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COMPUTE

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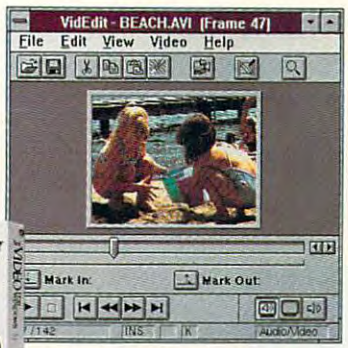

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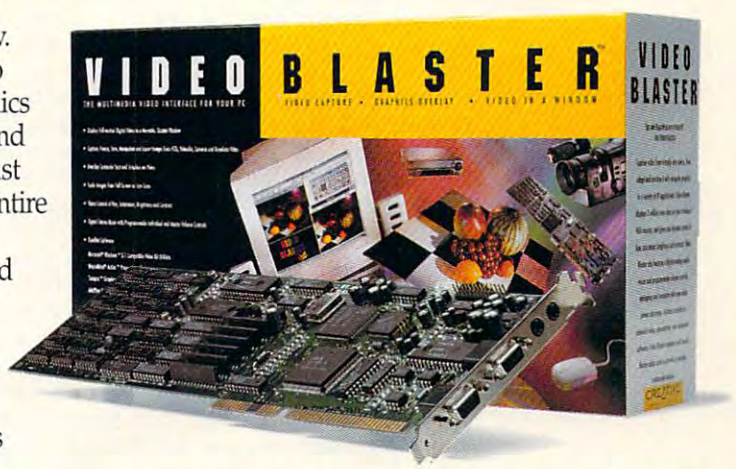

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Clifton Karnes

Cool products. That's what I live for. If you've been computing for any length of time, you know what I mean. Cool products are hardware or software marvels that make you smile and say "Yeah!"

Really cool products come along a few times a year, but this past month I've been lucky enough to find *four* of them. The first one's a utility, the second's a type manipulation tool, the third's a multimedia upgrade kit, and the last is, well, . . . I'll save that for last.

Cool products are hardware or software marvels that make you smile and say "Yeah!"

I use Windows and I like Program Manager. Its weakness is, however, that you often have to do a fair amount of double-clicking to get to the group you need and the program you want to run. I've partially solved this problem by putting all my most-used applications on one large group, which Program Manager always displays. But I can't put everything on this group. In the first place, you can only put 50 items on a Program Manager group (boo Microsoft!). And even if you could put more, most people still couldn't fit *all* their nifty utilities on one group. That's where Squeegee comes in (Icom Simulations, 800-877-4266, $79.95). This pop-up menu is ready at a mouse click to display all the programs you need to run quickly.

Squeegee can be customized to be called from a button on your title bar or by pressing almost any key combination or mouse button. I've set it up to spring to life when I make a single left mouse click on the desktop. If I want to run Windows' Setup, I don't have to hunt for the right group and icon; I simply click once on the desktop, slide the mouse pointer to Setup, and run the program. This is as fast as it gets running Windows programs.

Another really neat feature lets you display a directory of files. You can, for example, set up a Squeegee menu item to display all your Excel files. When you want to load an Excel file, you simply select that menu item, look for the file you want, and click on it, and both Excel and the file are loaded. This is much easier and faster than using Excel's Open dialog box or using File Manager.

That's a brief tour of Squeegee—but I'll tell you, this program has really improved my productivity in Windows. It's guaranteed to please.

If you work with documents in Windows, you'll want to try Makeup (Bitstream, 617-497-6222, $149). This dazzling program lets you turn your fonts into taffy and manipulate them in almost every imaginable way. You can create shadows, embossed effects, and fill patterns, and you can stretch and twist type in ways nature never intended.

Makeup is the key to high-impact logos, headlines, handbills, advertisements, and posters. Trust me—you won't be able to tear yourself away from this program.

The next cool product on my list is Creative Labs' Multimedia Upgrade Kit (Creative Labs, 408-428-6600, $799). This kit includes a Sound Blaster Pro card and a Panasonic-built CD-ROM drive. The kit installs as easily as any major hardware addition I've ever seen, and it performs flawlessly. After installing the Multimedia Upgrade Kit, your PC will be a real multimedia PC machine with synthesized and digital sound, and you'll have a fast CD-ROM drive. The Creative Labs Multimedia Upgrade Kit also comes with a slew of CD-ROM titles.

Not only is the Multimedia Upgrade Kit cool itself, but it lets you play the next really cool product—PC Karaoke.

If you've been stranded on a desert island for the last few years, you might not have heard of karaoke, but it's getting really big. A karaoke system plays music accompaniments that you can sing to. To make it possible to keep your place, the system displays words synchronized exactly with the music.

If you have a multimedia PC, however, you can have your own karaoke party with PC Karaoke (Sirius, 602-951-3288, $129). This innovative product comes with a high-quality microphone and an audio CD of hit songs (you can order additional CDs from Sirius). The software plays the CD through your system's audio, so the sound is full CD quality, and it synchronizes the words and displays them on the screen for you using Sirius's patented Compact Disc Synchronization technology, so you can keep your place. This thing is more fun than a barrel of Mr. Microphones.

That's it. Four cool products in one month. I just hope this isn't my cool allotment for the year. ❐

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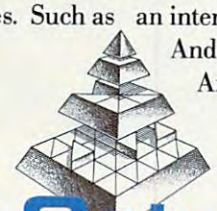

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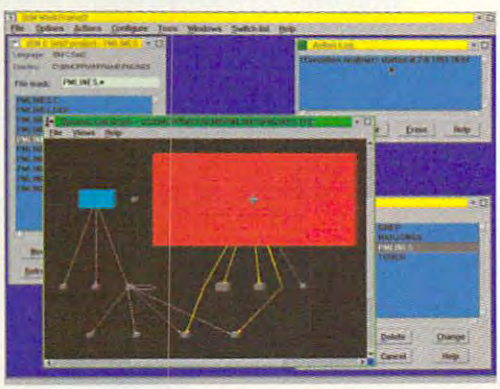

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FAX IT, SCAN IT, PRINT IT

THE COMPUTERIZED OFFICE BECOMES THE INTEGRATED OFFICE.

BY MIKE HUDNALL AND ROBERT BIXBY

ILLUSTRATION BY JOHN MATTOS

What can you do if you have a very limited amount of space for your office? You don't have room for a scanner, a fax machine, *and* a printer. Which do you sacrifice? Or what if you're setting up an office for a temp? You need a whole range of office automation devices, but you don't have all week to shop around town for a computer, a printer, and so forth. Wouldn't it be great if you could have all of your peripherals in one small package?

This kind of thinking has led to the latest revolution in peripherals marketing: the integrated peripheral. And it only makes sense. After all, what is a fax machine but a scanner and a printer? The photocopier is another common device that contains a scanner and a printer. Some fax machines have a copy option that will print out a copy as if it were a fax.

Most fax machines aren't very good scanners or printers, to be sure, and most of them print on that funky fax paper that's about halfway between tissue paper and wax paper; but if you could get a really good scanner and a really good printer, you could reduce their resolution for sending and receiving faxes and increase their resolution for normal office work.

In this article we will cover a handful of exciting new products that shrink an entire office suite down to a desktop while improving on the products they replace through integration and computer software.

DDM Private Station

Multifunctional capabilities, document storage and management, and speed are just a few features that make the Alacrity Systems Desktop Document Manager Private Station (DDM) an attractive package. To use it, you need an 80386 or higher industry-standard-architecture PC or compatible, Microsoft Windows 3.1 or higher, MS-DOS 5.O or higher, 4MB of RAM, a hard drive with at least 16MB of free space, two available bus slots, and an appropriate printer (Hewlett-Packard LaserJet II or III, IBM 4019 or 4029 LaserPrinter, Canon LBP-8, Unisys 9000-series laser printer, Olivetti PG-404 laser printer). For $1,995, you get a 50-MHz image coprocessor, 6MB of image RAM expandable to 16MB, a 9600-bps send-and-receive fax modem, a scanner interface, a high-speed interface to your printer, and a collection of integrated Windows apps that let you access and organize your documents in a variety of ways. The optional Microtek MS-II scanner COMPUTE used with the DDM adds around $600 to the price of the system. The DDM also supports Hewlett-Packard scanners.

To put the DDM to the test, we installed it in COMPUTE's production department, where it sent and received documents (paper and electronic) without a hitch, kept a record of all fax transactions, copied documents, scanned documents for further reference (and compressed them to save space), and printed faxes and spreadsheets very quickly indeed. While optical character recognition wasn't really a factor in the daily activities of our production department, we tried the OCR software, which performed respectably. You can use data scanned by your DDM system in paint or desktop publishing programs, although these programs are not part of the DDM package.

Installation. Installing the DDM wasn't difficult. The manufacturer provides excellent installation instructions, as well as a checklist to make sure you cover all the bases. The controller card plugged into the computer, a raster interface card

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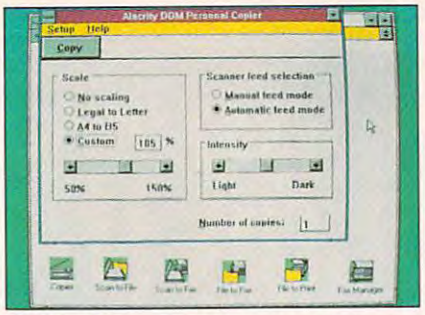
plugged into the LaserJet's auxiliary I/O port, and cables went from the computer to the raster interface, the telephone line, and the Microtek scanner. Additional steps could involve setting DIP switches for a different port address or modifying the raster interface card if you aren't using a Hewlett-Packard LaserJet. The limited length of the raster interface cable necessitated moving the LaserJet closer to the computer. As for the software, it installed easily, much as any Windows app, with the manual explaining choices along the way.

Documentation. The package includes four very good manuals: Installation & Getting Started, Scanning & Copying, Printing & Faxing, and DDM Viewer Optical Character Recognition. Each provides an overview, tells you what it will cover, covers the topic, and provides screen illustrations. Though the manuals lack indexes, the tables of contents, headings, and subheadings help a great deal. The Windows apps in the package include online help.

Ease of use. Just about anyone familiar with Windows should find this package easy to use. But even a user not familiar with Windows had no difficulty putting the system to work. Simply select the appropriate icon, choose from the options in the various dialog boxes, and, if need be, use the online help. The directories you build for fax destinations make sending a fax to an individual or a special group simple. No more queuing up to use a dedicated fax machine. You can fax from any Windows app simply by specifying the DDM fax system as your printer and clicking on the print button. The DDM keeps a record of your faxes for you. (Information about your faxing appears on the screen; unfortunately, there's no auditory feedback). Also, to simplify your access to documents you've stored on disk, the DDM software includes a finder utility with several search options.

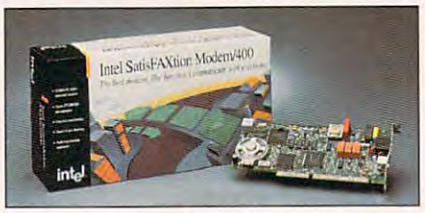
Special capabilities. Thanks to the graphics coprocessor and the 6MB of image RAM, the DDM system works fast and in the background, whether printing, copying, scanning, or sending or receiving a fax. Alacrity Systems claims that printing from Windows apps can be accelerated by as much as 500 percent; fax transmission and reception with the DDM were surprisingly fast.

If your hard drive space is limited, you'll welcome the DDM's compression and decompression capabilities. According to the manufacturer, up to 500 pages of documents can be stored in 10MB of disk space using the DDM. This last point bears careful attention if much of your document processing and management involves paper rather than electronic files.



Windows software makes the DDM simple.

The CJ10 provides beautiful color in seconds.



SatisFAXtion puts power in a small package.

Canon CJ10

If you're into color, you should take a look at the Canon CJ10 color copier/scanner/printer ($6,995 for the copier, $2,700 for the IPU that turns it into a scanner/printer). If you've made color copies at a copy shop, odds are that you've seen the output of the Canon CJ10. It prints on special paper and doesn't allow two-sided printing. The unit scans and prints at 400 dpi, which results in a printout that is very close to photographic quality. To test the unit, we spent most of a weekend scanning in blurry, faded, yellowed photographs and cleaning them up with Aldus PhotoStyler, which is provided with the unit. By using PhotoStyler's sharpening routines and boosting the magenta and cyan in the scanned images, we were able to return most of them to their original clarity (and improve the appearance of all of them). Then, we blew the pictures up to fill the 81/2- x 11-inch paper and printed them out into framable portraits that looked as if they had been created by a watercolor master (the images created don't have the sheen of photographs but rather the matte appearance of quality art paper).

Installation. The Canon CJ10 requires an IBM PC, Windows (because PhotoStyler is a Windows program), and at least 2MB of RAM. (A Macintosh version is also available.) Setting up the Canon CJ10 was a most complicated and intricate installation. First, the copier had to be set up. As you might expect, it is no simple device in itself. A screw and numerous tabs had to be removed to allow the scan head and printer heads to move freely. Then, the individual printheads had to be installed. Once the copier was ready, the interface device, called the IPU, had to be installed. The IPU is a metal rectangle about four inches high and slightly larger in area than the copier itself. It has indentations for the feet of the copier so the copier can sit on the IPU. A cable leads from the copier to the interface and from the interface to a SCSI adapter card, which has to be installed in the computer itself. Give yourself an afternoon to install this equipment—you'll need it. Finally, the software had to be installed under Windows (Aldus PhotoStyler, mentioned above).

Documentation. Strangely, the most difficult part of setting up the system was figuring out which side of the paper should face up in the paper tray. The manual says to put the whiter side up, but both sides of the paper were equally white. One side was more reflective than the other, so that side was turned upward. A dozen ruined printouts later (if you put the paper in wrong, the printer jams), the error became clear and the paper was turned over. Fortunately, this is an exception in a very detailed manual that was clearly written for people who normally try to avoid technology. It's full of troubleshooting tips and detailed instructions.

Ease of use. Is it possible for a computer peripheral to be too easy to use? It is when you can rapidly generate color printouts that cost about 47 cents apiece. When you have this kind of power at your fingertips, how can you rein in your creativity? Put a cigar box next to the printer and put in a couple of quarters each time you make a printout. Printing and scanning are so effortless that you'll have to keep reminding yourself that this is no toy.

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System to System

Name of System	DDM	Canon CJ10	DOC•IT 4000	DOC•IT 3000	SatisFAXtion
Scanner dpi	300(a)	400	400	300	400
OCR	yes	no	no	no	yes
Gray Scale	(a)	yes	no	no	yes
Color	(a)	yes	no	no	no
Pages per Minute	(b)	.67	8.00	8.00	NA
Printer dpi	(b)	400	400	300	NA
Copying	yes	yes	yes	yes	NA

(a) Depends on the scanner you choose. For example, the Microtek scanner used in our evaluation does not support gray scale, but one of the Hewlett-Packard scanners does.

(b) Depends on the printer used.

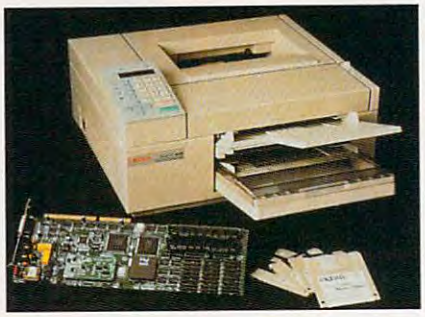
Special capabilities. Although color fax might be a logical extension to this leviathan, Canon has no immediate plans to add that option. If you want to send color faxes to someone with a similar unit, you'll have to fax or modem a color graphics file, then have the person on the other end send the file to the printer to get a hardcopy.

PhotoStyler is excellent software incorporating all sorts of photographic tools and a large assortment of special effects. It nearly won a COMPUTE Choice Award a couple of years ago. (In heavy competition, it lost out to Picture Publisher.)

The Canon CJ10 color scanner also does an excellent job as a gray-scale scanner.

DOC•IT

DOC•IT comes in two versions, the $3,299 300-dpi DOC•IT 3000 and the $3,799 400-dpi DOC•IT 4000. The unit reviewed for this article was the DOC•IT 4000. No larger or heavier than a standard desktop laser printer, the DOC•IT provides the full range of small office requirements. First, it's a laser printer that prints at a rate of eight pages per minute and supports both PCL 5, the page-description language used by Hewlett-Packard laser printers, and TrueImage, the PostScript emulation from Microsoft (standard on the 4000; the 3000 comes with PCL 4 and can be upgraded to PCL 5 and TrueImage). It can also function as a "walk-up" photocopier. The DOC•IT is set up as a sheet-fed scanner, which means that you feed sheets into it to copy them. However, the scanner is removable and can be used as a hand scanner for larger pages or for bound originals. The scanner allows the machine to operate as a 400-dpi sheet-fed or hand scanner. The software doesn't support gray-scale scanning, but if you have other software that supports gray-scale scanners (like Picture Publisher), you can access the DOC•IT as if it were a Hewlett-Packard ScanJet, and in this mode it can deliver up to 64 gray levels (Okidata technical support says that gray-scale capability will be added to the software in the future). Finally, the unit can function as a stand-alone fax machine capable of producing plain-paper faxes. The software can send either paper faxes or faxes generated by the software.



DOC•IT puts everything together for you.

Is the DOC•IT overpriced? To answer that question, you must consider its advantages and the range of equipment it was designed to replace. (The street prices are expected to be much lower than the standard retail prices listed earlier—around $2,500 for the 3000 and $2,800 for the 4000.)

Installation. Although we approached the large, complex DOC•IT system with some trepidation, installation was no more difficult that installing a card and setting up a laser printer. The toner cartridge and fixer brush slipped easily into the machine. A power cable and a serial cable run from the machine to the full-length 16-bit card. A telephone line is attached to the card just as it would be to a modem. Unlike the connections on many modem cards, the input and output connections on the DOC•IT card are clearly marked. We installed the phone lines in serial with the modem and had no trouble using the modem and the fax machine in tandem on a single phone line (though not at the same time, of course). Then the software was installed under Windows.

The only problem with installation was that when it was completed, the scanner wouldn't work. A few minutes on the phone with technical support supplied the solution, and the problem (an address conflict) was resolved and the scanner was fully operational. As automated as the software installation was, we had to edit the CONFIG.SYS and SYSTEM.INI files manually to get the equipment to work. Okidata says that in the next software release, the installation system will make these alterations itself.

Documentation. The Windows DOC•IT software was intuitive enough that reference to a manual was unnecessary for installation or operation. However, there is a complete manual that covers each of the functions in full (it didn't cover the technical problem described above, however). There are some typos in the manual, perhaps evidence of the haste with which the product was brought to market.

Ease of use. The software makes use of an icon bar that reduces all of the functions of the machine to clicking on a button that has both an icon and text. For example, the button that runs the scanner has a picture of a scanner on it as well as the word *Scan*. The DOC•IT unit has four buttons—for scanning,

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TECHNOLOGY UPDATE

How to get surround sound without buying the theater...

An amazing new surround sound decoder turns your existing stereo into a five channel home theater.

By Chuck Anton

As much as I love renting videos, it's just not the same as seeing a movie in a theater. I remember the first time I saw *Top Gun*. I nearly jumped out of my seat when the planes flew overhead. One of the reasons movies seem so real is because they use surround sound to make it seem like you're actually there. Now, an incredible new device lets you use your stereo receiver to get that same surround sound in your home.

It takes more than just four speakers to get surround sound. You need to have some way of separating the signals. The new QD-1 Series II decoder does just that, and in a revolutionary way that rivals the best Dolby Pro-Logic and THX Systems available.

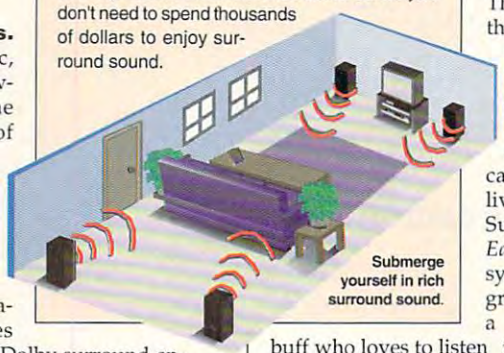
Wins over critics. Noted audio critic, Len Feldman, reviewed the QD-1 for the September issue of *Audio Magazine*. He concluded that "...the QD-1 produced a completely accurate and realistic surround sound experience from a variety of videotapes and laser discs with Dolby surround encoding... the QD-1 delivers home theater sound the way it was meant to be heard."

The Secret of Surround Sound

Surround sound has become the rage of the '90's because it adds "depth" to stereo sound, giving you the home theater experience. Simply stated, it makes you feel like you're actually at a concert or a movie theater.

To "fill a room" with sound you need more than the two channels. And that's the beauty of the Dynaco QD-1, it provides five channels from *any* two channel stereo or TV.

Dynaco offers rear channel speakers specifically designed to integrate with the QD-1 decoder. You may also need our center channel speaker, the A10-V, if your two front speakers are more than eight feet apart. Adding this fifth speaker, or center channel, helps keep dialogue and important localization cues centered. So you don't need to spend thousands of dollars to enjoy surround sound.



Submerge yourself in rich surround sound.

Breakthrough 'L minus R.' Back in the 1960's, Dynaco discovered that in addition to the right and left channels, a "difference" signal existed in a stereo recording, and aptly named it "L minus R." The QD-1 is able to decode Dolby Surround signals in a videotape or a laser disc because those spatial and depth cues have been matrixed into the "L minus R" portion of the stereo soundtrack. It does so passively, with no signal processing. What's more amazing, the QD-1 uses your main stereo amp to amplify the rear channels. You do not need any additional amplifiers!

Concert hall sound. The QD-1 also decodes the ambience found in all musical recordings. This sense of space, or concert hall acoustics is present in all CDs and cassettes, especially live recordings. John Sunier of *Audiophile Edition*, a nationally syndicated radio program, says "If you're a surround sound buff who loves to listen to music, you'll find this $79 passive black box superior to even the $3000 THX or Dolby Pro-Logic processor."

THE PASSIVE ADVANTAGE

Passive. The QD-1 is *passive*, meaning it requires no AC current. It actually sounds better than active decoders, producing more clarity, more detail, no noise, a greater sense of space, and zero distortion. This superior passive system is a breakthrough unique to Dynaco.

Active. All Dolby Pro-Logic decoders (stand-alone or built-in units) are active. This means they decode and amplify the signal electronically. The active way induces noise and distortion, hindering the home theater experience. This is an example where "more is less." Spending thousands on an active system will not give you the performance of the QD-1.

The QD-1 decoder *makes your movies come to life. Surround sound brings the theater experience home to you.*

Quick and easy installation. Hook up is easy. The QD-1 connects to the speaker outputs on your amp. The speaker leads then run to each of your four (or five) speakers. The rear channel speakers may be small; we recommend the AW-1s at $99 a pair. They come with mounting hardware, a keyhole slot for flush mounting, and have an attractive all-weather gun metal aluminum finish.

The AW-1 rear channel speakers *integrate perfectly with the QD-1.*

Factory direct offer. The QD-1 is so new you won't find it at your local department store. To introduce this product, we are offering it direct to you for a limited time special offer. By ordering now, you can save a substantial amount of money.

Risk-free home trial. Let's face it. The best way to evaluate surround sound is in your home, not in a showroom. That's why we're offering this risk-free home trial offer.

We're so sure you'll be delighted with the quality of these products and the surround sound experience that we are giving you 30 days to try them for yourself. If they're not everything we say, return them for a full refund.

QD-1 surround sound decoder.....**$79** $6 S&H

Speakers designed by Dynaco for the QD-1:

AW-1 *two* rear channel speakers .....**$99** $6 S&H

A-10V shielded center speaker.....**$59** $4 S&H

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copying, faxing, and printing—plus a telephone keypad for using the fax machine independently of the faxing software on the computer.

Special capabilities. The software allows you to scan in two pages, reduce and rotate them, and then print them side by side on a single sheet of paper. It will broadcast faxes and supports a telephone book and automatic cover page. If you are faxing to another DOC•IT, you can fax at the full resolution of the machine, though faxing to other machines is at standard 100 x 200 or fine 200 x 200 resolution.

SatisFAXtion Modem/400

The SatisFAXtion package from Intel takes multifunctionality a step beyond most fax/data modems on the market. If you're pleased with your computer and printer and would like to add scanning to fax/data modem capabilities, the SatisFAXtion is worth considering. With an 80286 or higher IBM compatible, DOS 3.0 or higher, at least 640K RAM and 4MB of disk space, and an appropriate graphics adapter (Hercules, CGA, EGA, MCGA, or VGA), you'll be ready to take advantage of this remarkable card.

The SatisFAXtion delivers great performance with a fax send and receive speed of 14,400 bps and, thanks to V.42bis data compression, modem data throughput of up to 57,600 bps. Compliance with the V.42 specification means that your transmissions are not only fast but reliable. In addition, Intel employs Smart UART (Universal Asynchronous Receiver/Transmitter) buffering to prevent high-speed data loss. Because this card dynamically monitors the quality of the phone connection, slowing down or speeding up according to line conditions, it's able to offer the best throughput possible while protecting your valuable data.

While a PC-based fax/data modem can improve your productivity, nobody likes the interruptions these devices can sometimes cause. Intel's solution is a coprocessor. The SatisFAXtion architecture provides an 80186 microprocessor, 512K of memory, and a custom gate array designed to manage the flow of data. Fax communication becomes largely a background task, smooth and transparent.

The SatisFAXtion Modem/400 package ($499) includes software for faxing directly from DOS apps. You also get a free copy of CROSSTALK Communicator software for data communications and an invitation to buy Intel's software for Windows: FAXability Plus ($79) or FAXability Plus/OCR ($249). If you plan to use this fax software, make sure you have at least 2MB of RAM and 6MB of available hard disk space.

For an additional $399, you can attach the Intel Hand Scanner, convenient for adding graphics into documents. It plugs into a Logitech-compatible gray-scale scanner port on the SatisFAXtion. Intel also sells three other versions of the SatisFAXtion board.

Installation. Hardware installation of the SatisFAXtion couldn't be simpler. Open your computer, ground yourself, handle the card carefully, and plug the card into an available bus slot. This unit features switchless automatic configuration, which means that you won't have to worry about jumpers or DIP switches. The installation manual spells out the installation very clearly and provides diagrams. The SatisFAXtion software and the FAXability Plus/OCR software also installed easily. Once the fax driver was chosen as the default printer, the SatisFAXtion was ready for business.

Documentation. In addition to the excellent Intel SatisFAXtion

There's Sound...

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SoundMan™ 16. Get Real.

SoundMan16 delivers sound so real, 85% of the time, people can't tell the difference from live sound. That's because it's packed with the absolute latest in sound board technology: up to 16-bit/44KHz record/playback, Yamaha OPL-3 stereo synthesis, 20-voice chip, 100%

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Modem/400 Installation Guide, you receive hardware and software manuals, a CROSSTALK Communicator manual, a pamphlet with recent news about the Modem/400 (updates, corrections, advice), a command reference card, and a directory of software you can use to increase productivity with the Modem/400. These are excellent manuals—thorough, indexed, and clearly written and illustrated—and Intel includes mail-back cards for you to offer criticism. If you need more help, it's available by phone, fax, BBS, CompuServe, and MCI Mail.

Ease of use. As with other Windows-based products examined here, the FAXability software is easy to use, due to its common user interface. In addition to a flashing icon with information about the progress of faxes, it has an in-box, an out-box, a phone book, and options for viewing, printing, forwarding, deleting, and rescheduling faxes. The OCR version allows you to convert faxes to editable text (which lets you save disk space, since text files are smaller than fax files). The DOS-based software that comes with the Modem/400 is also easy to use and can be installed as a TSR.

Special capabilities. The Modem/400 supports MR (Modified Read) encoding, which reduces connect time and phone costs an average of 25 percent, according to Intel. Most PC fax/data modems don't support MR. Because SatisFAXtion can recognize whether an incoming call is voice, fax, or data transmission, the Modem/400 allows you to use one phone line for all three purposes. In fact, Intel includes detailed instructions for setting up your phone and Modem/400 according to whether you use your line mostly for voice calls or mostly for fax calls. If your phone uses one ring pattern for one number and another ring pattern for another number, you can set the Modem/400 to pick up only for a particular ring.

Is Integration for You?

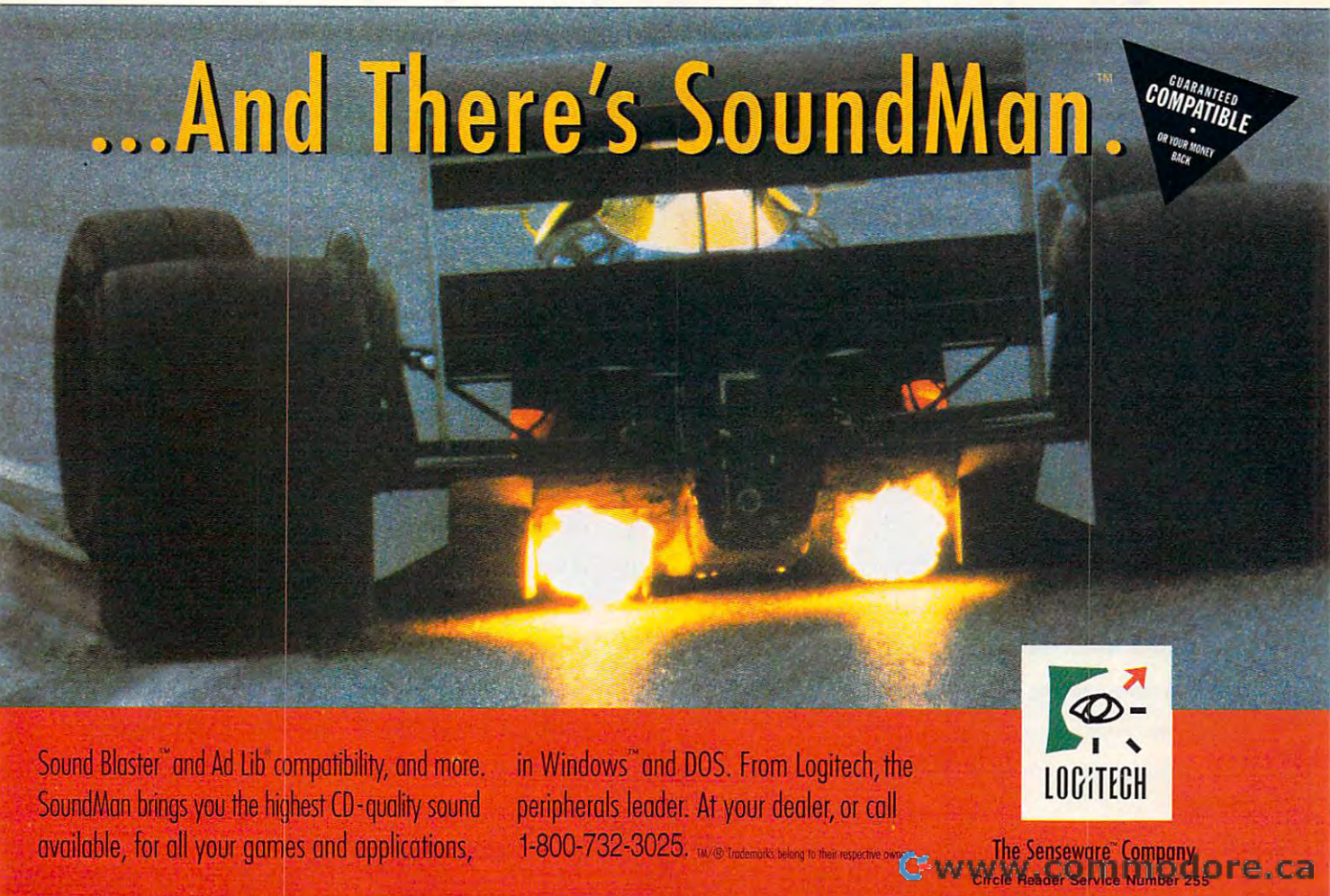
Just as there are good reasons to integrate, there are good reasons to leave well enough alone. For example, imagine that your laser printer breaks down. You can continue with your other work pretty much as normal until the repairs are made. If you have an integrated system, you might be out not only your laser printer but also your fax machine and your copier. Okidata says that its machine will continue functioning even if one component is down—but if that component needs to go into the shop for repairs, the entire system is gone.

