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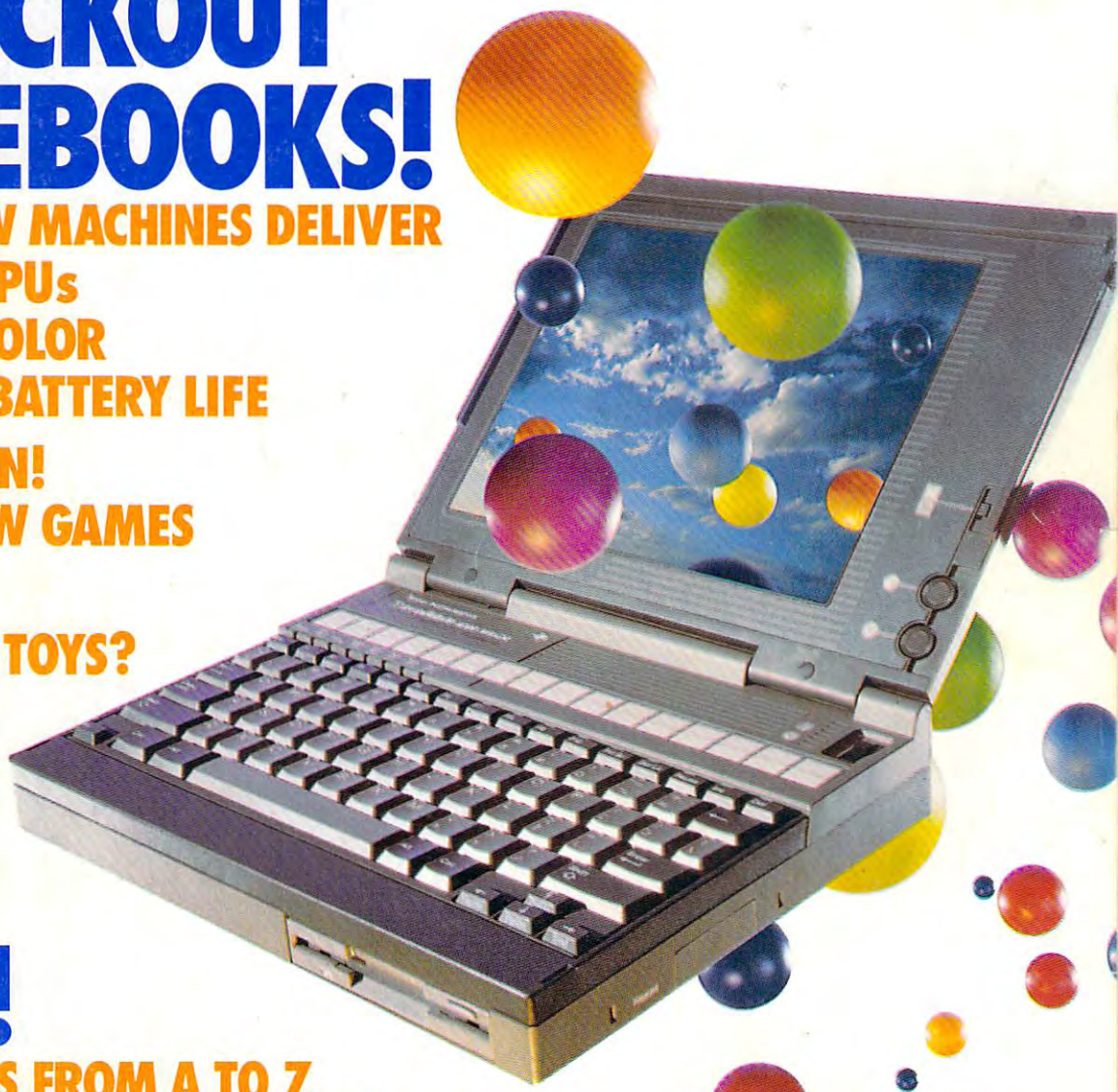

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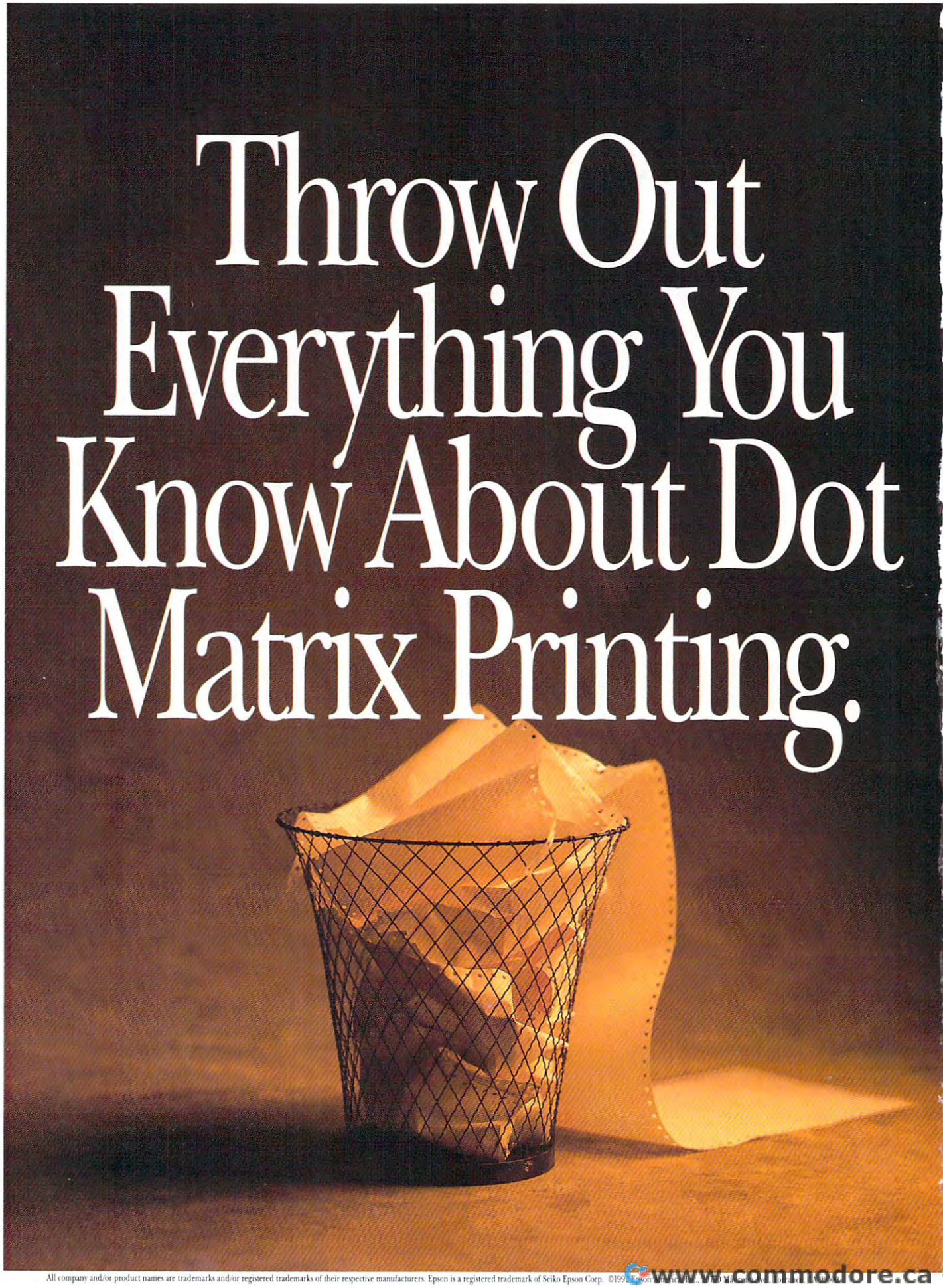

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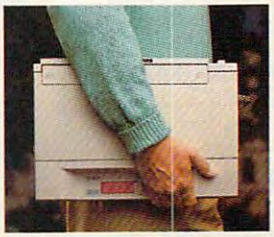

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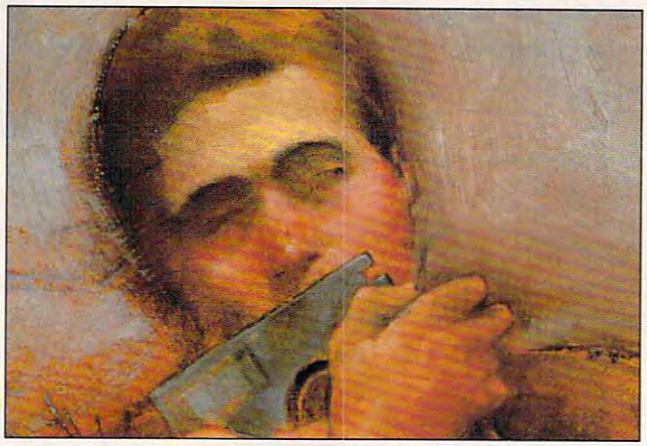

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COMPUTE (ISSN 0194-357X) is published monthly in the United States and Canada by COMPUTE Publications International Ltd., 1965 Broadway, New York, NY 10023-5965. Volume 14, Number 10, Issue 146.

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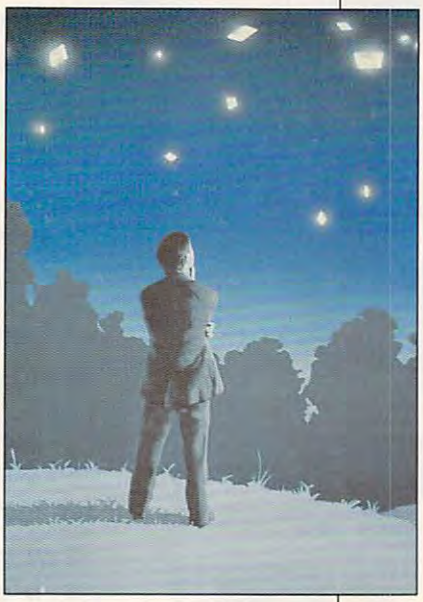
Clifton Karnes

FUD. No, it's not a curse or a new type of missile. As you may know, those three letters stand for *fear, uncertainty,* and *doubt.*

Where do this fear, uncertainty, and doubt come from? First, there's the fear that the hardware and software you're using now won't be useful in the future. The corollary to this is the fear that by buying something now, you'll be making the wrong decision. This fear leads to uncertainty about the future and doubt about the best course to follow.

The famous FUD factor has been with computing for a long time, and it's not likely to go away anytime soon.



FUD has often been used as a selling tool (or more accurately, as an antiselling tool), and some have said that IBM mainframe salesmen invented FUD by telling their clients not to buy competitors' products because "IBM will be coming out with a better product real soon that will blow the competitors' stuff away." Wham! FUD.

When it comes to PCs, FUD has its biggest impact with operating systems. This isn't surprising, since operating systems have the greatest influence on how we interact with our computers and ultimately on how productive we are.

The first big FUD epidemic came when MS-DOS was introduced into a world dominated by CP/M. Here, MS-DOS was clearly superior, and the FUD lasted only about a year.

Microcomputing's next great encounter with FUD came when OS/2 1.0 was released. Whether we wanted it or not, OS/2, it seemed, was our future. All of us asked questions: Should I buy any more MS-DOS software now, since it probably won't be compatible with OS/2? Should I make sure my next computer can run OS/2, even if I'm not running it now?

As we all know, OS/2 didn't take over the world. Or at least, it hasn't taken it over yet.

The next great FUD fight came when Windows 3.0 was introduced. It quickly became apparent that Windows 3.0 was first-rate, and it was a no-lose upgrade because it supported MS-DOS. Windows uncertainty lasted less than a year.

Recently, OS/2 has made a dramatic reentry into the FUD wars with version 2.0, but this release generated little real FUD. There simply aren't enough applications running on OS/2 yet to make someone afraid *not* to upgrade.

The most recent cause for FUD is Windows NT. NT is a FUD arrow aimed at would-be OS/2 buyers in the great tradition started by those IBM mainframe salesmen: "Don't buy their 32-bit operating system now, because we're working on one that'll really knock your socks off."

The side effect of this is that NT has instilled FUD in Windows users. All the old questions are coming back: Should I hold off buying any more Windows software? Should I make sure the next machine I buy can run NT?

With the installed base of Windows users and the repertoire of Windows applications growing dramatically each week, it seems unlikely that NT will knock out 3.1. And Microsoft doesn't seem to want it to. NT is clearly aimed at the workstation-level PC: a 486 or better with 16MB of RAM and a 300MB hard disk.

It doesn't really matter, though. Because the important thing to remember about FUD is that we, the consumers, are the ones in control and collectively making the decisions. We determined that MS-DOS was better than CP/M, that OS/2 1.0 wasn't better than MS-DOS, and that Windows was a great environment to coexist with MS-DOS.

In addition to operating systems, the other traditional source of FUD is hardware. PC prices are at an all-time low, but FUD is still high: Will prices drop even lower? Should I wait? What features are crucial?

Here, COMPUTE can help you with its FUD-fighting Test Labs. If you're looking for a state-of-the-art notebook, check out this issue's installment. We test 11 top notebooks that offer the hottest new technologies: power savings, great color screens, and super 486 power. If you want a multimedia machine, next issue's Test Lab has the scoop on the best, the brightest, and the brassiest. Or if you have your eye on a cost-effective 486SX desktop, January's Test Lab will have all the FUD-dispelling details on the newest entry-level power platform. Stick with COMPUTE. We're anti-FUD. ❐

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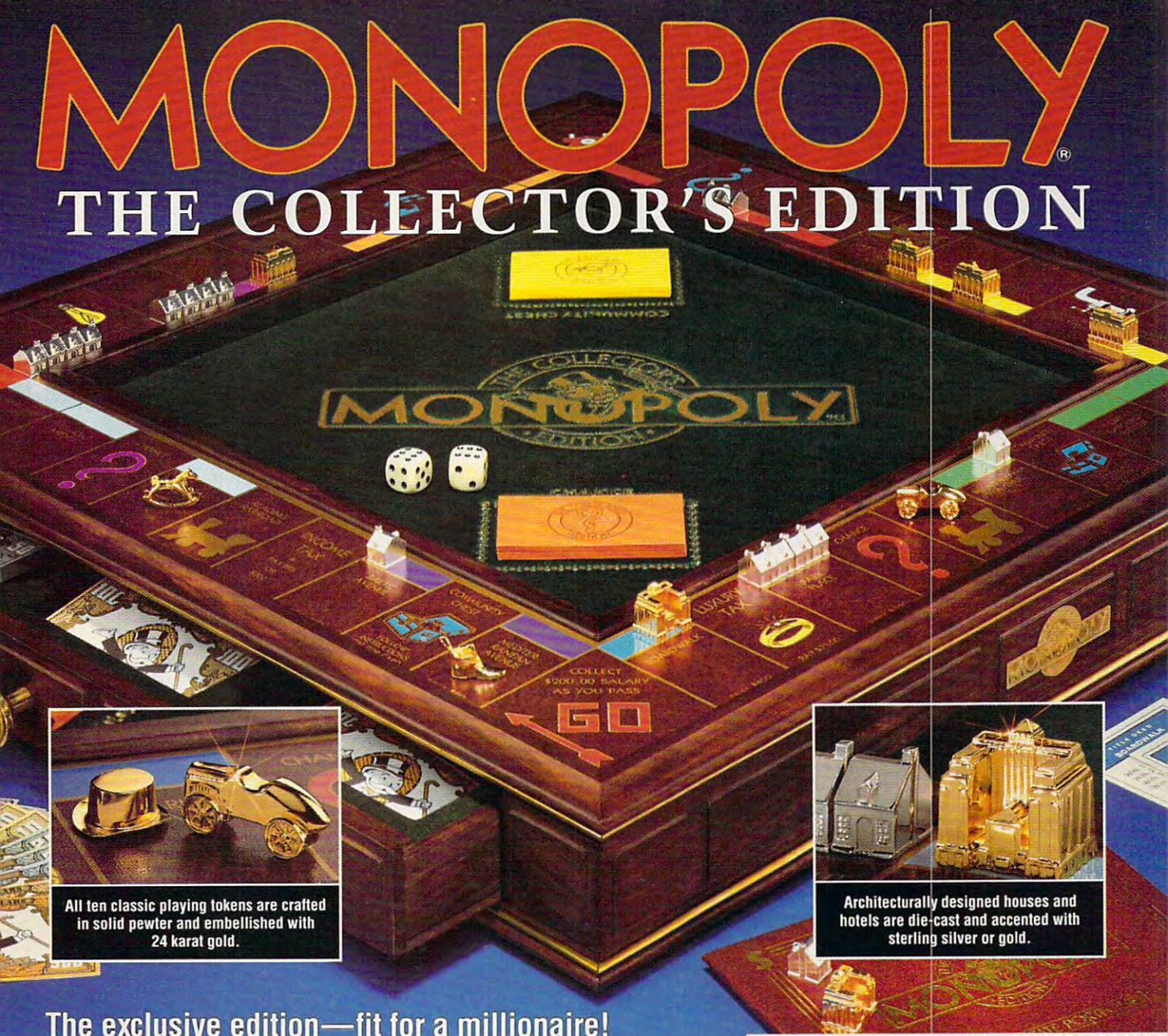

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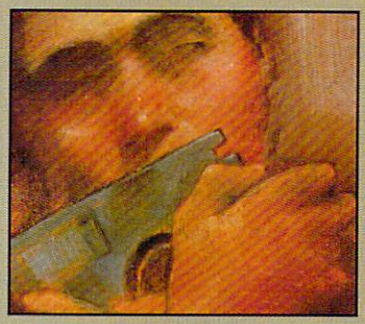

DATABASES

Drowning in data? A database can manage the thousands of details that swamp your desk day after day.

