attractive for those people who are exposed to computers—IBM or IBM compatibles—in the office environment, but who don't just want to buy an IBM for their home," says Smith.

At Electronic Arts, in San Mateo, Calif., President William "Trip" Hawkins has a different vision. "I think Amiga will be a real home computer," he says. "Hardware manufacturers are missing the boat; Amiga is where the boat is."

Hawkins feels optional IBM compatibility for the Amiga is a way for Commodore to play it safe. He is outspokenly confident that the machine is a technological boon to home computing, *au natural.* He thinks Amiga has a chance of avoiding pitfalls that kept other machines from being "real" home computers. In Hawkins' view, the Amiga has just the right combination of ingredients to make it the ultimate home computer for consumers and to avoid the pitfalls that upset the home designs of other machines. The IBM PC, for example, offers a lot of power and disk capacity, but no standard joystick port and nothing like the graphics and animation capability of the Amiga. The Apple IIc/e is significantly slower than the Amiga, and, like virtually all other personal computers, can't match the Amiga's graphics and sound capabilities. Similarly, the Commodore 64 has the advantage of being inexpensive and competitive from an educational or entertainment point of view, but it is extremely limited for business and other productivity applications.

Impressionistic Amiga: Artist Jack Haeger's "From Monet" still life shows off the computer's ability to "paint" with texture.

"All the other [home] computers have at least one fatal weakness," says Hawkins. "The Amiga has all the pieces—and better ones than have been available."

The third target market for Amiga is "the people who have traditionally bought Commodore 64s or Apples, or any of the consumer machines where, essentially, you're looking at multiple usage within the family—by different family members, for multiple purposes—the productivity applications, as well as entertainment and education applications," says Smith. Finally, he notes, Commodore will try to sell in "important niche markets", such as art houses, advertising agencies and architectural firms where animation and graphics are important.

"The Amiga's strength is that it can directly address both power users, who are typically the IBM universe, as well as ease-of-use users – a market position that Apple, or the Macintosh, has led so far," Smith says.

Smith's and Commodore's hopes and plans not withstanding, is there any good reason to buy an Amiga? It is only marginally "friendlier," than the Macintosh; and though certainly more flexible and versatile than the Mac, Amiga is not supported as well by software. Software availability for Amiga may never approach what it is for IBM machines that are currently available, despite the machine's favorable cost and functional comparisons. Amiga is also a functional cut above or a dollar cut below—or both—home machines by both Apple and Commodore. Yet, it remains an unproven entity, compared to all.

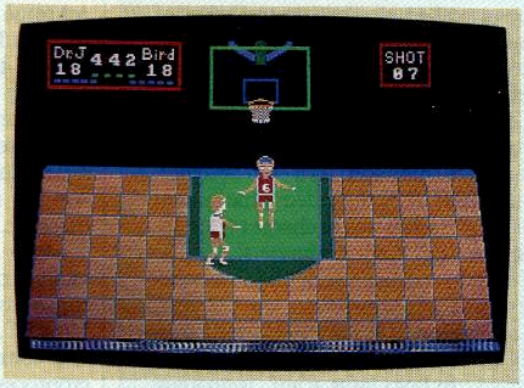
Still, there is reason for the Amiga to be embraced. Quite simply, it may be visually and audibly the most talented of all personal computers. Amiga's special abilities will likely be recognized by those who already own or use a computer. Such is the case with the Macintosh, which, though aimed at new users, realizes its greatest supporters among active computerists.

Comparison of the Amiga to the Macintosh is almost unavoidable. Like the Mac, the Amiga makes heavy use of icon symbols, high-resolution and bit-mapped graphics. Similar to the Mac's pull-down menus is the Amiga's use of drop-down menus. Instead of clicking on the mouse to pull down menus, Amiga's menus drop down when the cursor is moved to the head of the menu. Both the Mac and Amiga use a Motorola 68000 chip as the main processor. But point-by-point comparisons with the Macintosh tend to blur the essence of Amiga. Its design, operation and functions are quite different from that of Macintosh—or any other personal computer on the market. The Amiga uses a mouse pointing device, but it also has a full-function keyboard with a complete set of cursor-control keys, numeric keypad and function keys. The Amiga comes with one internal 3.5-inch, double-sided, double-density disk drive that offers twice the formatted disk space of the single-sided Mac disk—roughly 880k versus 400k.