Another problem arises when you want to swap equipment. Normally, when a person in an office needs temporary use of a laser printer, all you have to do is talk the burliest available worker into carrying it from one office to another (or wheel it on a desk chair or hand truck). With an integrated system, the printer is much more tied to the computer. Moving the equipment around also involves either shifting cards and installing software or moving the whole unit—computer and all—from room to room.

The final drawback is that integrated systems try to be all things to all people. If you have special needs, such as a higher-resolution scanner or a desktop typesetter, an integrated system will probably just get in the way.

Integration

Also available are what we've come to call "black boxes," which turn a print-



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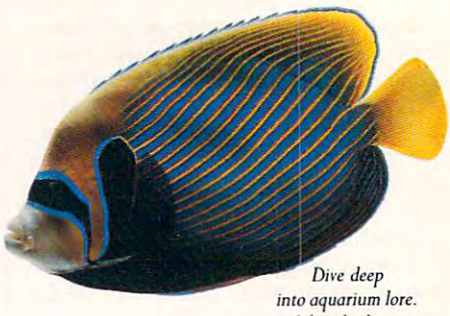

Dive deep into aquarium lore. Like whether a canister or protein filter is better for a 110-gallon saltwater tank.

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Finally, a computer information service you can't outgrow. No matter how hard you try.

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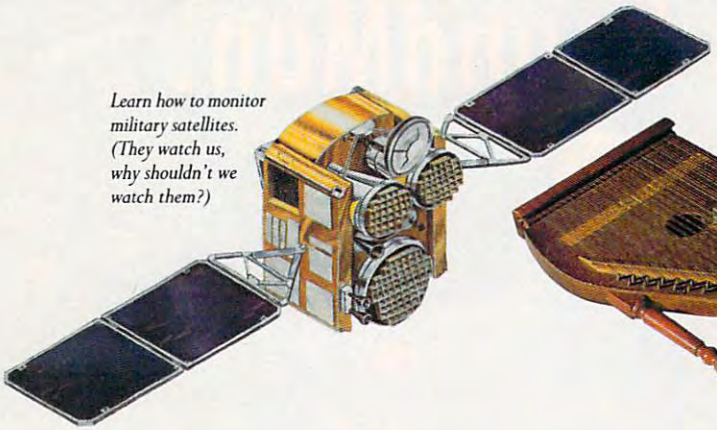

Find out just what the heck a zither is.

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No matter what you're into, you can get more out of CompuServe.

You can range widely over a list of services that will help you, entertain you, teach you, and challenge you. Or, you can delve deeply into favorite topics, learning (or even teaching) more, meeting experts, and making friends with people who share your interests.

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And that still leaves you the rest of the week to keep exploring. In fact, the more you use CompuServe, the more uses you'll find for it. It's the one computer

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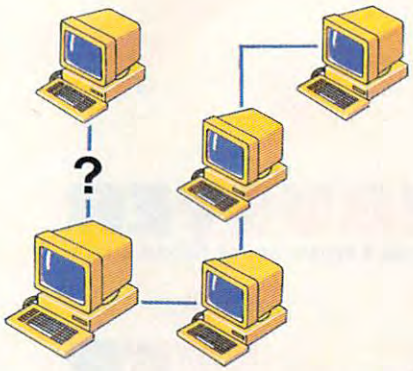
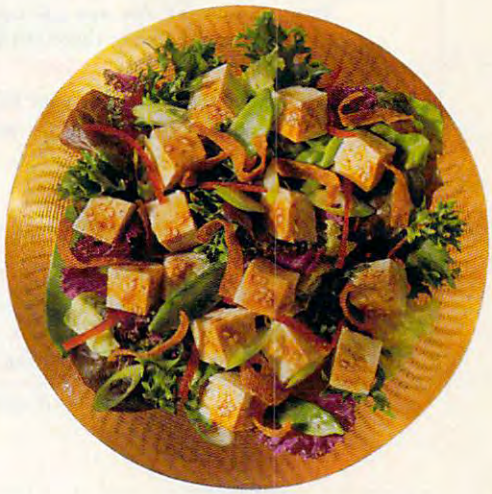


Find out why your PC won't talk to your LAN. And what you can do about it.

Find out how in the world to apply for a visa.

Discover a good place to dive, or get the lowdown on bouyancy compensators.

Copy down a truly delicious tofu recipe. (Really!)



Get the current phone number of your old friend from high school, and tell his new wife why you used to call him "Stinky."

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For a low one-time membership fee and $7.95 a month, you can use our most popular services as often as you like: news, sports, weather, shopping, reference materials, our electronic mail service of up to 60 messages a month, and more. Plus, there's a whole universe of other, extended options available at nominal additional charges.

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er into a plain-paper fax receiver. For example, Moonlight Computer Products (10211 Pacific Mesa Boulevard, San Diego, California 92121; 619-625-0300) sells a unit called the PrinterFax, which plugs into the font cartridge slots in a Hewlett-Packard LaserJet. (It only receives faxes; to send a fax, you need to have a separate fax modem or fax/data modem in your computer.) Various printer makers are building this fax-receive capability into their machines. Hewlett-Packard, Compaq, and others are adding the option of plain-paper fax receiving to their laser printers.

Throughout the preparation of this feature, we awaited the arrival of a product that takes office integration still another step further—Digital Design's Gateware, a combination laser printer, scanner, fax, copier, and computer in a single unit. Unfortunately, the system never arrived.

If computerization was the revolution of the early 1980s and the home and mobile office were the revolutions of the late 1980s, then integration could well be the revolution of the early 1990s. Offices are moving into temporary rather than permanent quarters: homes, dorms, motel rooms, the backs of vans—wherever they will fit. And why should you give up the benefits of your office when you're away? Why not have a suitcase-size piece of equipment that can do everything?

The movement toward office integration hasn't reached that level—yet. None of the equipment covered here is portable, and you'd have a hard time getting it under an airline seat (or even in an overhead compartment). But we already have scanners, printers, and computers that can keep company in a single briefcase. Just as this was going to press, Canon demonstrated in our offices its integration of the famous BubbleJet printer and a laptop computer into a seven-pound computer with a 360-dpi printer inside for under $2,500. With it, you have the option of adding a 14,400-bps PCMCIA send-and-receive fax/data modem. It's only a small step from there to packing an entire office suite to travel with you.

Meanwhile, if you want to install an office quickly and inexpensively with integrated peripherals, you have several options. And even more exciting things are on the horizon. ❑

Product List

Alacrity Systems Desktop Document Manager Private Station—$1,995 (without a scanner)
ALACRITY SYSTEMS
43 Newburg Rd.
Hackettstown, NJ 07840
(908) 813-2400

Canon CJ10—$6,995
IPU—$2,700
CANON USA
One Canon Plaza
Lake Success, NY 11042
(516) 488-6700

Intel SatisFAXtion Modem/400—$499
Intel Hand Scanner—$399
FAXability Plus—$79
FAXability Plus/OCR—$249
INTEL
5200 NE Elam Young Pkwy.
Hillsboro, OR 97124
(800) 538-3373

DOC•IT 4000—$3,799
DOC•IT 3000—$3,299
OKIDATA
532 Fellowship Rd.
Mt. Laurel, NJ 08054
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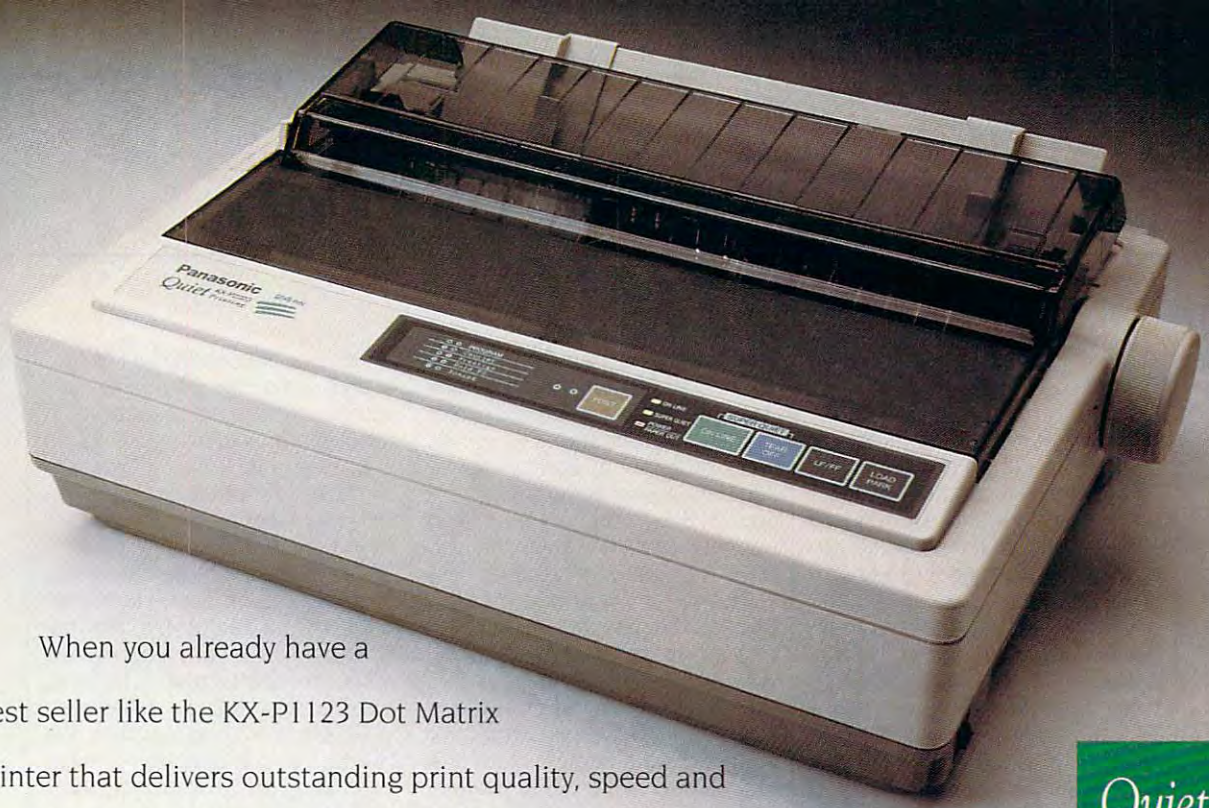


When you already have a best seller like the KX-P1123 Dot Matrix Printer that delivers outstanding print quality, speed and reliability for the money, what do you do for an encore? We asked people just like you and they told us to make it quieter.

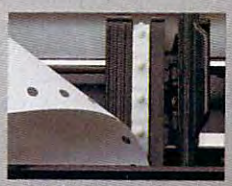
Quiet!

Quiet Technology for near laser-quiet operation.

WE ASKED PEOPLE HOW TO IMPROVE OUR BEST SELLING PRINTER. THEY TOLD US TO BE QUIET.

So, we added Panasonic's Quiet Technology and created the new KX-P2023 24-pin Dot Matrix printer. But, we didn't stop there. At the same time we made it easier on your ears, we made the KX-P2023 much easier to use with an all-new, user-friendlier control panel. We also made it easier to load and even more reliable with a belt-drive tractor feed and a simplified paper path. Plus, like all Panasonic Dot Matrix Printers, the KX-P2023 is backed by a two-year limited warranty.* No wonder the 1992 PC Magazine Service and Reliability Survey rated Panasonic "Excellent" on reliability, service and support.

Simplified Control Panel



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Panasonic Office Automation OA

PQ10-COM

Circle Reader Service Number 134

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TEST LAB

Edited by Mike Hudnall
Reviews by Tom Benford

Trumpet fanfare heralds the opening of an application. A synthesized band with wailing guitars and a pounding beat draws your youngster into the latest educational (and highly entertaining) software. An ominous chord and an eerie tremolo from your electronic "orchestra" announce danger in an entertainment package. Thunder, crashes, squeaking doors, and a collection of sound effects worthy of a Hollywood studio enliven software of all sorts. All of these musical marvels are possible, thanks to sound cards.

The beeps and boops of tinny speakers, too long the repertoire of the PC, have given way to the incredibly rich and diverse sounds of today's sound cards in much the same way the Victrola gave way to sophisticated stereo systems or CGA displays gave way to Super VGA. If you've never heard music and sound effects generated by one of these electronic wonders, you're in for a treat. Once you've tried a sound card, you'll never again be satisfied with just a PC speaker. And if the sound card industry maintains its present evolutionary momentum, you'll continue to benefit from more and more features, truer and richer sound, and more value for your money.

While the sound card industry has developed a certain degree of standardization, such as Sound Blaster or Ad Lib compatibility, you'll find a surprising amount of variety—in design, capabilities, prices, and software bundles.

This month Test Lab focuses on ten cards that were chosen because they're likely choices for COMPUTE readers, because they were ready for testing, and because they offer a variety of prices and features. While you may associate sound cards with games or MIDI, one of the cards, the Windows Sound System from Microsoft, targets the business user. An increasing number of productivity applications, such as word processors and presentation packages, take advantage of sound. Sound can entertain and educate, certainly, but it can also make you more productive.

The least expensive card in this month's lineup lists for $129, and the most expensive will run you $429. Take a look at this month's grid of features to see why you'll be spending more for some of these cards than for others. There, you'll find details about everything from the input and output jacks to the synthesizer chip set, the number of synthesizer voices, and the supplied accessories.

Notice in the grid a similarity in terminology to describe slot requirements and sampling rates. Four of the cards require a 16-bit bus slot; the other six can fit into an 8-bit slot. However, six of the cards offer 16-bit sampling rates (in addition to their 8-bit rates), and the other cards offer 8-bit sampling rates. What that means is that cards with 16-bit sampling rates give you access to more sound information than cards with 8-bit sampling rates. Thus, 16-bit sampling rates offer better sound quality than 8-bit rates and also require more hard disk space to store all of that information. The greater amount of sound information with 16-bit sampling becomes apparent, too, when you notice the frequency ranges (listed in kHz) that go with these sampling rates. Simply put, 16-bit sampling at 44 kHz gives you CD-quality audio, while 8-bit sampling gives you the kind of audio you might hear with an inexpensive FM radio.

Seven of the sound cards provide a CD-ROM interface, increasingly important if you plan to take advantage of the growing number of CD-ROM titles, including many specifically developed for multimedia.

Some of the cards offer FM synthesis, some offer wavetable synthesis, and some offer both. If these technologies are foreign to you, take a look at the glossary and at the sidebar comparing these two techniques for synthesizing sounds.

The reviews of these cards also offer insights into sound technologies, as well as detailed information about each card. Each review discusses installation, software, options, and distinctive features.

Finally, you'll find test data. We tested the compatibility of each card using six different programs. More significantly, however, we checked each card for distortion levels and signal-to-noise ratios. The sidebar on methodology details exactly how we tested these cards, and our bar graphs provide the results.

Whether you're looking for an entry-level card or a more sophisticated MIDI-capable device, this month's Test Lab has information you can use to make a sound purchase.

MIKE HUDNALL

ADVANCED GRAVIS ULTRASOUND

If you're looking for plenty of musical voices, features, capabilities, and expandability, the UltraSound from Advanced Gravis may be the right audio board for you.

This full-length board installs in any 8- or 16-bit expansion slot and uses jumpers to alter any of the default settings, although these settings should work for the majority of installations. The jumper caps on the UltraSound are nifty little items with extended "handles" that make them easier for you to remove and reinsert as required using the fingers alone. Standard jumper caps usually require the assistance of tweezers, needle-nosed pliers, or similar implements to change their position, so this is a nice touch that makes installation a bit easier than usual.

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The mounting bracket of the board contains a 15-pin D connector in the middle, which you use for attaching joysticks or the optional MIDI breakout box. Four jacks (two on each side of the D connector) provide audio input and output; the two uppermost jacks provide amplified output and line level output, while the lower two jacks accommodate microphone input and line level audio input.

The UltraSound does not contain an FM synthesizer chip. Instead, it uses a proprietary audio signal processor and wavetable synthesis to produce sounds. The board is capable of 16-bit, 44.1-kHz audio playback and can record 8-bit sound from 2.0 to 44.1 kHz in either mono or stereo. You can add 16-bit recording capability with an optional daughter board. Another daughter board for implementing the CD-ROM interface capabilities is also offered as an optional accessory.

The musical and sound capabilities of the UltraSound are impressive. Its on-board 16-bit synthesizer can generate 32 independent voices; in other words, you can control the volume, the amplitude, and the timbre of each voice independently. Since wavetable synthesis uses software "patches" of sound that can be loaded as desired, the ability to play 32 of these sound patches gives you the flexibility to create any type of orchestral arrangement you want. This capability is sure to find favor with serious computer musicians and MIDI users.

ADVANCED GRAVIS
1790 Midway Ln.
Bellingham, WA 98226
(604) 431-5020
List price: $199
Warranty: one year

Installation is a bit more involved than with some of the other boards, but since it's highly automated, even novice users should be able to accomplish it without a problem. Function tests check the board's operation and detect any conflicts that may require resetting the board's jumpers; this is a great aid for troubleshooting and correcting any problems that you might encounter in systems heavily laden with installed peripherals.

The review board came equipped with 256K of on-board memory, which you can upgrade to 1MB by adding 128K of DRAM chips, although according to Advanced Gravis's press release, 512K will be the standard complement for retail versions. Adding RAM to the board increases its capacity for storing wavetable patches to increase the number of sounds available in memory.

Included with the UltraSound is a program called UltraSound Studio 8, a full-featured recording studio for playing, recording, mixing, and customizing digital sound files. The package also includes Windows and DOS drivers and recording and playing utilities, as well as a program for synchronizing digitized sound with the AutoDesk Animator FLI-format animations. A program for playing MIDI files and numerous samples of demo music, sequences, and sounds also comes with the package, as well as a set of 192 General MIDI instrument patches. All software comes supplied on 3½-inch low-density (720K) disks, with no mention of the availability of 5¼-inch versions.

Sound Blaster and Ad Lib compatibility is provided by running a program called SBOS (Sound Board Operating System). This program tells the UltraSound's CPU to emulate the FM-synthesized sounds, but the resulting sounds are much better than their FM counterparts with respect to realism and clarity.

Circle Reader Service Number 371

ATI STEREO F/X-CD

Ease of installation and ease of use obviously ranked high on ATI's list of priorities as its engineers set about the task of designing the STEREO F/X-CD audio board. They've succeeded admirably in both areas.

The three-quarter-length card has no jumpers or DIP switches; you configure the card completely through the software, making the installation simply a matter of inserting the card into any available 8- or 16-bit slot and running the installation software. Interrupt 2, 5, or 7 is available for audio use, and you can select either 220 or 240 as the address.

The board uses pin connec-

ATI TECHNOLOGIES
3761 Victoria Park Ave.
Scarborough, ON, Canada M1W 3S2
(416) 756-0718
List price: $199
Warranty: five years

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tors, and there's a cable for routing the PC's speaker sounds through the STEREO F/X-CD. Another channels a CD-ROM drive's audio output through the board. You'll also find a 40-pin interface for Mitsumi and compatible CD-ROM drives.

The backplane mounting bracket houses a 15-pin D connector for attaching joysticks or the optional MIDI connector box. Three jacks handle microphone and line level input and speaker or headphone output. The mounting bracket also contains a rotary knob for controlling volume.

The Yamaha YMF262-M (OPL3) synthesizer chip provides the sonic heart of the board, delivering 20 stereo voices with 8-bit sampling rates up to 44 kHz in monophonic and 22 kHz in stereo.

This board offers full Ad Lib and Sound Blaster compatibility, along with full programming support for software designed to conform with these standards under DOS and Windows.

The accompanying software comes provided on two 5¼-inch high-density disks, with no mention of the availability of 3½-inch disks. Universal DOS and Windows drivers are provided, as well as several utilities and sound applications, including WinDAT and DOSDAT, two programs developed by Voyetra Technologies to provide an interface similar to the controls found on a stereo system and high-end tape deck. The *DAT* portion of these program names stands for *Digital Audio Transport;* the programs run from Windows and DOS, respectively.

For full, rich sound on applications written for mono FM synthesis, the STEREO F/X-CD has a feature which can add a stereo effect. I was somewhat skeptical of this feature until I actually tried running some mono FM sound samples through the card with and without the Stereo Effect feature active. I must admit that the effect made a noticeable difference in the sound and definitely added some dimension to it.

You'll also find mixer programs for DOS and Windows which permit actively mixing and blending the signals of six different sound sources (FM, Wave, CD audio, PC speaker, line input, and microphone). In addition to controlling the individual volume of each sound source, these mixer applications also regulate the left-to-right balance and overall volume.

In the bundled software, ATI includes a generous selection of MIDI song files and a DOS MIDI player utility.

The ATI STEREO F/X-CD provides a good means of adding stereo FM sound synthesis and audio capabilities at an affordable price.

Circle Reader Service Number 372

AZTECH LABS
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Fremont, CA 94538
(800) 886-8829
(510) 623-8988
List price: $179
Warranty: one year

AZTECH LABS SOUND GALAXY NX PRO

Aztech Labs packs plenty of desirable features and options into its Sound Galaxy NX PRO sound card.

A three-quarter-length card, the NX PRO requires a 16-bit expansion slot for installation. One of the interesting things about this board is that only Aztech proprietary chips are used for sound generation; the familiar Yamaha OPL2 or OPL3 chips are nowhere to be found on this board. A connector provided on the board routes CD-ROM audio through it, and another connector permits channeling the sound that would ordinarily go to the PC's speaker through the board as well.

The NX PRO boasts two CD-ROM interfaces, both 40-pin, which can accommodate a Panasonic CR-521 or CR-522 or a Mitsumi LU005S CD-ROM drive. An optional Future Domain SCSI upgrade kit (a Future Domain SCSI controller chip and device driver software) costs $30 and adds SCSI capability to the sound board.

The card's backplane mounting bracket holds three jacks used for microphone input, line input, and speaker or headphone output. There's a volume wheel between the speaker and the microphone input jack and a 15-pin D connector used for attaching a joystick or the optional MIDI cable.

To install the NX PRO, you simply insert the board into any available 16-bit slot and start the software installation process. The installation software and the other software come supplied on 3½-inch disks only, and I could find no mention in the manual or other supplied material of the availability of 5¼-inch disks. That's too bad, because the package is exceptionally complete in other respects.

In addition to the NX PRO sound card and the installation software, an RCA patch cable and a pair of miniature Walkman-style speakers are provided, along with a cable for routing the PC speaker's output through the board.

The real bonus is the software that comes with the hardware. You get First Byte's Monologue text-to-speech synthesizer; Voyetra's WinDAT waveform editor for Windows; SoundScript, a multimedia authoring program; and

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For more information contact:
Advanced Gravis Computer Technology Ltd.
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SOUND BOARD TEST METHODOLOGY

The lab tested all of the sound boards on the same PC system. This system included an i486DX/50 motherboard with 256K external caching and 8MB RAM, 1.2MB and 1.44MB floppy drives, a 213MB hard drive, one parallel port, two serial ports, a Microsoft serial mouse, a Renoir NT SVGA Windows Accelerator 1MB video adapter, and a multiscan SVGA monitor.

The system components were mounted in a minitower case with a regulated and calibrated 200-watt power supply, provided courtesy of General Technics, Ronkonkoma, New York.

Lab technicians installed all of the sound boards using the supplied software installation utilities and the manufacturers' default jumper, I/O, address, and DMA settings.

The test results appearing in the bar graphs are relative performance comparisons that are based on proprietary CPTS test files.

We used a Leader Instruments LAG-126 Audio Signal Generator to generate signal sound files. The 1-kHz and 10-kHz files offer a testing range easily heard by the human ear and supported by each of the boards. A Leader Instruments LDM-171 Distortion Meter provided distortion and signal-to-noise measurements. The LAG-126 and LDM-171 were provided courtesy of Leader Instruments, Hauppauge, New York.

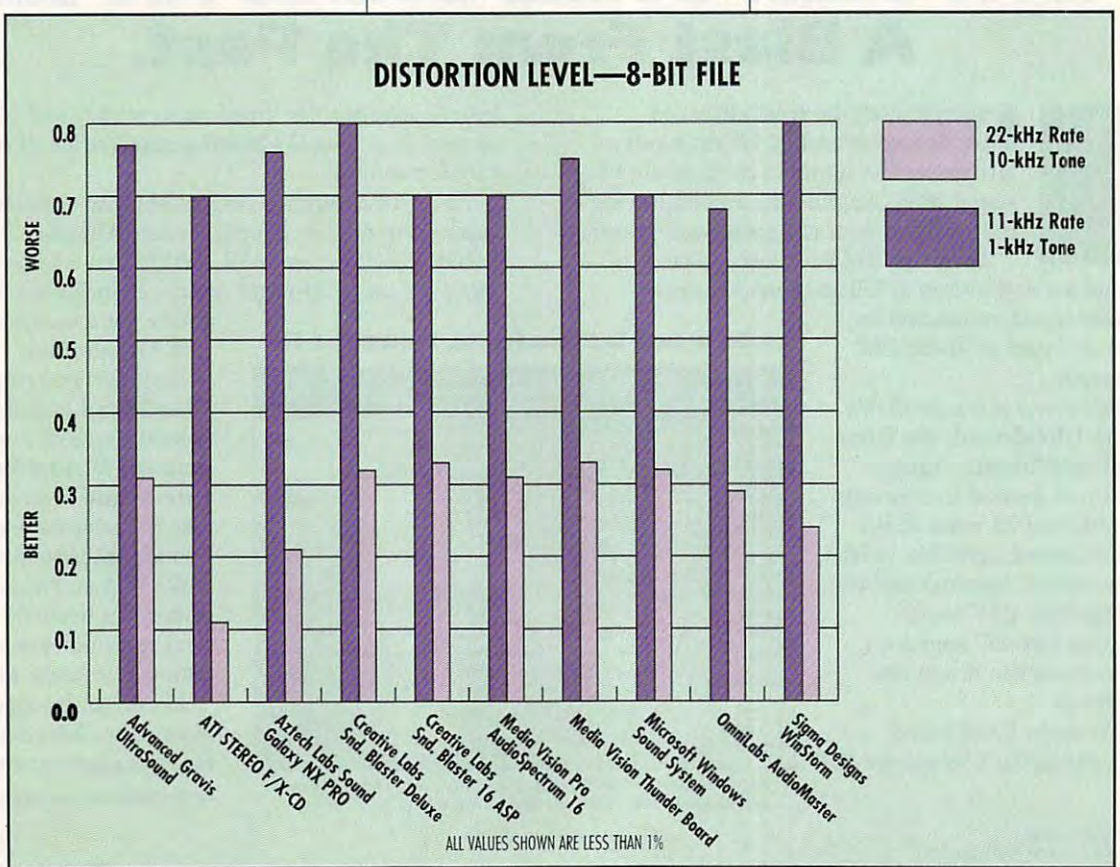
The sine waveforms and characteristics of the test signals were checked using a Gage CompuScope Lite 64K oscilloscope board and GageScope Digital Oscilloscope software, which we installed in the test system. The board and software were provided courtesy of Gage Applied Sciences, Montreal, Canada.

We ran the CPTS proprietary audio test files from within Windows 3.1 using Voyetra Technologies' AudioView software. Distortion and signal-to-noise readings were taken from each board's headphone or speaker output using both the 1-kHz and 10-kHz test files.

We tested each sound board's Ad Lib, Sound Blaster, and Disney Sound Source compatibility using Spectrum HoloByte's Falcon 3.0, Davidson's Zoo Keeper, The Learning Company's Operation Neptune, Sierra On-Line's King's Quest VI, Interplay Productions' Out of This World, and Virgin Games' Dune.

Joseph Fisher, product manager at Leader Instruments, provided technical assistance in calibrating and setting up the LAG-126 and LDM-171 Distortion Meter.

—TOM BENFORD, PRESIDENT
COMPUTER PRODUCT TESTING SERVICES



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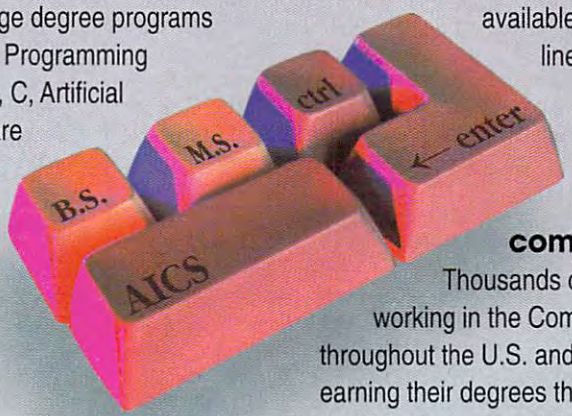

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Galaxy Master, a digital recording and playback program. Another utility program called Jukebox permits you to create playlists and play sound files, and CD Player serves as a CD-audio control panel. Another disk, called Sound Tracks, is a collection of song files, and still another disk contains Windows 3.1 drivers. There's certainly no lack of software here.

Of all the sound cards covered in this issue, the NX PRO undoubtedly offers the widest spectrum of compatibility. This stereo board supports four sound standards: Ad Lib, Sound Blaster Pro 2.0, Covox Speech Thing, and even the Disney Sound Source. During the review I ran several software titles which use sound, including Dune, King's Quest VI, Operation Neptune, Zoo Keeper, and Out of This World. I encountered no compatibility or audio playback problems.

The Sound Galaxy NX PRO provides good stereo sound quality, exceptional compatibility, a nice selection of features, and good upgrade and expansion potential.

Circle Reader Service Number 373

CREATIVE LABS SOUND BLASTER DELUXE

One of the first audio cards on the scene for PCs, the original Sound Blaster from Creative Labs set the industry standard for sound. Creative Labs has continued to refine and improve the Sound Blaster, so it's an oldie but a goodie.

As the Sound Blaster has evolved over the years, its physical form has changed as well. The original Sound Blaster, a three-quarter-length card, contained lots of discrete components; the new Sound Blaster Deluxe, now only half-length, uses plenty of large-scale integration to reduce the number of components required. The board will install in any available 8-bit slot.

CREATIVE LABS
1901 McCarthy Blvd.
Milpitas, CA 95035
(800) 998-5227
(408) 428-6600
List price: $129.95
Warranty: one year

Creative Labs has added a one-eighth-inch jack on the backplane of the board, increasing the total number of jacks to 3 (from 2 on the earlier Sound Blaster versions). This additional input jack accommodates line input, whereas line and microphone input shared the same jack in the past. There's also a line output jack, a manual volume wheel, and a 15-pin D connector for attaching a joystick. This connector doubles as an attachment point for an optional MIDI Connector Box so that you can use a MIDI keyboard or instrument with the Sound Blaster. The Sound Blaster Deluxe does not provide a built-in CD-ROM interface, however.