BY TOM CAMPBELL

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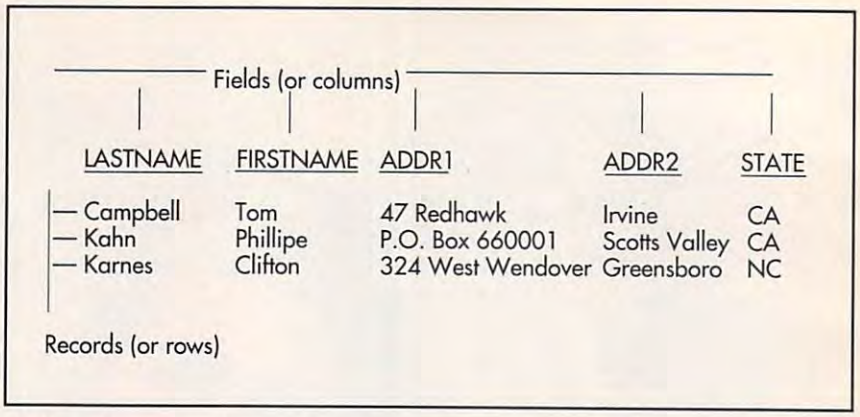
Every day, we're engulfed with important details to sort and file away. Phone numbers, appointments, seminars, records, and new ideas flood us. It doesn't matter whether we're small business owners, PTA leaders, club and co-op members, or coin collectors; the Information Age has touched us all. There's so much to keep up with that it can turn the most energetic, organized, dedicated newcomer into a tired, frustrated cynic in no time—that is, unless you have a database management system (DBMS) looking after things for you.



No Reason for Fear

Don't let the word database scare you away. Database managers are easier to use than ever, and if you can draw a picture onscreen, you can use just about any of the popular DBMSs on the market today. In fact, some of them are downright fun to play with. True, a few years ago database managers were forbidding and dull, but now they're one of the most competitive arenas in the software world. Software developers have learned that it takes more than horsepower to bring new users into the fold.

In fact, you may be using a DBMS already. If you run Windows and use Cardfile as a phone book/dialer, you're using a simple DBMS. Consider the list of BBS phone numbers and modem settings in your communications program—that's a DBMS. Spreadsheet jockeys who know their way around @HLOOKUP and @VLOOKUP are using the database portion of their spreadsheets (remember that Lotus 1-2-3 originally was advertised as a combination plate: spreadsheet, database, graphics, Coke, and fries). And if you've ever battled with your word processor's mail merge, you've been dealing with a DBMS, too. (Do you end a secondary merge field with {END MERGE} or <ENDMERGE> or...?)

Database Details

Broadly speaking, a DBMS is any program that stores information by category and lets you get at that information in an orderly manner. Parts inventories, mailing lists, accounting systems, and order retrieval systems are all databases and require a DBMS. The categories are normally called fields or columns. The group of fields (for example, last name, first name, street address, ZIP code, and so on) is called a database or a table, as illustrated in the accompanying figure.

Ever notice how Microsoft registration cards are divided into boxes, one per letter, like this?

Last name:ICIAIMIPIEILILI I I I I I I

Microsoft asks you to print and to employ a couple of odd conventions (the tail of the Q points up instead of down) for its optical character recognition system, which automatically translates your printing into computer-readable format. In fact, systems like this can also link directly to a database manager. You're limited to a certain number of character boxes because of the limitations of database managers; most of them restrict the amount of information that can be stored in records or fields. Each customer record is given only 200 bytes (or 2000), and the fields within are also stored in fixed sizes (30 characters for the last name, 25 for the city name, and so on). Of course, the person designing the database determines those sizes.

The reason a DBMS imposes this rather severe limitation is speed—a recurrent theme in database management systems. Without being able to assume that records are of equal size, a DBMS would have no choice but to search through each record until it

DATABASES AS PROGRAMMING LANGUAGES

Lotus 1-2-3 and dBASE shared a common trait from their earliest incarnations: They did certain things better than any other minicomputer or mainframe software could hope to do, and they sported programming languages. (Lotus macros are a programming language? You bet!) But microcomputer users were so cowed by their mainframe counterparts that, for years, dBASE wasn't recognized as a language. Today, no one disputes that point, and database languages may be the most popular computer languages in use.

So why program in BASIC at all? Conversely, why don't database languages look like other languages? Because different jobs call for different tools. Your Swiss Army Knife might be useful, but no one wants to use it to carve a roast. And dBASE may have over 500 built-in statements, but no sane person would use it to write a word processor or an operating system. Compiled languages such as C, Pascal, and QuickBASIC can always run faster than database programs, but they won't be nearly as flexible or as easy to maintain.

Most database languages are reasonably easy to understand, even to the uninitiated user. The examples below use dBASE, but languages such as Clarion and R:BASE are equally simple to learn.

It's easy to see that this line prints a message at the bottom of the screen: &24, 1 SAY "Please press Enter to continue".

You can display the contents of a database with a single keyword, LIST. This command has many options. This line prints all the last names and first names in your database: LIST LASTNAME, FIRSTNAME TO PRINT.

Trying to do either of these things in C, Pascal, BASIC, or any other traditional programming language would require literally thousands of lines of code to open, close, and view database files; and it could never be as clear to the user because there are no database-handling keywords in these languages. To program well in any traditional language requires months of study, but database languages are unique in that even a novice can create significant applications with only a few hours' perusal of the manual.

Is dBASE better than C? The answer, as always, is yes and no. Yes if your application relies heavily on database features, no if it's not a database program or if execution speed is most important.

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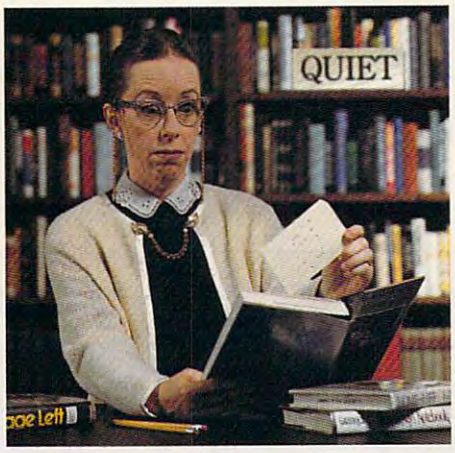

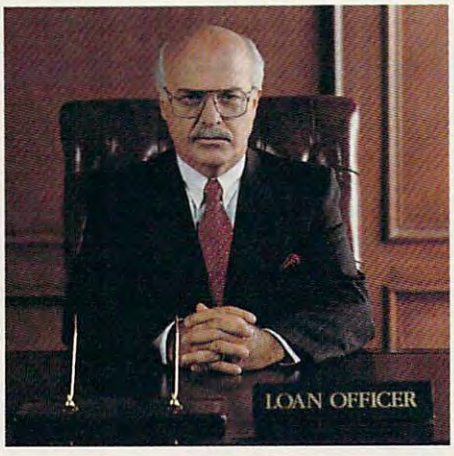

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found the one it was looking for. It's much, much faster for a DBMS to know that, in a database with 120-byte records, record 100 is at position 12000 in the file. Both hard and floppy drives are programmed to be able to position anywhere on the disk in a very short time.

This speed obviously comes at the cost of disk space. Most American surnames fit into 10 or 15 characters, but foreign and hyphenated names can be much longer. Do you want to alienate your customers by starting letters to Mrs. Adamkiewicz-Stanislaw with "Dear Mrs. Adamkiewic" because you can't afford the 50-percent slack such generosity would cost with your 20MB database, or do you want to eat the disk space and shell out $600 for a new drive? Most databases for small businesses, clubs, or home use turn out to be of an easily manageable size. If you have 100 people in your community band and each record uses 200 bytes, the database will be less than 20K in size—easily small enough to fit on even the humblest floppy disk. If you run a stationery store with 6000 customers on your mailing list for offices in the surrounding urban areas and each customer record fits in 220 bytes, your database will weigh in at only 1.3 megs and will still back up to a single high-density 31/2-inch disk.

Many DBMSs that use fixed-length records store only one record in RAM at a time, leaving the rest on disk, so the database capacity is limited by disk space instead of RAM. This contrasts to word processors, which are often limited to available RAM or, worse, the 64K-segment limitation of the 15-year-old 8088 microprocessor that came with the original IBM PC.

Most database managers allow the information they store to be restricted. For example, a numeric field allows for storage only of digits, plus signs, minus signs, and decimal points. A character field can store any information that can be printed—letters, numbers, punctuation marks, whatever. A

IF IT'S TUESDAY, THIS MUST BE REDMOND

Borland needed to expand its product line, and a database manager was the obvious acquisition. The best candidate was a comprehensive relational database with advanced QBE and a popular programming language, so in a much-publicized move, it bought Paradox. That was in 1987, and Borland's purchase of Ansa, developer and then-owner of Paradox, put that product on the map.

Borland spent years doing head-to-head comparisons of Paradox and dBASE, with the former always winning decisively. At the same time Borland vigorously denied the persistent rumor, now known to be accurate, that it was putting its considerable expertise in languages to work developing a clone of dBASE for Windows.

Borland now has two relational database management systems with totally different file formats, languages, and user interfaces. That's not counting Reflex, a flat-file database manager with its own file format and user interface. Borland assures developers that the two products are moving toward common goals, with compatibility being a major issue. That's a little like saying the European Common Market will move to make English compatible with French.

Microsoft needed to expand its product line, and a database manager was the obvious acquisition. The best candidate was a comprehensive relational database suitable for its flagship operating environment, OS/2. So in a much-publicized move, it acquired a controlling interest in Sybase. That was in 1987.

Microsoft spent years developing a powerful database manager that was also easy to use, and in 1992 it debuted plans to buy...Fox Software. It claims its internally developed product, Cirrus, will use BASIC as its lingua franca. But FoxPro uses the dBASE language.

Microsoft also has a number of other BASIC dialects: Visual Basic, Word BASIC, GW-BASIC, QuickBASIC, BASIC 7.1, Test, and QBASIC, to name a few. Visual Basic looks a lot like Word BASIC and Test, but it isn't really compatible with either. QBASIC looks a lot like QuickBASIC and BASIC 7.1, but it bears only the slightest resemblance to Visual Basic, Word BASIC, and Test. And GW-BASIC...well, let's just say that necessary evil would be a more than diplomatic description of its status at Microsoft. Luckily, an ANSI standard for BASIC finally appeared in the late 1980s, and Microsoft was quick to ignore it.

Microsoft is working on a systemwide macro language that will look sort of like Visual Basic but won't be quite compatible. Taking any bets on Cirrus?

Computer Associates needed to expand its product line, and a dBASE-compatible database manager was the obvious acquisition. The best candidate was a comprehensive relational database that extended the dBASE language in nonstandard fashion but ruled its niche of the market. So, in a much-publicized move, it bought...dbFast for Windows. That was in 1991.

In 1992, it swallowed Nantucket whole and burped up Clipper 5.01 for the DOS market. CA now has two dBASE compilers with incompatible language extensions and totally different user interfaces. (Actually, Clipper doesn't have a user interface.)

If an old-fashioned bedroom farce is your idea of a good pick at Blockbuster Video, you'll enjoy the last act of this one. In 1990 and 1991 a number of dBASE developers and power users banded together in the hope of forming an ANSI committee to standardize the dBASE language, working on the assumption that the dBASE language description was not subject to copyright protection. Ashton-Tate, then the owner of dBASE, not only wouldn't cooperate but threatened lawsuits. Borland, with only a nudge or two from the FTC, has since agreed that the language standard would be A Good Thing. If an xBASE (as the common-dBASE notion is called) standard arises, at the most one vendor's version of the language will survive, most likely Borland's. But even that's too close to call; ANSI standards have been known to take years to implement and to come out like a horse designed by a committee. The FORTRAN standard, begun in the 1970s, was known informally as FORTRAN 8X because the standards committee was foresighted enough to know that it would take a while to reach a consensus. The 8X means "nineteen eighty-something." The committee finally did reach a standard...in 1990.

Not only can a standard take years to form, but it can mean wholesale changes to the language. All the major C vendors were on the ANSI XJ312 committee to standardize C, and compatibility was stated as a top priority from day one. When the dust settled, no one's C compiler was compatible with the standard until about 18 months after the standard was ratified. If the xBASE standard ends up looking nothing like dBASE IV, everybody loses until someone comes out with xBASE compilers, which probably won't be compatible with the existing languages.

If Borland's version wins, it means that Microsoft, the second largest software developer in the world and currently an enthusiastic supporter of the xBASE standard, will have to take yet a new direction in databases from its number one competitor. If Microsoft's version wins, it means that Borland, the cradle of xBASE, will no longer own an xBASE-compatible language. If one of CA's versions somehow wins, it will mean that the company with the weakest product line will instantly control a nascent standard.

Oh, did anyone mention that CA is even bigger than Microsoft? It made its fortune in mainframe software and is doing what Microsoft did in the word processor and spreadsheet markets: throwing money at the problem until some of it sticks.

Bets, anyone?