Steve Dompier, chairman of Island Graphics, which is writing graphics and animation programs for the Amiga, eschews definition of Amiga as a color version of the Macintosh. "The Amiga operating system is very different

Amiga Software and Accessories

Here are some of the first-generation products designed for the Amiga. (Unless otherwise noted, these products will be available in October. Prices, in most cases, were not available.)



One on One: the popular game redesigned for Amiga.

BUNDLED SOFTWARE

The following programs will be included with the Amiga:

A tutorial developed by Mindscape, Inc., of Northbrook, Ill., that guides the Amiga user through basic features and operations of the machine.

AMIGADOS, Amiga's disk operating system that contains Intuition, the graphic interface.

BASIC 1.0, a version of the BASIC programming language, developed by Microsoft of Bellevue, Wash. for the Amiga.

KALEIDOSCOPE, a graphics package from Electronic Arts of San Mateo, Calif.

LEISURE

BLACK NIGHT is the working title for a game that is being developed specifically for the Amiga by Electronic Arts. It is a 3-D, science-fiction adventure.

RETURN TO ATLANTIS, from Electronic Arts, is a 3-D game in which the player faces a variety of underwater adventures.

ADVENTURE CONSTRUCTION SET, from Electronic Arts, lets players construct their own adventures.

ARCHON I AND II play like the original Atari and Commodore versions of these strategy games.

THE HALLEY PROJECT is a space-travel game.

ONE-ON-ONE is a new version of Electronic Art's basketball game.

WYNDWALKER is the code name of Synapse Software's (Richmond, Calif.) arcade game that deals with sorcery and is being designed especially for the Amiga.

ESSEX is a science-fiction-based text-adventure from Synapse Software.

MINDWHEEL, from Synapse Software, is a text-adventure game.

PINBALL CONSTRUCTION SET from Electronic Arts allows the player to design and play his or her own pinball game.

THE SEVEN CITIES OF GOLD is an educational adventure from Electronic Arts.

SKYFOX, from Electronic Arts, is an arcade-type game.

Infocom in Cambridge, Mass. will have its 16 text-adventure games available for the Amiga upon its introduction.

BUSINESS

ENABLE/WRITE, an advanced word processor from the Software Group in Ballston Lake, NY. It will be available upon launch.

SYNCALC from Synapse Software is a spreadsheet for the Amiga that is similar to the Atari and Commodore 64 versions.

RAGS TO RICHES, the accounting package from Chang Labs in San Jose, Calif., will be marketed by Commodore and will offer three modules available by September.

An unnamed sales analysis program for retail businesses is being developed by Chang Labs.

HOME PRODUCTIVITY

TEXTCRAFT, an easy-to-use word processor from Arktronics that can be used with either the mouse or keyboard and includes pre-installed formats. It will be available upon launch of the Amiga.

ENABLE for the Amiga will closely resemble the integrated IBM version and will offer word processing, a spreadsheet, a data base, graphics and communications software.

FINANCIAL COOKBOOK, from Electronic Arts, will include prestored formulas for home-finance matters.

GRAPHICS

GRAPHICRAFT is a color paint program developed by Island Graphics in Sausalito, Calif. that will be introduced with Amiga.

VIDEO CONSTRUCTION SET is a new animation package from Electronic Arts.

PRO PAINT, developed by Island Graphics and marketed by Commodore, is an advanced draw and paint program that will be available on launch.

PRINT SHOP is a popular graphics program from Broderbund Software in San Rafael, Calif. that allows users to design their own cards, banners and flyers. It is expected to be available before Christmas.

An unnamed animation program from Commodore will use Amiga's built-in routines to help create animated sequences.

MUSIC

HARMONY lets the user create original keyboard compositions on the Amiga's keyboard or on a separate musical keyboard. Developed by Cherrylane Technologies, the program will be marketed by Commodore.