The Sound Blaster Deluxe comes preconfigured to use I/O address 220, IRQ 7, and DMA channel 1; these default settings will work with most systems, although there are some instances when IRQ 5 may be more desirable (LPT1 is usually assigned to IRQ 7, and this might be troublesome in some systems). You change any of these default values by relocating the jumpers over the desired pair of pins to correspond with your choice.

Once you've completed the physical installation, all that remains is to run the automated installation application provided on the two high-density 3½-inch disks supplied; one contains the DOS programs, and the other contains Windows drivers and programs. A format-request card lets you receive low-density 3½-inch disks or either low- or high-density 5¼-inch disks. Your only cost for the optional-size media: the price of a stamp to mail the card back to Creative Labs.

During the review I installed the Sound Blaster Deluxe in a 486DX/50 PC, and the DOS portion of the installation proceeded without a hitch. The software correctly found the card; identified the IRQ, I/O, and DMA settings; and successfully played the provided sound test files. I ran several DOS-based games with the Sound Blaster Deluxe, and everything worked just fine.

Windows, however, was another matter. Running the Winsetup.exe program from within Windows produced an error message telling me that the Sound Blaster Deluxe environment wasn't set (even though it had been from the DOS installation) and refusing to let me proceed any further.

To get around the problem, I tried installing the drivers from the Add Drivers section in the Windows control panel. I managed to install the Sound Blaster Deluxe MIDI Synthesizer and Sound Blaster Deluxe Wave and MIDI drivers; I was not, however, able to get them to work. Upon loading Windows I heard a distinct "click" sound from the speakers

Benchmark/performance testing was conducted by Computer Product Testing Services, Inc. CPTS is an independent testing and evaluation laboratory based in Manasquan, NJ. Every effort has been made to ensure the accuracy and completeness of this data as of the date of testing. Performance may vary among samples.

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but no opening Windows sound (the default "tada" sound). Looking in the control panel section under Sounds, I found that all of the sound file names were ghosted out, signifying that Windows wasn't recognizing the Sound Blaster Deluxe.

I called Creative Labs' tech support department and waited only about six or seven minutes in the holding queue before a technician picked up my call. After double-checking my settings and asking me a few questions about my system, the tech support person told me that there were some known problems with the Deluxe drivers when used with high-speed 486 systems. I was advised to use the Sound Blaster 1.5 drivers included on the Windows system disks to get me up and running until a set of updated Deluxe drivers arrived via Federal Express the next day.

Time being of the essence, I decided to turn off both the internal and external caching on my 486DX/50 system to see if that would help. Presto—with the caching disabled, I could load and use the Sound Blaster Deluxe drivers without further incident or problems. Since my motherboard does not support dual speeds, disabling the caching apparently slowed the system down enough for the 8-bit Sound Blaster board to be recognized. When the new drivers did arrive, I still found it necessary to keep the on-board caching disabled in order for them to work correctly.

Like earlier Sound Blasters, the Sound Blaster Deluxe is an inexpensive audio product that delivers good performance and has industrywide software support.

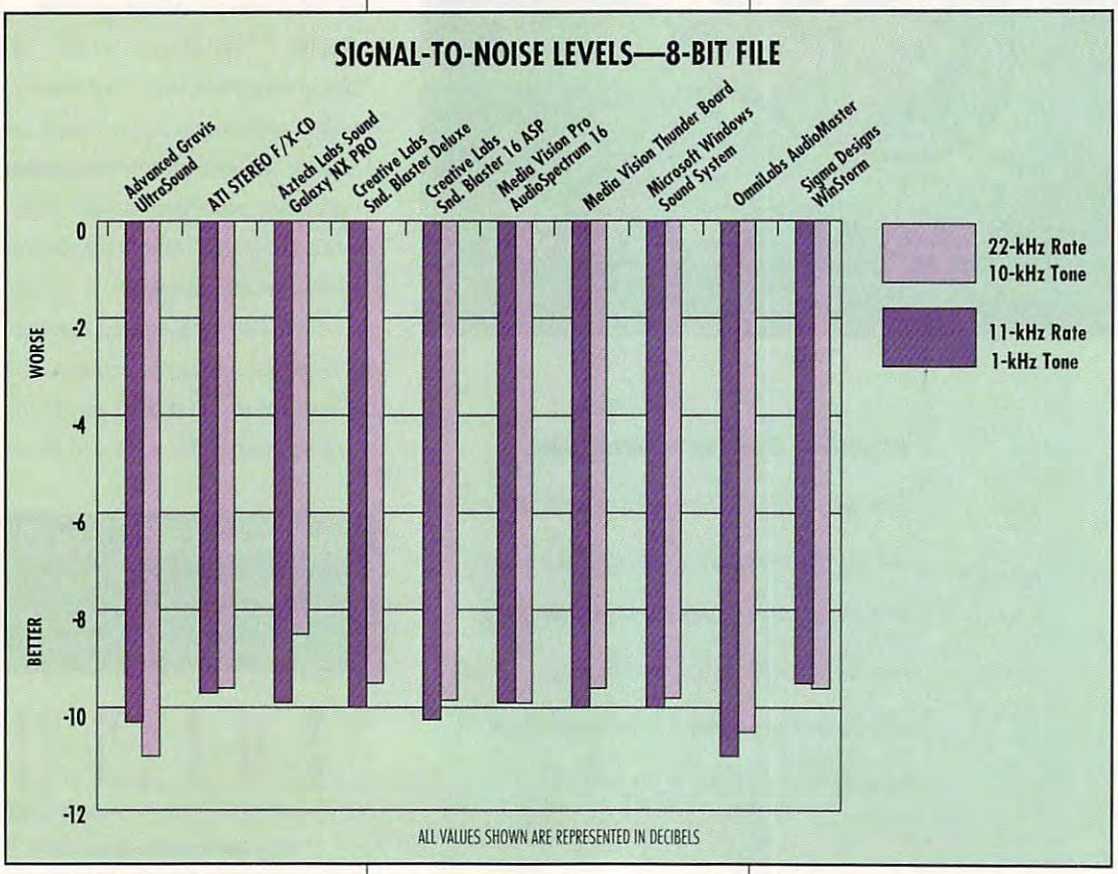
Circle Reader Service Number 374

CREATIVE LABS SOUND BLASTER 16 ASP

Creative Labs has taken the basic features of its Sound Blaster Pro card and added its ASP (Advanced Signal Processing) technology to produce true 16-bit stereophonic recording and playback while maintaining full compatibility with software designed to run on the original Sound Blaster and Ad Lib sound boards.

The 20-voice FM synthesizer capabilities of the Yamaha YMF262-M (OPL3) chip combine with lots of highly integrated components and several of Creative Labs' proprietary chips to deliver the best of both the FM synthesis and digital audio technologies.

This three-quarter-length card



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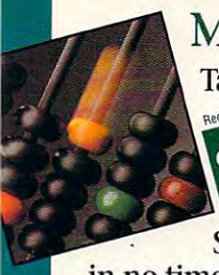

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requires a 16-bit expansion slot for installation. A wheel mounted on the board's backplane bracket controls volume. There you'll also find jacks for microphone input, line level input, and speaker or headphone output. Creative Labs supplies a high-quality dynamic microphone and a miniphone-to-RCA patch cable. A 15-pin D connector for attaching joysticks or the optional MIDI breakout box also resides on the mounting bracket.

As with the other better-quality sound cards covered here, the 16 ASP provides several connectors for channeling various sound elements through the board for recording, playback, mixing, or integrating. Connector pins are provided for routing the sound of the PC's internal speaker and CD audio through the 16 ASP. The board also includes a CD-ROM interface that supports internal CD-ROM drives from Creative Labs or Panasonic drive models CR-521 and CR-523. For attaching the optional Wave Blaster daughter board, there's a pin connector.

The Wave Blaster daughter board endows the 16 ASP with 32-voice, multitimbral stereo sound using E-mu Systems' sampled wavetable synthesis technology. If you're interested in exploiting the musical and MIDI capabilities of this board, you should also consider buying the Wave Blaster Upgrade option.

CREATIVE LABS
1901 McCarthy Blvd.
Milpitas, CA 95035
(800) 998-5227
(408) 428-6600
List price: $349.95
Warranty: one year

The Sound Blaster 16 ASP comes with plenty of software. The assortment includes Creative Wavestudio, a Windows-based wave editor that supports editing multiple sound files simultaneously. Creative Soundo'le, an object-linking recording and playback utility, is also included, along with Creative Mosaic, a tile-matching game with bit-mapped graphics and, of course, sound effects. The Creative Talking Scheduler helps you keep up with your calendar and appointments by giving you voice-annotated reminders.

Other bundled software consists of HSC's Interactive, a multimedia presentation-authoring, icon-animating, and image-enhancing package; PC Animate Plus, an animation creation program; and Monologue for Windows, a text-to-speech utility.

Several of the standard software offerings from Creative Labs also come with the Sound Blaster 16 ASP, including SBTalker with Dr. Sbaitso, FM Intelligent Organ, SBMIDI (MIDI file driver), SBSIM (Sound Blaster Standard Interface Module), MMPLAY (multimedia presenter), and DOS and Windows 3.1 software drivers. Creative Labs supplies the software on 3½-inch high-density disks, but a format-request card makes getting low-density 3½-inch or low- or high-density 5¼-inch disks as simple as affixing a stamp, filling in your name, address, and other pertinent information, and dropping the card into a mailbox.

The Sound Blaster 16 ASP proves that you can make a good thing better by constantly improving it with the latest technological advances.

Circle Reader Service Number 375

MEDIA VISION PRO AUDIOSPECTRUM 16

Media Vision's Pro AudioSpectrum 16 audio board has been around for some time now, but additional features and software utilities that the manufacturer now provides with the hardware keep this 16-bit stereo sound card current for today's more demanding audio applications.

A three-quarter-length board, the PAS 16 requires a 16-bit expansion slot for mounting. Three one-eighth-inch jacks on the board's mounting bracket accommodate microphone input, stereo line input, and stereo line output. A 15-pin D connector on the mounting bracket connects the optional MIDI Mate or an external SCSI cable kit.

The board also has a standard 50-pin SCSI interface connector for attaching a ribbon cable, as well as a 5-pin connector for routing CD audio through the board. There's also a 4-pin connector for

MEDIA VISION
3185 Laurelview Ct.
Fremont, CA 94538
(800) 845-5870
(510) 770-8600
List price: $299
Warranty: three years

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channeling the PC's system beeps through the board instead of through the computer's speaker (appropriate cables for making these connections are available as options). The board's mounting bracket doesn't contain a manual volume control wheel or knob because you adjust the volume via the software rather than through hardware.

Installing the board involves inserting it in a suitable expansion slot and putting the PC back together again; there are no jumpers or DIP switches to set, making this one of the easiest boards to install.

You should find the software installation for both DOS and Windows almost as easy as the hardware portion. Default IRQ, DMA, and port settings; subdirectory options; and installation options will work just fine with the majority of installations. However, you're given the opportunity to override the defaults if you so desire. A particularly nice feature is the automatic IRQ and DMA conflict testing, which alerts you to the possibility of a conflict and even tells you how to resolve it.

Running the Setup.exe program from within Windows will configure the board, load the appropriate drivers, create a program group, and install the audio applications in that group. The PAS 16 package includes four applications. Pocket Recorder, a simple recording and playback program, offers surprisingly good editing and effects features. Pocket Mixer, a simplified audio mixing console, uses an analog representation of dials to make adjustments. Pocket CD is a CD-audio player utility (this works only if you have a CD-ROM drive installed). Pro Mixer, a ten-control mixer, uses "sliders" to increase or decrease recording or playback volumes from all of the audio components. The ten sliders are labeled SYNTH, REC, AUX, CD, MIC, WAVE, SPKR, BLSTR, Master, and Record.

The DOS utilities provided include Stereo Studio F/X, a recording, playback, and editing package; SP Spectrum, a MIDI sequencer program; a DOS mixer; TrakBlaster Pro, a four-track music studio; Audio Mate, a DOS-based multimedia presentation package; and Monologue, a text-to-speech synthesizer.

One of the more noteworthy improvements to the software is Media Vision's new virtual device driver for Windows, which allows Windows and DOS software applications to share the PAS 16 hardware without the conflicts that frequently cause applications to crash. This feature allows you to run DOS applications (such as games) through a DOS window and still have full access to the sound card from both the DOS application and Windows.

With the ability to record and play back sound at a sampling rate of up to 44.1 kHz, this board is capable of CD-quality audio. Media Vision's Pro AudioSpectrum 16 remains a highly desirable product for adding sound to your system.

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Fremont, CA 94538
(800) 845-5870
(510) 770-8600
List price: $169
Warranty: three years

MEDIA VISION THUNDER BOARD

If you're looking for an inexpensive way to get into the world of sound and audio for both DOS and Windows applications, the Media Vision Thunder Board merits a close look.

The Thunder Board, a half-length card, installs easily into any available 8-bit expansion slot in the PC. The board uses a bank of four jumpers for changing the default IRQ setting, as well as a six-position DIP switch to select addresses, activate or deactivate the joystick port, enable or disable FM synthesis, and other functions.

The board's mounting bracket contains a volume wheel, a pair of one-eighth-inch jacks (one for input and one for output), and a 15-pin D connector for attaching a joystick. External MIDI functions are not supported by the Thunder Board, nor does it have a CD-ROM interface.

While it may lack these expanded capabilities, the Thunder Board does have all of the basic elements that most users interested in adding sound to their computing will want. It uses a Yamaha 3812 (OPL2) synthesizer chip to produce 11-voice FM music synthesis, and it's capable of recording and playing back 8-bit sounds up to 22 kHz. The Thunder Board's microphone input circuit also has AGC (Automatic Gain Control) to provide smooth recording at the proper volume level with minimal distortion.

You install the Thunder Board from DOS using an automated installation program that creates a subdirectory on the hard drive and copies over a series of files. The package includes both 3½-inch and 5¼-inch disks, a practice that I like.

During installation, the software checks to determine the card's address and IRQ settings, and a test tone helps you adjust the volume. The entire process

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takes only a few minutes and, like the Thunder Board itself, is efficient without frills.

Included in the Thunder Board package you'll find a series of DOS-based utilities, which are copied to the THUNDER subdirectory during the installation process. The Recfile.exe program records sound files, and as you might guess, the Playfile.exe program plays them back. A Setvol.exe program produces an audible tone so you can manually adjust the volume (using the volume wheel on the board's mounting bracket) to a suitable level. A diagnostic program called Tbtest.exe determines the board's hardware settings and will optionally also play the test tone for checking volume.

The Thunder Board packs plenty of free software samplers in the package. A full working copy of MicroProse's F-15 Strike Eagle II is supplied, along with a complete 96-page user manual for the game. In addition, sampler editions of the following games are also provided: Nova 9 (the sequel to Stellar 7), Lemmings, LexiCross, Rex Nebular, and Goblins. If you're into games, the software included justifies the purchase price of the board alone.

Media Vision's Thunder Board is an good entry-level sound card that will appeal to gamesters and others who want to add sound to their applications without breaking the bank.

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MICROSOFT
One Microsoft Way
Redmond, WA 98052-6399
(800) 426-9400
(206) 635-7040
List price: $289
Warranty: one year for hardware, 90 days for software

MICROSOFT WINDOWS SOUND SYSTEM

The Microsoft Windows Sound System, as its name clearly indicates, is designed for Windows only, and it targets the business computer user.

Look at the board closely, and you'll see that its physical configuration departs from the norm with regard to its components. A half-length unit, the Windows Sound System has both a Yamaha YMF262-M FM synthesizer and an Analog Devices CODEC digital sound processor as sound-generation sources.

The metal mounting bracket of the board contains three jacks to accommodate line input, microphone input, and headphone or speaker output. Two RCA jacks route the board's line output to another location; the only things you need are standard audio cables.

Along with 5¼-inch and 3½-inch high-density software disks, you get a form for requesting 3½-inch low-density (720K) disks. A decent pair of lightweight stereo headphones and a microphone also come with the Windows Sound System package, so you're ready to record, play back, and use sounds as soon as you complete the installation.

Installing the Windows Sound System consists of inserting the sound board into any available 8- or 16-bit expansion slot. A 16-bit slot, however, provides the best flexibility for the hardware configuration, because with a 16-bit slot you have additional addresses and IRQ lines to avoid conflicts in systems with plenty of peripherals. Jumpers on the card allow you to change the default address of 530, although this I/O address should work without a problem in most systems.

You can install the software from either DOS or Windows; the only difference is that the DOS installation starts Windows first, a step not required if you launch the setup from within Windows itself.

The Windows Sound System setup automatically starts when Windows is rebooted. First, the sound test checks the proper operation of the board and helps you troubleshoot any problems. If everything checks out as it should, the software installation

FM SYNTHESIS VERSUS WAVETABLE SOUND TECHNOLOGY

The principal difference between FM synthesis and wavetable sound is that with FM synthesis the sound is synthesized (artificially created), whereas with wavetable technology the data parameters (sound wave characteristics) of the actual sound are stored in internal memory on the sound card.

The sounds that are possible using FM synthesis are limited by the architecture of the synthesizer chip and the formulas hard-wired into its circuits.

Wavetable technology generates sounds by scanning either entire waveforms or portions of them from sounds produced by a real instrument; consequently, there are no limitations to the number or types of sounds that can be produced based on the chip's circuitry or algorithms. Different wavetable "patches" load different instrument sounds into memory and make them available for use. Wavetable technology, since it is RAM based, offers the ability to load a variety of patch sets to change the instrument selection available; FM synthesis technology is limited to the sounds possible from the circuits on the FM chip.

—TOM BENFORD

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Irwindale, CA 91706
(818) 813-2638
List price: $299
Warranty: one year

can proceed. If changes are required to resolve conflicts, an installation option permits modifying the settings for the board prior to installing the software.

The setup program installs Volume Control, Recording Control, SoundScapes, and Sound Control Panel in the Windows Control Panel, since these are required as system sound software elements. The setup program also creates a Windows Sound System program group and installs the system sound software icons and other applications in this group as well. The ProofReader application is installed with a Proof menu in Microsoft Excel or Lotus 1-2-3 for Windows if selected as an option during the installation process.

In addition to creating annotated voice files which can be embedded and linked into word-processing documents, spreadsheets, and other Windows applications, the Windows Sound System offers an innovative feature—voice recognition capabilities. The supplied voice recognition application, called Voice Pilot, enables you to execute commands by voice using the microphone that comes with the Windows Sound System.

With Voice Pilot, it's possible to navigate through the Windows operating system and 15 popular Windows-based applications via limited voice recognition. You can issue menu commands, including system commands such as "next window," or commands in a word-processing document, such as "Cut" and "Paste." Voice Pilot can also control customized commands, such as using a standard closing or boilerplate, which will insert predefined standard text into a document upon a spoken command.

The voice recognition is surprisingly accurate, and while I found that Voice Pilot understood my speech without a problem, you can also use a training mode to adapt it to different accents, pronunciations, or dialects.

If you're a game enthusiast, take note. While the lab was unable to test the Windows Sound System for Ad Lib or Sound Blaster compatibility because the test unit did not have these capabilities at the time of testing, Microsoft now provides Ad Lib compatibility and Sound Blaster compatibility, according Microsoft representatives.

Business users will find the Windows Sound System to be a most useful add-on that really enhances the power and dimension of computing under Windows 3.1.

Circle Reader Service Number 378

OMNILABS AUDIOMASTER

OmniLabs has taken a modular approach with its AudioMaster sound board, offering special enhancements and capabilities as accessory modules which attach to the sound board.

The almost-full-length board requires a single 16-bit expansion slot for installation, even with an optional daughter board (such as the FM Synthesizer Module) installed on the main AudioMaster unit. The board's backplane bracket provides a home for three jacks: one for line output, one for auxiliary input, and one for microphone input. A standard 15-pin D connector can attach one or two joysticks or the optional MIDI breakout box accessory ($69.95).

A variety of CD-ROM interface accessory modules ($69.95–$79.95) permit adding an internal CD-ROM drive and routing its audio through the AudioMaster. Kits are available for generic SCSI CD-ROM drives, for the Sony SLCD drive, for the Sony 531 and 525 drives, for Mitsumi CD drives, for Matsushita or Panasonic drives, and for Philips and LMSI (Philips manufactured) CD-ROM drives. The necessary driver software, ribbon interface cables, and audio output cables come with each of these kits. These kits are intended for use only with internal drives.

Technologically, the Audio Master differs a great deal from other sound cards. It has its own 32-bit Motorola 68008 CPU complete with an operating system and RAM as integral components of the board. This board uses wavetable lookup synthesizer technology rather than chip-based FM sound and music synthesis. This gives the AudioMaster an impressive range of 24 polyphonic channels which are fully independently controlled via MIDI commands. You get 128 instrument sounds, and 24 different timbres (or voices) can be played simultaneously, so you can virtually duplicate the instrument ensemble of a decent-sized orchestra. The excellent quality of the instrument sounds is equivalent to that of a high-end music synthesizer keyboard.

Since the AudioMaster uses wavetable technology, it isn't compatible with software designed to support Ad Lib or Sound Blaster sound standards unless you add the optional FM Synthesizer Module daughter board ($69.95). This small board snaps into a connector on the main board and contains a Yamaha 3212 (OPL2) chip, which enables the Audio Master to play FM-synthesized sounds and music. Sound Blaster speech functions, however, are not supported, even with the

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FM accessory module installed.

The AudioMaster's 128-instrument-sound wavetables are stored in its 384K of on-board memory. The RAM Expansion Module daughter board accessory ($99.95) adds another 1152K of memory, allowing more sophisticated and comprehensive wavetables to be stored and used. You also get a disk of enhanced instrument files with the module, which snaps into two connector receptacles on the AudioMaster board.

An RCA-to-miniphone audio cable and a good dynamic microphone come with the package, along with 3½-inch disks, an excellent user's guide, an equally excellent music application software manual, and an accessory catalog. The software bundled with the Audio Master includes a digital audio recorder, a mixing studio, a CD-music player, and MIDI jukebox applications for Windows, as well as numerous sound clips and Monologue text-to-speech software. DOS applications include Band-in-a-Box (an automated music composer), 2-Part Music Tutor, Sequencer Plus Jr., Multimedia Control Center, Command-Line Multimedia Player, and recorder, mixer, jukebox, and CD-music player programs.

If you're seriously interested in exploiting the sound capabilities of wavetable synthesis and the power of MIDI as a control medium, along with excellent CD-quality audio recording and playback capability, the AudioMaster is a product that deserves your attention.

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SIGMA DESIGNS
47900 Bayside Pkwy.
Fremont, CA 94538
(800) 845-8086
List price: $429

SIGMA DESIGNS WINSTORM

The Sigma Designs WinStorm gives you full 16-bit audio and 24-bit true color SVGA video, along with joystick, MIDI, and SCSI interfacing capabilities, all on a single card.

The three-quarter-length WinStorm board is densely populated with highly integrated components. The board's mounting bracket contains a 15-pin D connector for attaching a color monitor, along with three jacks for microphone input, line input, and headphone or speaker output; no manual volume control is provided. In addition to a 16-bit expansion slot for installation, you'll require a second access slot in the PC's case to receive the mounting bracket which contains the 15-pin D connector for attaching a joystick (this connector doubles as the MIDI I/O connector and attaches via a ribbon cable to the board).

The WinStorm's video is excellent, providing 24-bit true color (16.8 million colors) and SVGA modes up to 1024 × 768 with 256 colors. The board also features fast vertical refresh rates and VESA BIOS compatibility, which means that any modes supported under the VESA specification work correctly with this board. A MultiMode Control Panel application allows instant resolution switching via software under Windows, a very novel and handy capability. For popular applications such as AutoCAD and others, the package provides a number of DOS video drivers.

The WinStorm is certainly no slouch when it comes to audio capabilities. It has a Yamaha YMF262 (OPL3) 20-voice stereo synthesizer chip as its sound source, which also endows the board with full Ad Lib and Sound Blaster compatibility. Since the audio chip set used on the WinStorm comes from Media Vision, the board is also fully compatible with the Thunder Board and Media Vision Pro AudioSpectrum 16 sound standards.

This board uses jumpers for enabling or disabling functions (for example, VGA on and off), altering default settings (such as IRQ), and other variables, although the defaults will prove satisfactory for most installations. Several pin connectors on the board attach various cables. One routes the PC's sound through the board, and another channels the CD-ROM drive's audio through it as well. Another 4-pin block attaches external audio sources, and there's also a 50-pin SCSI connection, in addition to the connector for attaching the joystick or MIDI ribbon cable noted earlier.

All of the WinStorm software comes supplied on high-density (1.44MB) 3½-inch disks; I found no mention of the availability of 5¼-inch disks on or in the package. Of the nine disks provided, three contain Windows drivers, OS/2 2.0 drivers, DOS drivers, and utilities.

Additional software exploits the sound and multimedia capabilities of the WinStorm card. Animotion's MCS MusicRack, a Windows-based utility, allows you to control multimedia hardware with an interface resembling a home stereo. You also get Midisoft's Multimedia Music Library, a collection of MIDI music and sounds. Multimedia Make Your Point, a Windows-based presentation application from Asymetrix, completes the assortment of bundled software.

Sigma Designs' WinStorm is a good, cost-effective means of adding high-resolution video, 16-bit audio, and other multimedia features, all in one product.

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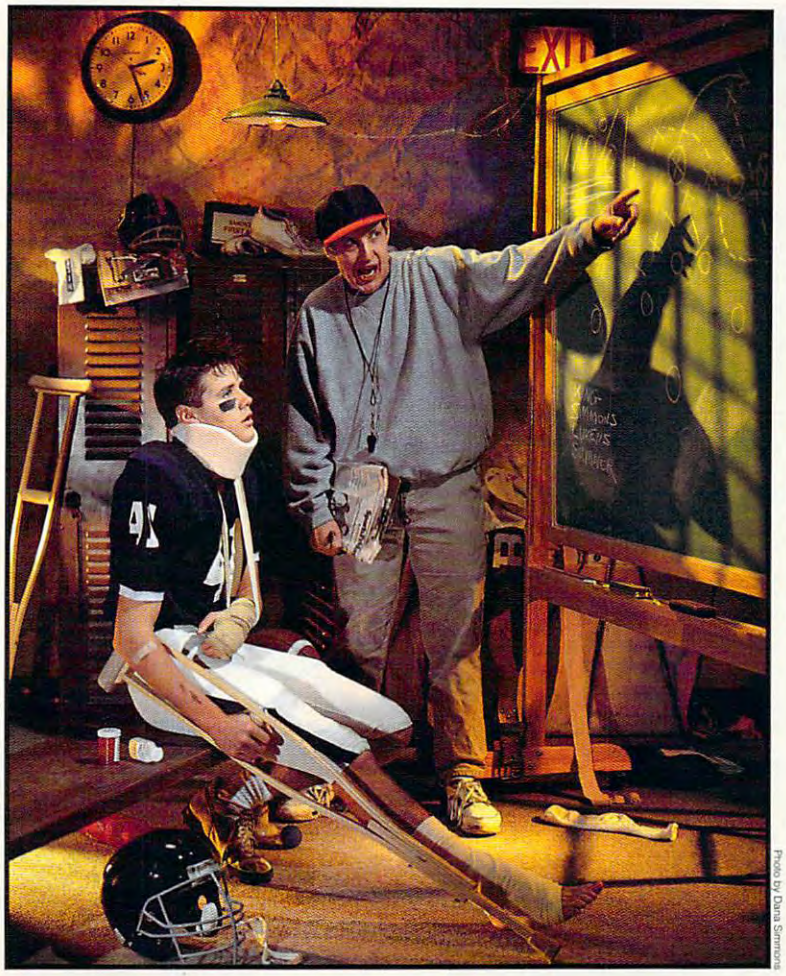
"Now listen, Tank, when this 300 pound bug gets in your way, run a dynamic link library around it. You know what the other team's got so you'd better go over our playbook and learn about object inheritance, operator overloading, and virtual destructors. Better yet, telnet to BIX and get into their Objective C huddle and go over strategies with the other BIXen, they're real pros. After you've reviewed all the plays, send Internet mail to my old buddy RAM at genvid.com to get his feedback. Let me give it to you straight, Tank, if you ever want to get off the bench and become a Hall of Famer, you'd better sign up with the BIX team."



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BIX

If you can hack it

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SOUND CARD FEATURES

	Advanced Gravis UltraSound	ATI STEREO F/X-CD	Aztech Labs Sound Galaxy NX PRO	Creative Labs Sound Blaster Deluxe	Creative Labs Sound Blaster 16 ASP
Slot required	8-bit or 16-bit	8-bit or 16-bit	8-bit or 16-bit	8-bit	16-bit
Compatibility					
Ad Lib	yes	yes	yes	yes	yes
Sound Blaster	yes	yes	yes	yes	yes
Disney	no	no	yes	no	no
Driver(s) for Windows 3.1	yes	yes	yes	yes	yes
Can be used from DOS	yes	yes	yes	yes	yes
Stereo or mono	stereo	stereo	stereo	mono	stereo
Microphone input	yes	yes	yes	yes	yes
Line input	yes	yes	yes	yes	yes
MIDI	yes	yes	yes	yes	yes
Joystick port	yes	yes	yes	yes	yes
External volume control	yes	yes	yes	yes	yes
Software volume control	yes	yes	yes	no	yes
CD-ROM interface	option	proprietary	proprietary	no	proprietary
Sound sampling	yes	yes	yes	yes	yes
Sampled sound playback	yes	yes	yes	yes	yes
Sampling rate	8-bit[1]	8-bit	8-bit	8-bit	8-bit, 16-bit
8-bit	to 44 kHz	to 44 kHz	to 44 kHz mono (22 kHz stereo)	to 15 kHz	to 44.1 kHz
16-bit	to 44 kHz	NA	NA	NA	to 44.1 kHz
Audio compression	NA	2:1, 3:1, 4:1	2:1, 3:1, 4:1	2:1, 3:1, 4:1	2:1, 3:1, 4:1
Synthesizer chip set	Gravis Wavetable	OPL3	OPL3	YM3812 (OPL2)	OPL3 and CODEC
Number of synthesizer voices	32	20	20	11	20
Microphone supplied	no	no	no	no	yes
Headphones supplied	no	no	no	no	no
Patch cable supplied	no	no	yes	yes	yes
Speakers supplied	no	no	yes	no	no

NA=not applicable

[1]The manufacturer offers a 16-bit option.

GLOSSARY

decibel. A measure of sound intensity. One decibel is the smallest unit of sound that the human ear can hear.

8-bit/16-bit sound. This refers to the dynamic range of the sampled sound, with 16-bit having double the amount of sound data of 8-bit sound. While 8-bit sound provides 48 dB of dynamic range, 16-bit increases the range to 96 dB, or double that of 8-bit. Since more sound information is involved, 16-bit sound requires more memory and more disk space for storing the sounds than 8-bit sound does, but it provides much better quality.

FM (Frequency Modulation) synthesizer chip. A chip with predefined circuits that generate sound waves. To synthesize different sounds, one fixed waveform modulates (adjusts the characteristics of) another. The resultant waveform can have harmonics (tonal quality) better than those of either of the two waveforms used to create it. By varying the modulation and adding more waveforms to the mix, you can approximate the sounds of musical instruments. The Yamaha YM3812 and YMF262 are the two most commonly used FM synthesizer chips.

harmonic distortion. The "overtones" produced as byproducts of generating the original signal. These are naturally occurring signals that are generally multiples of the original signal. Unfortunately, the harmonics can degrade the original quality of the signal. The greater the number, the lower the quality.

line level input/output. A line level signal is typically put out by audio components which do not require preamplification (CD and cassette players, for example). Line level signals are based roughly on the signal intensity sent over a telephone line.