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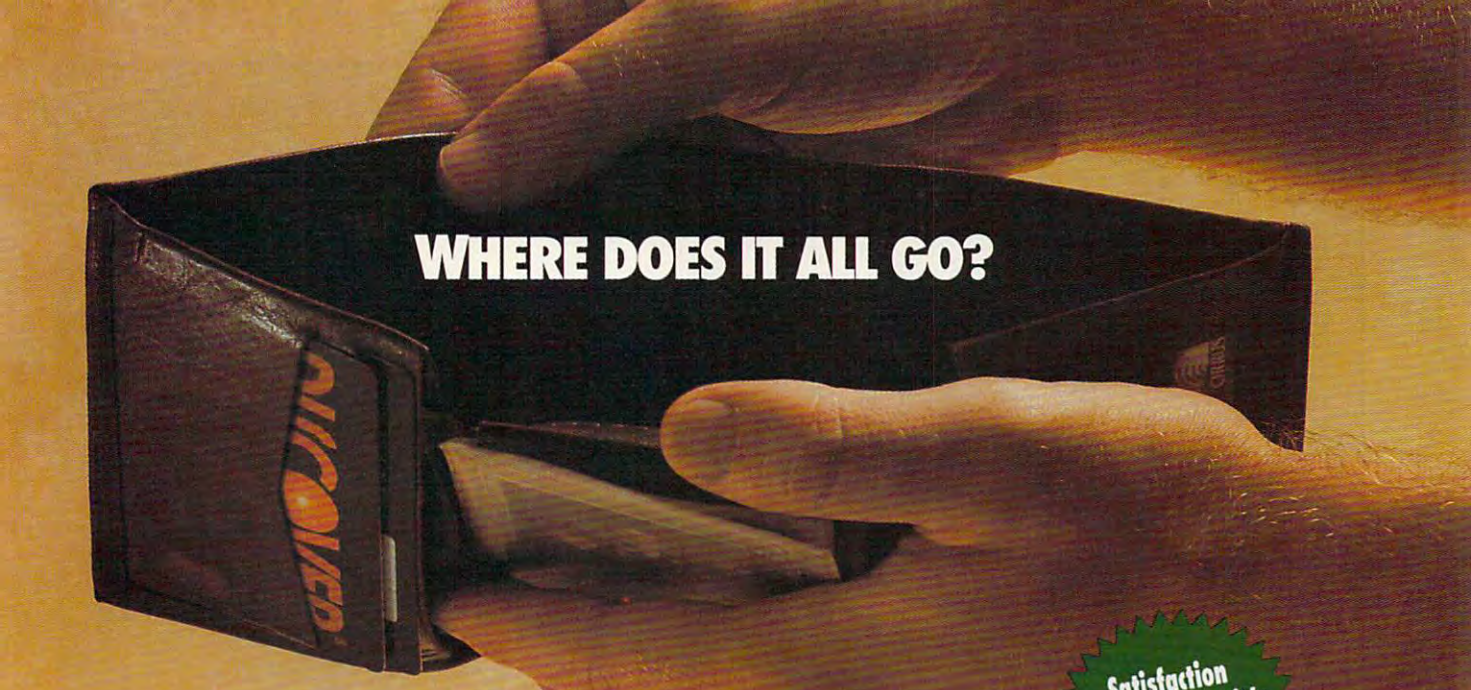

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THE PLAYERS

You can't tell the players without a scorecard. Here it is, with the players listed in alphabetical order.

Clipper 5.01
$795
Computer Associates
12555 W. Jefferson Blvd.
Los Angeles, CA 90066
(310) 390-7923
Unique among the programs listed here, Clipper is a compiler. When you write a Clipper program, it runs as a stand-alone exe file, and you're allowed to distribute it to other users without paying a fee and without their having to own Clipper. It's based on dBASE III Plus with a number of extensions that aren't compatible with dBASE IV. The documentation assumes you know the dBASE language and doesn't have much in the way of tutorial information. Its report writer is good, but you have to be a programmer to use it. Clipper is more suited to traditional programmers than the other products here, but what it does, it does quite well. And what it doesn't do can still be done, because you can use C to add to the Clipper language (and make use of Clipper's internal routines).

dBASE IV 1.5
$795
Borland International
P.O. Box 660001
Scotts Valley, CA 95067-0001
(800) 331-0877
Still the market leader, dBASE is always a good choice. FoxPro is currently more state-of-the-art, but dBASE is, of course, the only product listed here that's completely dBASE compatible. There's a huge market of third-party books and training materials for dBASE, and it runs on every computer known to humankind. Its user interface was given a face-lift for version 1.5, but it doesn't come close to FoxPro's. It has great documentation, an excellent report writer, and a very good programming language. It uses memory efficiently, runs well on 286s, and will soon be doing Windows.

dbFast for Windows 1.7c
$550 (competitor upgrade—$179)
Computer Associates
1 Computer Associates Plaza
Islandia, NY 11788-7000
(800) 225-5224
Purchased by Computer Associates before it purchased Clipper (thus leaving CA in the uncomfortable position of supporting two incompatible dBASE dialects), dbFast for Windows is much more suited to the novice programmer than Clipper is. Again, the documentation on its programming language leaves something to be desired, and the release as of this writing is known to be buggy. Still, it allows you to create stand-alone Windows programs using the dBASE language—a unique benefit no other product could offer at press time.

FoxPro 2.0
$795
Fox Software
134 W. South Boundary
Perrysburg, OH 43551
(800) 837-3692
Illustrating just how hard it is to write a good database, Microsoft threw in the towel after years of in-house development and bought the best dBASE-compatible DBMS money could buy. Well worth the $170 million in stock Fox cost Microsoft, FoxPro is at the crest of a new wave of databases. It's by far the easiest relational database to learn in this group, yet it's also among the most powerful. Most DOS database managers are woefully behind in the user interface department, but the developers at Fox clearly put their Mac programming experience to work in FoxPro 2.0. Arguably a better dBASE than dBASE, FoxPro is at once fairly compatible with the dBASE IV language and well beyond it in such critical areas as user interface features and lightning-fast indexing. If you need total dBASE compatibility and portability to other machines, go with dBASE. But if you want to give your programs a modern look and demand a red-hot development environment, FoxPro remains unchallenged.

HyperPad 2.2
$229
Brightbill-Roberts
P.O. Box 2476
Syracuse, NY 13220-2476
(800) 444-3490
HyperPad could've been a big hit in the DOS market, and I'm still not sure why it wasn't. Its visual approach to database design makes the creation of most databases a cakewalk, and its English-like command language is child's play to learn, especially if you know HyperTalk. HyperPad is not a clone of the seminal Macintosh program called HyperCard, but the influence is unmistakable. As with ToolBook, you attach program code to onscreen objects such as buttons and fields. This has a hidden trap: You can't make major changes to the program without somehow copying the database records to a new database, and there's no provision for doing so.

ObjectVision 2.0
$149.95
Borland International
P.O. Box 660001
Scotts Valley, CA 95067-0001
(800) 331-0877
Borland's ObjectVision, a Windows program, is a wildly uneven product in terms of where its power lies, although it's rock solid and does everything it's advertised to do and more (Borland doesn't do a good job of explaining it). It's every bit as simple to create a database in ObjectVision as it is in ToolBook, but OV is relational and uses Paradox, dBASE, ASCII, and BTrieve as native file formats. You create a database by "drawing" it onscreen, much as you do with ToolBook. There is no traditional programming language, but ObjectVision lets you attach 1-2-3– and Quattro Pro–style functions to such Windows objects as buttons and data entry fields. Amazingly, Borland lets you distribute stand-alone applications by including a runtime version of ObjectVision with your programs. There's no faster, cheaper, or more effective way at the moment to create Windows databases of simple to medium complexity that you can distribute. Its programmability is limited compared to dBASE's or ToolBook's, but you can still do quite a lot.

Paradox 3.5
$795
Borland International
P.O. Box 660001
Scotts Valley, CA 95067-0001
(800) 331-0877
Borland acquired a database manager called Paradox some years ago because the product lived up to its name: It had a simple-to-learn user interface but came with a language every bit as powerful as dBASE. PAL, the Paradox programming language, is not dBASE compatible, so Borland is now faced with the unenviable task of somehow reconciling two completely incompatible programming languages in the same market segment. Paradox is no longer the technology leader in the realm of high-end relational databases (FoxPro snatched the crown a couple of years ago), but it remains an excellent product with thorough documentation, a much-imitated visual query mechanism, and high-performance database management.

ToolBook 1.5
$395
Asymetrix
110 110th Ave. NE, Ste. 700
Bellevue, WA 98004
(800) 448-6543
ToolBook makes better use of the Windows environment than any other database product available. It's sluggish on even medium databases and on anything but a high-end system (fast 386 on up), but its advantages are many: a programming language that looks like HyperTalk with the bad parts left out, the best sample applications of any product listed here, a solid interface to Windows, an optional multimedia extension package, and some of the most elegant documentation ever written. It's a class act, if limited in some ways, but as a whole it's a seductive development environment.

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date field contains only allowable numbers for months (1–12), days (1–31), and years (typically 1900 and up). A logical field can only store T for True and F for False (or sometimes Y for Yes and N for No).

Restricting the kind of information that can be entered into a field confers several advantages to the DBMS user. First, most databases automatically force the user to input only that type of data, so an absent-minded data entry person won't be able to enter ZIP code (numeric) into the state field (character). Second, it speeds indexing.

An index is a copy of one or more key fields (fields you want to sort by, for example, last name or ZIP code) that's designed for very fast access. If you index a file by its ZIP code, the database manager can create a separate index file with a copy of the ZIP code for each record stored in a quick-access format. Computers can sort numbers faster than letters, so the indexing mechanism can take advantage of that trait and convert its copy of the ZIP codes, which are stored as printable characters in your record, into binary values for the index file. That way, printing your customer list by ZIP code will be sped up enormously, perhaps a hundred or a thousand times.

The designers of dBASE III Plus recognized that some databases would do well with the ability to store free-form information, at the cost of limiting how that information could be searched. For example, if you want to store a log of a client's dealings with your customer service department, you'll quickly realize that most records leave this field empty, but the ones for which it is used can easily spill over your database's maximum record size of 4000 characters. The answer to this problem is memo fields, pioneered by dBASE.

Memo fields take up ten bytes per record no matter what. That's the bad news. The good news is that those ten bytes are used to refer to a location in a separate memo file that can store up to 64K of information per memo field. (FoxPro and some other dBASE-compatible databases manage to allot even larger memo fields.) Memos can't be sorted or used in indexes, because indexes copy the contents of each indexed field and they can't be searched easily—but when you need 'em, you need 'em bad. Many database managers that claim to be dBASE compatible don't support memo fields, whereas others, such as FoxPro and Clipper, go dBASE one better by offering beefed-up support for memo fields. Fox for the Mac, for example, uses memo fields to store MacPaint images!

Family Relations

There are two kinds of fixed-length DBMSs (that term includes database managers that use memo fields): flat-file and relational. A relational DBMS is one that lets you use several databases at once, connected by common fields. An example is a customer list that's related to accounts receivable by customer ID. Scroll through the customer list, and you'll see how much each customer owes you because the DBMS knows to look up each account as you scroll. (The inventor of relational database design theory, Edward F. Codd, rightly disputes this simplified example and wrote an entire book explaining what relational databases really are, but we're using the popular definition here for the sake of discussion.) Database managers without this ability are known as flat-file managers, because they use only one database at a time.

GOOD DATABASES CREATE ORDER OUT OF CHAOS

In general, relational database managers are much more capable than flat-file managers and by definition can do everything flat-file managers can, but they're usually more expensive and more difficult to learn.

Indy Car or Family Sedan?

A DBMS that uses fixed-length records isn't the only game in town, of course. You might think of it as the family sedan of databases, which can do just about any task you can throw at it with varying degrees of success—big capacity, reasonably fast sorting and indexing, pretty flexible, and nicely paired with the performance characteristics of a disk drive. Three other varieties of DBMSs exist—network, hierarchical, and object-oriented, but they aren't popular on PCs. A fifth variety, free-form databases, has been around for some time and occupies a small but solid niche in the PC world. Lotus Agenda and AskSam are well-known examples of free-form databases.

While you can make free-form databases look like traditional row-and-column database managers, why bother? Their true power is precisely in not forcing you to such a narrow organizational paradigm. Instead, you're encouraged to make up freestyle associations; Agenda knows that the phrase next Wednesday is the same as December 9 and can spot other such connections without your explicitly asking. Free-form DBMSs usually store all information in RAM, so they can be sharply limited in the amount of information they store.

Two hybrid DBMSs are HyperPad, a sort of character-mode HyperCard for DOS, and ToolBook, a Windows application that also looks like HyperCard. Fields aren't typed, essentially doing the job of both character and memo fields, and they may contain up to 32,000 characters. But nonetheless, they can be sorted and searched, and they don't waste disk space. Each comes with a wonderfully rich programming language and terrific sample applications that you're encouraged to modify for your own use. HyperPad boasts much snappier operation and works well even on the lowliest 8088 DOS machine. ToolBook is unpleasant on anything less than a 386 with four megs running at 33 MHz. If you plan to sort a 10,000-name mailing list in ToolBook, plan to leave your computer running overnight, but that's not really what ToolBook is for. If you want to prototype a Windows application or put together a visual database fast, ToolBook is without peer. Both HyperPad and ToolBook are stable, mature products.

Gone Fishing

With all the options available, you're sure to find a DBMS that suits your style and needs. The most difficult challenge database managers pose may well be choosing the best one for your needs. If you find this to be the case, consider setting up an appointment with a computer consultant, who will evaluate your habits and system capabilities. But don't delay. Information keeps pouring into your life; the sooner you get it managed, the sooner you can take that vacation you've been putting off. ❑

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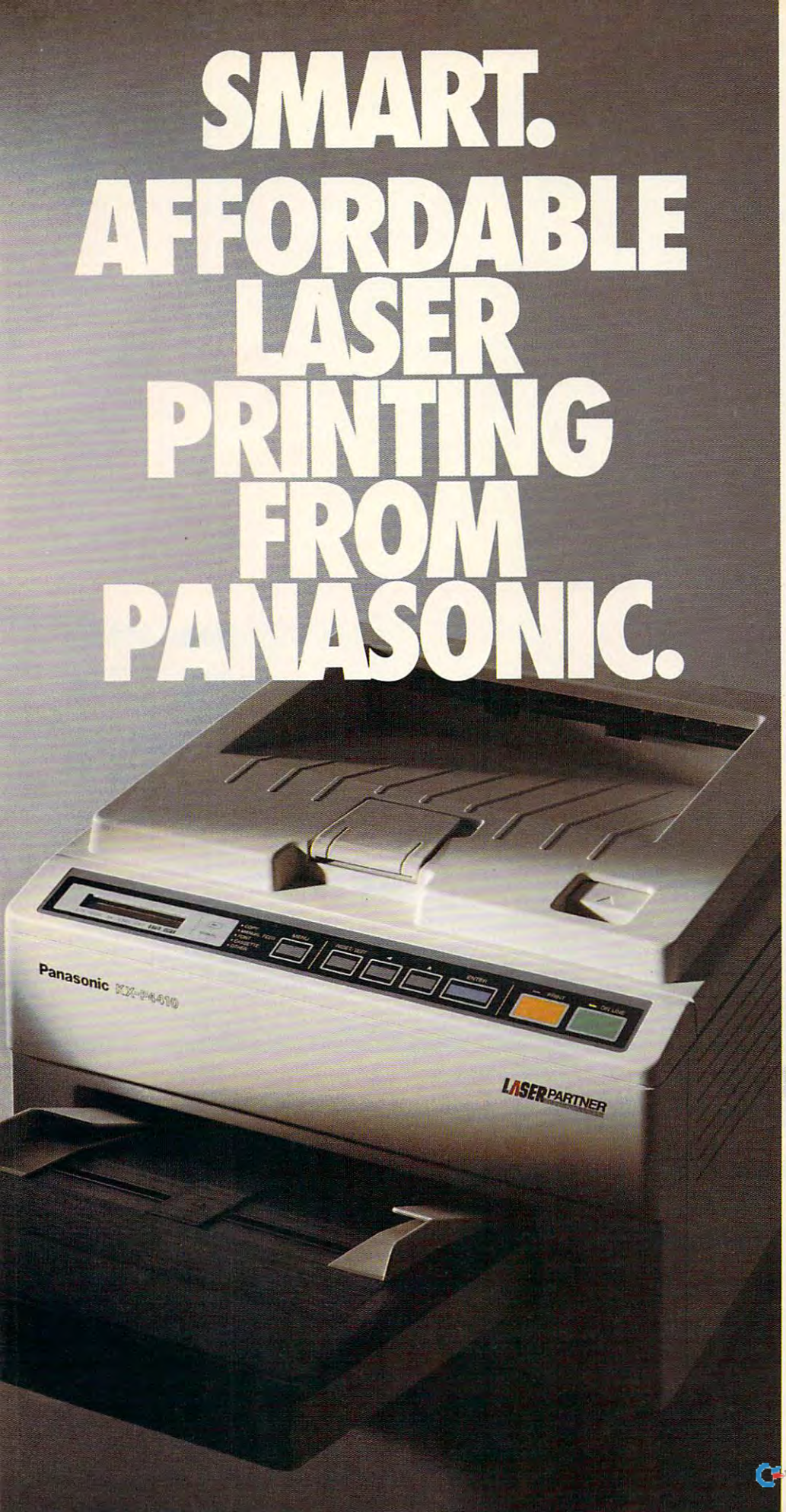