INSTANT MUSIC from Electronic Arts is a new package for the Amiga that is designed to take advantage of the machine's sound capabilities.

SOUND VISION is the tentative name of a music and animation package from Hayden Software in Lowell, Mass. It is expected to be released in November.

DELUXE MUSIC CONSTRUCTION SET from Electronic Arts lets users compose and play music.

LEARNING

KEYBOARD CADETTE is a typing tutor program from Mindscape, Inc.

PROGRAMMING LANGUAGES

C COMPILER AND PASCAL language from Commodore will be available when the Amiga ships.

LOGO, developed by The Lisp Company in Los Gatos, Calif., is an all-purpose programming language that features multiple processing. It is being marketed by Commodore and will be available upon launch of the Amiga.

TURBO PASCAL from Borland International in Scotts Valley, Calif., is expected to make use of the Amiga's multitasking ability.

HARDWARE

Optional equipment available with the introduction of the Amiga includes:

- A 3.5-inch, 1Mb disk drive from Commodore.
- 256k RAM cartridge from Commodore; $200.
- RGB analog monitor from Commodore; $495.
- 1200-baud modem from Commodore; $295.
- A 20Mb hard disk from Tecmar in Solon Heights, Ohio, which will be priced at approximately $1,000.

Hardware expected by the fall follows below (Unless listed, prices were not available):

- The Trump Card from Commodore, priced at approximately $500, offers IBM compatibility.
- A Digitizer from Commodore.
- A Genlock Interface from Commodore that will allow you to merge still or moving video images from a video cassette recorder with animation or graphics created on Amiga.
- A "frame grabber" that will allow frames from a camera, television or video cassette recorder to be transferred to the Amiga's screen and then manipulated.
- A MIDI interface from Commodore that will link the computer with a variety of musical instruments.
- A music keyboard from Commodore.
- A 2400 baud modem from Tecmar.
- A 20Mb tape backup unit from Tecmar.
- A multifunction accessory offering 2Mb of RAM, a serial port, printer port or Winchester interface, and power supply.
- **PITCHWRITER,** a hardware device from Cherrylane Technologies, is designed for use with Harmony software. Pitchwriter will allow sophisticated editing and recording of voice and music on the Amiga.

The History Of Amiga

The Amiga project began about three years ago when a group of Midwest investors formed a company called Hi-Toro, in the hopes of cashing in on the then-booming video-game craze. Their idea was to create a low-cost home computer with great graphics and sound.

The investors first hired an experienced engineer, Jay Miner, who was then working for a firm designing custom chips for use in a pacemaker. But his experience made him an outstanding candidate to help design what would eventually become the Amiga computer. As a chip designer, he worked on the custom chip for the Atari VCS, the video game system that has sold more than 10 million units. He also was in charge of designing the three essential graphics chips in Atari home computers.

David Morse was hired as chief executive officer from his job as vice-president at Tonka Toys in Minnesota. It was Morse who, late last year, negotiated the sale of Amiga to Commodore. He now works for Commodore as a consultant since Amiga, recently relocated into new offices in Los Gatos, Calif., is no longer a separate company, but a division of Commodore International of West Chester, Pennsylvania. Although it's in Silicon Valley, Amiga doesn't totally fit the stereotype of a firm run by energetic young Turks: Morse and Miner are 41 and 52 respectively. There is, however, the characteristic loose atmosphere at Amiga, and the paradoxic casual intensity of its staff.

Commodore entered the picture at a crucial time for Amiga.

"We were targeting a price range of between $300 and $400 for a system based on the Motorola 68000," recalls Miner. The name they wanted was actually Amica, which someone had found in a Latin dictionary. It means friend or friendliness. But it turned out the name Amica was already licensed, so they simply changed the C in Amica to a G. "I don't think they had thought of the Spanish word Amiga; it just turned out that way," says Miner.

Other people were brought on board to help in the effort—Amiga employed 43 people at the time it was sold to Commodore for $25 million ($12.8 million in cash and 550,000 in common shares)—but the young company had to divert some of its efforts from the computer project to stay healthy. So Hi-Toro, renamed Amiga, became known as a joystick company. It made joysticks for home computers and garnered some publicity—and modest sales—for a product called the Joyboard.