MIDI breakout box. An assembly which usually attaches to the 15-pin joystick connector on an audio card to provide additional input and output connec-

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SOUND CARD FEATURES

	Media Vision Pro AudioSpectrum 16	Media Vision Thunder Board	Microsoft Windows Sound System	OmniLabs AudioMaster	Sigma Designs WinStorm
Slot required	16-bit	8-bit	8-bit or 16-bit	16-bit	16-bit
Compatibility					
Ad Lib	yes	yes	yes[1]	option	yes
Sound Blaster	yes	yes	yes[1]	option	yes
Disney	no	no	no	no	no
Driver(s) for Windows 3.1	yes	yes	yes	yes	yes
Can be used from DOS	yes	yes	no	yes	yes
Stereo or mono	stereo	mono	stereo	stereo	stereo
Microphone input	yes	yes	yes	yes	yes
Line input	yes	(uses microphone input)	yes	yes	yes
MIDI	yes	no	no	yes	yes
Joystick port	yes	yes	no	yes	yes
External volume control	no	yes	no	no	yes
Software volume control	yes	no	yes	yes	yes
CD-ROM interface	SCSI	no	no	proprietary[2]	SCSI
Sound sampling	yes	yes	yes	yes	yes
Sampled sound playback	yes	yes	yes	yes	yes
Sampling rate	8-bit, 12-bit, 16-bit	8-bit	8-bit, 16-bit	8-bit, 12-bit, 16-bit	8-bit, 12-bit, 16-bit
8-bit	to 44.1 kHz	to 22 kHz	to 48 kHz	to 44 kHz	to 44 kHz
16-bit	to 44.1 kHz	NA	to 48 kHz	to 44 kHz	to 44 kHz
Audio compression	2:1, 3:1, 4:1	2:1	2:1, 4:1	2:1, 3:1, 4:1	NA
Synthesizer chip set	YMF262 (OPL3)	YM3812 (OPL2)	OPL3 and CODEC	OmniLabs Wavetable[3]	OPL3
Number of synthesizer voices	20	11	20	24	20
Microphone supplied	no	no	yes	yes	no
Headphones supplied	no	no	yes	no	no
Patch cable supplied	no	no	no	yes	no
Speakers supplied	no	no	no	no	no

NA=not applicable

[1]According to Microsoft, the Windows Sound System now supports Ad Lib and Sound Blaster compatibility. However, because the lab had an earlier version of the Windows Sound System, those compatibilities were not tested.

[2]The manufacturer offers a SCSI option.

[3]The manufacturer offers an OPL2 option.

tors. The breakout box usually provides MIDI in, MIDI out, and MIDI thru connections for attaching external MIDI devices such as keyboards and drum machines. A connector for attaching a joystick is also usually provided on the breakout box.

patch. A sound data file used for loading desired sound libraries (data about a particular sound) into the sound card's memory. Patch files are usually used with wavetable and MIDI devices.

sample. The first step required to convert an analog signal into a digital representation. The analog sound is measured at regular intervals called samples. These measurement values are then encoded to provide a digital representation of the analog signal.

signal-to-noise ratio. This number represents the strength ratio of the desired signal (for example, music) to that of the extraneous noise present (for example, background hiss). The higher the number, the cleaner the sound will be. The signal (music) is measured at full volume, whereas the noise (hiss) is measured when no signal is present (during silence). In addition to hiss, noise can also include the whine of the computer or any other undesirable noise which is not a part of the signal itself.

timbre. Also called tonal color or musical quality, this term refers to the sound characteristics that allow us to differentiate one sound from another, the qualities that make sounds unique. For example, timbre is what makes a saxophone sound like a sax instead of a guitar.

—TOM BENFORD

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NEWS & NOTES

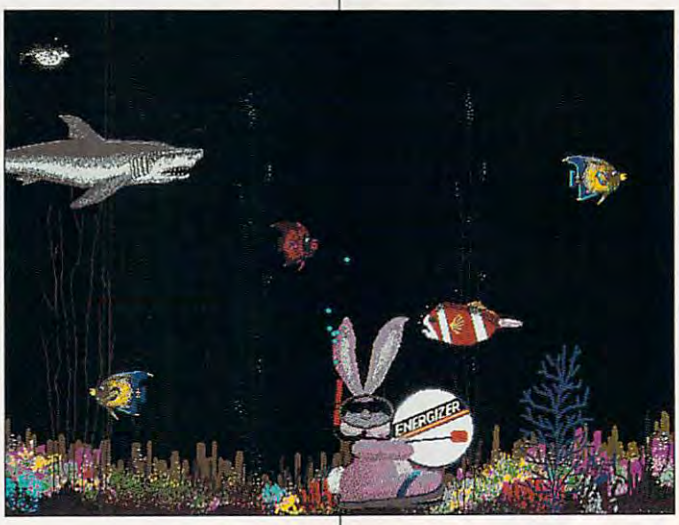
Jill Champion

Pentium Rollout

The long awaited rollout of the Pentium multitasking, superscalar (it can process up to two instructions in a single clock cycle), clone-killer chip has finally arrived.

Intel claims that the Pentium is up to five times as powerful as the 33-MHz Intel486 DX CPU and that the chip is fully compatible with existing software. Nonetheless, programs must be specially optimized to take full advantage of the new chip, so look for the emergence of a generation of Pentium-ready software.

Tonight on the adventure channel—no, it's that pink plush interloper, the Energizer Bunny.



The Pentium processor is offered in 66- and 60-MHz versions. "We expect that initial customers for Pentium processor–based systems will be those traditional early adopters who require increased performance to meet their needs. Additionally, these systems will surface in high-performance servers for corporate downsizing applications," said Paul Otellini, senior vice president and a general manager of Intel's Microprocessor Products Group. "As volume ramps over the next year, Pentium processor–based systems will gravitate toward more traditional desktop applications. Meanwhile, the Intel486 CPU–based systems continue to be the choice for today's mainstream application requirements."

The Pentium processor features two 8K on-chip caches, improved floating point performance, and a 64-bit burst-mode external bus. It has 3.1 million transistors—nearly three times as many as the Intel486 CPU.

The floating point unit (FPU) incorporates optimized algorithms and dedicated hardware to execute one floating point operation per clock cycle. Many applications will run five to ten times faster on a Pentium than on a 33-MHz Intel486 DX CPU.

For more information, contact Intel at (800) 548-4725 or write for Intel Literature Packet #JP-53, P.O. Box 7620, Mt. Prospect, IL 60056-7641.

He *Still* Keeps On Going...

. . . and going, and going, only this time he's marching across your screen. PC Dynamics recently teamed with Eveready to bring you the Energizer Bunny screen saver—an energizer for your workday to chase the doldrums away. The "hare with flair" pops onto your screen for guest appearances when you least expect it, safely interrupting your computer session for some humorous shenanigans with a snorkel, parachute, flag, and other accoutrements. Under Windows 3.1, the pink guy thumps his drum loud enough for you to hear through your PC's built-in speaker. If you have a sound board, you'll hear fully digitized sound clips excerpted from several different commercials, complete with the announcer. (Doesn't everyone need a commercial break?) And he's compatible with other screen savers, so if you're not satisfied with the Energizer Bunny on his own, you can have him make guest appearances with the crew of the *Enterprise,* a screenful of flying toasters, or your other favorite screen saver. Suggested retail price is $24.95. To find out more, contact PC Dynamics, 31332 Via Colinas #102, Westlake Village, California 91362; (800) 888-1741, (818) 889-1014 (fax).

Recharging Portables

Duracell, of the copper-top battery fame, announced last fall that it was entering the rechargeable battery category with its new nickel–metal hydride (Ni-MH) battery packs, which promise to be "the most advanced rechargeable system commercially available." The battery packs will provide up to 40 percent longer life than the best nickel-cadmium batteries currently on the market for computers, cellular phones, camcorders, and other portable devices.

Better yet, the company is already teaming with computer OEMs (Original Equipment Manufacturers) to establish a standard-sized Ni-MH rechargeable battery pack for all types of portable computers. By eliminating the num-

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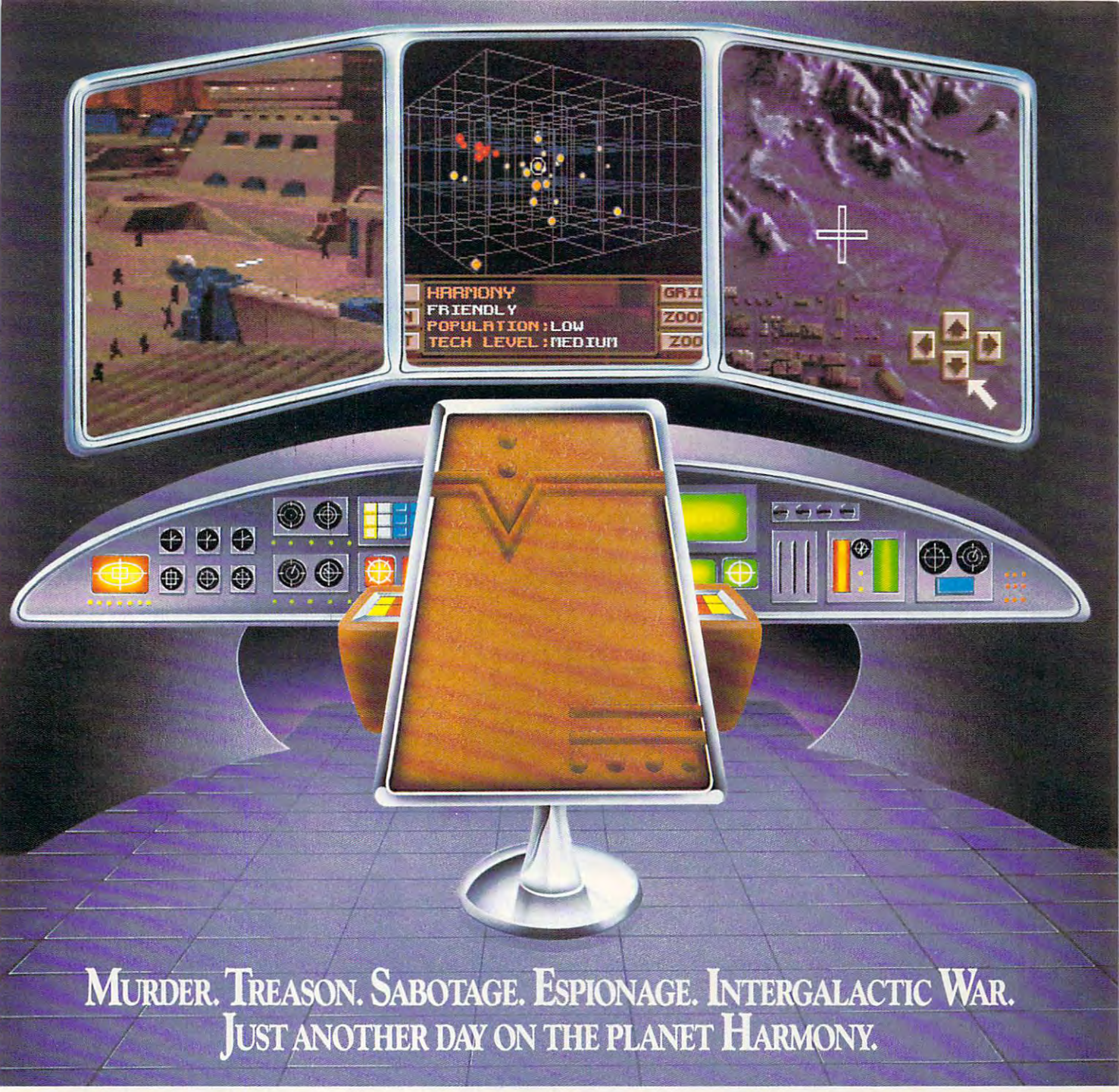

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ber of rechargeable pack sizes needed, Duracell hopes to minimize consumer confusion at retail, which means you'll be able to purchase replacement batteries for your notebook or laptop as easily as you now purchase flashlight batteries. For more information, contact Duracell, Berkshire Corporate Park, Bethel, Connecticut 06801; (800) 422-9001, (203) 791-3273 (fax).

Making Music

So, you're a Tchaikovsky or a Gershwin. Or maybe you're an Axl Rose. Whoever you are, you want to put those original tunes in your head down on paper. No need to spend hours agonizing with a number 2 pencil when you have a computer at your fingertips—and the right software. Coda, in case you haven't heard, has been at the forefront of music-making software since its release of Finale in 1988. Now, Finale has more power than ever to notate music.

IntelliKeys gives kids a keyboard they can use (and it's programmable).

Finale's powerful HyperScribe feature transcribes your performance while you're playing your MIDI instrument—even complex rhythms and tricky tempo changes—capturing every note and nuance in piano-roll graphics. You can choose one of two ways to enter lyrics: either directly into the score or with the built-in text processor. Either way, every syllable is neatly aligned with its note. You can also add headers, page numbers, and even a copyright notice to your music. Chords are made simple: You can easily add your own chord symbols or guitar fingerboard symbols, build a library of frequently used chords, or play a chord on your MIDI instrument and let Finale analyze and label it.

Everything you see on the screen can be accessed, edited, copied, moved, removed, changed, or customized: staves, dots, brackets, bar lines, headers, footers, ties, text—anything. And as for signatures, the program supports standard and nonstandard key signatures, so no matter what kind of music you play, from classical to alternative rock, Finale will handle it. The *grand* finale to this program is the stack of slick, publisher-quality musical scores it'll print for you.

Suggested retail price is $749. To find out more, contact Coda Music Technology, 1401 East 79th Street, Minneapolis, Minnesota 55425; (800) 843-2066.

Smart Keyboards for Kids

Preschool students, elementary school students, and even students with physical, visual, and cognitive disabilities will profit from IntelliTools' IntelliKeys "smart" keyboard. Designed with big graphics for little fingers, the keyboard works with Macintosh, Apple II, and IBM and compatible computers and includes six interchangeable keyboard overlays: Arrows, Alphabet, Numbers, Basic Writing, and standard IBM and Macintosh layouts. The overlays allow a parent or teacher to choose a keyboard face that matches a child's needs. Ease of use is one of the most attractive features of IntelliKeys. You simply plug IntelliKeys into your keyboard port and slide in the overlay of your choice, and you're ready to go. IntelliKeys keyboards work with all software programs that use standard keyboards. Suggested retail price is $395, which includes the keyboard, one computer cable, six user overlays, and one setup overlay. For more information, contact IntelliTools, 5221 Central Avenue, Suite 205, Richmond, California 94804; (800) 899-6687, (510) 528-2225 (fax).

Windy City Fair

If you're interested in viewing some of the more than 200 exhibits on new research and development in computer, communications, and control technologies, plan on being in the Windy City September 21–23 at Navy Pier. That's where Omron will hold its corporate global technology fair for the Western Hemisphere. Exhibits will include all of Omron's major new technologies and products introduced since 1991. Open to the public, the fair will feature numerous seminars and workshops, speakers and panelists, and special events and programs.

For more information, contact the Omron Technical Fair (OTF) Information Center, One East Commerce Drive, Schaumburg, Illinois 60173; (708) 843-7900, (708) 843-7787 (fax).

Companies or public relations firms with items of interest suitable for "News & Notes" should send information along with a color slide or color transparency to News & Notes, Attn: Jill Champion, COMPUTE, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. ❐

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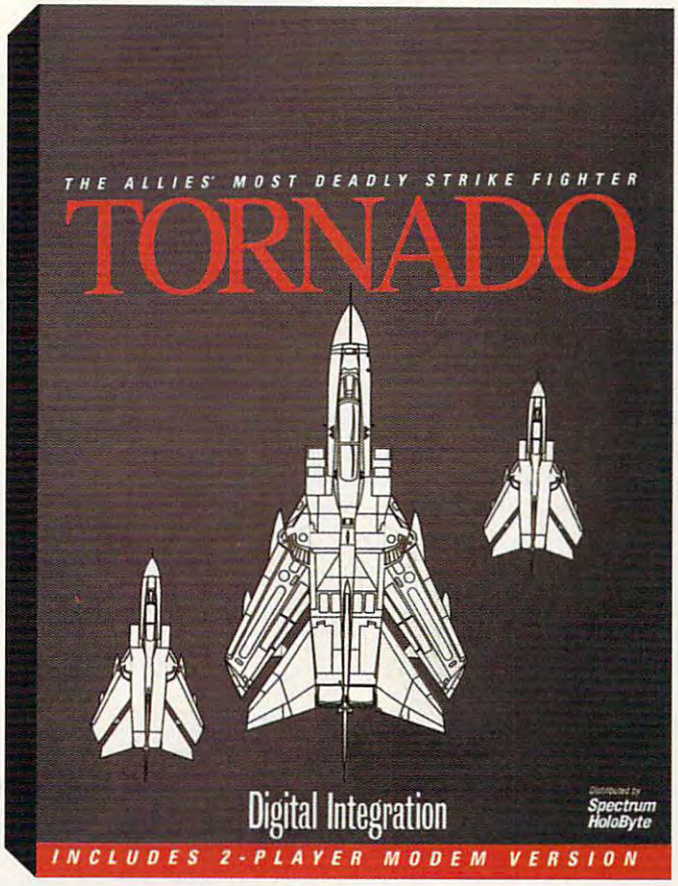

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FEEDBACK

Double floppy drives, DOS wallpaper, best windows word processor, non-Intel processors, type-in programs, and more

All in One

I've read in catalogs and some advertisements about an "all-media" disk drive that can read and write 5¼- or 3½-inch disks, all in one drive unit. Have there been any problems with these? Are they a good investment?

BRETT MCFALL
ROCK ISLAND, IL

We assume you're referring to the disk drives that pack two drive units—one 5¼-inch and one 3½-inch—into a single half-height package. We've heard no complaints about them.

They're ideal if you find yourself short of drive bays. You not only get two drives in the space usually reserved for one, but the drive also uses only one ribbon connector and one power connector.

Unfortunately—and this is the case with any integrated system—if one drive in the unit goes bad and you take it in for repair, you don't have the other drive until the unit comes back.

Wall Crawling

I created a Windows wallpaper that I'd like to display in DOS. Is there a way to do that?

Also, are the DeskJet 500C and 550C compatible with TrueType?

PETER MOORE
BROOKLYN, NY

In answer to your second question, any graphics printer with the appropriate Windows driver is compatible with TrueType.

In answer to your first question, here's a BASIC program that provides a DOS slide show of Windows wallpaper files. It should work for your wallpaper. The list of DATA lines at the end contains some of the wallpaper files that come with Windows 3.1. Just add your wallpaper to it. You can save time on the display by making your BMP file small and simple (the more variations in color within a single line, the longer the graphic takes to be displayed) and by compiling the program with QuickBASIC or a similar BASIC compiler. This program will only display 16-color BMP files measuring 640 by 480 or less.

If you're interested in writing a routine using GET and PUT to tile your logo, note that the variable tilewid *contains the tiling width of the BMP file, which isn't always the same as the width of the graphic.*

```
SCREEN 12
DIM a&(255)
DIM filebyte(640)
top:
READ file$
IF file$ = "000" THEN
LOCATE 1, 1: PRINT "End of
 slide show. Press Enter to
 continue."
GOSUB waitforkeypress
PALETTE
END
ELSE
OPEN "c:\windows\" + file$
 FOR BINARY AS #1
END IF
FOR i = 0 TO 53
a$ = INPUT$(1, #1)
filebyte(i) = ASC(a$)
NEXT
height = filebyte(22) + 256 *
 filebyte(23)
wid = INT(((filebyte(2) +
 filebyte(3) * 256 + filebyte(4)
 * 65536 - 110) / height) * 2)
tilewid = filebyte(18) + 256 *
 filebyte(19)
colors = (2 ^ filebyte(28))
IF colors <> 16 OR wid >
 640 OR height > 480 THEN
CLS
PALETTE
PRINT file$; " is either too
 large or has too many
 colors"
PRINT "to display with this
 viewer. Press Enter to
 continue."
GOSUB waitforkeypress
CLS
CLOSE
GOTO top
END IF
col(0) = 65536: col(1) = 256:
 col(2) = 1: col(3) = 0
j = col(3)
FOR i = 0 TO 255
a&(i) = j
NEXT
FOR i = 1 TO (4 * colors)
a$ = INPUT$(1, #1)
a&(INT(j / 4)) = a&(INT(j / 4))
 + (col(j AND 3) *
 (INT(ASC(a$) / 4)) AND (col(j
 AND 3) * 63))
j = j + 1
NEXT
indent = (640 - wid) / 2: i =
 indent: j = (480 - height) / 2
PALETTE USING a&(0)
WHILE NOT EOF(1)
a$ = INPUT$(wid, #1)
FOR l = 1 TO wid
a1$ = MID$(a$, l, 1)
IF a1$ = "" THEN a1$ =
 CHR$(0)
a1 = ASC(a1$)
PRESET (i, 480 - j), (a1 AND
 240) / 16
PRESET (i + 1, 480 - j), a1
 AND 15
i = i + 2
IF i >= wid + indent THEN
i = indent
j = j + 1
END IF
NEXT
WEND
CLOSE
GOTO top
bmpfilenames:
DATA CASTLE.BMP,
 CHITZ.BMP,HONEY.BMP,
 ZIGZAG.BMP,
 ARCHES.BMP,
 MARBLE.BMP,
 ARGYLE.BMP,CARS.BMP,
 FLOCK.BMP,
 REDBRICK.BMP,
 RIVETS.BMP,TARTAN.BMP,
 THATCH.BMP,WINLOGO.BMP,
 EGYPT.BMP,ARCADE.BMP,
 LEAVES.BMP,SQUARES.BMP,
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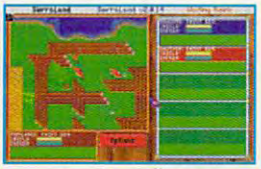
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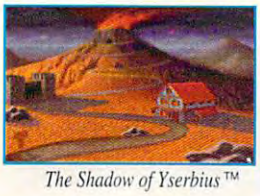
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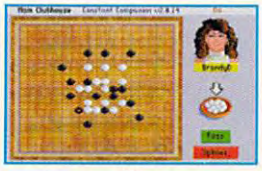
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```
TIGER.BMP,WAVE.BMP,
YACHT.BMP,TREES.BMP,000
waitforkeypress:
a$ = ""
WHILE a$ = ""
a$ = INKEY$
WEND
RETURN
```

BATcom

I work with batch files a lot, and I'm looking for a program to convert the batch files to EXE files. Where can I find a program like that?

JOHN MA
KNOXVILLE, TN

A program called Turbobat, available on most online services, will turn a BAT file into a COM file. This will cause it to run faster and will also discourage nosy people from looking at your batch files to see what you do with your computer.

Looking Out for #1

After reading your January issue, I feel you're quite unclear about which product should be ranked #1.

You awarded Word for Windows the COMPUTE Choice award for best word processor, then in your "Productivity Choice" article, you say, "Ami Pro . . . is without a doubt the best Windows word processor."

So which is it? Ami Pro or Word for Windows? The world is waiting.

JAMES GALLEGOS
FREMONT, CA

The "Productivity Choice" article represents the opinion of its author (Mark Minasi) and the opinion of some of the editors and writers for COMPUTE.

The COMPUTE Choice award was a political choice that represents the majority view. You wouldn't go wrong with either of these word processors—they're both excellent.

It was just a coincidence that both views were expressed in the same issue. We didn't mean to confuse anyone.

Intel We Meet Again

We have been looking to buy a 486 or a 486SX computer and were shown a computer with an SLC chip which isn't made by Intel.

Can you tell me what is the difference between the Intel chip and this other one and whether it's worthwhile to buy this computer, which costs several hundred dollars less than the one

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BENJAMIN PUGH
MADERA, CA

Several chip makers have decided to climb on the CPU bandwagon with their 386-and 486-clone CPUs. From what we've heard, there's no significant difference between the Intel CPUs and these clones other than the price. Make sure you know what you're getting, though, so you can compare chips intelligently. Find out the cache size, the CPU speed in MHz, and whether the chip has an onboard math coprocessor. Then compare the price to an Intel chip with similar specs (you probably won't be able to match them perfectly).

The Right Idea

IdeaFisher Systems has lowered the price of IdeaFisher (discussed in the May 1993 "Personal Productivity" column) from $595 to $199. Please let your readers know.

MARLEE PARKER
MISSION VIEJO, CA

Not My Type

I liked reading the programming listings in your early days. I understand that the IBM PC is a little more difficult to program, but I would like to see more articles on programming in machine language and QuickBASIC, especially in animation and data organization. Also, is there any way to convert the program listings of Commodore computers to the PC without buying an expensive conversion utility?

ALBERT POLLARD
RUTH, CA

We've never heard of any conversion utility, expensive or otherwise, that would convert programs written for the Commodore to the PC.

COMPUTE runs program listings in "Feedback," "Programming Power," and "Tips & Tools." Data management and animation are best left to professionally developed programs. It would be impossible to run a program listing for a professional database or animation program even if we filled several issues. And who would spend weeks typing it in? Type-in programs made sense in the early days when we were still discovering what a computer could do and when there was virtually no professionally developed software. The program listings we publish now focus on teaching techniques or getting little jobs done with utilities.

Most PC programmers don't use machine language. In a machine such as the Commodore 64, which only has about 40K of program space, machine language is the only way to get an extensive program into RAM. On the PC, C is king while machine language is primarily used for the kind of quick utilities you can often find in "Tips & Tools." If you want to learn machine language, Borland's Turbo Assembler is sold with an excellent guide to the language.

And, finally, the PC is no more trouble to program than any other computer. Maybe it's even a little easier than most because there's so much expertise around.

Readers whose letters appear in "Feedback" will receive a free COMPUTE's PC clock radio while supplies last. Do you have a question about hardware or software? Or have you discovered something that could help other PC users? If so, we want to hear from you. Write to COMPUTE's Feedback, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. We regret that we cannot provide personal replies to technical questions. ❐

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WINDOWS WORKSHOP

Clifton Karnes

HOW TO GET MORE FONTS

If you're interested in adding some TrueType fonts to your system, there are many sources.

Last time, I talked a little about TrueType and its advantages. This time, I'd like to discuss some software packages that can help you get the most from TrueType.

If you're interested in adding some TrueType fonts to your system, there are many sources. First, I'd suggest you look into the Microsoft Font Pak (Microsoft, $69.95). This package contains the Arial Narrow, Book Antiqua, Bookman Old Style, Century Gothic, and Century Schoolbook font families, which, along with the TrueType fonts originally shipped with Windows 3.1, give you the 35 fonts that form the original PostScript stable.

With your original TrueType fonts plus those in the Font Pak you'll have the following fonts (with the PostScript equivalent names in parentheses): Arial (Helvetica), Arial Narrow (Helvetica Narrow), Times New Roman (Times), Courier New (Courier), Book Antiqua (Palatino), Bookman Old Style (Bookman), Century Gothic (Avant Garde), Century Schoolbook (Schoolbook), and Symbol (Symbol).

In addition, Font Pak includes the complete Lucida family, type that's designed to be easy to read and attractive when printed on laser printers. Also in the Lucida family is a subfamily of fonts just for faxes. If you fax often, check it out.

Microsoft's Font Pak II (Microsoft, $69.95) contains more text and display fonts as well as a host of decorative fonts. You'll also get Microsoft's Font Manager, which lets you store fonts in groups for easy access.

Another superb collection of fonts comes from Swfte in TypeCase I and TypeCase II (Swfte International, TypeCase I—$69.95, TypeCase II—$49.95). These two collections include 230 excellent TrueType fonts plus a font manager. TypeCase I and II contain just about every font you'd ever need.

What if you already have an investment in PostScript fonts or those in another format. There are several utilities that can come to the rescue here. For quick and easy conversion try Atech's AllType for Windows (Atech, $79.95). This program goes back and forth from TrueType, PostScript, Nimbus Q, FastFont, and Bitstream's Fontware, to name just a few of the formats supported.

If you need more than conversion, Font Monger (Ares, $149.95) is my top choice. It will convert just like AllType, but it also lets you edit fonts. You can create special characters or modify those already in the font. And it's a beautifully designed and intuitive program.

If you need to modify your TrueType fonts but what you're really after is special effects, then TrueEffects for Windows (SoftLogic, $59.95) may be the right package. With TrueEffects, you can change the way your fonts' letters are filled. Instead of plain black, you can use a grid, stripes, stars, bricks, or a fountain, and you can reverse your type and add effects to the background. No doubt about it, this program is fun.

Now that we have the TrueType ball rolling, I'd like to finish this column with a little information about how to use all the characters of each font.

As you may know, DOS uses the ASCII character set (ASCII stands for American Standard Code for Information Interchange). This character set consists of 127 characters. IBM added another group of characters to the ASCII set to form IBM ASCII. This additional group of characters is called the extended character set.

This comes as a shock to some people, but Windows uses the ANSI character set (ANSI stands for American National Standards Institute). The first 127 characters of this set are identical to the ASCII set. The two differ only in characters 128–256.

There's some real gold in these extended characters, however. We just have to learn to mine it.

If you look at these characters, you'll see symbols for typographical double and single quotes, em dash, en dash, fractions, copyright and trademark symbols, and much more.

If you use these in your documents instead of their sometimes crude typewriterlike equivalents, they'll have a polished, professional quality. Making it easy to use them is what we're going to talk about next.

If you look at the bottom right corner of Character Map, you'll see an indication of which keys you need to press to place one of these characters in your document.

For example, select the copyright symbol (5th row down, 15th character over), and you'll see *Keystroke: Alt+0169* indicated.

If you're in a document and you press the Alt key, hold it down, and press 0, 1, 6, and 9 *on the numeric keypad,* you'll get the copyright symbol in your document.

To try this, load Windows Write and use the keypresses described above, and then experiment with some other extended characters. If you incorporate these characters into your documents, then you'll get the most from your beautiful new TrueType fonts. ❐

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TIPS & TOOLS

Edited by Richard C. Leinecker

Wild Copies

If you've ever wanted to copy more than one file type using wildcards, you're out of luck if you just rely on the regular Copy command. Here's a batch file called COPYSOME-.BAT that copies up to eight file specifications with wildcards to a single destination.