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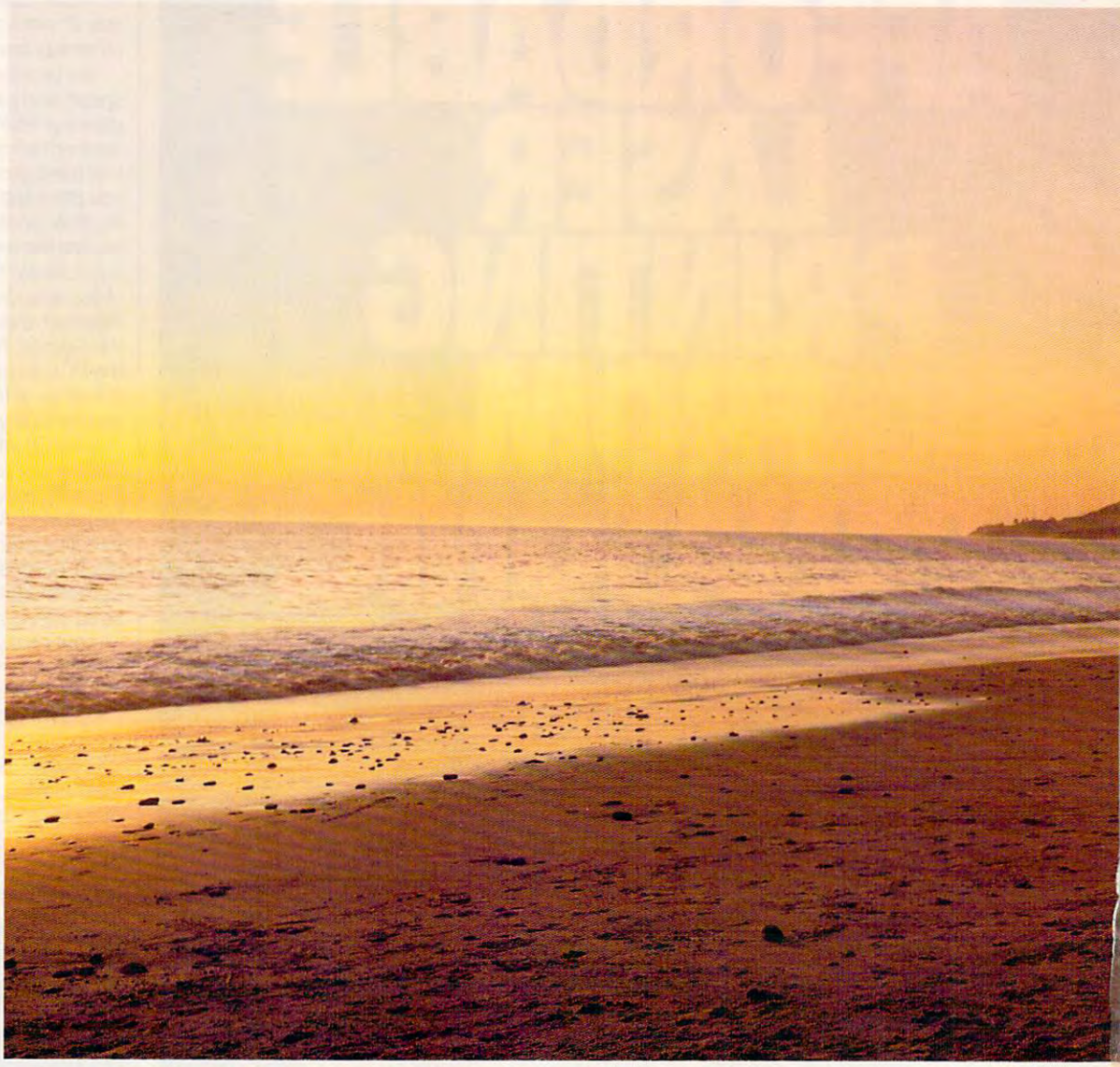

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TEST LAB

Edited by Mike Hudnall
Reviews by Tom Benford

Notebook computers have come of age. At one time, laptop and notebook users were beset by limitations, having to to put up with limited mass storage, processing power, display opportunities, battery life, and expansion capabilities. Overcoming any of these limitations meant investing very large sums of money.

While notebook computers still aren't exactly inexpensive, they do offer you far more for your money than previous generations of portable computers did. Perhaps you've been tempted by the freedom notebooks offer you to compute when and where you want or enticed by the promise of increased personal productivity. Perhaps you've resisted that temptation because you didn't want to give up the power and economy of a desktop system. Or maybe you've decided to wait because you're not sure which technology best fits your needs.

Wait no more. This month's Test Lab lineup includes 11 notebooks that in one way or another offer cutting-edge technologies: color displays, advanced power management, raw computing power. And if you've followed the news in the computer industry, you know that computer prices, including notebook prices, are dropping rapidly. You should, for example, manage to find a hard drive–equipped 386SX notebook with features galore and plenty of software for a street price of under $2,000. Whether your portable computing needs are modest or demanding, you'll probably find unexpected bargains wherever you look.

Three of this month's evaluation units offer color displays. Those from NEC and Toshiba boast active matrix color, and AST's notebook gives you a lower-cost passive matrix color display. While gray-scale approximations of color have improved significantly, these color displays are mighty nice.

You want power? Two of this month's evaluation units boast Intel 486 microprocessors: one a DX (TI's TravelMate 4000) and one an SX (Toshiba's T4400 SXC). Two of the notebooks, the Wyse DecisionMate and the PC Brand 486SLC, use the Cyrix 486SLC chip.

Not too long ago, using Windows on a notebook presented a real challenge because of memory limitations, smaller hard drives, and less capable microprocessors. Now many companies bundle their notebooks with Windows and even pointing devices that let you do Windows on the run. In fact, you may find that your Windows apps are more responsive on the new notebook than on the old desktop back at the office. With massive hard drives (up to 200MB), memory expansion of up to 20MB, and expansion-bus technology allowing the use of expansion boxes and docking stations, you might find a notebook that takes the place of your desktop machine. Zenith's Z-Note even offers a port to let you hook into your company's network.

Today's notebooks have also advanced in upgradability, and in this respect, too, they seem to be catching up with desktop computers. From adding a modem to upgrading a hard drive, you'll find more upgrades and options than ever. Samsung's notebook lets you remove the hard drive, and Zenith's promises you can exchange your monochrome display for a color display later. Some of these upgrades still must be performed by the manufacturer, and, in general, upgrading a desktop system is still easier than upgrading a notebook; however, great strides have been made in notebook upgradability.

With the increasing power of today's notebooks, power management ranks high on many people's list of priorities. And several of the units tested this month employ innovative power management technologies. As you ponder future cross-country trips, consider these technologies, and pay careful attention to the battery depletion benchmark statistics.

Should you buy a 486? A 386? A DX, SX, or SL? Should your notebook have an Intel processor, an AMD processor, or a Cyrix processor? This month's Test Lab helps you sort out what each of these microprocessors has to offer; pay particular attention to our benchmark test results. In part, the processor you choose will depend on the applications you use, how much you'll depend on your battery, and how much money you have to spend. This month, as always, Test Lab gives you the information you need to assess your own needs and make a more informed buying decision.

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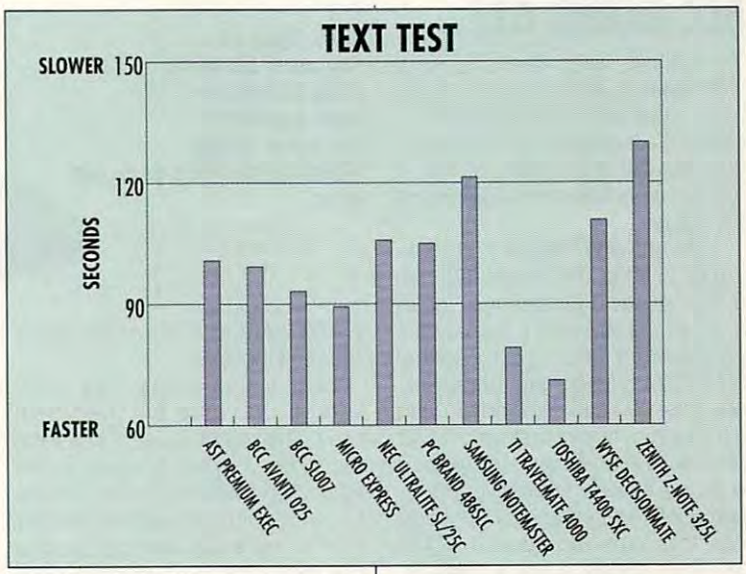
AST PREMIUM EXEC 386SX/25C

Compact and smartly styled, the briefcase-totable AST Premium Exec 386SX/25C color notebook computer uses the Intel 80386SX chip running at a respectable 25-MHz speed. It's the only notebook PC in this roundup that features a passive matrix color display.

The color display is the most distinctive feature of this computer, and I found it to be an acceptable compromise between black-and-white LCDs and the more expensive active matrix color LCDs offered on other notebook models. While the passive matrix technology is less expensive to produce, resulting in a lower overall price for the consumer, there are some video tradeoffs that you should consider. The passive matrix video display, while good, lacks the color vibrancy, the richness and depth, of the active matrix display. Additionally, I noticed in the passive matrix display a marked propensity toward moiré patterns and some blotchiness on the screen. It is color, however, and it adds an entirely new dimension to notebook computing when compared to the mundane appearance of even the best black-and-white LCDs.

The Premium Exec's high-density 3½-inch floppy drive is mounted on the front, and I found this to be a much more convenient and accessible site for the drive than the side of the machine, where other manufacturers usually place the floppy drive. In addition to the floppy drive, the Premium Exec also comes outfitted with a hard drive; the standard configuration is a 60MB drive, but you can optionally order an 80MB drive or a 120MB drive (the review unit came equipped with the 80MB drive and 4MB of RAM installed).

You can expand this notebook's memory to a maximum of 8MB by using single in-line memory modules (SIMMs) in either 1MB or 4MB capacities to populate the two SIMM sockets provided. Adding more RAM is accomplished by removing a sliding cover, which provides access to the interior parts of the machine.



You can also install an optional second serial port adapter when you remove this panel cover, since installation of this option is a snap-in procedure. No technical prowess is required for either of these upgrades, thanks to good overall design. The Premium Exec can also accommodate a 387SX/25-MHz math coprocessor for those chores which are math intensive, so there's good expandability with this machine if and when your needs require more computing oomph.

All of the I/O ports are located at the left rear of the machine and protected by a flip-down door when they aren't in use. A single serial port, a parallel port, a 15-pin Super VGA video port, and dedicated mini-DIN ports for an external keypad and the AC power adapter and battery charger are all grouped together here. You'll find the battery compartment located on the right side of the Premium Exec near the rear of the machine. A snap-off cover on the left side of the notebook provides access to the optional second serial port.

The on/off switch and the brightness and contrast controls are located directly beneath the video display screen on the body of the computer itself. To the left, also at the top, you'll find a bank of six LED indicators which signify power, floppy drive, hard drive, Num Lock, Caps Lock, and Scroll Lock activity.

I found the keyboard quite comfortable, offering good key placement along with a positive, snappy action with an audible click. I really liked the feel of this notebook keyboard, since it closely mimics the feel and sound of my desktop PC keyboard. AST also offers an optional adapter for connecting a desktop keyboard to the Premium Exec if you prefer to use one.

Weighing in at 7.5 pounds, the Premium Exec 386SX/25C is quite totable and, with a charge life of over 1.5 hours under heavy use, serviceable, too. If you're looking for good 386 performance with a color display in a notebook PC at an affordable price, the AST Premium Exec 386SX/25C merits a close look.

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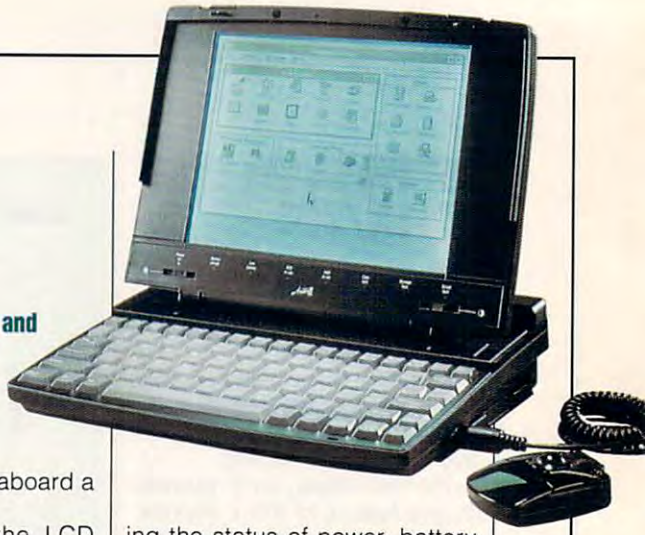
BCC AVANTI 025

Very slick, very sleek, loaded with features, and ready to do business—that's the Avanti 025 notebook PC. It boasts lots of innovation with a marked flair for styling as part of its standard equipment package.

With an AMD 386SXL CPU ticking at 25 MHz, the Avanti 025 has a strong basic computing "power plant" to start with. A socket is provided for adding an optional 80387SX/25-MHz math coprocessor, and you can expand RAM to a maximum configuration of 8MB (the review unit came equipped with the standard base configuration of 4MB installed). In addition to a side-mounted 1.44MB 3½-inch floppy drive, an 85MB, 19-ms hard drive is also standard equipment.

The shape of the Avanti 025 is its most distinctive feature. Rather than taking the traditional notebook approach with a squared-edge rectangular shape, BCC softened the sharp edges of the case with rounded corners and sculpted curves, which makes the case resemble a clamshell when closed. Molded in a semigloss black plastic, the Avanti 025 looks like a notebook PC that would be right at home aboard a Stealth bomber.

BCC
1610 Crane Ct.
San Jose, CA 95112
(800) 827-4222
(408) 944-9000
List price: $1,995
Warranty: one year, parts and labor



Bright and large, the LCD screen provides 64 shades of gray. The method used to attach the video display housed in the lid to the main body of the notebook is quite innovative. Rather than using a standard hinge, the display screen pivots forward from a closed position, making it possible to use this notebook in very cramped spaces (such as the tray on the back of an airplane seat).