Amiga eventually sold off all its joystick products when the video game boom began dying and it needed cash to continue development of its computer. The initial design called for a computer with relatively limited memory and no built-in disk drive, but expandable. Miner is delighted with what became Commodore's Amiga. "What we have now is the machine I'd want in my own home," he says.

Commodore entered the picture at a crucial time for Amiga. "Commodore has made a big difference in terms of financial support and manpower," notes Miner, now vice-president of development at Amiga. "Commodore came in and said 'You guys are on the right track, here's money, go do it the way you think it should be done'."

What also made the buyout attractive from the points of view of both Commodore and Amiga was Commodore's chip-manufacturing MOS Technology. After examining the Amiga, Commodore determined it could manufacture support chips and hardware at MOS, which, to a large degree, accounts for the ability of the firm to keep the cost of the Amiga relatively low.

—David Needle

from the Macintosh," he points out. "The disk-access speed is like lightning compared to the Mac. Apple's in a canyon with the Mac; the 68000's doing all the work."

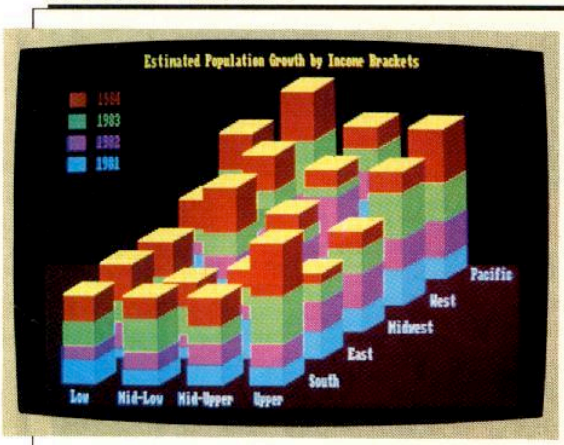
Macintosh delivers a sharper, slower, monochrome image; so does the IBM, which also delivers high-resolution color with the addition of the IBM Enhanced Graphics card. Nothing can manipulate movement and color like the Amiga, however, and most unbiased observers would instantly choose to view a well-done simulation or animation on the Amiga, rather than on any current rival machine.

Many developers are expected to take advantage of the Amiga's powerful multitasking capability. The recently introduced AT&T Unix PC, for example, offers multitasking, but that computer uses the 68010—a central microprocessor even more powerful than the Amiga's—and costs thousands of dollars more.

Even the AT&T's multitasking is slow compared to the Amiga, because it was designed as a front-end to the operating system at the core of Unix PC. "In the Amiga, windowing is part of the operating system. It's not sitting on top of any thing; it's totally integrated," says Dompier. Windowing programs like IBM's TopView and Digital Research's GEM on the IBM PC are comparatively constrained, because PC architecture wasn't designed for it.

Smith describes what multitasking might mean to an Amiga owner: "In any given screen, you can have any number of user-defined, overlapping windows running separate functions in real time, in a choice of four colors, at any given level of resolution. You can also split the screen so that you have two screens with different colors and different levels of resolution. For example, in the lower screen you might have a 320 by 200-[pixel] graphics program running, because you can have those in multiple windows—and in the higher screen you could have a spreadsheet and a text program, again multiple windows, in a 640 by 400-[pixel] mode."

It's no accident that you can't talk about the Amiga for longer than a few seconds without mentioning its sound and graphics capabilities. Commodore is counting on the machine to, as Smith says, "be a major boost to and probably open new markets for graphics applications." Movie studios have generated a slew of inquiries about animation possibilities. And movie studios mean adult users. ". . . Every time the graphics level improves, you get a more sophisticated consumer participating," Smith says. "When you've got, essentially, little stick figures running around the screen like Pac-Man, you have kids playing. When you start getting the graphics capability of the Commodore 64, you start getting teenagers involved in it. When you get the graphics



The Amiga, with its 3-D color graphics, could break ground as a powerful presentation tool in business.

capability of an Amiga, you start getting adults." Adults who might buy a computer for use at home and then take it to the office.