Copying multiple file specifications with a single command and turning your computer into an electronic nagging machine

```
ECHO OFF
REM We need at least two
REM arguments for the batch
REM file to work.
IF "%1"=="" GOTO USAGE
IF "%2"=="" GOTO USAGE
:GETDEST
SET DESTINATION=%2
IF "%3"=="" GOTO GOTDEST
SET DESTINATION=%3
IF "%4"=="" GOTO GOTDEST
SET DESTINATION=%4
IF "%5"=="" GOTO GOTDEST
SET DESTINATION=%5
IF "%6"=="" GOTO GOTDEST
SET DESTINATION=%6
IF "%7"=="" GOTO GOTDEST
SET DESTINATION=%7
IF "%8"=="" GOTO GOTDEST
SET DESTINATION=%8
IF "%9"=="" GOTO GOTDEST
SET DESTINATION=%9
:GOTDEST
REM We keep copying file types
REM until %1 is the same as
REM %DESTINATION%.
:MAINLOOP
COPY %1 %DESTINATION%
SHIFT
IF "%1"=="%DESTINATION%"
  GOTO END
GOTO MAINLOOP
:USAGE
ECHO Usage: COPYSOME filetype1
  filetype2 . . . destination
ECHO Example: COPYSOME *.EXE
  *.COM C:\DOS
:END
SET DESTINATION=
```

ALLEN KORSLUND
EAGLE GROVE, IA

Daily Reminders

I use a batch file called DAY.BAT to remind me of tasks I need to perform on certain days of the week. I call it from the last line of my AUTOEXEC.BAT file with the line *call day.bat*.

```
ECHO OFF
REM First we create a script
REM that'll let us create a small
REM COM file to report
REM the day of the week to our
REM batch file.
ECHO E 100 B4 2A CD 21 B4 4C
  CD 21 > DAY.LST
ECHO RCX >> DAY.LST
ECHO 8 >> DAY.LST
ECHO W >> DAY.LST
ECHO Q >> DAY.LST
REM Now we execute Debug and
REM pipe in our script to create
REM DAY.COM.
CTTY NUL
DEBUG DAY.COM < DAY.LST
CTTY CON
REM Run the program that'll
REM report the day of the week to
REM our batch file
REM as an errorlevel.
DAY
REM Check to see which day it is
REM and jump to the appropriate
REM label.
IF ERRORLEVEL 6 GOTO SAT
IF ERRORLEVEL 5 GOTO FRI
IF ERRORLEVEL 4 GOTO THU
IF ERRORLEVEL 3 GOTO WED
IF ERRORLEVEL 2 GOTO TUE
IF ERRORLEVEL 1 GOTO MON
IF ERRORLEVEL 0 GOTO SUN
:SUN
ECHO Today is Sunday.
GOTO END
:MON
ECHO Today is Monday.
ECHO It's time to back up
ECHO WordPerfect files.
ECHO Make sure there's a disk in
ECHO drive A.
ECHO (You can press Ctrl-C
ECHO to cancel.)
PAUSE
COPY C:\WP51\MYFILES\*.*  A:
GOTO END
:TUE
ECHO Today is Tuesday.
GOTO END
:WED
ECHO Today is Wednesday.
ECHO Get ready to defragment
ECHO disk.
ECHO (You can press Ctrl-C
ECHO to cancel.)
PAUSE
SPEEDISK C: /U /SN
GOTO END
:THU
ECHO Today is Thursday.
GOTO END
:FRI
ECHO Today is Friday.
ECHO It's time to back up
ECHO DPAINT files.
ECHO Make sure there's a disk in
ECHO drive A.
ECHO (You can press Ctrl-C
ECHO to cancel.)
PAUSE
COPY C:\DPAINT\MYFILES\*.*  A:
GOTO END
:SAT
ECHO Today is Saturday.
ECHO Don't forget to wash the car.
GOTO END
:END
DEL DAY.COM
DEL DAY.LST
```

DANIEL DEAN
FAIRBORN, OH

Shorter Prompts

In the October 1992 "Tips and Tools" column a reader showed some uses of the PROMPT command. One of these uses was to show the time as part of the prompt. That can be very useful, but it's better if you leave off the seconds and hundredths of seconds.

To omit the seconds and hundredths of seconds, you need to use the prompt code for backspace, $H. Now, instead of the prompt $T PG that gives you the prompt 17:38:17.54 C:\XY>, you can get the prompt 17:30 C:\XY> with the command Prompt THHHHH$H PG.

ENRIQUE MUNOZ TORRES
SANTIAGO, CHILE

Easy Formats

I teach computer repair and frequently need to format a large number of disks for use in the classroom. I prefer to do this while I do other

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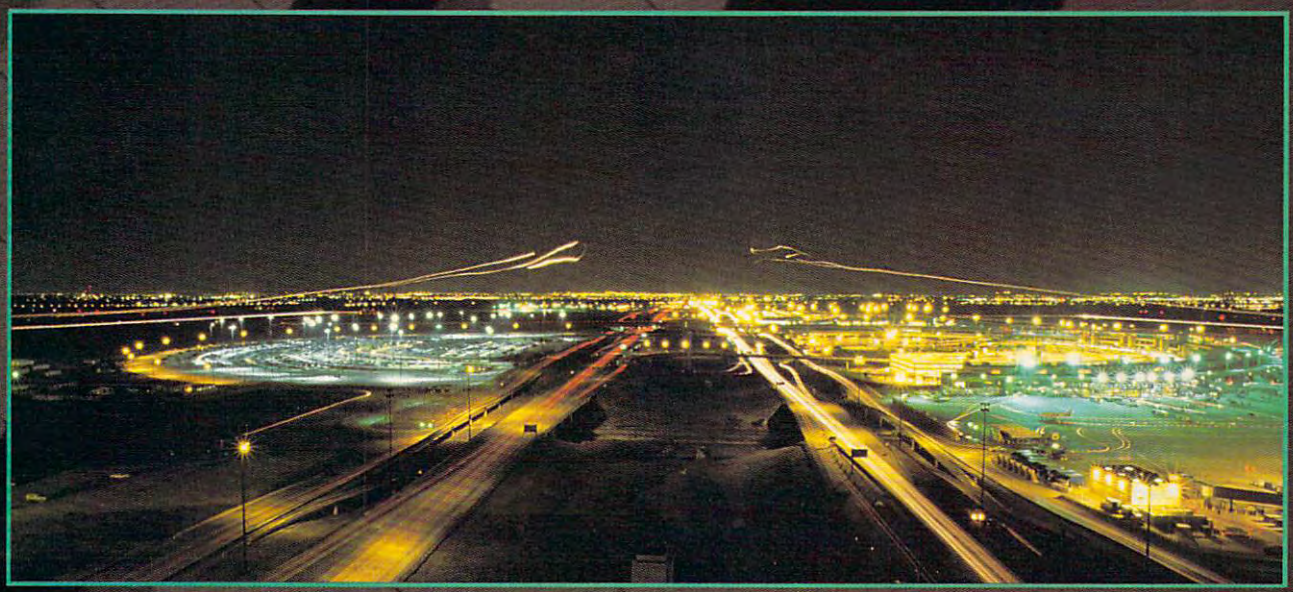

ETA, Summer 1993.

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TIPS & TOOLS

things, so I devised a batch file called MASSFORM.BAT that reduces the amount of interaction I have during the process.

```
@ECHO OFF
CLS
IF '%1'=='' GOTO HELP
ECHO Put the diskette to
ECHO be formatted into
ECHO the drive and:
PAUSE
CLS
:AGAIN
REM This line redirects a
REM cr/lf to the first
REM FORMAT.COM prompt.
ECHO. > ZYXW.TMP
REM This line answers
REM FORMAT.COM's request for a
REM label.
ECHO J_WEBB_CET> ZYXWA.TMP
REM This line answers
REM FORMAT.COM's
REM question about
REM formatting another
REM diskette.
ECHO N > ZYXWB.TMP
REM This line concatenates
REM the FORMAT.COM response
REM file.
COPY /A ZYXW.TMP +
 ZYXWA.TMP + ZYXWB.TMP /B
 ZYXW.TMP > NUL
FORMAT %1 %2 %3 %4 %5 %6 <
 ZYXW.TMP
ECHO Press Ctrl-C to exit.
ECHO OR
ECHO Put the next diskette
ECHO to be formatted into
ECHO the drive, and
REM this line cleans up the
REM *.tmp mess.
DEL ZYXW*.TMP
REM This line beeps to alert
REM the user to check the
REM diskette quality and
REM either change diskettes or
REM exit.
PAUSE
CLS
GOTO AGAIN
:HELP
ECHO.
ECHO.
ECHO The correct syntax
ECHO for MassFormat is
ECHO the same as for the
ECHO MS-DOS 5.0 FORMAT
ECHO command:
ECHO MASSFORM drive: [/S] [/Q]
ECHO [/U] [/F:size]
PAUSE
```

JERRY WEBB
DRUMRIGHT, OK

Command Line Typewriter

There are many times when I want to type a couple of lines of text and print them out. That means loading my word processor and going through all of the steps to print a document.

Here's an easier way. It's a program called Typerite, and it lets you type as many lines as you want and sends them out to the printer. Once you're done, just press Escape, and it sends a form feed to the printer and returns you to the DOS prompt.

To use the program, just type *typerite*. If you want another printer port, type *typerite port#*. When you're done, press Escape.

You can type in Typerite using the DOS Debug command. Make sure the DOS program called Debug is in your path or the current directory. In these examples, the italic text is what the computer prints; the roman text is what you should type. One way to be sure you get these programs exactly right is to have someone read the numbers to you as you type them in. Another way suggested by one of our readers is to read the numbers into a tape recorder and then play them back as you enter the program code.

```
debug typerite.com
File not found
-e 100 be 80 00 ac 0a c0 74 10
-e 108 ac 3c 0d 74 0b 3c 20 74
-e 110 f7 2c 31 2a e4 a3 4e 01
-e 118 b4 01 cd 21 3c 1b 74 20
-e 120 50 8b 16 4e 01 2a e4 cd
-e 128 17 58 3c 0d 75 ea b0 0a
-e 130 8b 16 4e 01 2a e4 cd 17
-e 138 b4 02 b2 0a cd 21 eb d8
-e 140 b0 0c 8b 16 4e 01 2a e4
-e 148 cd 17 b4 4c cd 21 00 00
-RCX
CX 0000
:50
-W
Writing 0050 bytes
-Q
```

If you run Checksum on this program ("Tips & Tools," July 1992), the number 062 should appear on your screen.

RICHARD C. LEINECKER
MIAMI, FL

If you have an interesting tip that you think would help other PC users, send it along with your name, address, and Social Security number to COMPUTE's Tips & Tools, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408. For each tip we publish, we'll pay you $25–$50. All tips submitted become the property of General Media International. ❐

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Computer Trade Watch, June 22, '92

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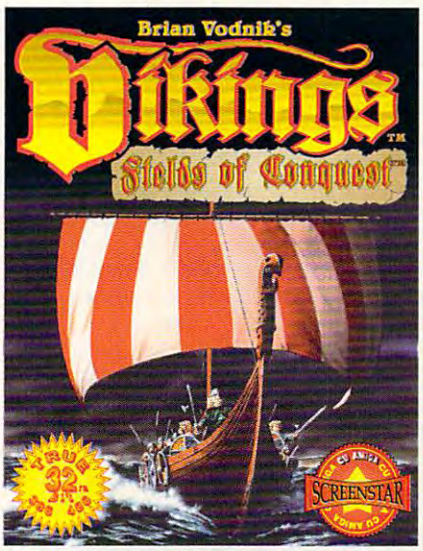

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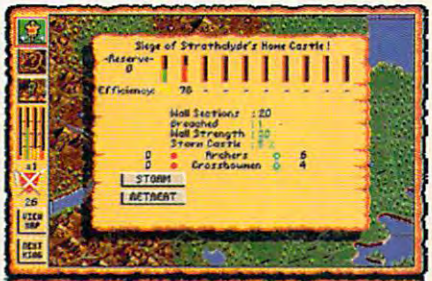

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INTRODOS

Tony Roberts

KEEP DOS IN LINE

Sometimes it's easy to overlook the little things. Somehow the big picture keeps getting in the way. Here's a list of little things you can do to make DOS work better.

Follow these guidelines to make the most of DOS.

What was that switch again? Don't forget DOS 5.0's help feature when the syntax for a seldom-used command escapes you. Just enter either *help* for a list of subjects on which help is available or *help* command, filling in the name of the command for which you need extra information.

Where did that file go? DOS 5.0's enhanced Dir command can be used as a file finder. The /s switch, when added to a directory command, will build a directory for the current subdirectory and all of its children. To search your whole hard disk for that missing file, use a command such as Dir README.TXT /s. Wildcards work, too. Try Dir MYFILE*.* /s, for example, to find any file with any extension that begins with the characters *myfile*.

Hey! Where am I? It's easy to get lost in the subdirectory structure of a large hard drive, but it's also easy to teach the DOS prompt to provide a You Are Here pointer. Just add the line *prompt PG* to your AUTOEXEC.BAT file. This will display the current path as the system prompt, so you'll always know which subdirectory is current.

Kick that keyboard into high gear! The DOS Mode command provides a way to control the typematic rate of the keyboard—the rate at which DOS repeats a character when you hold down the key for that character. The command Mode con:rate=32 delay=1 will give you the fastest rate possible. Add it to your AUTOEXEC.BAT and watch your cursor fly. In the unlikely event that this setting is too fast, reduce the rate and increase the delay (up to a maximum of 4) until you find a setting that suits you.

Make your hard disk brush and dfFloss daily. Preventative maintenance is good for your teeth, and it's good for your hard disk as well. Run Chkdsk or another disk-repair utility at least once a day and clean up any file allocation problems or lost clusters. This keeps the disk's road map to your files clear and easy to read. Always perform a disk check after a system crash or lockup because file damage is most likely to occur when programs can't exit normally.

Verify that Copy. Have you ever copied a file to a floppy disk for a friend or co-worker only to learn later that the file couldn't be read on his machine? If you want to be sure you've saved a good copy, turn on DOS's verify feature with the command Verify on. If verify is on, DOS will write the file to the floppy disk and then read it back and compare it to the copy on the hard disk to ensure that the data was saved correctly. Using Verify takes a little longer, but the extra few seconds is worth it. Use Verify off after you've finished with the copy, or your system will verify *every* file write. To see whether Verify is on or off, type *verify* at the DOS prompt.

Directory style default. If you have DOS 5.0, you have a Dir command with lots of switches to customize your directory listings. You can specify sort order, group subdirectories first, display files based on attribute settings, and display directories in upper- or lowercase letters. Once you've figured out which directory settings you use *most* of the time, make those commands your default by setting an environment variable called DIRCMD. Do this in your AUTOEXEC.BAT file. I use the command Set DIRCMD=/l/ogn to display directory information in lowercase ordered by name with subdirectories listed first.

Quicker than Copy. If you're copying several files to and from floppy disks, save time by using Xcopy rather than Copy. When copying multiple files, Copy reads one file from the source disk and then writes it to the target. But Xcopy reads as many of the files as possible into memory; then it writes them all out in one operation.

Buckle up for safety. If you've been uninspired by the Mirror command, reevaluate the situation. Mirror is like a seat belt: When everything's going smoothly, it doesn't do much, but when there's trouble, it can make all the difference. Mirror saves copies of your system's file allocation table, which the Undelete and Unformat commands can use as reference points if the need arises. I recommend running Mirror on each of your hard drive partitions from commands within your AUTOEXEC.BAT.

See the difference. Have you ever wondered what the difference is among the files on your disk named AUTOEXEC.BAT, AUTOEXEC.BAK, AUTOEXEC.000, and AUTOEXEC.SYD? An easy way to compare text files is with the FC command. FC is a DOS file-compare utility that doesn't seem too helpful until you figure out that you need to use the /l, /c, and /n switches with it. The switches indicate that you're doing an ASCII compare (/l), you're not concerned about the characters' case in the files (/c), and you want line-number references included in the output (/n). For example, enter *fc /l /c /n autoexec.bat autoexec.bak;* any differences in the files will be displayed. ❐

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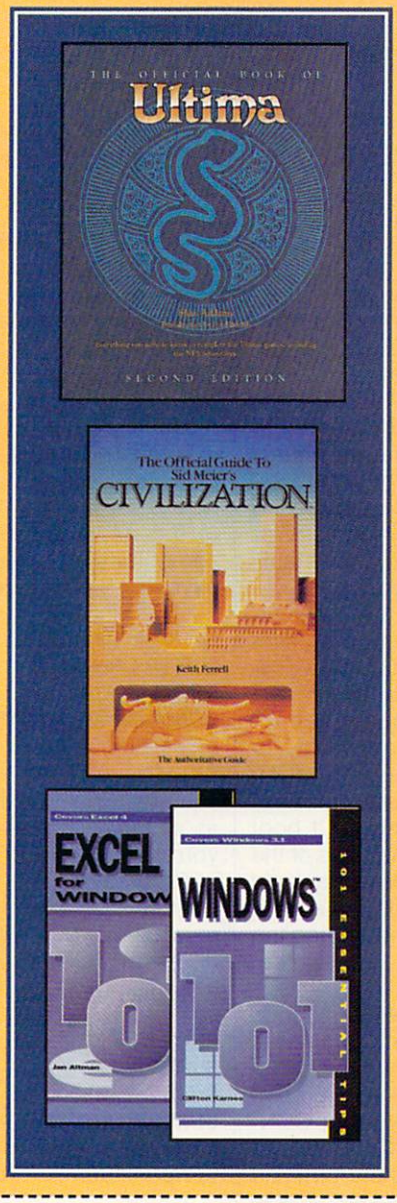

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HARDWARE CLINIC

Mark Minasi

DOS 6's MULTICONFIG

One of DOS 6's best features is MultiConfig. Here's how to make it work for you.

DOS 6 will be out by the time that you read this. That means that I can finally tell you about it. And you know what's probably the best part of DOS 6, at least for techies? MultiConfig.

I mean it. I have one computer that has ten different sets of CONFIG.SYS/AUTOEXEC.BAT files—one for normal DOS work, one for remote access, one for playing around with the CD-ROM, and one for when I attach the Bernoulli Box and do backups.

How often do you find yourself having to set up a plain-vanilla AUTOEXEC.BAT/CONFIG.SYS combination to make some kind of program happy? Or rooting around for a bootable floppy because a CONFIG.SYS experiment went awry and your system won't boot from the hard disk? One of the great annoyances of the world (like having to floss your teeth or do the dishes) is juggling configurations. MultiConfig solves all that.

Here are the highlights. First, MultiConfig allows you to merge together many CONFIG.SYS/AUTOEXEC.BAT combinations into one big CONFIG.SYS/AUTOEXEC.BAT. Second, it adds a simple front-end menu system to those multiple configurations, allowing you at runtime to decide which configuration is right for your work today. And third, it allows you to designate a particular configuration as the default configuration that loads after waiting a specified number of seconds. This month, I'll show you how to do all three with a simple MultiConfig example.

Getting Started

For my example, I'll use another DOS 6 feature, Interlnk. DOS 6 includes a serial and parallel port–based file transfer program much like LapLink, called Interlnk. Setting up Interlnk involves two parts: a device driver called INTERLNK.EXE and a TSR called either INTERSVR.EXE or INTERLNK.EXE, depending on whether your PC will be acting as a server (INTERSVR.EXE) or a client (INTERLNK.EXE). I don't want to explain Interlnk in detail—you don't need to know the details in order to follow this example—but I want to show you how to set up a PC to be able to act as an Interlnk client sometimes. Suppose you have this basic CONFIG.SYS.

```
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
```

To make your PC able to act as an Interlnk client or server, you have to add the INTERLNK.EXE device driver. On the days when you want to work with Interlnk, you'll need a CONFIG.SYS that looks like this.

```
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
DEVICE=C:\DOS\INTERLNK.EXE
```

Basically, you have two CONFIG.SYS files—one that you use for normal operations, and one that you use for Interlnk operations. Let's call them that for convenience's sake: the normal and interlnk configurations.

There are several steps to MultiConfig-ing these files; let's take it one step at a time.

Merging CONFIG.SYS Files

With MultiConfig, you put both CONFIG.SYS files into the same ASCII text file. (I say *both,* but if you have almost a dozen configurations—as I do—then the better phrase is *all configurations.*) Don't name it CONFIG.SYS just yet, as it's still going to need some work. For now, call it CONFIG.ALL.

The configurations will be separated with MultiConfig commands, so leave a blank space or two in the file between each configuration. At this point, my CONFIG.ALL looks like this.

```
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH

FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
DEVICE=C:\DOS\INTERLNK.EXE
```

Naming the Configurations

MultiConfig separates the commands that are to be executed as CONFIG.SYS statements from the commands that are to be MultiConfig commands by requiring MultiConfig commands to be enclosed in square brackets. The first MultiConfig statements to add are the identifiers for these two configurations.

You can call these configurations anything that you like, so let's keep calling them normal and interlnk. Just put those names in square brackets above each configuration. Your CONFIG.ALL will then look like this.

```
[normal]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH

[interlnk]
FILES=60
BUFFERS=30
STACKS=9,256
```


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```
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
DEVICE=C:\DOS\INTERLNK.EXE
```

Just for convenience's sake, let's call each group of lines, headed by a line in square brackets, a block. This CONFIG.SYS contains a block called [norma] and a block called [interlnk].

If you were to attempt to boot using this file as your CONFIG.SYS, DOS would treat this CONFIG.SYS as if it were blank. None of the commands would execute. MultiConfig would recognize two configurations called normal and interlnk, but there would be no MultiConfig statements actually telling DOS to use either of these configurations.

Setting Up the Menu

Most of the directives to MultiConfig go in a block called [menu]. In the [menu] block, you list the alternative configurations and tell MultiConfig what the menu should look like, which options it should take as defaults, how long to wait for a user response, and even what color to put on the screen! Just for starters, we'll list the configurations. You do that with the MENUITEM command. It looks like this: MENUITEM configurationname,menutext. Configurationname is the name in brackets at the top of a configuration—normal or interlnk in our example—and menutext is the English text that MultiConfig should display when showing the menu. Add the [menu] block, and CONFIG.ALL looks like this.

```
[menu]
MENUITEM normal,Standard setup
MENUITEM interlnk,Setup with
  Interlnk driver

[normal]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH

[interlnk]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
DEVICE=C:\DOS\INTERLNK.EXE
```

Now, you can copy CONFIG.ALL to C:\CONFIG.SYS and reboot. You'll see the *Starting MS-DOS . . .* message (a message always seen in DOS 6 when booting), and after two seconds you'll see a screen containing a menu like this.

```
MS-DOS 6 Startup Menu
=====================

    1. Standard setup
    2. Setup with Interlnk driver
Enter a choice: 1
```

Press 1 and the Enter key, and the system will boot with the normal setting. If you reboot and press 2 this time, you'll see the Interlnk driver load. Take a bow; you've built your first MultiConfig menu!

Adding Defaults and Timeouts

It would be a pain to have to hover over the PC every time it boots, pressing 1 to start up the standard setup and 2 now and then when you need Interlnk. It would be preferable to be able to tell MultiConfig, "If I don't press any keys for two seconds, assume that I want the normal configuration." You can do that with the MENUDEFAULT command. It looks like this: MENUDEFAULT configurationname,timeout.

In this command, the configurationname is the same thing as it was in the MENUITEM command—the name surrounded by square brackets that precedes the block of CONFIG.SYS statements that define a configuration. In our example, you could specify either normal or interlnk. You can optionally add a number to define a timeout, the maximum number of seconds for MultiConfig to wait before taking the default. I'd like to tell MultiConfig to give me two seconds to make a choice, and if I don't make a choice within two seconds, then just to load and use the normal configuration. I can do that by adding this line to the [menu] block of CONFIG.SYS: MENUDEFAULT normal,2. It can go anywhere in the [menu] block. Now, my CONFIG.SYS looks like this.

It would be a pain to have to hover over the PC every time it boots.

```
[menu]
MENUITEM normal,Standard setup
MENUITEM interlink,Setup with
  Interlnk driver
MENUDEFAULT normal,2