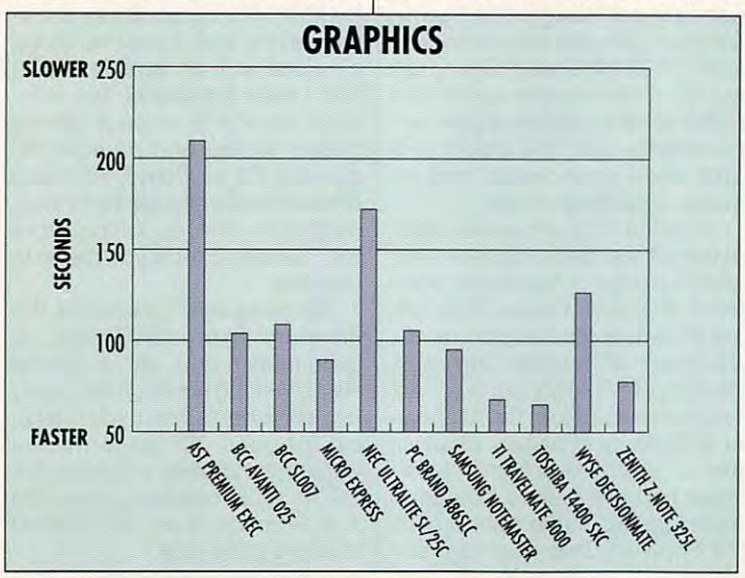
You'll find controls for adjusting the brightness and contrast of the LCD conveniently located just below the display itself—a good place for them, since black-and-white LCDs frequently require adjustment for optimal viewing from one application to another. Illuminated indicators displaying the status of power, battery charge, low battery, floppy use, hard disk use, Caps Lock, Num Lock, and Scroll Lock are also located across the bottom span of the LCD screen.

Advanced Power Management (APM) circuitry built into the Avanti 025 extends battery life, and I had no problem using the computer for 2½ hours or longer per charge, depending on how heavy my usage was. This is particularly significant, since the Avanti 025 also comes equipped with a built-in 9600-bps send/receive fax and 2400-bps data modem which also draws power from the notebook's ni-cads.

Behind a flip-down panel door on the left side of the machine beneath the keyboard, you'll find a 15-pin VGA port for connecting an external color monitor, a parallel port, and a single 9-pin serial port. A PS/2 mouse port and the flush-mounted power switch are mounted on the right side, along with the floppy drive. The AC power connector jack is located at the right rear of the machine, while the dual telephone jacks (for line and phone) are mounted at the left rear corner.

The keyboard features a soft yet sure touch with very short key travel. While this takes a little getting used to if you're accustomed to a full-travel desktop keyboard, I found typing on the Avanti 025 very fast and almost effortless after using it for a short while.

MS-DOS 5.0, Windows 3.1, and WinFAX software all come



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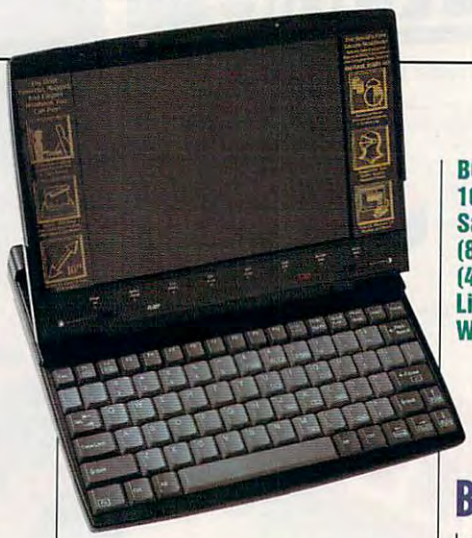


with the Avanti 025, as does a handsome carrying case with ample room for cables, manuals, and more. All this adds up to a 25-MHz 386 machine with the muscle and equipment needed to do serious business right out of the box. And if that's not enough for you, consider this: The Avanti 025 is designed and manufactured right here in the U.S.A.

Circle Reader Service Number 305

BCC
1610 Crane Ct.
San Jose, CA 95112
(800) 827-4222
(408) 944-9000
List price: $3,495
Warranty: one year, parts and labor

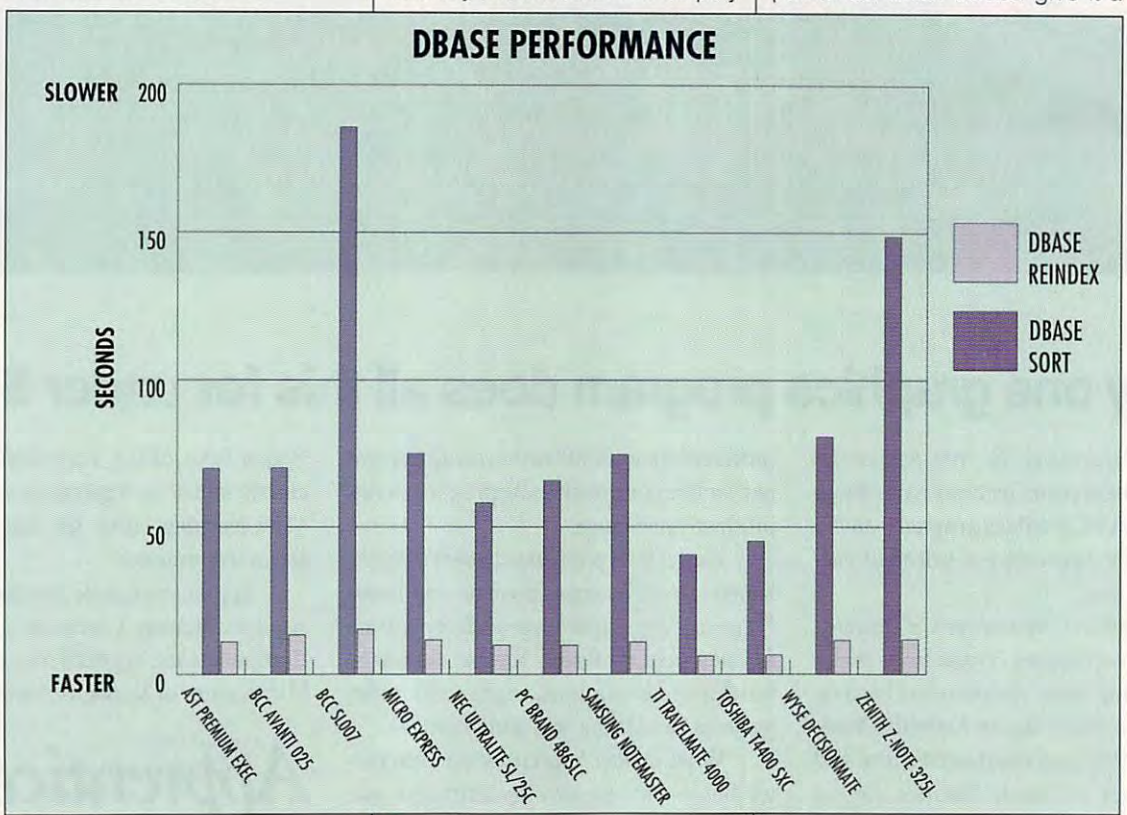
BCC SL007

Looking virtually identical to the BCC Avanti 025 notebook also covered in this roundup, the BCC SL007 notebook boasts many of the same features as the Avanti model but adds a couple of innovations of its own.

The SL007's video display is the same as the one found on the Avanti, featuring a ten-inch diagonal viewing area—one of the largest and brightest available on any of today's notebooks. The display screen is built into the lid of the notebook, and like the other BCC model, uses a unique pivoting arrangement to erect the screen in much less space than other notebooks require. By pivoting the screen forward when it's open, you can use the notebook comfortably on your lap or on the tray mounted on the back of an airplane seat. This feature will find favor with frequent flyers who need (or want) to compute on the go.

The APM (Advanced Power Management) features of the SL007 will also find favor with commuting computerists, since its average charge life extends well past 1½ hours even with high-demand usage. Normal charge life under average use was typically 2½–3 hours during the review.

A "soft touch" mar-resistant semiflat black sculpted case contains the notebook PC, and its curved lines and clamshell-like appearance when closed give it a



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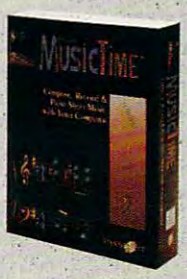

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very nineties look, indeed.

Standard equipment for the SL007 consists of 4MB of RAM (expandable to 8MB) and a very fast 85MB IDE hard drive. A side-mounted 3½-inch high-density floppy drive, a parallel port, a serial port, and a 15-pin VGA port are also part of the basic complement of features, as is a PS/2-style mouse port. BCC also provides a socket for adding a math coprocessor if you think you might need one.

Unlike the Avanti model, which uses an AMD CPU, the SL007 uses an Intel 80386SL chip running at 20 MHz. While performance on the SL007 was quite good, it didn't have the snappy performance evident in its sibling, the Avanti.

The SL007 also features a built-in 9600-bps send/receive fax and 2400-bps data modem. Software that comes with the notebook includes WinFAX, MS-DOS 5.0, and Windows 3.0, so this machine is factory equipped and configured to do meaningful work as soon as you turn it on.

The most innovative feature of the SL007 is its built-in security. BCC claims that the SL007 is the "world's first secure notebook," incorporating a DES (Data Encryption Standard) coprocessor so that only authorized personnel can use it. This security feature permits you to assign a special five-character password to the notebook via a utility in the machine's setup section. This is a particularly attractive feature if you have sensitive information on the machine that you'd like to protect from unauthorized eyes when the machine is left otherwise unguarded (as during a lunch break).

A pleasant and unexpected plus is the inclusion of a miniature trackball, which plugs directly into the PS/2-style mouse port of the SL007. The mini trackball, only about half the size and thickness of a standard desktop mouse, is quite serviceable and a handy device to have if you're a traveler using today's GUI-based software, especially since you don't need a flat surface to use it. The thumbball unit is a nice touch that both looks good and works well.

The combination of built-in features, good performance, and encrypted security makes the SL007 a machine worthy of serious consideration.

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MICRO EXPRESS
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Santa Ana, CA 92705
(800) 989-9900
(714) 852-1400
List price: $2,695
Warranty: 15 months, parts and labor; 30-day money-back guarantee

MICRO EXPRESS NB2500

The Micro Express NB2500 is chock-full of features that will appeal to just about any user. Molded in a black, wrinkle-texture finish that doesn't show fingerprints, the notebook has rugged good looks and is a bit larger than most of the other notebooks reviewed here.

The NB2500 uses the AM386DXL CPU running at 25 MHz. This low-power microprocessor includes an internal 128K RAM cache for high performance, coupled with low current requirements to extend battery life. The extraordinarily flexible power management on this machine permits adjustable sleep modes and other energy-conserving features that contribute to battery charge life of between 2½ and 3 hours under ordinary use and more than 1½ hours under continuous, heavy use.

Standard equipment on the NB2500 includes a high-density floppy drive, an 80MB hard drive, and a built-in send/receive fax/modem. The notebook comes with 4MB of RAM, but you can expand the memory to a maximum of 8MB with an optional 4MB SIMM upgrade ($240).

The display measures nine inches diagonally and delivers 640 × 480 VGA resolution represented in 64 levels of gray. Slider controls just above the keyboard let you adjust brightness and contrast, and a 15-pin jack at the rear of the machine lets you use an external monitor.

Along with the external VGA jack, you get an external keyboard/mouse port, a parallel port, a 9-pin serial port, a telephone jack (for connecting the fax/modem), a proprietary expansion bus, and a scanner port, all located at the rear of the machine beneath a flip-down panel door. The scanner port supports a Marstek handheld scanner (either the 400-dpi or 800-dpi model), and it's certainly a unique and useful idea.

An optional expansion chassis ($499) adds two full-length 16-bit slots and an additional power supply, and it mates with the NB2500 via the expansion bus connector.

I found the keyboard of this machine really terrific, mimicking exactly the feel, key spacing, and action of my favorite desktop keyboard. All function keys are grouped together at the top, while dedicated cursor control keys occupy the bottom right of the keyboard. As far as notebook keyboards go, I'd rate this one a solid 10 on a 1–10 scale.

The front mounting of the floppy drive on this machine appeals to me. However, I don't like the placement of the green LED power indicator and amber hard

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THE SONERA VIDEO SCORES

To test the performance of displays in this month's notebooks, we used DisplayMate from Sonera Technology. The Sonera video scores represent our lab's subjective analysis of display performance in DisplayMate's Video Obstacle Course, a series of 33 test patterns designed to uncover video anomalies or substandard performance. Common video irregularities, including blooming, defocusing, geometric linearity, moiré patterns, flicker, streaking, ghosting, and other conditions, are diagnosed using the test patterns displayed. A "jury" of three CPTS staff members scrutinized each monitor for each test and voted either 1, signifying the monitor passed the test, or 0, designating failure. The votes of these three testers were compiled for all of the tests, and the results were totaled. A perfect score for the Video Obstacle Course is 33.

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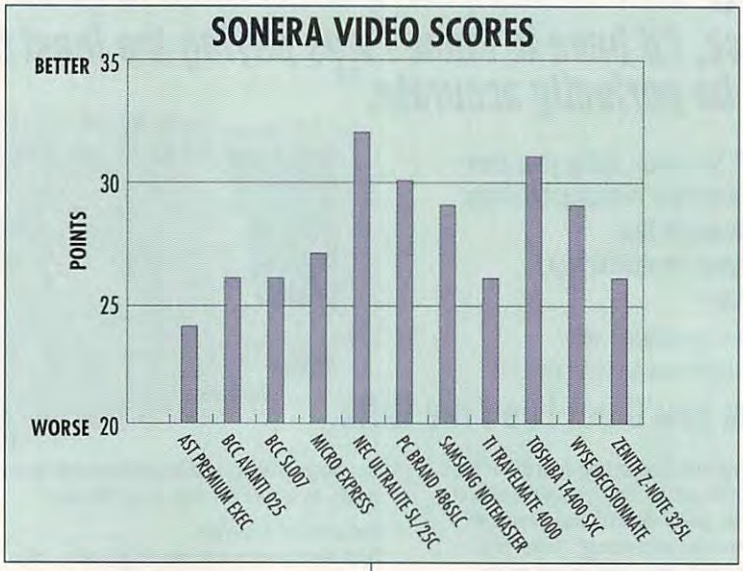

drive activity indicator next to the floppy drive. The problem is that when you're typing, your hands obscure the view of these two LEDs. My feeling is that if you're going to put status indicator lights on a notebook, you might as well put them where the user can see them while working. A minor gripe, perhaps, but one I feel is valid.

The notebook proved itself to be a reasonably quick and consistent machine for all of the DOS and Windows applications I ran on it during the reviewing process. MD-DOS 5.0 comes with the NB2500, along with several utility and setup disks. The documentation for the machine is thorough, well written, and logically organized. If you're considering a 386-based notebook, you should consider the Micro Express NB2500.

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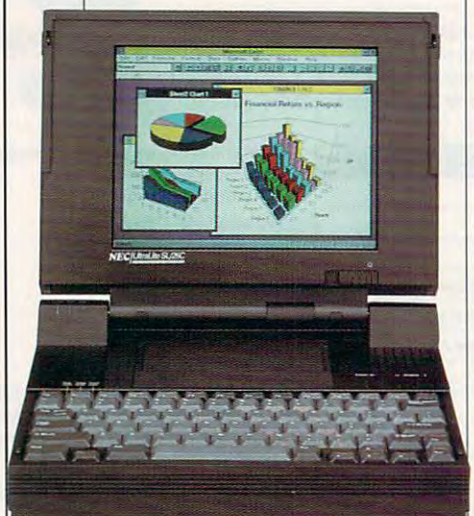

NEC ULTRALITE SL/25C

The impressive power and features of the NEC UltraLite SL/25C should raise the eyebrows of even the most stoic and jaded computerist. This is a wish-list machine.