But the road to today's dominant computing standard is littered with obsolete computers based on superior ideas—and inferior business plans. Another personal computer that got high marks for stunning color graphics was the Mindset, which had some success selling to a niche market of graphics designers, but fell way short of general market penetration. Amiga's Trump Card accessory has the makings of a great equalizer, however, so rigid positioning doesn't seem to be an obstacle in Amiga's path. Amiga's uphill battle will be fought on different fronts, including at the retail store. (See related story.)

It won't be easy, but Commodore is off to a running start, if only based on the enthusiasm Amiga's technology has fermented. Doug Carlston, president of Broderbund Software in San Mateo, Calif., remembers what happened when his company decided to write software for the Amiga. "We had programmers desperately anxious to work on the Amiga." On the other hand, The Amiga presents an unusual dilemma for developers. Steve Gibson, explains that, compared to working on other computers, writing for the Amiga is "like falling in the ocean; you're not sure which way to go. It's too big, I feel lost."

Such is life on the leading edge. Can Commodore stand up to the pressure of being a technological leader? The outlook seems favorable. The company has a new management team and a promising new cash-cow product in its C-128. It is probably the only company in the business that can get away with as sweeping a product introduction as the Amiga. Despite some recent bad quarters, the company is still financially sound enough to hold fast with the Amiga, should its initial 1985 sales be as low as 50,000 machines. Commodore also has little choice to do otherwise. "Amiga is our future," admits company chairman Irving Gould.

But is Amiga the future for computer users? Here the odds are longer, but the potential reward is great. No doubt, early users of the Amiga may feel lost. Amiga represents computing with a bold new vision, and coddles little from the past. For a while, at least, using Amiga, won't be the easiest or most satisfying or most productive of all computing ventures. But it is a new performance standard that has the potential to carve out a, less cryptic and more dynamic style of computing. Perhaps a year or two from now, those new to computing will look at Amiga and say: "Of course, that is what a computer is supposed to do. Right?" ■

Can Commodore Pull It Off?

Clearly, Commodore has come only part way with the Amiga. The company now has to fulfill its promises, continue to assauge the skepticism of software developers and satisfy the demands of specialty retailers—all while keeping Amiga's technological integrity intact.

Analyst Eugene Glazer of Dean Witter gives kudos to the Amiga as "very interesting" from the perspective of price and performance. He notes, however, that "independent retailers out there have only so much room on their shelves for computer products and this is a new operating system."

Dave Winer, president of Living Videotext, suggests a problem for Amiga getting out of the retail door. "The Macintosh marked the end of the general computer euphoria; it may not be here today," he says. "You look at the Amiga; it has a lot going for it but you can still say it may not make it, because the people that need computers have them."

Raimund Wasner of the Yankee Group market research firm says of Commodore: "Financially, they have to walk on water. They're going to have to watch their pennies very carefully: no advertising mistakes, no marketing mistakes, no manufacturing mistakes, because they don't have much of a buffer."

Commodore also has to live down its long-standing reputation, earned under the stewardship of Jack Tramiel (now chairman of Atari Corp.), for mediocre support of independent developers. Further complicating the matter is that most development firms have committed to other computer architectures, notably the IBM PC family (and compatibles) and Apple's Macintosh. If that's not enough, the personal computer industry as a whole and the home market in particular are now in something of a malaise.

Tramiel haunts the Amiga in another way. Whether or not Atari's long-rumored ST series of computers materializes this summer, it has garnered enough speculation to make dealers and prospective consumers wary, at the least, of jumping too deeply into the water with Amiga. The long-anticipated PC II from IBM is having a similar effect on the climate that is greeting Amiga.

Commodore and Amiga officials insist their machine will be shipping this summer, but the president of one well-known software company is skeptical. "Our own evaluation of the state of the Amiga operating system is that it won't be ready in time," says one developer, who asked not to be named. "We haven't started writing for the Amiga because what we consider will be their ship date takes it out of our revenue cycle for this year, but we will have products for it next year," he adds.

Round two now begins for Commodore: making believers out of skeptics.