[normal]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH

[interlnk]
FILES=60
BUFFERS=30
STACKS=9,256
DEVICE=C:\DOS\HIMEM.SYS
DOS=HIGH
DEVICE=C:\DOS\INTERLNK.EXE
```

Try booting the system, and keep your hands off the keyboard. You'll see MultiConfig count down and load the normal configuration. Try booting again, and press 2; you'll see that it overrides the default, loading the Interlnk driver.

Now that you have a basic menu system in place, try adding a third or fourth option. By then, you'll notice that there's a lot of redundancy in this system.

Next month, you'll learn how to fix that, as well as how to add a bit of color. ❐

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PROGRAMMING POWER

Tom Campbell

WHAT'S THE BEST REASON TO READ COMPUTE?

Four moneymaking reasons to read COMPUTE

What would be the best reason to buy a copy of COMPUTE? My answer would be "to help me make more money." Here's my way of making good on that statement. There's some really hot development software available at consumer prices, and I've been seeing some hot market opportunities for savvy users of these tools. Believe me—if I had the time, I'd be taking advantage of these opportunities myself. But I'm working on my own killer ideas. Pick up where I had reluctantly to leave off and make us both look good.

A DOS Idea Manager in Visual Basic for MS-DOS

There are some good commercial programs around to help you track lots of different ideas and create relationships among them. The usual metaphor for this concept is Post-it™ notes, but extended by adding searches between notes, querying notes by date or word content, sorting them by title or subject, and so on. This requires a built-in text editor and a good windowing interface to keep the user working on ideas instead of trying to figure out the software, but up until now those abilities meant buying costly add-on libraries. Visual Basic for MS-DOS comes with an application called NotePad that lets you open multiple notepad windows and enter up to 32,000 characters in each one of them. It's a fully realized program and is more than adequate to get you going. Visual Basic is a superlative extension to QuickBASIC because it's upward compatible yet gives you nearly the same ease of application development as the Windows version. So you get Windows-like convenience with BASIC's power.

Medium-Strength Windows Editor in Pascal

Windows' Notepad drives me up the wall because it only opens one window, has no macros, and can't be customized. Borland Pascal 7.0 (or any version of Turbo Pascal for Windows) comes with editor objects in Borland's ObjectWindows library—which comes bundled with every copy of TPW sold—with the built-in ability to open as many windows at once as Windows has memory. I'd love to see a medium-strength text editor that's beefier than Notepad but easier than Brief. Why hasn't anyone done it before? Because ObjectWindows is woefully underdocumented. The TFileWindow object in question, for example, gets this treatment in the 7.0 manual: 'For details on the fields and methods of the type TFileWindow, see the online help.' Period. This won't be an easy project to get started, but it will reward you early on because TFileWindow is in fact a very high-level object. You'll look like a real genius, too, because Borland/Turbo Pascal for Windows generates small, fast code. Windows bloat won't be a problem with this product.

A Scrapbook Program

The Windows Clipboard is frustrating in a number of ways, most notably in that it nominally holds only one thing at a time. Copy some text to the Clipboard, and the bitmap picture you were storing there is gone. Copy a row of cells from your spreadsheet, and the text is history. The Macintosh has always had a modest desk accessory called Scrapbook, which is like a simple Clipboard that can hold as many Clipboard-supported objects as you want, just like your family scrapbook. I'd love to see a utility like that but one that goes one better than any similar applications I've seen. One of the little-known aspects of the Clipboard is a process called registration, in which applications often store several versions of the same data at the same time on the Clipboard, and the receiving application chooses which it can handle best. For example, if you copy data from an Excel spreadsheet to the Clipboard, it's stored not only in Excel's native format (called, unfortunately, BIFF) but also in text, comma-delimited, and bitmap formats. So if the application you paste to understands Excel data as is, great. But if it doesn't, it probably understands text or perhaps comma-delimited. Anyway, I'd like to see a Scrapbook-type application that would hold more than one item at a time; give you each item in all its registered formats; and let you attach notes to Scrapbook entries, sort them by user-defined categories, and print. At worst, you'll sell at least one copy—to me. I really need that program.

Tiny BASIC for Windows

How about a small BASIC interpeter for Windows? A lot of people have complained about the huge runtime size for Visual Basic, and surely there are plenty of old-time BASIC users who'd like to dash off a short program without having to lard it with buttons and bitmaps. This may not be a huge moneymaker, but it would be a public service in the spirit of the free Tiny BASIC interpreters that sprang up in the late seventies. ❐

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ToyBox II is a great-looking graphical menu system simple enough for kids and sophisticated enough for power users. ToyBox II allows for setting up multiple levels of menu pages, which can hold several thousand programs. Hot keys can also be assigned to run particular programs or open menu pages, with optional variable program parameters provided at the time you run a program. ToyBox can import and use Windows 3.x icons, and it includes a paint utility to design your own.

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DOS

DOS REACHES

Whether you've been demanding better memory management, better disk management, or more tools to help you avoid loss or climb the learning curve more quickly, Microsoft has been listening.

By Mark Minasi

Once again Microsoft has brought forth a new DOS, claiming this time to "make it easier." The world's most widespread operating system has graduated to 6.0.

But is DOS growing up, or growing out? Does DOS 6.0 break new ground, or simply put a polish on existing features? A little of both, as it turns out.

DOS 6.0 is the latest in a long line of versions of Microsoft's biggest cash cow, the virtually ubiquitous PC operating system. Though long, the line hasn't been an unbroken string of successes for DOS architects, however—if you've been around long enough to remember DOS 4.0, you'll probably agree—so it's logical for a PC user to ask, "Should I upgrade? Is DOS 6.0 worth it?" The answer is "Yes, almost certainly." Here's why.

Don't expect the kind of gotta-have-it revolutionary features in DOS 6.0 that you saw in DOS 5.0; in some ways, DOS 6.0 might better be named DOS 5.1. That's not a negative comment; it's just a recognition that DOS 6.0, while different from DOS 5.0, is nowhere near as different from its forebear as 5.0 was from 4.01. There's still a lot to talk about in DOS 6.0, however. This article will have to be the quick tour. We can only cover the highlights here.

On-the-Fly Disk Compression

DOS 6.0 is fairly big—about 8MB, if you install it all—but paradoxically, you may find after you've installed DOS 6.0 that you've got more free disk space than you did before. That's because of the DoubleSpace feature.

DoubleSpace is an adaptation of a product that's been around for a while called DoubleDisk. Microsoft started from DoubleDisk, but the company says that DoubleSpace is much improved over DoubleDisk. An on-the-fly compression routine works something like PKZIP or Lharc, compression programs with which you may be familiar. Various programming tricks let you crunch a lot of data to a smaller space. Virtually every file you find on a bulletin board or communications service nowadays is zipped or arced—there's nothing new there. But when you want to use the file, you must first uncompress it, which can be something of an annoyance. DoubleSpace and programs like it offer the ability to transparently compress and decompress your files as they are used, removing the need to run a separate compression or decompression routine.

Decompressing and compressing data on the fly sounds a mite risky. In my experience it's fairly reliable. I've used it on a notebook computer for months now without incident, but people using high-performance disk controllers sometimes report trouble with DoubleSpace, so back up before you rely upon it.

Fending Off Viruses

Sometime in the mid 1980s, the PC world got something new to worry about (as if hard disk crashes, acci-

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6.0: A NEW LEVEL

dental formats, power surges, and buggy software weren't enough). Word got around the business that a class of program called a virus was starting to appear in PCs.

You've probably heard about viruses for years, but 1992 was the year viruses came into their own. For the purpose of teaching seminars (which is my main job), my company rents PCs for use in hands-on exercises. In the entire second half of 1992, I never rented a group of computers that didn't have at least one infected machine. Stoned, Flip (Omicron), and Joshi were the viruses I saw most commonly.

DOS 6.0 offers two kinds of protection from viruses: a virus scanner and a virus shield. Both programs are based on the very popular Central Point Antivirus. Msav is a virus scanner. It searches a disk, looking inside every program for a possible virus. Msav works very quickly, which is quite a feat when you consider that it was designed to recognize thousands of miscreant programs. There are two versions of the scanner program: Msav runs under DOS, and Mwav runs under Windows. You could conceivably run Msav every time you booted up DOS, but you'll probably find that you'll scan your disk every week or so, or perhaps after installing some software that you suspect to be infected. The scanners can either detect viruses by looking for distinctive strings in program files or by creating checksums for each program file which can then be recomputed and compared later to the previously created checksum files. Any programs whose checksums have changed get flagged.

A virus scanner like Msav or Mwav reports that the damage has been done; it doesn't keep viruses from getting to your disk in the first place. For this purpose, DOS 6.0 offers full-time virus protection in the form of Vsafe, a virus shield. When you run Vsafe, you activate a program that runs continuously in your system, looking over DOS's shoulder and trying to keep DOS from getting into trouble. Vsafe first tries to keep your data safe by monitoring efforts by programs to go resident in memory (become terminate-and-stay-resident programs or TSRs). Now, all TSRs must go resident in order to do their jobs, so Vsafe will sound a false alarm for any legitimate TSR program; that's an unfortunate fact of life. Vsafe also monitors any attempts to use the BIOS's Format command—a command normally used only by the DOS Format command, and only then to format floppies. With IDE drives these days, there's probably no reason anymore for the BIOS to support a format command on hard disks, as you can't low-level-format IDE drives. Vsafe won't make it impossible for programs both good and bad to request format operations, but it will alert you to their format commands before BIOS can carry them out, giving you the chance to override the format request.

Despite its good points, however, there are some real flaws in the antivirus package. For one thing, Vsafe can be removed from memory with a particular keystroke. What's to keep a virus from detecting Vsafe and then just mimicking that keystroke? Msav itself can also cause false alarms, leading other virus scanners to think that there's a virus in memory. And Msav has trouble cleaning several viruses that it claims to be able to handle, including Frodo.

Sadly, it's true: PCs need virus protection, and it's about time that DOS reflected that sad truth.

Hooking Up

With DOS 6.0 come two new approaches to hooking up PCs—Interlnk and Workgroup Connection.

Nowadays, many people rely on laptop computers. Laptops are great, except for one small problem: Transferring data to and from a laptop is generally somewhere between a pain and a nightmare.

A whole class of high-speed utility programs has arisen to solve the data transfer problem—programs with names like Brooklyn Bridge, LapLink, and FastWire. These programs support data transfer at speeds of up to 500 Kbps.

The new DOS includes one of these programs. Called Interlnk (pro-

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nounced "interlink"), this new facility makes blasting data from your desktop PC to your laptop PC (or from any PC to any other PC, for that matter) a breeze. You'll find Interlnk simple to use: You just hook up the first PC to the second with a cable (that's the hard part, by the way—DOS doesn't include a cable for the transfer), install the Interlnk device driver in the CONFIG.SYS of both machines, and then run Intersvr on the server PC and Interlnk on the client PC. The drives of the server PC will instantly appear as new drive letters on the client PC. (The server PC can't do anything else while Interlnk is in operation.)

But the new communications capabilities don't end there. As you are probably aware, in the fall of 1992 Microsoft released a new version of Windows called Windows for Workgroups. It's a version of Windows designed to allow people to build peer-to-peer networks (networks that don't require dedicated servers).

DOS 6.0, as the first version of DOS released since Windows for Workgroups, contains an updated version of the workstation software, called Workgroup Connection. It is very important for you to understand, however, that Workgroup Connection under DOS is not a stand-alone product. This isn't made clear in the DOS documentation. You cannot build a network using only Workgroup Connection. It'll only let you share printers and files and send messages via a PC running Windows for Workgroups. But if you do use Windows for Workgroups, then the Workgroup Connection will allow you to send and receive E-mail as well as share files, disks, and printers with a PC running Windows for Workgroups.

MultiConfig

My favorite DOS 6.0 feature is MultiConfig. If you run more than one complex program, you probably have more than one CONFIG.SYS and AUTOEXEC.BAT file—one for doing normal work, one for Wing Commander II, and perhaps another for Windows.

Even if you don't mess around much with your CONFIG.SYS and AUTOEXEC.BAT, you must sometimes rename them or move them somewhere else so that you can boot your system in a so-called vanilla configuration, a stripped-down setup required for troubleshooting some hardware and software.

Either way, it all boils down to lots of shuffling around of configuration files. (And always keep a bootable floppy handy in case you didn't copy something right!) But DOS 6.0 solves the multiple configuration problem with MultiConfig.

MultiConfig is actually three features rolled up into one. First is Clean Boot. Any time you want to boot your PC and not run your CONFIG.SYS and AUTOEXEC.BAT, just press and release F5 when the *Starting MS-DOS . . .* message appears, or hold down both Shift keys and DOS will boot without either file. This is a godsend for inveterate configuration twiddlers like me (and probably like you, if you read COMPUTE).

The second form of MultiConfig is Interactive Boot. Have you ever had a situation where you wanted to boot the system without a particular device driver? Or have you ever seen an error message flash by from some CONFIG.SYS command but not known which command caused the error? In these situations, you should press F8 when the *Starting MS-DOS . . .* message appears. DOS will pause at each CONFIG.SYS command and ask whether or not to execute that particular command.

Under the third form of the new MultiConfig utility, you can combine several configurations into a single AUTOEXEC.BAT/CONFIG.SYS pair. You can attach a menu to it, complete with colors and a countdown timer. Then, every time you boot, you'll see your various boot-up options and a countdown timer. If you don't select any option within a certain amount of time (an amount that you choose), then DOS picks a default configuration.

MultiConfig brings a whole slew of new commands to CONFIG.SYS. There's not enough space to examine them here, but you'll find that MultiConfig is covered in detail in my "Hardware Clinic" column this month.

Better Memory Management

DOS 5.0's memory manager was pretty good. It was very good, if you consider that it cost nothing beyond the price of DOS. But it lacked a few of the features of the two big-name memory managers, Quarterdeck's QEMM and Qualitas's 386Max. Namely, it didn't offer any assistance in setting up the memory manager, it didn't allow you to specify where to place programs in memory above 640K, and it didn't provide any special handling for programs that grow and shrink in size while loading—so-called yo-yo programs.

DOS 6.0 includes a memory optimizer program called MemMaker, which is much like Qualitas's Maximize or Quarterdeck's Optimize. MemMaker analyzes your CONFIG.SYS and AUTOEXEC.BAT files to determine which commands take up memory in your conventional area—that is, the area below 640K. It does that by rebooting your system. It then looks at the amount of unused space in your upper memory area (UMA) where these commands could be loaded. It then considers all possible combinations of ways of loading these programs, seeking the combination that nets the most free conventional memory. Then, it reboots a second time to try this configuration. If your computer seems to be behaving and it didn't lock up when MemMaker attempted to make it reboot, you've got a freshly optimized configuration. If the configuration malfunctions, you tell MemMaker that it didn't work, and MemMaker tries something else.

I've never liked automatic memory optimizers. They're too much of a compromise, and their designers ask too much of a simple program. MemMaker does nothing to change my mind on that score. Late one night I set up a real humdinger of a memory optimization problem with 260K of TSRs and told MemMaker to put as many of them into upper memory as it could. Upon MemMaker's first reboot, my system complained that the CMOS setup memory was erased . . . and sure enough, it was. Good thing I'd written down how many heads, cylinders, and sectors I had on my hard disk. My advice about MemMaker is (1) be sure to map out all of your upper memory from addresses 640K through 1024K, explicitly including and excluding addresses, and (2) don't allow MemMaker to aggressively search memory for free space.

Readers of last year's "Hardware Clinic" columns about using the DOS 5.0 memory manager will recall that I grumbled about DOS 5.0 just loading each program into whichever area has the most free space available rather than letting you pick where each program should go in upper memory. That's a terrible approach, and DOS 6.0 now allows you to add a parameter to your LOADHIGH and DEVICEHIGH statements that will let you specify which region of upper memory to load a program into.

But what about handling yo-yo programs? Quarterdeck handles them with its Squeeze feature, and Qualitas handles them with its Flexframe feature. DOS 6.0, on the other hand, puts its head in the sand about programs that grow and shrink at boot time. According to a Microsoft techie, the

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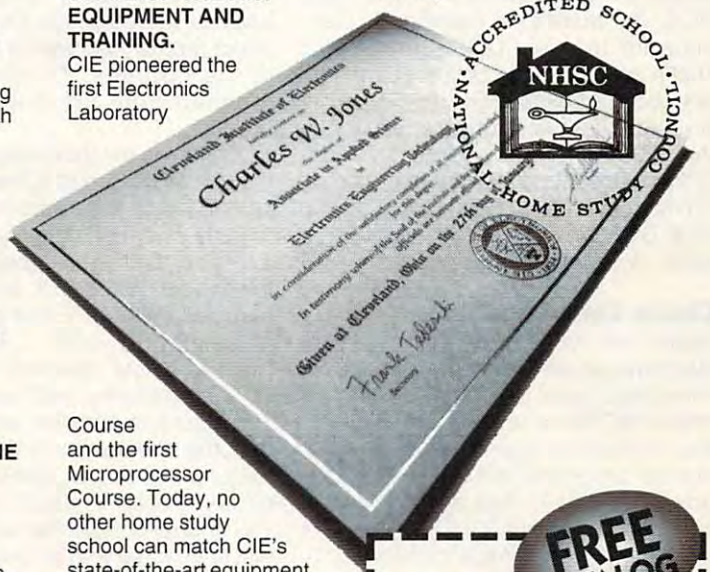

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reason why DOS 6.0 doesn't include commands for special handling of yo-yos is that this would make the system unstable. *Unstable?* Hmmm . . . Microsoft, by the way, viewed the whole idea of memory management as unstable a few years ago. Perhaps in time the company will get comfortable enough with the idea of yo-yos that it will add some kind of yo-yo support. It's most needed with Microsoft programs—the MOUSE.COM driver loads at 56K and shrinks to 17K!

On-Line Documentation

If you find hunting around in a manual to be tedious, Microsoft's heard you. It's solved the problem by not including a manual with DOS 6.0.

That's not really true. There *is* a manual discussing some of the why's, where's, and how-to's of the new DOS. But there's no command reference for the new DOS commands. That's only available online. (Or in my new book, *Inside DOS 6.0.*) Now, if you type, say, *help chkdsk,* you'll get the Chkdsk syntax, notes on what Chkdsk does, and examples of use of Chkdsk. I've found this aspect of the new DOS very useful, particularly when using my notebook on the road.

Choice Comes to PCs

People who write really snazzy batch files have always lacked a command to receive input from the user of the batch file. Many have gotten by with the dozens of commercial public domain programs that fill the gap, but now DOS finally has a batch input command of its own: CHOICE.

CHOICE is a simple command. It will provide a prompt to the user; then it will accept one keystroke—and only one—from a list of acceptable keystrokes. By default, it only accepts the keys Y and N, but you can change that, and even make the choices case-sensitive. It will also optionally "time out" after a given time, using a default choice if no other is made. This command really opens up some interesting possibilities for batch files; I've even used the timeout option to create a batch file that will cause the PC to "sleep" for a specified number of seconds by telling CHOICE (1) not to display a prompt and (2) only to accept as input an Alt-255, the "invisible" ASCII code.

Better Disk Management

Little by little, Microsoft is chipping away at the domain of the disk utility vendors. DOS 6.0 includes four new commands which together are probably worth half the cost of the package—Dosback, Deltree, Defrag, and Move.

Dosback is a trimmed-down version of Norton Backup, and Microsoft ships it in both a Windows flavor and a DOS flavor. Don't use both, by the way—running one trashes the configuration file of the other. Dosback does all of the things you've come to expect from a high-speed backup program. It's easy to use, it supports data compression, it has built-in error recovery, and it can memorize your pattern of backing up into configuration files called sets. It does not support tape drives directly, but it will back up to any DOS device driver–type storage mechanism; for example, I've used Dosback with Bernoulli Box cartridges with no problems. Those using floppy disks for backup will wish that Dosback used direct memory access to transfer data to the floppies. This feature was trimmed from the original Norton product.

Deltree is my third-favorite DOS 6.0 feature. (MultiConfig is first, and being able to place programs into particular regions of upper memory is second.) Ever had to erase a subdirectory, and the subdirectories in it, and the subdirectories in them? Erase and RD, and erase and RD, and . . . It's tiresome. Now, to delete directory X and all of its subdirectories, just type *deltree x.* You'll get just one *Are you sure?*, and then the directory and all of its subdirectories and subsubdirectories are history. I hope I needn't mention that you should handle this with care, but that's the case with all power tools.

Defrag is another cut-down Norton product, a version of Speed Disk. Not only will it unfragment your disk, but it'll sort your directories.

Move is another utility that's been around since at least 1983 in public domain versions, and it finally comes to DOS. Move will move a file from one directory to another in one command, rather than making you copy a file and then delete the original. Oddly enough, Move also has another purpose: It lets you rename a subdirectory. (Move is another one of those it's-about-time commands).

More Bulletproof Undeletion

It's hard not to like the Undelete command in DOS 5.0. It's potentially of use to almost anyone. Nice as DOS 5.0's Undelete is, however, DOS 6.0's outdoes it by providing three levels of undeletion protection.

The Undelete that comes with DOS 5.0 already has two levels of undelete protection: simple undeletion and deletion tracking. DOS 6.0's Undelete not only includes those two undeletion methods (which space does not allow me to recapitulate), but it adds a new level of protection called the Deletion Sentry. It's a simple idea, but it offers a whole new level of data integrity. The idea is this: Once you've activated the Deletion Sentry, any file erase operations do not actually erase files. Instead, they move the files to a hidden directory. The files in this directory are not counted as taking up disk space, and in general, you won't see them at all. If you need a lot of disk space for some new file or files, so much disk space that DOS would have to actually erase the hidden files in order to fit the new files, then DOS erases the files for good. But that won't happen in most cases, and the net effect of the Delete Sentry is to extend the life of an erased file for a few extra days—time enough for you to realize that you've erased a file that you didn't mean to erase.

Should You Upgrade?

Is DOS 6.0 worth the cost and trouble of upgrading?

For most of us, the answer is yes. The continual improvements in data recovery tools are priceless, as the most valuable thing on your computer is your data. The disk compression lets you put more data on that hard disk—a real blessing if you're using modern disk-hungry software.

The improved memory manager lets you load more programs in your computer, and the antivirus protection makes it easier to keep malicious virus programs from loading into your computer.

For heavy Windows users, DOS 6.0 offers a new Windows Undelete, an antivirus utility and a backup program, plus DoubleSpace.

The E-mail and network support are convenient add-ons if you're already using Windows for Workgroups or LAN Manager, and the Interlnk software will keep the folks who make LapLink, FastWire, and the like burning the midnight oil trying to turn out something better.

Something better may be the best way to characterize DOS 6.0. It's not everything we want in an operating system, but it's a step beyond any previous version of Microsoft DOS. Whether you've got an XT or a Pentium-driven machine, at $60 (discounted price) there's something in the latest DOS for you. ❑

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Clifton Karnes

PARADOX FOR WINDOWS

Paradox for Windows is a beautifully designed database program that has something for beginners and pros alike. With its intuitive design tools, tyros can get databases up and running quickly without writing a line of code, and pros have a powerful built-in language at their disposal for demanding tasks.

The first thing you'll notice when you open the Paradox for Windows box is the program's extensive documentation; the package boasts six manuals. Three of these manuals cover basic aspects of Paradox: Getting Started, a fast-paced guide to get you up and running; Quick Reference, which covers common commands; and User's Guide, which is thorough.

The other three manuals, devoted to ObjectPAL, Paradox's built-in development language, are Learning ObjectPAL, ObjectPAL Developer's Guide, and ObjectPAL Reference. Overall, the documentation is excellent. I'd prefer more tutorial material and more examples both in Getting Started and in Learning ObjectPAL, but these are minor criticisms.

In addition to the manuals are four high-density installation disks. You'll find that installing Paradox is fast and painless, but you'll need about 14MB of hard disk space to get your database party going. This isn't an extravagant amount of hard disk real estate, however, when you consider what Paradox can do.

When you run Paradox for the first time, you'll see what looks like a typical Windows application with a menu bar and a toolbar (Borland calls its toolbar SpeedBar) with buttons for opening a table, form, query, report, script, or library, as well as ones for opening a folder and adding and deleting folder items (more about folders later).

To open an existing table (*table* is just another name for a database), click on the Open Table button. You'll see a File-Open dialog box from which you can select the database you want to load. Paradox can read dBASE III, dBASE IV, Paradox 2, and Paradox 3 databases. When your database opens, you'll see it in a tabular view (hence the name *table*) where each row is one record and each column is one field in the record. This table view is like dBASE's Browse view.

You'll notice that when your table loads, the toolbar changes and several buttons are added. Since these buttons give a good idea of just what you can do with Paradox and your table, I'll run through some of the most important ones. Moving from left to right, you'll see buttons for cut, copy, and paste; print; search and search again; navigation for moving to the first and last record in a file, moving forward or backward by pages, and moving forward or backward by single records; editing; and switching to a forms view. There are also Quick Form, Quick Report, Quick Graph, and Quick Crosstab buttons.

If you haven't designed a form for your table (a form shows a single table record), you can press the Quick Form button and create a respectable form on the fly. And, as you probably gathered from the buttons described above, you can also generate reports and graphs at the press of a button.

Before moving on, I want to mention the Folder button. Press it, and Paradox displays icons for all the database files (including forms) in the current working directory.

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The folder view is like a mini–Program Manager just for your database files. It's a very nice front end that makes managing your databases much faster and easier.

That's a quick look at Paradox. Now, let's go through some of the program's features that you'll encounter when you design a database from the ground up.

Designing a database from scratch with Paradox is much easier than you might think. If you've done this before with other database programs, you'll be familiar with the steps. You may be surprised at how easy Paradox makes most of these steps, however.

The first thing you need to do when you create a new table is define its structure. By *structure,* I mean the items your table will hold. If, for example, you're designing the classic address-book database, you'll have fields for last name, first name, address, city, state, ZIP code, phone number, and perhaps several others.

You need to tell Paradox which fields you want to use, their type, and their size. To open a new table, you simply right-click on the Open Table button and choose the table type from the dialog box.

You'll see an empty table. To create your fields, you simply fill in the blanks for field name, type, size, and key. If you don't know, for example, what types are available, you right-click on the field, and you'll see a menu of choices.

Right clicking is something you can do almost everywhere in Paradox's windows to inspect fields and objects and to get help. It's one of the things that makes using the program so easy and so much fun.

After you've created all of your fields, you save your table. You can work with your table by using the table view and the program's quick forms, or you can create your own forms. Since Paradox has such excellent design tools, let's look at form design.

To create a new form, you right-click on the Open Form SpeedBar button. The program will ask you which table to use for the form; you supply the name of the one you just created.

You'll find yourself in form design view with fields laid out for your table showing each field's label and its data area. Now, the real fun begins. You can move and resize all of these fields, and more important, you can change their *properties.*

To change a field's properties, right-click on the field. You'll see a pop-up menu with the entries Color, Pattern, Frame, Design, Runtime, and Methods. Each of these entries is a cascading menu, so choosing one calls a submenu.

Choose Color, for example, and you'll see a grid of colors to choose from. If you want to keep the Color grid handy, its title bar has a snap-off button. Click on this, and the Color grid snaps off the menu and stays on your Paradox desktop. Many of the menus have this snap-off feature, which I've found indispensable.

One of the most important entries on the menu is Frame, because it lets you choose the overall appearance of the object. You can place a shadow behind the object or give it a 3-D indented or a 3-D outdented look, to name just a few choices. The Frame option combined with the Color selection gives you the tools to create dazzling-looking forms.

After you discover how easy it is to design a great-looking form with Paradox, you'll probably want to spend an inordinate amount of time in the designer. I know I did.

If you do get out of the designer, however, you'll have a chance to look at some of Paradox's other excellent features. Here's a whirlwind tour of some of the most important. The program's report designer is as easy to use and as powerful as the forms designer—you can create crisp reports in minutes. Paradox is fully relational, too, and it supports a graphical query-by-example tool that's the easiest to use I've seen.

Of course, I've only been able to touch the surface of this powerful and feature-packed program. But the message is loud and clear: Paradox for Windows is a winner. It's not only easy to use and very powerful, it's also fun. ❐

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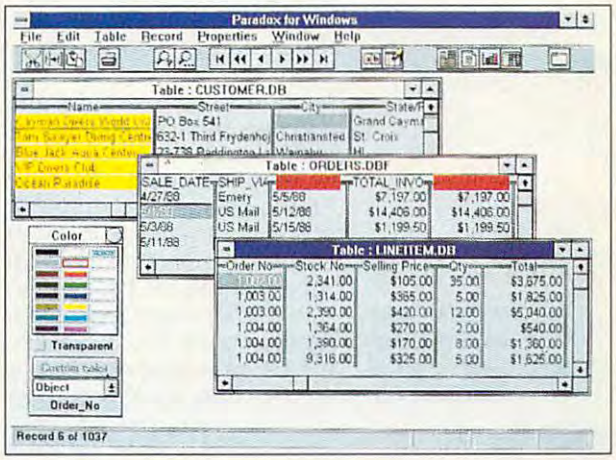

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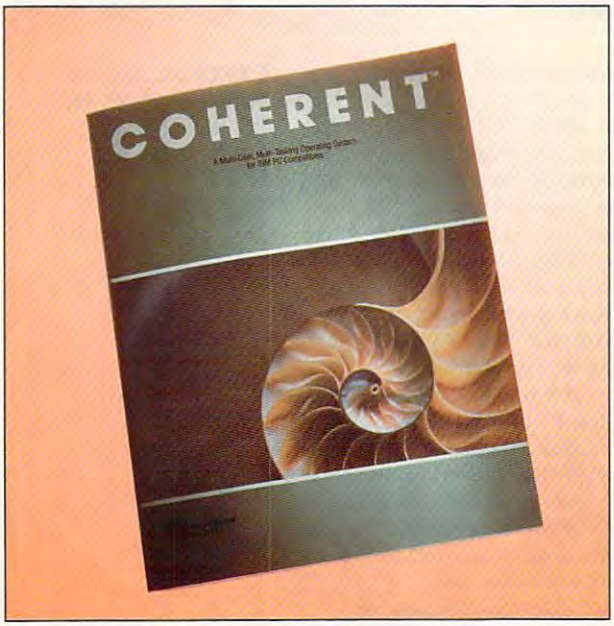
COHERENT 4.0

For many computer users the only question has been whether to run OS/2 or DOS alone or DOS with Windows. COHERENT (Mark Williams Company, 60 Revere Drive, Suite 250, Northbrook, Illinois 60062; 708-291-6700 or 800-627-5967, fax 708-291-6750) should be another option under consideration. COHERENT 4.0 is a 32-bit UNIX-like operating system for the Intel 386 or higher.

One of the strongest reasons for choosing Windows or OS/2 is that they both have the ability to multitask. COHERENT answers this need by being a true multiuser, multitasking operating system. Granted, it currently does not support graphics, but I am told that graphic capability is in the works.

For text editing, COHERENT provides MicroEMACS and elvis (a vi clone), both of which take a little getting used to if you are not familiar with them. I wasn't expecting flashy screens and pull-down menus, so I wasn't disappointed. Don't get me wrong; they are both powerful editors—they just aren't flashy.

For UNIX power without a high price, take a look at COHERENT 4.0.



For those who want to try programming, COHERENT provides a K&R C compiler, lex, yacc, and make utility. There is also sh (Borne shell) or ksh (Korn shell) for programming shell scripts and awk (a string-based interpreter). Best of all, they are all documented with short beginner's examples in the manual.

An operating system is of no use without applications. Although COHERENT comes with only the applications mentioned above, many additional applications are available. One of the new developments in COHERENT 4.0 is that it is COFF compliant. This means that its executable files, theoretically, will run on any other system that is also COFF compliant. This should include systems like Interactive UNIX and SCO UNIX (not Xenix) just to name two.

I checked out this claim. Pacific Micro (201 San Antonio Circle, C250, Mountain View, California 94040; 415-948-6200, fax 415-948-6296) sent me a copy of its Interactive UNIX version of Common-Link (a product that will format, read, and copy from Macintosh high-density disks and DOS 720K or 1.44MB disks), and it worked under COHERENT.

If you're trying to learn UNIX or have UNIX at the office and want something similar at home, COHERENT 4.0 is a very close clone of UNIX System V. It has most of the tools that you would expect to see on many Unices (the plural of UNIX). For those of you familiar with the GNU (GNU's Not UNIX) project (Free Software Foundation, 675 Massachusetts Avenue, Cambridge, Massachusetts 02139; 617-876-3296), Mark Williams is currently finishing the port of both the GNU (ANSI standard) C/C++ 2.3 compiler as well as the GNU tools, a selection of programming, development, and general file-manipulation tools. Mark Williams will be making the compiler and the tools available for $49.95 each and the source to the compiler available for $99.95.