NEC TECHNOLOGIES
1414 Massachusetts Ave.
Boxborough, MA 01719
(508) 264-8000
List price: $4,599 with 2MB RAM; $4,868 with 4MB RAM
Warranty: two years, parts and labor

The SL/25C's remarkable TFT (Thin Film Transistor) active matrix color liquid crystal display is an absolute pleasure to view, even for the most extended periods. I found the images on this display absolutely stable and the colors strikingly crisp. In the Video Obstacle Course of the DisplayMate Video Utilities, the UltraLite scored an unparalleled 32 out of a possible perfect score of 33; no other color notebook or laptop display I've seen to date surpasses that of the UltraLite SL/25C.

Standard equipment on this notebook includes a built-in high-density 3½-inch floppy drive for transient file work and a fast 80MB hard drive for mass storage. Two mini-DIN ports, one for a PS/2-style mouse and one for an external keyboard, are located next to a 15-pin external Super VGA connector and a single 9-pin serial port, all concealed from view when not in use by a flip-down panel door. Adjacent to this panel you'll find another flip-down door, which houses the parallel printer port and a proprietary connector for an external floppy drive.

Snap-off covers on the right side of the UltraLite conceal an external numeric keypad port

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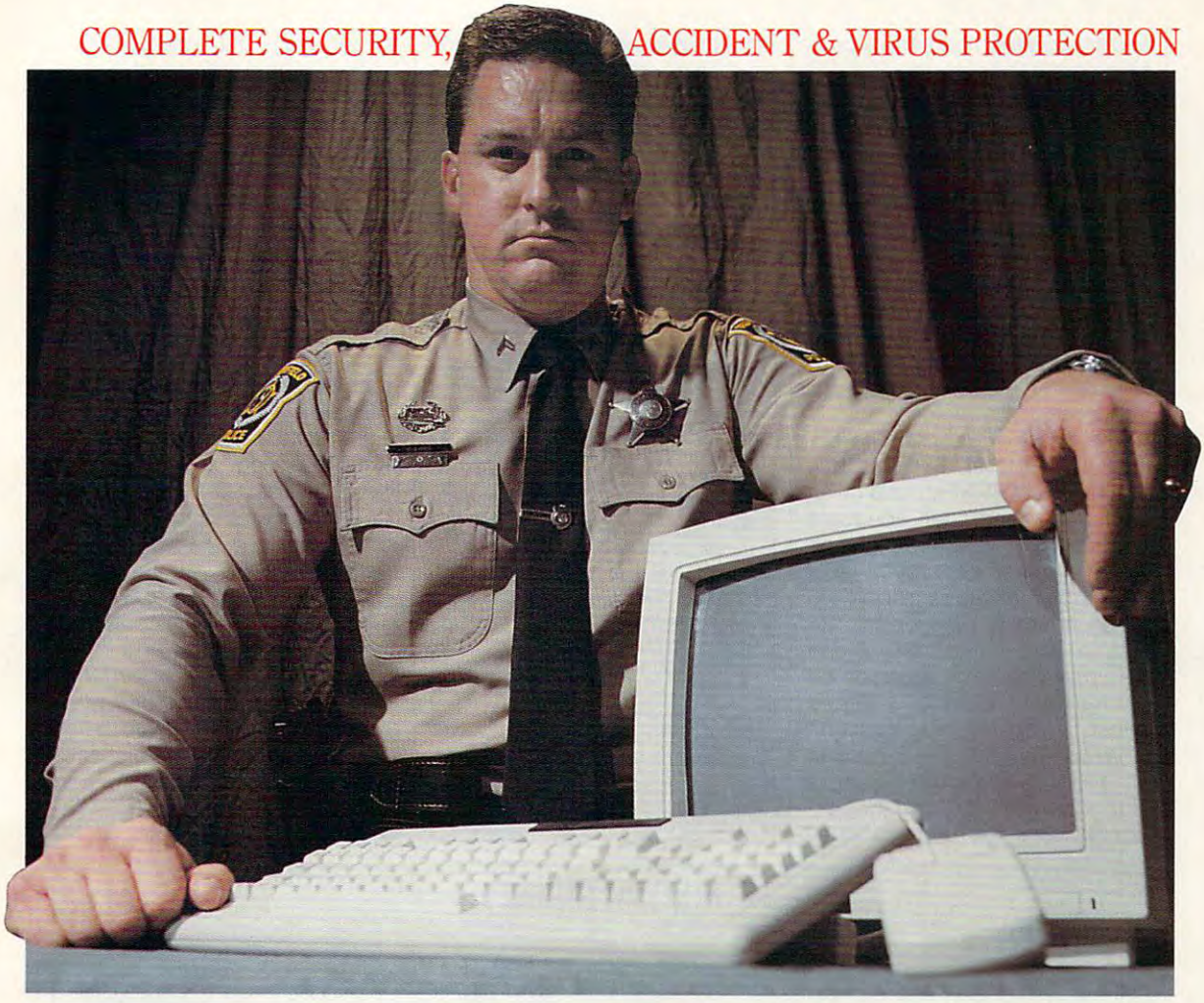

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and an expansion port. The expansion port connects the SL/25C with its accessory docking station, an optional item which endows the SL/25C with two 16-bit expansion slots and a 5¼-inch drive bay to accommodate an extra device, such as a CD-ROM drive.

If you prefer using an internal modem, you can install an NEC modem in the internal slot. Expand RAM to a maximum configuration of 10MB via 2-, 4-, 6-, or 8MB memory modules.

The heart of the UltraLite SL/25C is the Intel i386SL CPU, which runs at 25 MHz. This gives the SL/25C more than adequate performance while keeping the power requirements reasonably modest through the SL chip's power management functions.

While NEC claims that you can get up to 5 hours of operation on a charge with light use and about 1½ hours under constant operation, I found the SL/25C to be a bit on the power-hungry side with average continuous-use sessions lasting only slightly more than an hour between charges. With all of the power management options enabled, I averaged 2–2½ hours per charge, which is a workable charge life in real-world terms.

Thanks to excellent layout and design, using the machine is a joy. Illuminated power, battery, and disk usage LEDs grace the upper left of the unit by the lid hinge, while illuminated Num Lock, Caps Lock, and Scroll Lock indicators appear just above the excellent 88-key keyboard, which features a dedicated cursor keypad and an embedded numeric keypad.

You can adjust screen brightness via a slider control mounted at the lower right of the display, and the standby and power switches are flush mounted at the upper right just above the keyboard. Overall ergonomics of the 7½-pound notebook are excellent, and its black nongloss case gives it a distinguished, business-like appearance.

Windows and DOS-based applications all run at a respectable clip on the SL/25C equipped the way I reviewed it, but adding an optional 80387SX math coprocessor along with some additional RAM would improve its performance even more for those real power-user applications. If you're like most users, however, you'll find that the SL/25C fills your wish list just fine the way it is.

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THE NORTON INDEXES

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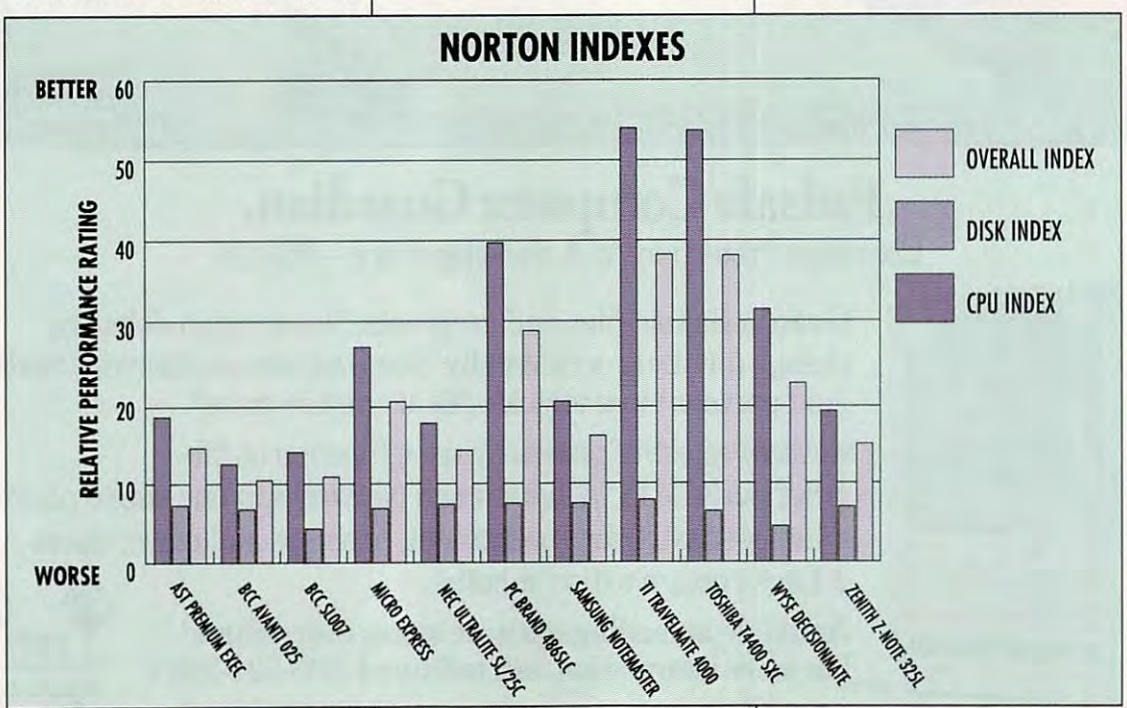
The computing index rates the computer's microprocessor performance. The disk index rates the performance of the hard drive. The overall index factors in the microprocessor and disk performance, among other things.

—RICHARD C. LEINECKER



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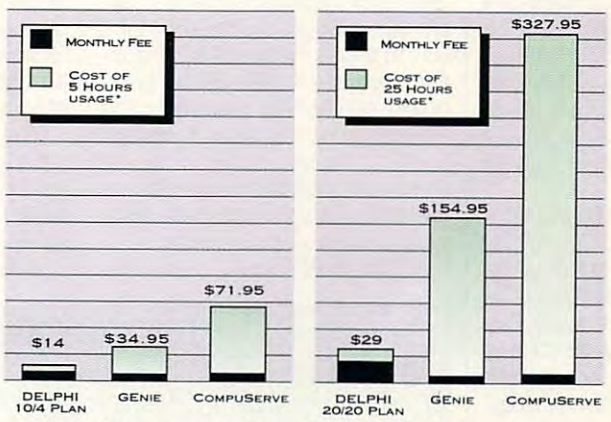

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PC BRAND 486SLC

PC BRAND
405 Science Dr.
Moorpark, CA 93021
(800) 722-7263
List price: $1,995 with 2MB RAM; $2,245 with 4MB RAM
Warranty: one year, parts and labor; 30-day money-back guarantee

Weighing in at just a tad under seven pounds, the PC Brand 486SLC notebook computer packs the power and functionality of Cyrix's new microprocessor (486SLC) into the convenient and easy-to-carry notebook form factor.

An abundance of good features make this notebook an attractive choice for many users. For example, the 486SLC comes equipped with two serial ports rather than the single COM port usually found on notebooks. These dual ports, as well as a single parallel port, reside behind a drop-down panel door at the right rear of the notebook. An adjacent panel houses the PC Brand proprietary expansion connector used for attaching peripherals.

On the left side of the machine, you'll find a jack for an external keyboard; a mini-to-standard-DIN keyboard cable adapter is also thoughtfully provided with the notebook. On the right side of the notebook, you'll find the floppy drive, a 15-pin external VGA jack, and an AC power adapter or battery charger jack.

PC Brand has placed the controls for the notebook's display within easy reach, right below the display screen itself. The LCD screen is one of the best I've seen, completely devoid of any moirés and flickering, which makes it easy to view for even extended periods. I did notice some streaking and image persistence, although these weren't major concerns.

Compared to keyboards on other notebook PCs, this one is slightly stiff and doesn't produce an audible click, but the action is positive, and most fast typists will like the speed and feel this keyboard offers. I found the key arrangement and spacing quite satisfactory; the dedicated cursor keys and the embedded numeric keypad make it an almost perfect input device. To page up or page down, you must depress the Fn key and the up- or down-arrow key, but the absence of dedicated Page Up and Page Down keys was the only real feature I missed on this keyboard.

Unfortunately, the user's manual for the 486SLC wasn't ready in time for the review, but a manual for the PC Brand NB/386SX was supplied as a substitute. While most of the information covered in the 386-model manual covers the 486SLC model, as well, I was at a loss for specific information germane to the 486SLC (like power-conserving features). The 386 documentation was excellent, and if it is representative of the user manual, then the manual for the 486 will be equally complete, easy to read, and well organized.

While all Windows- and DOS-based applications ran without a hitch during the review, the performance of the 486SLC (using the Cyrix 486SLC microprocessor) wasn't as good as I expected it to be, based on my experience with i486-based notebooks. Even running it with all of the power-saving options turned off (CPU timeout disabled, display and hard drive timeouts disabled), its performance overall was lackluster and more in keeping with a faster 386-based machine rather than a 486 notebook.

The 486SLC comes with a zippered carrying case, the external-keyboard adapter cable mentioned earlier, and MS-DOS 5.0, as well as setup and utility disks.

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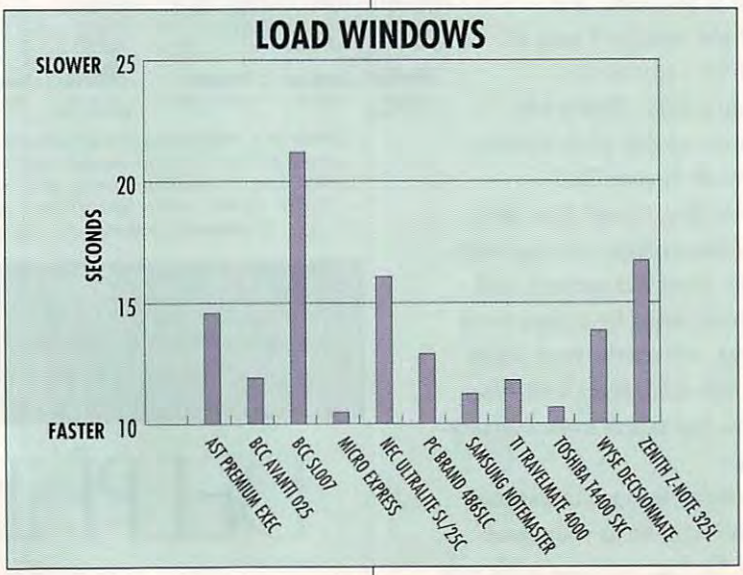

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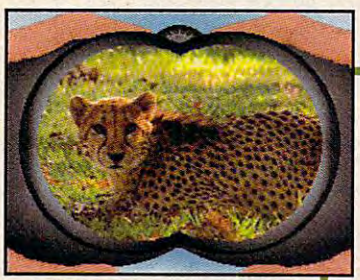

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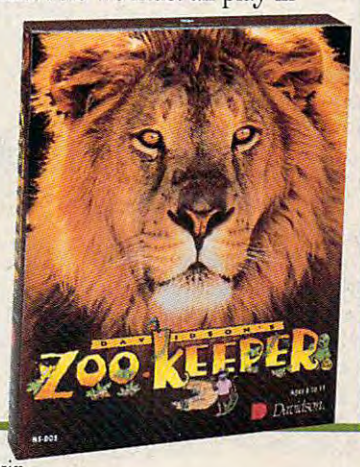

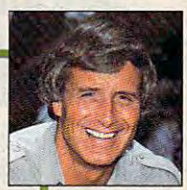

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SAMSUNG NOTEMASTER 386S/25

SAMSUNG ELECTRONICS AMERICA
Information Systems Division
105 Challenger Dr.
Ridgefield Park, NJ 07660
(201) 229-4136
List price: $2,199 with 2MB RAM and 60MB drive; $2,548 with 4MB RAM and 60MB drive
Warranty: one year, parts and labor

Samsung's 5.8-pound NoteMaster 386S/25 is one of the lightest and best-looking notebooks around, and its removable hard drive and battery features are sure to appeal to business travelers.