One other service worth mentioning is the Mark Williams Bulletin Board. On this you may read mail or news and ask questions and download updates or software packages, most of which will even include source code. It is accessed using UUCP, a mail package that comes with COHERENT. It takes a little effort to set up, but if you take the time to follow the manual, it's not that difficult.

If you have a business and your VAR/dealer tells you that the solution you need includes a UNIX operating system, COHERENT is only $99.95 and doesn't require a license from AT&T.

If you are a VAR or dealer, one of the most promising products available on COHERENT is the Acucobol-85 COBOL compiler (Acucobol, 7950 Silverton Avenue, Suite 201, San Diego, California 92126; 619-689-7220, fax 619-566-3071). Acucobol runs on over 520 platforms, and its programs are portable unmodified. Acucobol's Golden Access disk contains a catalog of applications arranged according to the vertical markets that they target and the companies that provide them.

So, do you need COHERENT? Well, it probably won't replace your DOS, Windows, or OS/2 system, but if a UNIX-like solution is what you need and you don't want to pay a lot, ask your VAR or dealer if COHERENT can be your solution. Of course, if you prefer, you can contact Mark Williams and order it directly. COHERENT comes with a 30-day, money-back guarantee. ❐

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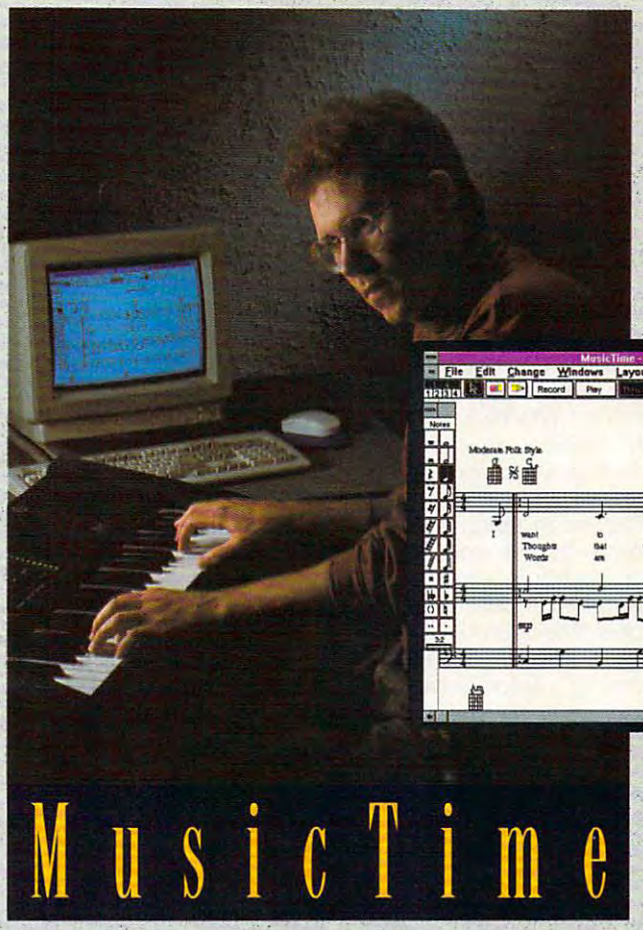

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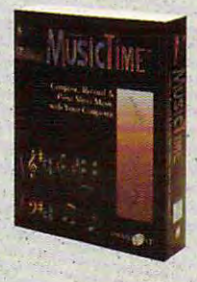

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MUSIC FOR SOUND CARDS

You can use most Windows-based MIDI music programs, even if you only have a sound card.

When Microsoft added sound to Windows 3.1, it also added MIDI to Windows. MIDI (Musical Instrument Digital Interface) is the data communications protocol that has become the standard for today's music synthesizers, computer-music interfaces, and computer-music software. As I mentioned last month, great-sounding General MIDI modules are inexpensive enough ($250–$800) for almost anyone to buy one. This month, I'll look at music programs for Windows that work with ordinary sound cards as well as MIDI modules and synthesizers.

The key to telling Windows whether to use your sound card's built-in FM sounds or an external MIDI device is MIDI Mapper. It helps ensure that music produced for one kind of electronic musical device will sound the same when played back on another. If you've installed the Windows driver for your sound card or MIDI instrument, you should be able to bring up MIDI Mapper by double-clicking the Control Panel icon (it's usually in the Main group) and then double-clicking the MIDI Mapper icon. Microsoft provides drivers for many popular sound devices (usually including Ad Lib, General MIDI, MT32, and Proteus/1). If you can't find the driver for your sound card or MIDI device, check your documentation to see if you can use another driver in its place.

By selecting the appropriate driver, you tell Windows to route all MIDI communications to and from that device. For example, if you have a Media Vision card, you can have its FM synthesizer chip play your MIDI notes. If you have a MIDI device attached to your sound card, such as the Wave Blaster daughterboard that's available for the Sound Blaster 16 ASP, you can send the MIDI signals there. Because Windows takes care of which device gets the MIDI data, most Windows-based MIDI software will work with most sound cards and MIDI devices—as long as you have the right MIDI Mapper driver selected.

Now that you know how to send MIDI data to your sound card or MIDI device, let's look at Windows-based MIDI programs that can be used by beginners as well as professionals. Top of the list would have to be Band-in-a-Box Pro for Windows (PG Music, 266 Elmwood Avenue, Unit 111, Buffalo, New York 14222; 800-268-6272; $88). It creates automatic accompaniments using a large number of musical styles (Jazz Swing, Reggae, Miami Sound, Blues Shuffle, and so on). Type in the chords to a song, pick an appropriate style, and press the Play button. That's all there is to it. The bass, drums, piano, guitar, and strings parts are created automatically. Band-in-a-Box Pro comes with 75 styles, but you can buy extra ones or create your own in the StyleMaker section of the program. While the package includes many preprogrammed melodies and chords, you can record your own using the built-in sequencer or buy MIDI FakeBook disks that contain the melodies and chords to many popular songs. Best of all, this mix-and-match approach yields some excellent—and often unique—tunes. If you're into music, Band-in-a-Box is a must buy. It's loads of fun.

PG Music also sells PowerTracks for Windows, a full-featured Windows MIDI sequencer that costs only $29 (they even throw in the DOS version of PowerTracks for free). And for just $389, the company will sell you a Roland SCC-1 (it's a Sound Canvas on a PC card) and throw PowerTracks for Windows in for free. It's a terrific package for anyone who wants to get started with General MIDI.

If you've ever wanted to program a drum machine, take a look at The*Drums. It offers realtime pattern editing and recording and supports standard MIDI files. Each drum instrument is given a row of boxes that represent the beats in a measure. Simply click on the boxes to turn the drums notes on and off. If you have a good ear for music, you can quickly create complex drum patterns. CompuServe members can find the demo version of The*Drums in the MIDI/Music Forum (type *go midiforum*). The full version is available for $50.

Other Windows music programs that support sound cards, as well as MIDI synthesizers and modules, include Power Chords 1.0 (Howling Dog Systems, Kanata North Postal Outlet, Box 72071, Kanata, Ontario, Canada K2K 2P4; 613-599-7927; $84.95), which lets you generate your music using the onscreen frets of a guitar, bass, or banjo; NotePlay for Windows (Ibis Software, 140 Second Street, #603, San Francisco, California 94105; 415-546-1917; $49.95), which helps you learn to sight read music; and MusicTime (Passport, 100 Stone Pine Road, Half Moon Bay, California 94019; 415-726-0280; $249.00), which lets you record your music and use desktop publishing to produce it in standard notation.

If you would like to learn more about MIDI, check out these two books. Craig Anderton's *MIDI for Musicians* is intended for the nontechnical musician who's just starting out with MIDI, while Joseph Rothstein's *MIDI: A Comprehensive Introduction* is a clear and concise explanation of all aspects of the MIDI specifications. ❐

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ART WORKS

Robert Bixby

ART WITHOUT THE WORK

Last month, I told you about Arts & Letters Scenario (Computer Support, 15926 Midway Road, Dallas, Texas 75244), a simple and inexpensive way to have fun with clip art and a generous set of drawing tools. Instant Artist (Autodesk Retail Products, 11911 North Creek Parkway, Bothell, Washington 98011) takes this concept even further. Instead of providing a blank canvas for you to fill, Instant Artist provides eight standard formats (letter, envelope, certificate, postcard, banner, sign, business card, and greeting card) with several predrawn examples in each format. You can alter the existing designs or create your own with free-form art, any of the dozens of clip art objects, or text in any TrueType or Adobe PostScript Type 1 font available on your system. The type styles available include plain and italic (no bold) but also tilted, staggered (at random baselines), and wacky (staggered and tilted at all angles). You can also alter the type's width, color, and outline color.

Drawing supplies like Sketcher and Instant Artist take the pain out of computer art.

One problem is that Instant Artist prints registration marks (little crosses to indicate the edge of the card on the paper) when you print postcards and business cards. I found them unnecessary, and there is no way to turn them off.

This month, I also had the opportunity to try Fractal Design Sketcher (Fractal Design, 335 Spreckels Drive, Suite F, Aptos, California 95003).

Sketcher is a gray-scale graphics program that's both ingeniously designed and creatively packaged. Another Fractal Design product, Painter, comes in a paint bucket. Sketcher comes in that staple of sketch artists everywhere, the cigar box. Sketcher supports the Wacom touch-sensitive tablet, but I was able to get great results using just a mouse (Sketcher comes with a special mouse driver).

Sketcher provides the computer artist with a broad range of drawing tools, including pen, pencil, and charcoal. You can also smear with water and erase completely. You have the option of drawing on one of several paper grains. You can cut, paste, distort, and trace. Tracing is a little different from what you might expect. Rather than tracing the contours of a gray scale, it superimposes one drawing on the other so you can trace it, just as if you were working with tracing paper. The program is a complete gray-scale photo studio that lets you take charge of brightness and contrast and even impose a paper's texture on a scanned photo, making it look as if it's been rendered in charcoal on art paper. A gray-scale editing program is perfect for most desktop publishers, since few of us can afford much use of color on the desktop.

On the hardware front, after some months of trying, I finally got my hands on the ScanPlus B/W 300 PageReader LT scanner (Plustek USA, 3350 Scott Boulevard, Suite 46, Santa Clara, California 95054). This scanner is a sheet-fed HP ScanJet–compatible black-and-white 300-dpi scanner specially designed for OCR work. It comes with Calera Wordscan OCR software, which operates in Windows (you can order another package, if you want; Recognita is available, which can read foreign languages and operate under DOS). I normally use ReadRight OCR software, and the Calera product impressed me in two ways. It's very accurate (while somewhat slow when compared to ReadRight). But it is simple to use and has a very intuitive user interface. Once you've scanned material in, you can save it in any one of several word processor formats, including ASCII.

Installation involves nothing more than putting a controller card in the expansion bus of your computer, stringing a cable from the scanner to the computer, and installing the OCR software. The scanner doesn't even require its own power supply. It attaches to the computer via a control cable, and it takes its juice from the expansion bus. The software and hardware performed flawlessly, but remember that a sheet-fed scanner is useless for scanning from bound material. If you only need to scan in sheets of material, the ScanPlus will serve you well.

This scanner currently lacks a paper handler, so you have to feed each sheet in individually, but a paper handler may be added by the time you read this. It's no fun feeding sheets through a scanner, but after typing a book and then scanning a book, I can attest that the process of scanning and using an OCR is much easier (and far more accurate) than typing. ❐

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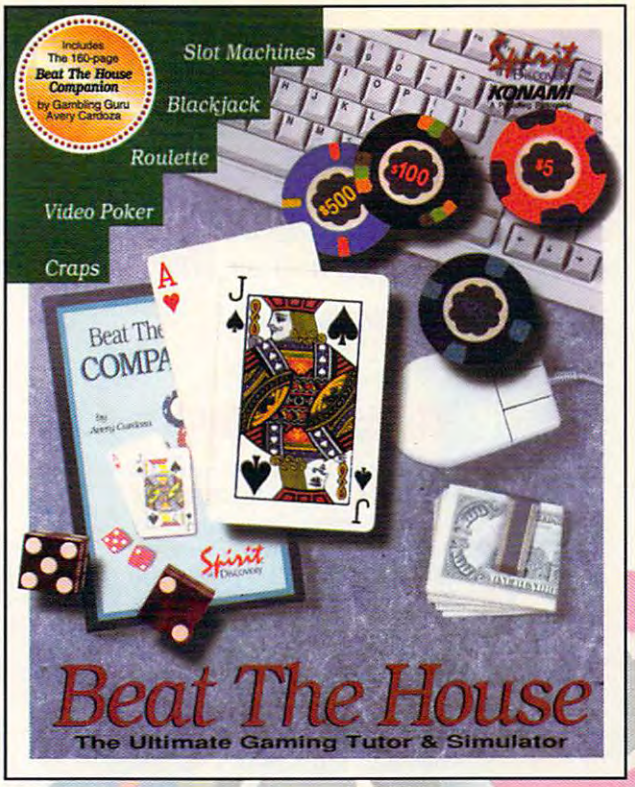
Some play for fun...



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DISCOVERY CHOICE

This colorful, animated game keeps kids thinking and moving fast as they solve math and language puzzles in their effort stop the Master of Mischief.

Clayton Walnum

TREASURE COVE

A mysterious fellow named the Master of Mischief has left his home in Treasure Mountain, crossed the Rainbow Bridge, and made his way to Invention Island, a place where he is anything but welcome. Now, he has destroyed the Rainbow Bridge and is polluting Treasure Cove with goobies, a type of fish found beneath the ocean's sands. It's up to your child, in the role of a Super Seeker, to stop the Master of Mischief, get rid of the goobies, and help the elves rebuild the Rainbow Bridge.

This is Treasure Cove, another exceptional educational program from The Learning Company. Children ages 5–9 get to slip into their swim fins, don a mask and snorkel, and join a fascinating adventure beneath the sea as they solve puzzles, learn about sea creatures, and find treasures. They'll discover that Treasure Cove is as addicting as any videogame, thanks to its charming characters, challenging puzzles, and action. And, as they enjoy the videogame-style fun, they're brushing up on their counting, reading, and logical skills.

The game begins with a short storybook presentation that explains the underwater mission. To play, your Super Solver must dive into the depths armed with only a flashlight and a bubble pump. Under the sea's surface there's much to explore: over a dozen types of sea creatures, a sunken ship, mysterious caves, and more. By capturing sea animals with the bubble pump and exploring the ocean floor with the flashlight, your child advances through the levels of the game, eventually gathering enough gems to rebuild the Rainbow Bridge.

The Super Solver's flashlight requires light energy to work. To get light energy, your child has to collect red sea stars with the bubble pump. This involves swimming up to a sea star, aiming the bubble pump, and shooting bubbles. If the bubbles enclose the sea star, the flashlight's energy indicator goes up one unit, the bubble pops, and the sea star skedaddles. In the lower levels, capturing sea stars is a snap. As the game progresses, however, your child's aim must be increasingly more accurate.

The bubble pump, of course, requires air. Super Solvers can refill the pump by finding an air station and blinking the flashlight the number of times shown on the pump. If they're successful, the station's Crabby Attendant emerges, grabs the sea-horse air nozzle, and fills the bubble pump with a ten-bubble charge. Players who run out of light energy and therefore can't refill the bubble pump can find a school of glow fish. These glowing friends provide just enough light energy to start the air station. In this way, Treasure Cove never comes to a frustrating dead end.

After capturing an orange sea star, your child is given a puzzle to solve. Puzzles are multiple-choice questions and usually involve solving simple math problems, finding rhyming words, or completing sentences. A correct answer is rewarded with a clue that will help your child locate gems and the all-important puffer fish.

Gems increase your child's score, but the elves also need them to rebuild the Rainbow Bridge. And, after all, helping to rebuild the bridge is one of the game's objectives. Therefore, as a Super Solver, your child's main task is to find as many gems

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as possible. But the gems are hidden on the ocean floor, covered by various types of ocean life. To find them, Super Solvers must locate the right group of life forms and then shine the flashlight on them. The clues given for correct responses to puzzlers help children locate the life forms that are hiding the gems.

Each level in Treasure Cove offers as many as three clues. For example, after catching an orange sea star and answering its puzzler correctly, children may be given the clue *three*. This means the kids should search for a group of three plants or animals. A second clue may be *blue*. By combining the clues, children can figure out that they must look for a group of three blue plants or animals. Finally, the last clue may be the name of an animal or plant—for example, *crabs*. Gems can be found under a group of life forms that match just two clues. In our example, any group of blue crabs, any trio of crabs, or any trio of blue life forms may hide gems. However, when players locate the group of life forms that matches all three clues, they get the puffer fish, which is required to move on to the next level.

Of course, children can search for gems and the puffer fish with any number of clues by randomly shining the flashlight on the ocean floor. This method, however, takes a lot of time and forces the child to stock up often on bubbles and light.

While searching for gems and puffer fish, your child also needs to keep an eye out for enemies—specifically goobies, which steal light energy when touched. Luckily, goobies, like the sea stars, can be handled via the bubble pump. Enveloping these creatures in a bubble causes them to float up and off the screen. By replacing traditional weapons with the bubble pump, The Learning Company has cleverly avoided violence in Treasure Cove. Animals trapped in bubbles are not destroyed; they're simply removed from the screen.

After finding all the gems in the level and locating the obligatory puffer fish, players can move on to the next level. To do this, they have to find the level's Goobie Tube and plug it with the puffer fish. The successful Super Solver is escorted to the next level by a sea creature. For example, in one level, the child's onscreen character swims into a whale's mouth and then is blown into the air through the whale's blowhole. These well-rendered animations further reward children for a job well done.

After completing three levels, players enter Shark Park, where they must avoid sharks while trying to shine the flashlight on a bonus gem. Sharks, like goobies, steal light energy when touched. However, a well-aimed blast from a bubble pump fills these meanies with air and floats them away.

Players who successfully avoid or remove the sharks are taken to the elves to give them the gems collected so far. The elves rebuild part of the Rainbow Bridge with the gems and then reward the Super Solvers with a special treasure of their own. These treasures are stored in the sunken ship. Children can swim through the ship to see the treasures they've amassed.

All throughout this underwater adventure, your child will be delighted by Treasure Cove's almost cartoon-quality graphics and humorous animation—especially when the program is run in 256-color VGA. (The EGA graphics are OK, but to fully appreciate this program, you really need VGA.) Moreover, Treasure Cove's sound takes full advantage of a Sound Blaster–compatible card to produce snazzy sound effects and a catchy soundtrack.

IBM PC or compatible; 640K RAM; EGA, MCGA, or 256-color VGA; mouse and hard disk optional; supports Sound Blaster sound card—$59.95

THE LEARNING COMPANY
6493 Kaiser Dr.
Fremont, CA 94555
(800) 852-2255

As mentioned previously, Treasure Cove is targeted for children between the ages of 5 and 9. However, the younger children will need parental assistance, since reading skills are required to answer the puzzlers. Also, younger children may not have the dexterity required to handle the action portion of the game; aiming the bubble pump and swimming both require manual skills.

Treasure Cove is filled with delightful characters, fascinating underwater scenes, and enough sound and action to keep learning from becoming boring. Kids will love it. What more could a parent ask? ❐

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GAME INSIDER

Shay Addams

THE NOT-SO-DEAD ZONE

June traditionally signals the beginning of the dead zone for entertainment software—publishers aim to release new games for Christmas, not the Fourth of July. This summer, however, a clutch of fresh titles promises an endless summer of fun for those of us who vacation at home in front of our computers.

After achieving a breakthrough with Sim City, Maxis is moving to the country in Sim Farm. In this engaging simulation of running a small family farm, you must keep an eye on the environmental aspects of your endeavors to turn the farm into a lucrative business. (Unfortunately, Willie Nelson will not stage a Farm Aid concert if you run out of money.)

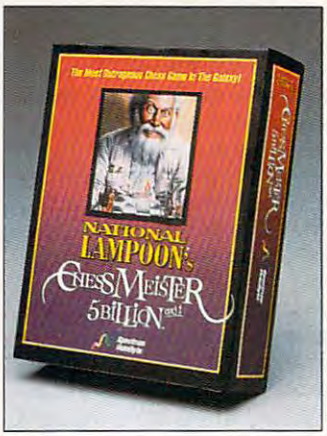
In another novel simulation, Walt Disney's Coaster straps you into the front seat of Disneyland's Matterhorn and nine other world-famous roller coasters. You may also build your own roller coaster, if you desire. Coaster was scaled back from the original design, so don't expect the depth of Stunt Island. Do expect to pay about half the price, though.

Air combat fans seeking new war birds to fly can finally climb into the cockpit of the British Tornado. Spectrum HoloByte is importing a European simulation of this jet that specializes in low-level ground attack rather than air superiority. For anyone having trouble mastering all the controls of Falcon 3.0's F-16, Spectrum HoloByte has produced its first video, which also includes new mission disks along with other extras.

Three-Sixty followed up with its WWII land war game, V for Victory, with a standalone program called V for Victory: Market Garden. Featuring SVGA graphics, Market Garden is based on the operation portrayed in the film *A Bridge Too Far.* Another one to watch for later this summer is New World Computing's Empire Deluxe, a six-player version of the classic war strategy game. It offers modem and network play options.

Access's second golf course for Links 386 Pro carts you off to Innisbrook for 18 holes of SVGA-illustrated golfing. (It includes a VGA version that's compatible with the original Links and Microsoft Golf.)

In La Russa Baseball II, Strategic Simulations' sequel to last year's hit sports sim, veteran sports announcer Ron Barr calls the plays. Three expansion disks provide new players and stadiums, plus a fantasy draft feature.



Chessmeister 5 Billion and 1 puts a National Lampoon slant on the ancient game of chess.

Jim Walls, a retired California Highway Patrolman and creator of Sierra's Police Quest series, recently completed Blue Force: Next of Kin. You begin as a by-the-book motorcycle cop, but for the last two-thirds of the game you play a private eye who gets to bend the rules. Walls codesigned the game with Cheri Lloyd, who has done the art for Walls' games since Police Quest II.

Meanwhile back at Sierra, Al Lowe made a dramatic shift in story material for his latest quest. Lowe went west—to the Wild West—to tell the story of Freddy Pharkas: Frontier Pharmacist. Lowe applied a *Blazing Saddles*–style of humor to his first Western, and it's sure to keep you laughing even when you're hopelessly stuck.

Space Quest V is the first installment in the series to be produced at Dynamix.

LucasArts is heating things up in the CD arena, simultaneously shipping the CD talkie and the floppy versions of Maniac Mansion II: Day of the Tentacle.

New World Computing's Dark Side of Xeen (which may not arrive until late June) will give role-playing aficionados good reason to keep Clouds of Xeen on their hard disks. Players will be able to move back and forth between the worlds found in Dark Side and Clouds and finally solve those mysterious quests that were so elusive in the latter.

Other new role-playing games you should be watching for in June are Dynamix's Betrayal at Krondor, which employs rotoscoped 3-D graphics; Virgin's Lands of Lore, a three-character quest with a first-person perspective à la Eye of the Beholder; and Realms of Arkadia, a best-selling German quest just imported by Sir-Tech.

If you're looking for something different, the most unusual new game on the shelf this month is National Lampoon's Chessmeister 5 Billion and 1 (from Spectrum HoloByte). The world's only humorous chess simulation, Chessmeister is also the most risqué of the dozens of such programs. It parodies chess and computer games and gives you a better chance of winning than the artificial intelligence of other chess games. Until next month, that's check and mate for "Game Insider." ❐

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ENTERTAINMENT CHOICE

With 3000 planets to explore, hosts of aliens to meet, and scads of spacecraft to fly, you'll be entertained for hours with this fully digitized space adventure.

David Sears

STAR CONTROL II

When we last heard from Earth, the Alliance fared badly against the Hierarchy. It threw everything it had against the brutally powerful Ur-Quan dreadnoughts and battle thralls, but it suffered terrible defeat. Now, most Alliance worlds lie fallow; their star-faring days are over. The Ur-Quans no longer consider humanity a threat. Little do they know that a handful of earthlings survive outside the slave shield—the children of a lost scientific expedition to Vela.

That's where you come in. Cut off from news of the war, the scientists in the Vela-Zeeman system worked in ignorance of the struggle's outcome. There, they discovered an abandoned Precursor factory. The ancient Precursors possessed science that today's sentient races can only mimic and never fully comprehend. With this factory, you hope to manufacture a Precursor starship that might withstand the fury of the Ur-Quan masters.

Alas, you can produce no more than the skeleton of the Precursor vessel. What now? You return to Earth, where, hopefully, whatever remains of the human race will assist you in completing your warship and join you to annihilate the dread Ur-Quan masters. Thus begins your quest, and the journey, even in hyperspace, is a long one.

Star Control II holds much in common with its popular predecessor, such as large star maps, starship factories, a definitive space-combat simulator, interstellar exploration, and more—there's plenty here for 100 hours of play.

But Star Control II offers much more than the original's tactical considerations and manic action. It reaches deep into galactic history to paint a picture of considerable drama and pervasive humor. For instance, if you ever wondered why the fairylike Arilou visited Earth centuries ago, you may find the answer in this sequel. On your expeditions, you'll encounter over a dozen alien species of disparate temperaments and combat aptitudes. All prove quite talkative, particularly if you've acquired items they desire. Just ask your questions via the dialog box and enjoy their responses. Avoid insults: A few unkind words so angered the Vux that they swore animosity toward man forever.

To complete your ship, you'll need vast amounts of raw materials. Some you may acquire within the solar system; most, however, lie scattered throughout the galaxy. Using the Earth's star base to synthesize necessary modules, add a few storage pods to your Precursor ship along with extra fuel and crew members. Pull up the star map and choose your destination. Nearby stars might not promise the greatest mineral wealth, but the likelihood of an insectoid Ilwrath Avenger blasting you to atoms isn't as great, either. A convenient autopilot feature guides you into hyperspace and then drops you at your destination. You can instead work the controls manually, but even the abbreviated distance covered in hyperspace takes considerable time.

Once within a star system, you guide your ship into orbit around a planet or moon, perform an energy scan, a biological scan, a mineral scan, or perhaps all three, depending on your zeal. Next, drop a lander craft on the surface and run over minerals to store them; stun life forms with the lander's blaster and then pick them up. Any energy sources shown on the map indicate technology of some sort; approach with caution. You may lose some crew members, but the rewards of more

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Precursor trinkets warrant a few sacrifices. Return to your ship and repeat the process until your cargo bays overflow or your limited fuel levels dictate a return to Earth.

At home, you can exchange your raw materials for more synthesized Precursor modules—more powerful weapons, defensive systems, crew and storage pods, and additional fuel tanks. In the Earth's shipyards, you'll choose from plans for lesser starships—earthling cruisers at first, but more diverse vessels as you form alliances with friendly races and they place their technology at your disposal.

Initially, Star Control II seems to involve much of this sort of exploration, flagship design, and fleet construction; and all of these constitute an excellent game. But after a point, you acquire enough resource units that you really don't need to explore every planet you encounter. Of course, whenever a new species offers you starship blueprints, you'll want to build that ship just to fly it, if for no other reason.

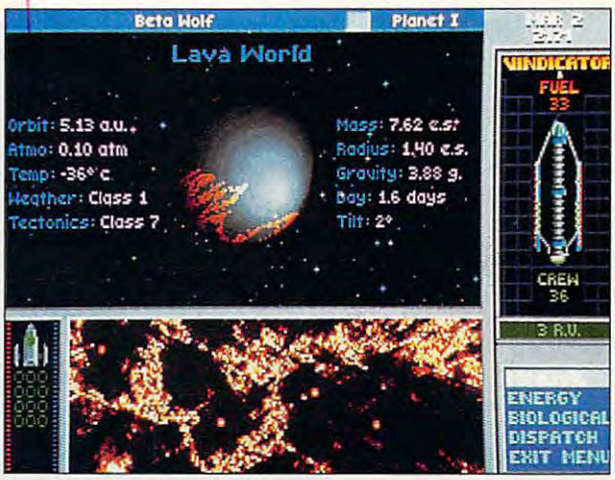
So, what's left after you have all the credits an earthling could ever spend? Meeting the neighbors! They all have problems, and only you can solve them. Either that, or it will seem that every alien you encounter will want to kill you, so pack your blasters along with your best diplomatic banter. As you work your way through the galaxy, you come closer to unraveling the mysteries the Precursors left behind and the motivations of the Ur-Quans, and you encounter the strangest assortment of spacecraft ever assembled in one game. More significantly, you'll play top gun in a galactic showdown rivaled only in the best science-fiction films.

Called the first totally digital game by its designers, Star Control II stands ready to amaze. Played only in impressive VGA and MCGA graphics modes, its playfields sport parallax star fields, exquisitely detailed battle craft, and gorgeous explosions. Consistently superb, though limited in variety, the animated sequences that accompany each alien encounter convey whimsy or dread equally well. Dialogue, often the weakness of sci-fi or fantasy role-playing games, rates from witty to inspired, and it would probably amuse even the most grizzled space veteran. The designers placed the emphasis on fun here, and while it's easy to treat Star Control II seriously, only a few of the aliens do. These are, of course, your worst enemies.

Owing more to its digital heritage than the graphics and dialogue, however, the eight-channel score and accompanying sound effects redefine what a PC speaker can produce. The Pkunk starship captain taunts his opponent with intelligible insults while a techno combat theme thumps in the background. Explosions sound very large—and very much like explosions. Somehow, all this mixes without missing a beat. Alien encounters merit moody atmospheric pieces or playful tinkling melodies; all are memorable and among the best done for any game on the market.

Star Control II configures itself automatically on most systems, will run under Windows, and works happily in tandem with a disk-caching program. The larger the cache the better: With 9MB of hard drive space full of scores of stars, uncountable planets, and nearly an hour of music, the more time you can spend playing the game and not drumming your fingers during seek/read times, the better.

Before you tangle with the Ur-Quans, you'll want to try out a few of the newer starships and pit them against the old standbys. The game includes a stand-alone program, SuperMelee, that lets you fill a fleet with the ships of your choice and slug it out in deep space. For a humbling experience, try a melee against the computer in Frenzy mode. You won't believe your PC can move so fast!



Star Control II gives you exactly what you want in a space adventure: action, bizarre technologies, monsters, friendly aliens, vicious aliens, a love interest, and unfathomed mysteries. Who wouldn't want more of the same? This time, though, the smart money is on the earthlings at Accolade. ❐

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GAMEPLAY

Paul C. Schuytema

HITTING THE BOOKS

Gone are the days when good mechanics and a fresh idea ensured a quality game. We, as consumers, demand more from our computer entertainment, and game developers have obliged us.

A case in point is Dynamix's Aces of the Pacific. This World War II flight simulator pulls us into the world of sun-bleached runways, swaying palms, and Quonset huts of the Pacific theater. The mechanics are there: a solid simulator with impressive graphics and a healthy dose of great gameplay.

Aces, like good literature, provides a vivid, continuous experience. Research is the element that makes the experience real.

Aces is so convincing largely because of the work of John Bruning, who is working toward his master's degree in aviation history at the University of Oregon.

He began his research in typical fashion: devouring books at the university library, from secondary sources to pilots' memoirs. After he'd grasped the big picture, he worked through the Air Force archives at Maxwell Field, Alabama, where he studied microfilm records of unit histories and official listings of fighter and bomber groups.

Bruning discovered that one of the highest-ranking aces of the Pacific theater, Gerald Johnson, was a native of Oregon. He tracked down Johnson's widow and borrowed an interesting piece of memorabilia from her: the silk map Johnson carried with him when he flew. On it were all of the main American air bases, against which Bruning could check his research.

His interest in this era is evident not just in his conversation but also in Aces.

Stepping back even further in time, Electronic Arts' The Lost Files of Sherlock Holmes enters the smog-draped London of 1888. The Lost Files is the largest interactive adventure yet put on a PC, and the experience it provides is a cross between a colorized Basil Rathbone movie and a long indulgence in the work of Sir Arthur Conan Doyle.

R. J. Berg, the game's scriptwriter, has been a fan of Sherlock Holmes since boyhood. When he decided to put this game together, his first step was to dive into the canon of Doyle's work, rereading the stories not only for the mystery but also for the tone of speech and the quirks of Holmes's character.

Berg didn't want to rehash any of Doyle's work or rely on explanations borrowed from the fiction. He wanted to create a completely new adventure that excited the modern palate for mysteries but also remained true to the fictional Holmes. He labored to re-create Holmes's rhythm, from his conversational mannerisms to his tendency to overuse people's names.

Berg also studied Dickens's fiction to capture the Victorian flavor of the dialogue as well as the setting, and he used the clichés of Victorian society to bring the 1880s back to life.

Using period maps, Berg made sure that place and street names were accurate, while artists worked with books of Victorian fashion and costume to create the look of the game's characters.

Berg explains that Holmes was an enigmatic individual who was generally very far removed from the Basil Rathbone matinees. He was crass, solitary, and very unsympathetic toward those who were swung by their emotions. He didn't like women very well, and he couldn't tolerate ignorance in anyone. Holmes's personality is very strong in the game, a product of Berg's endless writing and rewriting.

The result is a cinematic excursion into the smokestacks of London and a wild and believable journey with Holmes as we help him unravel the Case of the Serrated Scalpel.

The research necessary to create these games answers our demands for greater depth. Our criteria for what makes an unforgettable movie or book have intermingled with our expectations of computer entertainment. We demand much more, and thankfully, we are getting it. ❐

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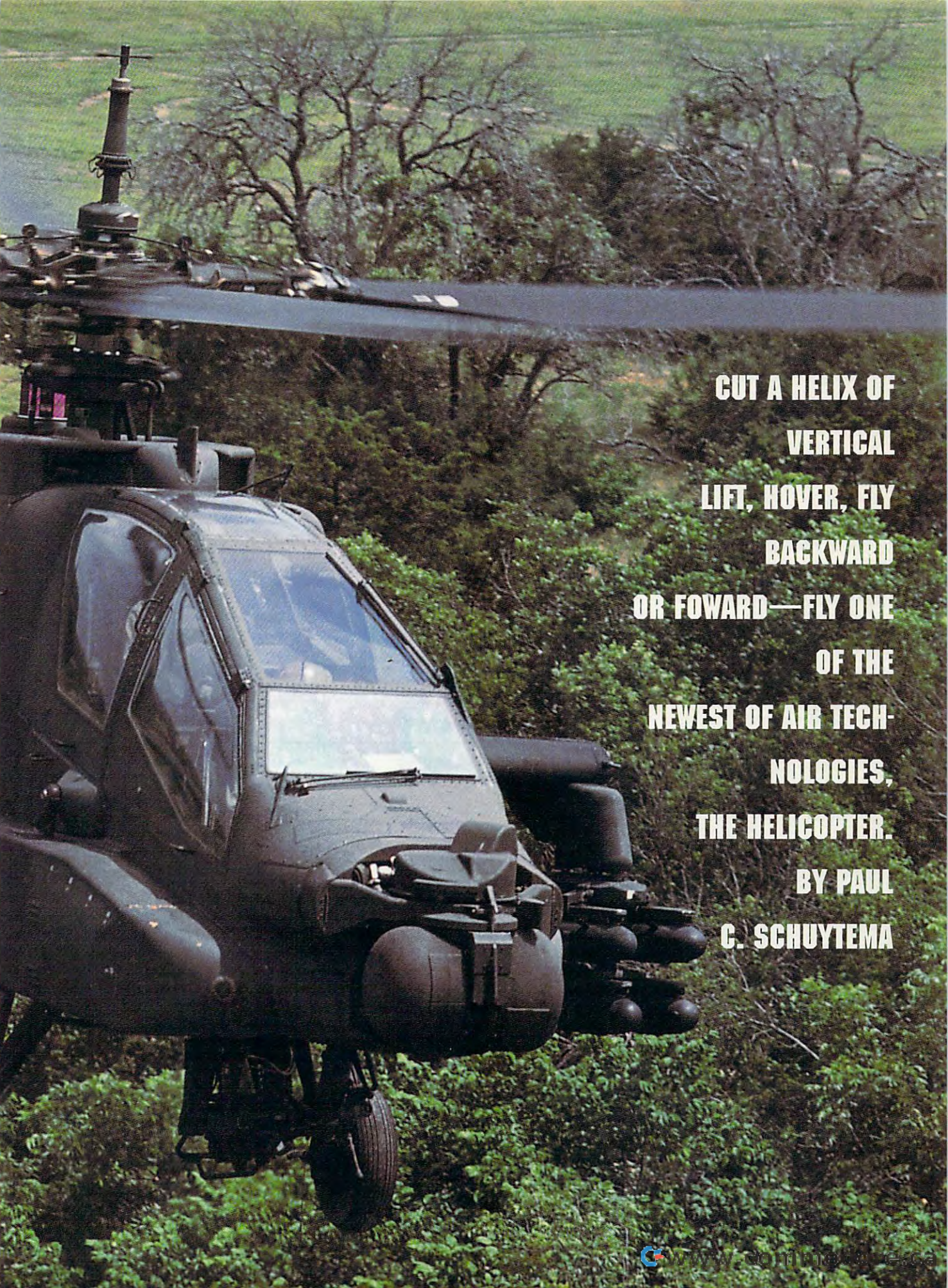

CUT A HELIX OF VERTICAL LIFT, HOVER, FLY BACKWARD OR FOWARD—FLY ONE OF THE NEWEST OF AIR TECHNOLOGIES, THE HELICOPTER. BY PAUL C. SCHUYTEMA

www.commandpost.ca

You're flying low, almost brushing the trees' highest branches. Suddenly you detect a surface-to-air missile (SAM) rocketing toward you. You lift, swerve, and then duck to avoid it. Safe for a moment, you drop and hide along the side of a forested hill. You're not flying the fastest jet, but one of the slowest of aircraft, a helicopter. You've traded speed and glamour for stealth and unusual powers. Almost a secret weapon in modern warfare, your helicopter possesses advantages over all fixed-wing aircraft. It can take off and land in a space no larger than a two-car driveway, fly at arm's length above treetops, and duck into foliage to hide. Lucky for you, you aren't actually risking life and limb during your mission; you're piloting one of the latest flight simulators in the safety of your own home.

Only recently have computers been able to handle the close-to-the-ground rendering necessary for helicopter flight. The most significant of these simulators are Gunship 2000 from MicroProse and Comanche Maximum Overkill from Nova Logic. They use the technology found in the powerful helicopters in action as recently as Desert Storm.

Electronic sophistication: That's the hallmark of the modern helicopter. Apaches, SuperCobras, and Comanches are marvels in state-of-the-art electronics, with multifunction computer displays, laser and infrared targeting, and extensive countermeasure capabilities. Gunship 2000 and Comanche Maximum Overkill are, respectively, modern-era and near-future simulators that take advantage of these capabilities.

Low-level scenery makes sims realistic.

Helicopter sims bring the enemy up close.

One of the most enjoyable aspects of a helicopter simulator is that the slower speed gives you time to assess situations. And, since piloting a helicopter involves intense concentration on the terrain, flight is a much more active—and challenging—endeavor.

Gunship 2000: Multichopper Missions

MicroProse's Gunship 2000 allows you to fly a wide array of helicopters, from the Apache to the experimental Comanche. Missions allow you to travel the globe from the Middle East to Europe, the Philippines, and Antarctica (the latter two theaters are included in the scenario add-on disk, Gunship 2000 Philippine Islands and Antarctica Scenario Disk with Mission Builder).

Play begins with a series of training missions, and successful completion earns you a promotion to Warrant Officer First Class. From there, you fly single-helicopter missions until success leads you to full commission. As a commissioned officer, you can fly any of the helicopters in single-helicopter missions or command a multichopper flight. Lastly, a campaign series of multicopter flights tests your expertise.

MicroProse has done a commendable job in bringing the complicated instrumentation of the modern helicopter to the computer. Fortunately, it has included many ways for players to customize the flying difficulty, from allowing the copilot to handle all weapons and countermeasures to taking full charge of the helicopter simulation with varying lift-to-speed characteristics.

The exterior graphics are unspectacular polygon renderings, but there's so much going on around you that they're more than adequate.

Flying the choppers is simple at

THE RAH-66 COMANCHE

Both Comanche Maximum Overkill and Gunship 2000 allow you to sit behind the controls of the Comanche, but just what is at the heart of this high-tech helicopter? The Boeing Sikorsky RAH-66 Comanche is an experimental helicopter that will reach its first prototype flying stage in 1994. Already, the U.S. government has committed to purchasing over 1200 of these nimble combat and scout choppers.

The Comanche's small, thin, and aerodynamic body will be constructed entirely out of composite materials. The scooped cockpit holds a crew of two, each in sealed, identical chambers. The pilot sits in front, enjoying a panoramic view, and the copilot is a fully trained pilot as well.

The instrument panel is dominated by twin Multi-Function Displays, each able to display a wide array of instruments from digital maps to television images and damage control. The units are redundant, which means that if one unit fails, the other can replace it. Prior to each mission, the pilot loads a 650MB optical disk into the chopper's computer, which then relays such information as targets and maps.

One of the most interesting aspects of the Comanche is its ability to pop into view of the target area, record data, and then retreat. The pilot and copilot can then review the images in relative safety to plan their attack.

The Comanche's design is totally modular, with ergonomics and efficiency factored in at every juncture. Currently, when Apache helicopters are in the field, an entire electronic testing laboratory must accompany them for maintenance and repairs. The Comanche needs only handheld computers to diagnose its problems, and its modular nature allows a new part to be fitted almost instantly while the malfunctioning part is repaired offline.

The Comanche is a fly-by-wire helicopter, which means that the pilot's control actions aren't linked directly to the control surfaces but instead are linked electronically to the computer. Based on the context, the computer can then take whatever actions are necessary to achieve the pilot's desired results. When flying a Comanche, a pilot no longer has to control the throttle, tail rotor, cyclic, and collective; the computer handles all of the calculations and adjusts each system automatically.

Undoubtedly the most advanced helicopter yet designed, the Comanche is expected to see service well into the next century. With user-friendly designs such as this being possible with today's technology, one wonders what the future holds for rotary-winged aircraft.

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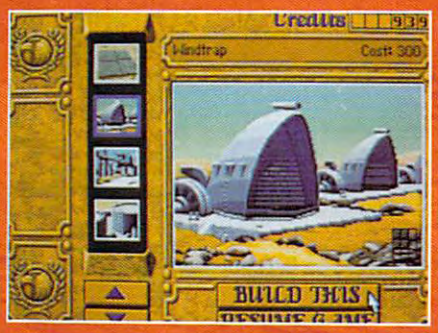

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first, but at the advanced levels it's a true test for your brain's on-the-fly computational ability. You control the cyclic, which is the directional control, and the collective, which controls lift. These controls continually affect each other, requiring you to give them almost constant attention and adjustment, especially when you are swerving and ducking to avoid mountains or incoming SAMs.

During multicopter missions, you must not only fly a helicopter but also issue orders to an entire wing. During the course of many missions, the pilots who are flying with you grow in experience and training, and any green cadets become seasoned combat veterans.

Gunship 2000's scenario add-on disk, Gunship 2000 Philippine Islands and Antarctica Scenario Disk with Mission Builder, adds some flight capabilities, like collective control for a CH Flightstick. But the heart of the add-on disk consists of new theaters and scenarios. City flights are available in the European theater, and you can skim over and through rugged mountain ranges in northern Iraq. The Philippines and Antarctica are also represented. Plus, the disk sports a comprehensive scenario builder.

BUYING INFORMATION

Comanche Maximum Overkill—$69.95
NOVA LOGIC
Distributed by Electronic Arts
P.O. Box 7530
San Mateo, CA 94403
(800) 245-4525

Gunship 2000—$59.95
Gunship 2000 Philippine Islands and Antarctica Scenario Disk with Mission Builder—$39.95
MICROPROSE SOFTWARE
180 Lakefront Dr., Dept. 10
Hunt Valley, MD 21030
(800) 879-7529

Comanche Maximum Overkill: Electronics Challenge

Nova Logic's Comanche Maximum Overkill is set in the year 1999 and is based on the RAH-66 Comanche, a helicopter not yet in actual use. There are no flight options and no levels of flight difficulty, but the Comanche is such an unusual chopper (see "The RAH-66 Comanche") that there's plenty to keep you busy.

The most striking feature of Maximum Overkill is its terrain graphics. The mountains, hills, and riverbeds appear as fractal landscapes based on actual topographical data. Thanks to native-mode assembly language programming (no memory manager is needed, but you do need 4MB of RAM), the graphics are smoothly rendered and awe-inspiring. Nothing quite compares to whipping down a river canyon at 190 knots with cliffs blurring past on either side.

Maximum Overkill is easier to operate than Gunship 2000; consequently, it sacrifices some realism. For instance, the only graphics besides the rolling terrain are the threats (missiles and other hazards that your enemy sends your way); there are no incidental buildings or cities, nor are there trees. Also, you fly the missions in the immediate vicinity of the threats; you do not have to struggle with navigating your Comanche.

The flight model is also easier to fly than that of Gunship 2000, but that's partly because of the projected ease of flying the Comanche, which automates many of the controls. Since there's no hard flight data yet for the Comanche, it's impossible to know just how realistically Maximum Overkill flies.

That doesn't mean this simulation isn't entertaining: Gameplay is fast and exciting, and there are plenty of tactics to learn. With the complexity of the terrain modeling, you truly can utilize "nap of the earth" tactics, popping up to target and order an artillery strike and diving low over a riverbed to avoid an incoming missile.

Take the Challenge

Helicopter simulators are a fascinating and addicting way to learn about the flight models of one of our most unusual inventions. Rotary-winged aircraft are common enough, but the details of their operation are something very few of us know about. The battlefield of the future will be nonlinear. No longer will massive deployments of troops cover hundreds of miles; rather, small, discrete combat units will be asked to perform small, very specific missions in discontinuous locations. At the heart of this type of strategy is the helicopter: elusive, dangerous, and capable of transporting troops and armament deep behind hostile borders. If you're ready for new challenges and a fresh gaming (and a true learning) experience, climb behind the cyclic of a rotary-winged simulator and give helicopter flight a whirl. ❑

"Sorry, Jack, but I'm sending someone a tad more reliable."

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64/128 VIEW

You know something, Igor?
I think there may be
life in this thing after all.

Tom Netsel

There's a great scene in the movie *Frankenstein* when things look bleak for Dr. Frankenstein. He and his assistant, Igor, have done their best to create life in the laboratory, but the experiment appears to have failed. The electrical storm has blown itself out, the generators are quiet, and the traveling arcs of electricity have ceased to crackle and spark. The creature lies still on the table. The doctor slumps in despair.

But wait! There's movement on the table. A hand twitches and starts to move. The doctor rushes forward with his stethoscope and listens for a heartbeat. It's there! His creature lives! "It's alive!" Dr. Frankenstein cries ecstatically. "It's alive!"

That movie scene flashed through my mind recently as I examined a new disk publication called Cee-64 Alive! Jack Vander White and Steven Baxter started the enterprise about a year ago, and now it's up and running and producing disks for the 64.

I suppose the Cee-64 Alive! name reminded me of that movie, but the name also indicates that there's still 8-bit life after IBM. If you're like me, you've had enough of this doom and gloom and moaning and groaning about the alleged death of the 64. Well, its CPU is still beating. The "monster" lives, so let's get on with the movie! We've got a lot of computing to do before the peasants burn the mill in the final reel.

Vander White and Baxter believe that, too. Last year they released a demo and five disks of programs and computer art. Later, Gaelyne Moranec joined the team as disk editor. This year they've issued another double-sided demo disk and expect to release more programs, articles, and graphics for the 64 and 128. "Our plans for 1993 include six issues of Cee-64 Alive!," Moranec says, "and as yet an undetermined number of supplementary Cee-128 Alive! issues."

In addition to original programs, the staff plans to include programs from the past that still have appeal. "In the areas of shareware and public domain alone it would take one person a lifetime to sift through the programs available, and then there are thousands of commercial programs to consider," Moranec says. The staff already has enough material to fill several volumes, but Vander White still encourages program submissions.

"Cee-64 Alive! has survived its first year—a recession year, at that—by starting out small and building slowly," Moranec says. "We're not packaged fancily, but we offer a wealth of information and programs for a very low cost."

You can get a sample disk for $3. The six disks issued for 1993 in volume 2 cost $25, and discounts are available for groups that order five disks or more. The five-disk set of volume 1 is still available for $20.

Subscribers also can access the Cee-64 Alive BBS. It offers more than 26MB of programs. The BBS number is (916) 395-9733. To subscribe, order a demo disk, or request more information, write to Jack Vander White, P.O. Box 232115, Sacramento, California 95823. ❐

GAZETTE

64/128 VIEW G-1
Check out Cee-64 Alive! This disk publication offers programs and articles for the 64.
By Tom Netsel.

UPGRADING WITHOUT CHANGING PLATFORMS G-3
You don't have to abandon your 64 just because you want to upgrade your present computer system.
By John Elliott.

REVIEWS G-8
Dr. Spellingstein, The Landmark Series, and Escape Route.

FEEDBACK G-14
Questions, answers, and comments.

D'IVERSIONS G-16
Young artists and their multimedia illuminations wow an IBM crowd in Atlanta.
By Fred D'Ignazio.

MACHINE LANGUAGE G-18
Touch a key and your screen changes immediately.
By Jim Butterfield.

PROGRAMMER'S PAGE G-20
Try these wild and exciting sound effects.
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Get the most out of geoPublish, a powerful but sometimes intimidating program.
By Steve Vander Ark.

BEGINNER BASIC G-24
Use your TOD clock to control the user port.
By Larry Cotton.

PROGRAMS
Minesweeper (64) G-25
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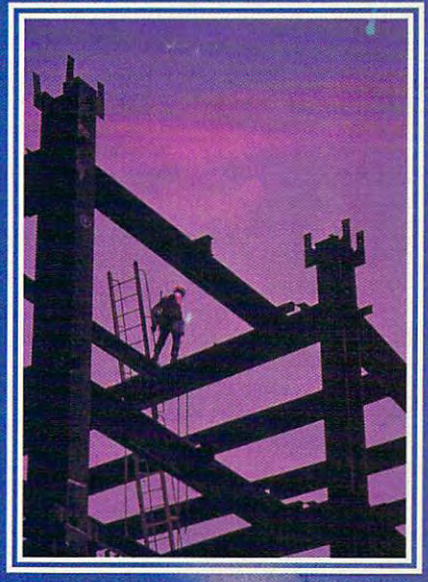
UPGRADING WITHOUT CHANGING PLATFORMS

By John Elliott

Just because you want to upgrade doesn't mean you have to abandon your present equipment and buy a new system.



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Are you planning to upgrade your computer system anytime soon? If so, just what do you mean by upgrading? Even people who support the 64 and 128 usually think it means moving to the Amiga or IBM, but it can mean something else as well. You can upgrade your present equipment, making it more flexible and powerful, without buying a whole new system.

It's true that major software developers rarely produce for 8-bit platforms anymore, but that doesn't mean that the platform's been abandoned. It would seem that owners of these computers should consider preserving their hardware and software since replacing them may be expensive.

Some people argue that there's nothing new for the 64 in the way of hardware and that even once-familiar names in the Commodore market are dropping their 8-bit products. So maintaining and enhancing existing equipment can also be difficult.

Schnedler Systems

The story of Schnedler Systems supports the above arguments. Until recently, Schnedler Systems produced accelerator CPUs that boosted the 64's operating speed to better than 4 MHz. It also made adapters that let you use RAM expansion units with these speed-up devices. Schnedler's main Commodore customers were factories in various industries which used 128s to monitor different testing procedures. The additional speed of the accelerator CPU was useful in this process.

"When Commodore stopped making the 128, the factories gradually lost interest in using it for these purposes," says a Schnedler spokesperson. Schnedler has sold out of these devices and has terminated production. The company now primarily makes interfaces and modems for IBMs, although one interface is Commodore compatible.

Efforts to boost the operating speeds of the Commodores have met with little success. For more than a year, there were rumors about new high-speed chips that could accelerate the 128.

Parsec

Through his company, Parsec, Ron Brown commissioned the production of a limited number of 128 boards which operate at from 6 to 12 MHz and carry up to 1MB of RAM on board. Advertising of this and two other new products was limited to his magazine, *Twin Cities 128,* and to bulletin board systems. By November 1992, he had more than 100 advance orders, but that was not enough to pursue production. Partly because of the narrow margin of profitability with this product, Brown was forced to abandon these high-speed boards.

The news is not all bad, however. Brown reacted to the death of *RUN* magazine by expanding *Twin Cities 128* to include 64 coverage.

The Commodore story is far from being over, however. Older products disappear, rumored new ones never make it to market, but there's still plenty to get excited about. Many companies still support the 64/128 by updating their successful older products and by developing new ones.

The FGM Connection

Ron Hackley and Jerry Freadman operate a company whose very popular program, Fun Graphics Machine, manipulates graphics and type in many unique ways. I asked Hackley, the FGM programmer, why he still supports the Commodore platform.

"It's more forgiving and has a smarter DOS than the other machines," he said. "When you turn it on, the DOS is just sitting there. There are few viruses—maybe not any. It's much friendlier to use. For most programs, you need only a couple of sheets of simple instructions. It's for the home user who doesn't need extras."

Like many producers of a single program, Hackley and Freadman don't have a large advertising budget to attract customers. In addition to placing small ads in Gazette, they rely on somewhat unorthodox marketing approaches by selling FGM through user groups and electronic bulletin boards.

An FGM upgrade will soon be available that will support RAMLink from Creative Micro Designs (CMD). It will also support Commodore's RAM expansion units, if Commodore will allow a license. The new FGM will import graphics in geoPaint format, Handyscanner creations, and text from most word processors.

The Write Stuff

Eric Lee is the creator of The Write Stuff, a word processor that's generated such loyalty among its users that they've created their own newsletter. With each hardware innovation in the 64/128 market, Lee has adapted his program to take advantage of any additional possibilities. All versions allow use of an REU to save text and to check spelling. There are special versions for the 1581 disk drive, Quick Brown Box nonvolatile storage cartridges, and Creative Micro Designs' hard drive and RAM units.

Lee has decided to take his word processor to version 3. This version will feature high-resolution printing on Epson-compatible printers by utilizing three passes of the printhead. Each letter, up to 500 dots in height, can range from two inches to microscopic. Printing will be solid at all sizes—no jaggies! Fun Graphic Machine's Ron Hackley has seen sample printouts, and he says they are "near laser quality." A beta version should be circulating by the time this article appears.

At the same time, Lee is compiling a collection of 7000–8000 IBM shareware and public domain images that he is porting to the 64/128. He will sell catalogs of these images that will be indexed by subject. Sales will be largely through user groups. More than 220 of these associations are currently selling his Write Stuff word processor.

Quick Brown Box

Brown Pulliam sells a range of battery-backed cartridges that have storage capacities of from 64K to 256K. Several hundred owners use a model of a Quick Brown Box that contains a specially adapted version of The Write Stuff. The word processor is available instantly, and users can store files in it as well. Many other people use a Box as a substitute disk drive to hold frequently used programs, such as SpeedScript.

Last year, Pulliam ran a contest for database and spreadsheet developers to see who could develop the best version for QBB. Although there were no database submissions, Pulliam did select and now distributes a spreadsheet that not only loads from QBB but also stores the created spreadsheets back to the Box. It was initially released in its non-QBB form as Calc by Pankhurst Programming. Pulliam says that he finds that the spreadsheet especially lends itself to inventory control.

With his relatively low sales volume, Pulliam does not advertise widely, but his products are still available. Word of mouth is a primary method of promotion.

Rio Computers

Rio Computers, which sells a number of Commodore and video-related devices, sells Handyscanner, the only scanner available for the 64/128 in North America. By the spring of 1993 it expects to offer a genlock for the 64 that should sell for around $400, but

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early orders may go for $300.

Rio also plans to offer a standalone video titler in the same price range. While it will begin with titling and mixing, video editing and other modules will eventually be added. The hardware should sell for prices that are comparable to an Amiga's. The market could include small television stations, cable stations, and home hobbyists.

I asked Rio why it produced high-end material for an inexpensive machine. "We love the 64," a spokesman said. "It meets all of our needs. We produce for those who don't want to go to a new machine when new things come out."

Mad Man Software

Gene Barker and his associates have developed an adventure game that they call Messiah III. This multidisk product technically surpasses previous 64 games and challenges those of any platform. Bard's Tale had 70 different pictures, but Messiah III has more than 300, with more than 50 maps of the terrain.

To make this amount of information manageable, they developed a personalized "Mad DOS" that makes the longest wait between pictures 12 seconds. Since Messiah III has been adapted to run from CMD RAM devices, loading is instantaneous. "It's like using CD-ROM," says Barker.

It was also necessary to develop a compression program that doubles the disk capacity to fit the game on a reasonable number of disks. This Master Archiver is available separately for about $40.

The staff at Mad Man has also written a paper called "How to Keep Your Commodore Alive." This is a collection of tips and suggestions to keep your computer fit and happy.

Barker and friends began work on Messiah in 1986 while at the Colorado School of Mines. They are just about finished. Why spend all this time and effort on an aging machine? "Why drop the 64 when it can challenge the IBM?" Barker answers. He and his coworkers feel that with appropriate planning and programming, the 8-bit Commodores can accomplish anything that other computers can and do it more efficiently.

SOGWAP

Mark Miller is the creator of Big Blue Reader and Bible Search, two programs still on the market for the 64 and 128. He started selling Big Blue Reader for the 128 and 1571 in August 1986. By November 1987, it generated enough income (modest, he insists) for him to be able to quit his regular job. In 1988, he began to sell a version for the 64. For all these years sales have been consistent. Most of his market has been in North America.

While BBR provides profit, Bible Search barely supports itself. Miller revised it about a year ago. It now prints verses, saves a range of verses to disk more easily, and on the 1581 treats the Old Testament and New Testament as one section.

BBR version 4 now supports a joystick, and both the 64 and 128 versions recognize subdirectories and RAM expansion units. Both versions are compatible with JiffyDOS.

Over the years, support has been consistent for the 1571 and 1581 versions of BBR. As yet there have been few requests for a version that works with the new floppy drives from CMD.

Creative Micro Designs

CMD has produced more innovative software and hardware for the 64 and 128 than any other company. Its initial success came from JiffyDOS. There are now a million of these DOS wedge and disk accelerator units in use. CMD's RAMLink and RAMDrive cartridges provide nonvolatile RAM expansion units with a proprietary DOS. CMD sells the only hard drive still being marketed for the 64/128. CMD also markets a number of software enhancements for GEOS that make special use of its hardware.

CMD also sells special-purpose cartridges. One contains an extra SID chip that enables the 64 to produce stereo sound. The other is a high-speed RS-232 interface that allows connection to IBM devices.

Most recently, CMD is marketing two high-density FD series drives. The FD-4000 3½-inch drive lets you use enhanced density disks and provides up to 3.2MB of storage. This is more storage capacity than the floppies of most other computer platforms. Its little brother, the FD-2000, allows up to 1.6MB of storage.

The latest version of JiffyDOS is three years old. With the exception of it and the hard drives, all of CMD's products have been either developed or newly marketed in the past two years. This is a heavy commitment to a platform that some say is in decline.

Charlie Christianson Jr., the president of the Massachusetts-based CMD, provided some significant statistics that may explain his company's support for the Commodore computer. "About 800,000 Commodore 64s were sold worldwide in the past 12 months. Eighty percent of these were sold in Germany, where these machines are assembled. The company (Commodore) still supports the C64 in Europe."

While business in Europe is good, over half of the CMD sales are in this country. After Germany and North America, Australia provides a good return in terms of investment. Last year the Australian branch of Commodore sold 30,000 units in a

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Commodore sold 30,000 units in a single sale to China.

Christianson says he wants to assure Commodore users that as long as his company's products continue to be successful, they can expect further hardware and software enhancements from CMD.

Performance Peripherals

Peter Fiset, in addition to being a graduate student in computer engineering, is the creator of CMD's RAMDrive. Although his studies are not on Commodores, he continues to develop for the 64/128 because he sees a strong potential market.

In December 1992, he began to ship a battery backup unit (BBU) which allows both geoRAM and Commodore REUs to have nonvolatile memory. Whatever program or data is in the unit when you turn off your computer will be there when you turn it on again. As long as the program doesn't reinitialize the REU each time it's loaded, whatever the program puts in the REU will remain there. The most obvious uses for this product would be for word processors which place text files and spelling checkers in the REU, and, of course, GEOS.

A separate battery backup RAM disk (BBG RAM) can retain up to 2MB of memory. This device is only for GEOS, but it includes a GEOS application that lets you select one of up to five 1571 drives.

By some estimates there are up to 800,000 Commodore RAM expansion units and geoRAMs on the market. Fiset will be successful if a significant fraction of this population becomes aware of his devices and decides it wants to leave programs or data in its REUs. What BBG RAM will lack in comparison with the CMD units is the ability to access partitions, emulate different Commodore disk drives, and easily convert the device number of the RAM device.

Fiset has a particular market in mind. Aware that in a sense he is competing against his own RAMDrive, Fiset pointed out that "some Commodore users cannot afford the CMD RAM devices but do want nonvolatile memory." Fiset has not done formal market research and will know by his sales whether there is a market for his devices, which start at about $50.

The Current State of the 64/128

In a recent "64/128 View," editor Tom Netsel complained that his cupboard was nearly bare of products to review for Gazette. New products for the IBM were being released at a tremendous rate, but Commodore products had slowed to a trickle and had practically dried up altogether. Was this going to be the end of the 8-bit line?

That's when I decided to check with companies to find out for myself whether or not anything new for the 64 was in the offing. Was there anything coming that could give my system a technological upgrade, or should I resign myself to stick with the hardware that I already have? I expected to hear people say that as long as my Commodore is performing its tasks satisfactorily, then I should be content. After all, only vanity could justify my changing platforms.

Instead, I found that a group of individuals and small companies are stretching our computers in directions undreamed of only a few years ago. Gone are the huge distributors who once flooded the Commodore market with flashy advertisements and jealously guarded their marketing plans. This group is a community of developers. In many cases I received names and phone numbers of companies from people who in any other business would be considered rivals.

Collaboration is evident. The Write Stuff adapts to CMD and Quick Brown Box hardware. The Write Stuff creator sends his letter quality fonts to the developers of Fun Graphics Machine. Messiah III's developers at Mad Man are adapting for the CMD RAM devices and considering further joint projects. It could be argued that some of the products described in this article don't constitute simple upgrades. A cartridge or a new piece of software may not seem like much, yet each product makes the 64 or 128 do something it couldn't do before. The more substantial pieces of hardware from Rio or CMD can certainly broaden your computing horizons, and you don't have to be a computer engineer to use or install them.

Upgrading by using the products described here seems to me to be a better idea than switching computer platforms. It's an especially strong argument when you consider the time, effort, and money you probably have invested in your Commodore system. There's another reassuring note when you examine the other end of the Commodore pipeline. The investment of time, energy, and money by the software and hardware developers is an indication of their conviction that our Commodore computers will be productively used and enhanced by

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DR. SPELLINGSTEIN

Things are different in Australia. Stargazers seek the Southern Cross, not the Big Dipper. Those wanting to be alone with their thoughts go on *walkabout*, not *retreat*. And Australian schools use Commodore 64s—hence Free Spirit's import from the "Minister of Education for and on behalf of the Crown in right of the State of South Australia." Meet Dr. Spellingstein, the monster spelling program for the 64.

Dr. Spellingstein is a drill-and-practice program designed to reinforce words already taught in the classroom. It does this via three different games: Flash Words, Jumbled Words, or Guess the Word. Players who answer all game questions correctly earn the chance to build their own monsters in the laboratory via Monster Mix and Match.

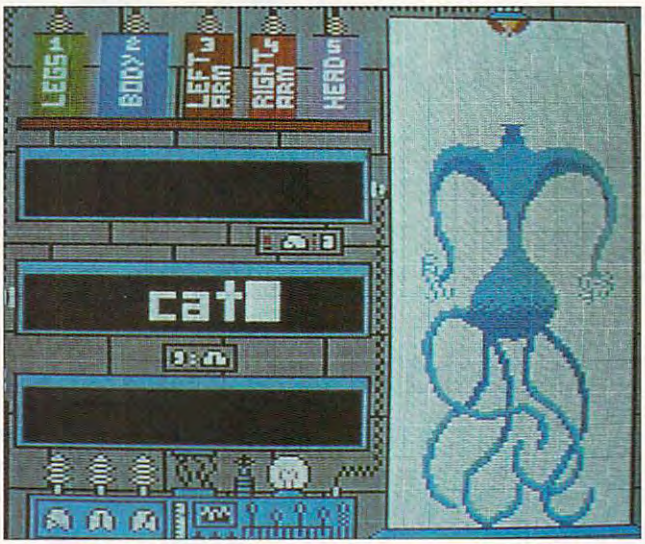
There are two ways to use Dr. Spellingstein. The first is to play what the manual refers to as Dr. Spellingstein—Home Version and what the game menu refers to as The Dr.'s Flash Game. This discrepancy illustrates the sole problem with this game: The program menus differ from those illustrated in the manual. Only the section titles are changed, however, and since they're in correct sequence, it's not hard to figure them out.

This first game lets you select a list of six words from 168 lists already on disk. The word list is displayed on the screen for study. When you've finished studying, press Return to begin. At that point, Dr. Spellingstein's laboratory appears, and the first word flashes briefly in the top window. The word disappears, and a cursor appears in a second window, ready for you to spell the word that just flashed.

Correct answers are sometimes rewarded by the appearance of a monster's body part in the laboratory. By the end of a game, even without getting every answer right, the whole monster can be assembled. Get all the answers right, however, and you can build your own monster by combining parts from other monsters.

The next option on the menu (School Version in the manual; Your Game and More Games on the screen) lets you play games that you've created with your own word lists. These lists may contain up to 20 words and are saved with their own game parameters. That is, a list saved as KATE1 may be a list of 20 words that we've saved for our daughter Kate to play as Flash Words. KATE2 could be the same list saved as Jumbled Words where you unscramble letters to make your word. KATE3 could be the same list again for playing Guess the Word, a Hangman-type game.

The lists are created with the next module (Word List Editor in the manual; Game Creator onscreen). From here you can change the game setup; edit a word list; print the list; and load, save, or erase games.



Answer all questions correctly and earn the chance to build your own monsters in the laboratory via Monster Mix and Match.

The power of the program lies in the parameters within Change Game Setup. This is where you choose one of the three games; how long a word is displayed before it disappears (or in the case of Guess the Word, how many letter guesses you get); whether or not the game is sensitive to entering upper- or lowercase; whether or not the player wins the chance to build a monster; and, finally, whether or not Answers equal Questions.

This last option, at first confusing, actually gives you the ability to devise a quiz. For example, you could enter a math equation such as 10 × 5 as the question and 50 as the answer, thus creating a math quiz. There are any number of short questions that could be handled with this option, making this program much more useful than a mere spelling game.

The last module, known as Monster Printer in the manual and Print Saved Monsters onscreen, handles the loading and printing of monsters that the players have created. It also provides a way to delete files to make room for new monsters.

We have always admired programs that allow versatility and creativity in their operation. Dr. Spellingstein has as its primary goal to assist youngsters in learning their spelling words. It approaches this in a challenging and fun way. Yet it also allows you to modify enough facets of the program to put you in control. You determine how hard to make the games, what words to use, and even how the games are played. The possibilities are as endless as the number of monsters you can make with the various parts Dr. Spellingstein provides!

It's easy to see why the Australian school system uses Dr. Spellingstein. It's a program that can be used at home or in a class, and it can be adapted by parent or teacher to suit any student's abilities and needs. It's flexible and powerful, easy to grasp for the student user, and entertaining as well. In fact, Dr. Spellingstein fulfills every requirement we've ever had for an educational program and does so respectably. We highly recommend it.

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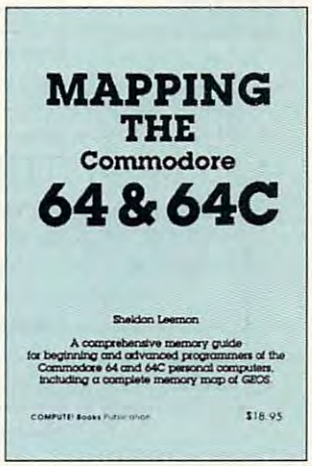

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REVIEWS

ESCAPE ROUTE

It was a cold night in the city when the chief gave me the job of reviewing this new game from Creative Pixels called Escape Route.

Following his orders, I went undercover as private investigator Eric Hawthorne of the Apex Detective Agency. My job: recover the rare Acme diamond. It seems some dame called the IceLady stole this little trinket. I've got three weeks to catch this frozen Fräulein and recover the rock, and she's got a 4000-mile head start on me. This gumshoe's got no time to waste.

The sleuthing begins with a main menu of seven icons and a picture of the chief, who looks amazingly like Humphrey Bogart. These icons, which are explained in detail in the instructions, are a series of tasks and events that make up the game. These include a piano drop, roulette wheel, expenses, driving, gems, the IceLady's castle, and a flat tire.

When the main menu comes up, a flashing figure of Eric moves quickly from icon to icon. He's moving so fast that you have no real choice of which icon to try. Instead, you must hit the joystick's fire button and take your chances. Just hope that Eric doesn't land on the expenses or flat tire icons, since these cost him time and points.

The piano drop, like the main menu, depends solely on luck and requires no skill. Your only requirement is to move Eric left or right on the screen when he encounters the IceLady. Pick a spot, press the fire button, and wait for the piano to drop, praying it doesn't land on Eric. If Lady Luck is in a good mood, Eric not only avoids being flattened, but he gains 250 miles on the IceLady. On the other hand, if his luck is out to lunch, the IceLady gains 250 miles on Eric.

When an event is over, you return to the icon screen to try another game. Once again you press the fire button and see where Eric lands. At the top of this screen, you'll see the number of days which have passed, the number of miles to go, and the point score.

These extra miles can be whittled down easily, however, if Eric lands on the roulette icon. They can be increased just as quickly if he lands on the expenses icon. When he lands on either of these icons, a screen will come up with a picture of the IceLady, stating how many miles have been lost or gained. With the roulette wheel, which works in the player's favor, you can gain from 1 to 500 miles. The ex-

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