The attractiveness of the NoteMaster is immediately apparent in its molded case, which uses a nonglossy, semitextured, gunmetal gray plastic with a black inset panel on the lid for contrast. Opening the lid reveals that the clean, uncluttered lines are carried through here, too. The hinge that serves to keep the display screen joined to the main body of the notebook does double duty as an indicator panel.

Rather than the traditional rectangular LED indicators usually found, Samsung has shaped its indicators on the NoteMaster in the form of icons representative of their status. For example, the power indicator LED is an illuminated light bulb icon, the floppy drive indicator is a disk icon, and so forth. While not a major feature, it's one of the little niceties that make this such an attractive notebook.

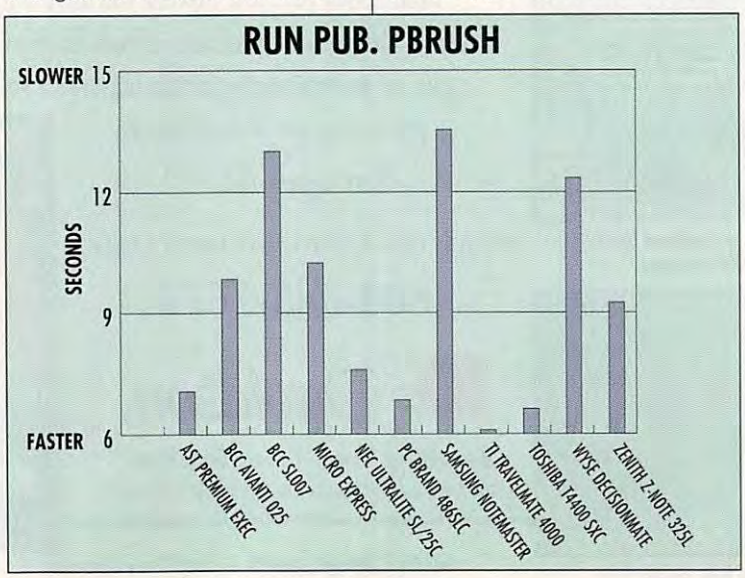
The NoteMaster uses the AMD 80386SXL as its central processing unit, and its clock ticks along at a pace of 25 MHz. Two megabytes of RAM come standard with the notebook, along with a 40MB hard drive. You can expand RAM up to 8MB using a memory card, and if you want a larger hard drive, you can order a 60MB or 80MB model. For extra number-crunching power, you can also order an 80387SX math coprocessor. Samsung has provided convenient access to the coprocessor socket via a door on the underside of the notebook; you don't have to disassemble the notebook to insert the chip.

A unique feature of the NoteMaster is its ability to use alkaline batteries instead of its own rechargeable ni-cads. This feature can really come in handy if you run low on power and you don't have access to an AC power source. Just pop in the optional ($69) alkaline pack, which uses standard AA alkaline batteries, and you're good for another hour of computing. Additionally, you can change batteries while the NoteMaster is in operation without losing power.

Without a doubt the most innovative feature of the NoteMaster 386S/25 is its removable hard drive. Yes, you read that correctly; the hard drive can be removed from the NoteMaster, since it's mounted in a convenient handheld caddy. Samsung decided on this unique removable hard drive approach as a feature that would appeal to business users who'd like to be able to transfer data conveniently from their NoteMasters to their office desktop PCs.

Samsung is also offering an internal hard drive receptacle as an accessory item ($249) that allows a desktop PC to accept the hard drive from the NoteMaster. The removable drive caddy also makes it easy to upgrade or switch hard drives in the NoteMaster. Now that's innovative!

As one would expect in such a well-appointed and innovative



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machine, all of the basic requirements are covered, as well. The NoteMaster comes equipped with a serial port, a parallel port, and external keyboard and 15-pin VGA ports, as well as a proprietary expansion slot. The keyboard offers firm, positive action along with excellent spacing. Performance, I found, was pleasingly quick using applications under DOS and Windows 3.1, and battery charges regularly lasted over two hours, even when the notebook used the battery a great deal.

For styling and features, the NoteMaster is an excellent choice in a 386 notebook.

Circle Reader Service Number 310

TI TravelMate 4000 WINDX/25

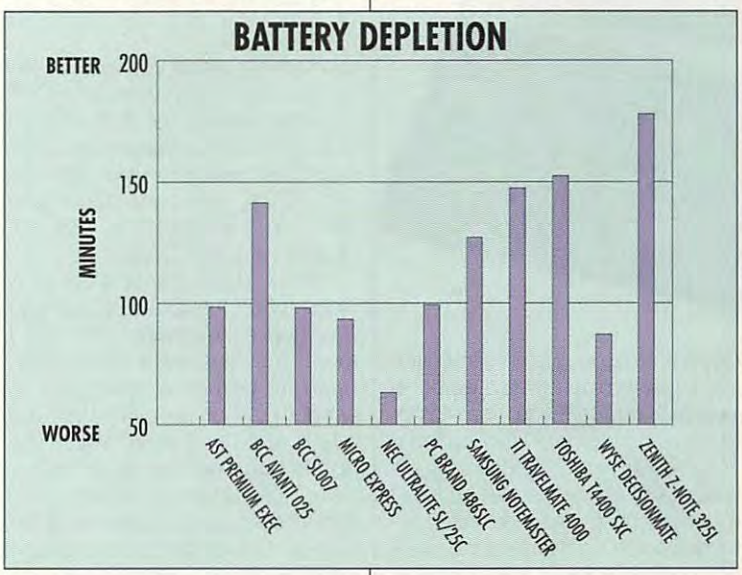
Texas Instruments describes its TravelMate 4000 WinDX/25 notebook as "486 desktop power to go." This is an accurate statement, since this machine is armed to the hilt with heavy computing artillery.

The core of the WinDX/25's power, its 486DX CPU, runs at 25 MHz. The 486DX CPU has a built-in math coprocessor and associative caching, so it's a veritable powerhouse to build upon. And that's exactly what Texas Instruments did. The machine comes with 4MB of RAM as its standard complement, and this can be expanded up to a 20MB maximum.

The WinDX/25's case is remarkably thin (under two inches), and the machine could rightly be described as compact. With a weight of just over 5½ pounds, it's certainly one of the lighter and easier-to-carry notebooks presently available. The case sports handsome two-tone brownish gray plastic with clean lines and flush-mounted controls.

The machine's high-density floppy drive is front mounted, and the jack for connecting an external keypad occupies the right side of the WinDX/25. You access all other ports—serial, parallel, external video, and PS/2-style mouse—behind a flip-down door on the left side. In the rear you'll find a proprietary expansion bus and the AC power adapter or battery charger jack. If you prefer an internal fax/modem, you can order one as an option for this notebook.

The WinDX/25 comes preconfigured to do useful work as soon as you turn it on; its 120MB internal hard drive comes already loaded with MS-DOS 5.0 and Win-



COMPUTE APPLICATION AND BATTERY TESTS

We put this month's notebooks to the test with a series of real-world applications: a word processor, a spreadsheet, a database, a CADD program, and so forth. These are the kinds of apps COMPUTE readers use on a regular basis, so the benchmarks offer a realistic and familiar way of evaluating the performance of our notebooks. The bar graphs indicate how long a particular notebook required to accomplish something, whether sorting a database or doing a search and replace in a word processor. As Microsoft's Windows environment continues to gain acceptance, even on notebooks, we decided to time how long it took each notebook to load Windows. The lower the bar, the better the performance.

The battery depletion test should prove particularly interesting if you'd like to compare the battery performance of a 386SX notebook (such as AST's) to the performance of notebooks sporting new microprocessors like Intel's 386SL, microprocessors that have special power management capabilities built in. For this test, the higher the bar, the better the notebook's performance.

To ensure fair comparisons and to make our data more meaningful, we asked each manufacturer to include 4MB of RAM, even if the base configuration included less RAM; and we asked that no coprocessors be included. The one obvious exception to the coprocessor prohibition is the Texas Instruments TravelMate notebook; its 486DX microprocessor has coprocessing capabilities built in.

These benchmark results should be particularly interesting if you've wondered about the relative performance of chips from Intel, Cyrix, and AMD (identified in the grid of notebook features). Even if you don't understand all of the specific differences among the microprocessors, you can appreciate the differences in performance.

—MIKE HUDNALL

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dows 3.1. Texas Instruments also includes its TravelPoint pointing device to facilitate your use of Windows and other GUI applications. The TravelPoint is a little trackball (*thumbball* is a better description) mounted on a platform which attaches to the right side of the notebook. While it takes a little getting used to, I found it a worthwhile and functional device that gives the notebook additional productivity as part of the standard package.

The video capabilities of the WinDX/25 are well taken care of. The ten-inch (diagonally measured) liquid crystal display (LCD) features 640 × 480 resolution with 64 shades of gray. It has 1MB of video RAM and TI's Mouse Quick display technology, which provides instant screen updates of mouse movements without lag. While I found the LCD to be good, it did exhibit some tendency toward moirés, ghosting, and streaking. On the plus side, the machine features a video-reversal switch which instantly changes the screen from dark on light to light on dark. This compensated for less-than-optimal screen patterns and contrast levels with some applications, and it is an attractive feature.

The external VGA capabilities of the WinDX/25 make it a natural for using with a good color desk-

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top monitor when you're not traveling about. When you use a CRT display instead of the built-in LCD, the video adapter supports 640 × 480 resolution with 256 colors, 800 × 600 resolution with 256 colors, and 1024 × 768 resolution with 16 colors.

Texas Instruments also provides a jack that allows you to use an external keyboard, although I found the machine's native keyboard to be one of the best I've used. Its action is positive without being stiff, and there's just the right amount of key travel for my taste. Key spacing is excellent, and a dedicated cursor keypad with an embedded numeric keypad makes this keyboard very utilitarian. All function keys line the top row, and all eight of the machine's LED status indicators are flush mounted just above the function key row.

You'll find the screen controls for brightness and contrast flush mounted and the power switch recessed to prevent your accidentally pressing it.

If you're looking for the power of a 486DX in a well-designed notebook, you'll certainly want to consider the WinDX/25.

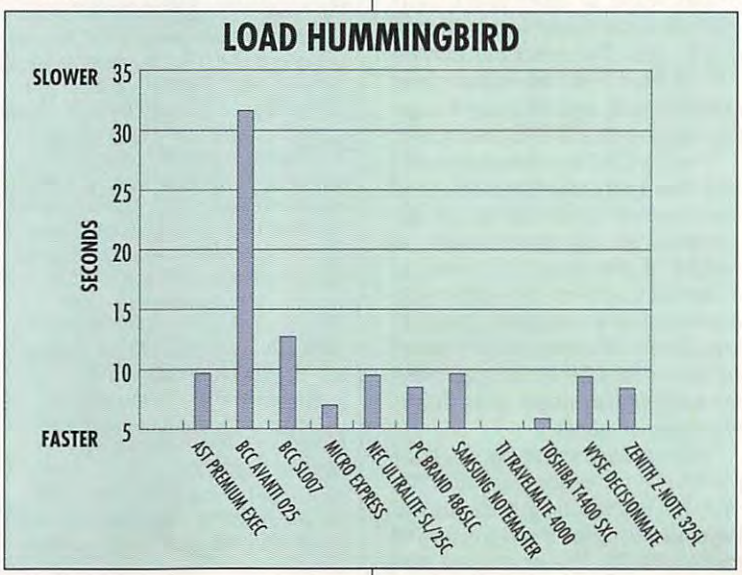
Circle Reader Service Number 311

TOSHIBA T4400SXC

Striking, sleek, impressive, fast, expensive, and maybe even *sexy* are all valid descriptors for Toshiba's impressive T4400SXC color notebook computer. So if you're looking for a color notebook that's on the leading edge of technology and your pockets are deep enough, this machine may be just the ticket for you.

If good things come in small packages, then Toshiba has produced a good thing indeed by stuffing a 486-based computer with an active matrix color display, floppy and hard drives, multiple I/O ports, and a full-size keyboard into a demure package that fits easily into a briefcase and weighs only 7¾ pounds with its battery installed.

The heart of the T4400SXC is an Intel 80486SX CPU running at 25 MHz. The i486 chip has its own 8K internal cache, which,



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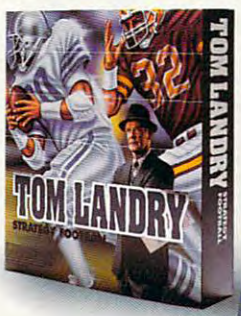

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combined with the 25-MHz speed, makes even the most laborious computing task a remarkably speedy operation. Should you require even more computing speed and power than this mini-Titan delivers in its standard configuration, the CPU can be upgraded to a 25-MHz 486*DX* chip.

A high-density 3½-inch drive, located on the right side of the T4400SXC near the front, handles floppy media, while an internal 80MB IDE hard disk takes care of your mass storage. For even more storage, you can order a 120MB hard drive for about $500 more.

The I/O ports are located at the rear of the machine, hidden from view when they're not in use by a flip-down door. This panel also hides a dedicated PS/2-style mouse port, a 15-pin RGB video port, a parallel printer or external floppy drive port, and a 9-pin serial port. Also at the rear of the machine, you'll find a Toshiba proprietary expansion connector, protected by a removable snap-off panel cover. This connector lets you use the T4400SXC with its desktop docking bay, which offers two full-sized industry standard expansion slots, a parallel port, a serial port, a PS/2-style mouse port, a VGA monitor port, a keyboard port, a floppy drive port, and a 5½-inch bay.

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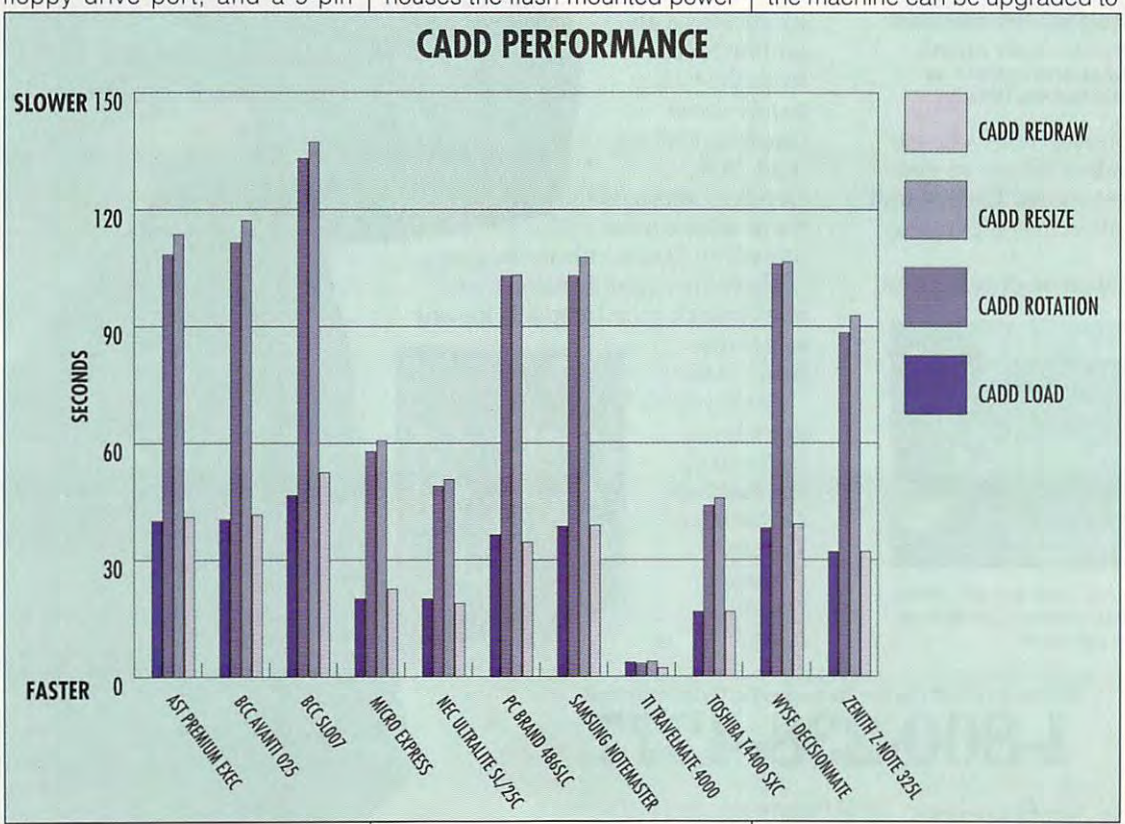
Computer Systems Division
9740 Irvine Blvd.
Irvine, CA 92718
(800) 334-3445
List price: $5,499 with 80MB drive; $5,799 with 120MB drive
Warranty: one year, limited

The left side of the machine houses the flush-mounted power switch near the rear of the unit and an external keypad port (hidden by a snap-off cover) at the middle of the left side. Near the front, you'll find a modem line port under another snap-off cover. This gives you access to an optional, internally mounted, 9600-bps, cellular-ready fax/modem.

The review unit came outfitted with the standard 4MB of RAM, but the total memory capacity of the machine can be upgraded to



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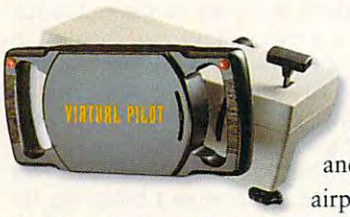

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NOTEBOOK FEATURES	AST Premium Exec 386sx/25c	BCC Avanti 025	BCC SL007	Micro Express NB2500	NEC UltraLite SL/25C	PC Brand 486SLC
Microprocessor	i386SX	AM386SXL	i386SL	AM386DXL	i386SL	Cx486SLC
CPU speed in MHz	25	25	20	25	25	25
Optional math coprocessor support	387SX	87SLC	387SX	387DX	387SX	Cyrix
BIOS	AST	Award	Award	AMI	Phoenix	PC Brand
Width (in inches)	11.4	11	11	11.6	11.5	11
Depth (in inches)	9	8.5	8.5	8.7	9	8.5
Height (in inches)	2.3	1.7	1.7	2.3	2.4	2.25
Weight (in pounds)	7.5	6.38	6.38	7	7.5	6.14
Shades of gray or color technology	passive color	32	32	64	active color	32
Standard/Max RAM in megabytes	4/8	4/8	4/8	4/8	2/10	4/16
Serial ports	1	1	1	1	1	2
Parallel ports	1	1	1	1	1	1
Mouse port	■	■	■	❐	■	❐

■=yes ❐=no

20MB. While the 4MB configuration proved more than adequate for all of the DOS- and Windows-based software I used on the T4400SXC, expanding the RAM and possibly upgrading to the DX CPU would increase the multitasking and overall throughput power you might need if your application demands are extraordinarily heavy.

You can power the Toshiba T4400SXC three ways: through its own internal rechargeable batteries, through its AC power adapter, or through the optional desktop docking bay. One of the big surprises of the T4400SXC was the longevity it enjoyed from a fully charged battery; a charge life of over 2½ hours was routine, with some computing sessions approaching a full 3 hours before the low-battery warnings started. Toshiba claims a 3-hour battery life with a 90-minute recharge, and my experience corroborates this claim.

The 83-key keyboard has a comfortable, positive action with good tactile feedback, although it lacks an audible click. I found key placement and spacing excellent, so if you're a fast touch-typist, you'll really fly when using it.

The active matrix liquid crystal display (LCD) is truly superb, capable of supporting all standard color and VGA modes as well as SVGA color (256 colors at 640 × 480 resolution from a palette of 185,193 colors). If you hook up an external monitor to the RGB port on the T4400SXC, you can see video on the LCD screen as well as on the external monitor, a handy feature for sales, training, or classroom presentations. The colors are absolutely brilliant with excellent hue and saturation; I found the screen easy to view from virtually any angle and under almost any lighting conditions. Since this computer uses an LCD panel rather than a cathode-ray tube, the images are rock steady with pristine definition. To say that viewing on the T4400SXC is a pleasure is an understatement.

There's lots to like with the T4400SXC, even though it will seriously deplete your piggy bank. As of the writing of this review, prices for this notebook are already dropping; competition from other manufacturers will doubtless make this and other leading-edge products more affordable for the masses in the not-too-distant future.

Circle Reader Service Number 312

WYSE DECISION-MATE 486SLC

Just when you think you've seen it all when it comes to making notebook PCs slimmer, Wyse introduces its DecisionMate 486SLC notebook computer, which pushes the thin profile envelope further still. This five-pound notebook measures less than 1½ inches thick.

The DecisionMate's finish, with a handsome wrinkle-texture bronze color, resists fingerprints and presents a most pleasing appearance. The machine is uncluttered without being boring.

Wyse managed to keep the weight and thickness down by opting for a detachable floppy drive, which attaches to the notebook via a proprietary port located at the left rear of the machine, beneath a snap-off panel cover. This same panel also conceals the single serial port.

The detachable floppy drive could be a mixed blessing for some users who don't want to plug and unplug the device, although business travelers who ordinarily do their file exchanges via a modem or file transfer cable and rarely or never use floppies while

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NOTEBOOK FEATURES	Samsung NoteMaster 386S/25	TI TravelMate 4000 WinDX/25	Toshiba T4400SXC	Wyse DecisionMate 486SLC	Zenith Z-Note 325L
Microprocessor	AM386SXL	i486DX	i486SX	Cx486SLC	i386SL
CPU speed in MHz	25	25	25	25	25
Optional math coprocessor support	387SX	(built in)	(no, but CPU upgradable)	na	387SL
BIOS	Phoenix	Phoenix	Toshiba	Modular	Zenith
Width (in inches)	11	11	11.7	11	11.63
Depth (in inches)	8.5	8.5	8.3	8.6	8.54
Height (in inches)	1.8	1.8	2.3	1.45	1.87
Weight (in pounds)	5.8	5.6	7.75	5	5.92
Shades of gray or color technology	64	64	active color	32	64
Standard/Max RAM in megabytes	2/8	4/20	4/20	4/8	4/12
Serial ports	1	1	1	1	1
Parallel ports	1	1	1	1	1
Mouse port	■	■	■	■	■

■=yes ❐=no na=information not available

on the road will love it (a LapLink cable and file transfer software are provided with the DecisionMate). Of course, you can always pack the floppy drive along in the supplied carrying case, since it weighs only about a pound.

The 486SLC CPU provides performance comparable to that of a 486SX running at the same clock speed of 25 MHz but provides additional power conservation features to extend battery life. During the review I averaged 1½ hours of constant use with all of the power-saving features disabled and 2½- to 3-hour averages with the power management turned on.

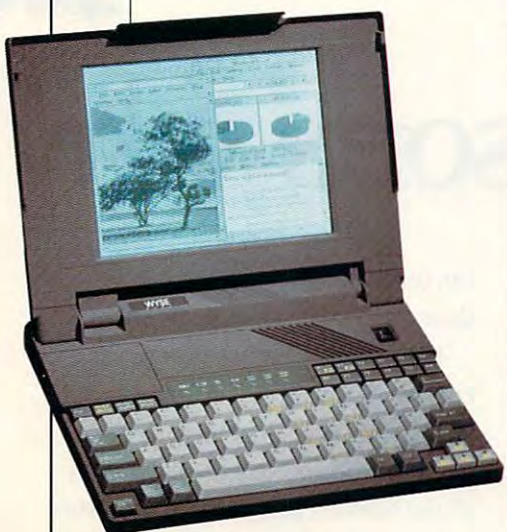
The base configuration comes standard with 4MB of RAM, and you can expand this to 8MB. Wyse offers two models of the DecisionMate; the only difference between them is internal hard drive capacity. The Model 80/4 comes with an 80MB drive, while the Model 120/4 comes with a 120MB drive; the latter unit was supplied for the review.

Security is something the folks at Wyse have taken seriously. The computer features password protection that prevents unauthorized eyes from seeing your data or entering the system configuration menus. In addition to the password protection, the DecisionMate also comes with a hardware security kit, which consists of a restraining bracket, cable, and combination lock. This kit tethers the notebook to a desk to make sure it will still be there when you get back from a trip to the water cooler.

I found the VGA liquid crystal display screen bright and easy to read, especially with the special character set Wyse uses. A 15-pin port on the left side of the machine lets you attach an external VGA or SVGA monitor (up to 800 × 600 resolution is supported), and a mini-DIN connector lets you attach a PS/2-style mouse or keyboard. The parallel port and the dial controls for video brightness and contrast are located at the right side; the power connector is located at the rear.

Wyse preinstalls MS-DOS 5.0 on the hard drive, as well as software for menuing, disk caching, expanded memory management, setup, and testing.

The keyboard is excellent, with an inverted-T dedicated cursor pad and an embedded numeric pad. Wyse groups the function keys together in two rows at the upper right corner of the keyboard, and all LED status indica-



WYSE TECHNOLOGY
3471 N. First St.
San Jose, CA 95134-1803
(800) GET-WYSE
(408) 473-1200
List price: $2,299 with 80MB drive; $2,699 with 120MB drive; $2,899 with 200MB drive
Warranty: one year, parts and labor

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1. "I just turned it on and started using it. Dynamite!"
Madeline S. Fitzgerald
Woodcraft Supplies

2. "Almost no need for the manual. QuickBooks makes it easy."
Julia Perkins
Photography

3. "A breeze! Does everything I need, quick and easy."
Kenneth P. King
Finance Consultant

4. "Does two employees' work. Simple, quick and efficient."
David L. Wies
Chiropractor

5. "It's so easy, I haven't used the manual since I installed it."
Timothy J. McManus
Campground Operator

6. "Hallelujah! QuickBooks is simple to understand and use."
Cynthia Krol, Accounting

7. "Love it! Reports can be laid out in any conceivable way."
Susan Yeagley Sullivan
Psychiatric Mgmt.

8. "Our clients will never use manual ledgers again."
James Matthews, CPA

9. "You don't have to be a rocket scientist, or even a CPA."
Stephen P. Blanding
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10. "So thorough and accurate — for such a reasonable price."
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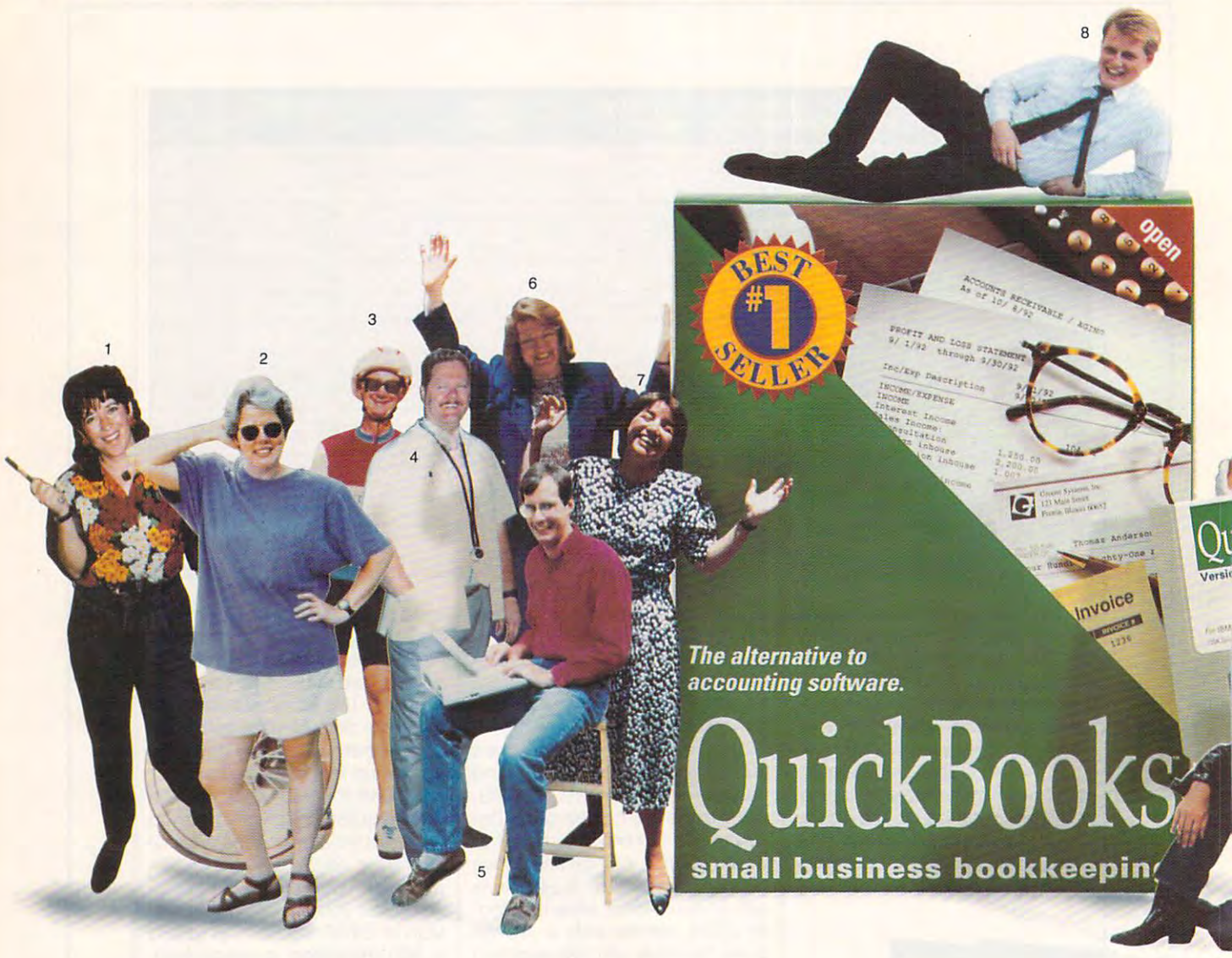
Photographer

11. "Super! For the first time, I look forward to my accounting."
Jan Cole
Appraiser

12. "The best! (I tried Pacioli, Peachtree,® DacEasy,® etc., etc.)"
Dan Ridgely
General Contractor



A few of the reasons why

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PC Magazine

"QuickBooks is the easiest."
New York Times

"A great program if you're more interested in running your small business than becoming an accountant."
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13. "Finally! The first program I feel like I have control of."
Valerie Lindow
Accounting

14. "Saves so much time! Unbelievably easy to use. Thanks."
Gerald Frazier
Real Estate

15. "Un-mindboggling! It's easy. Install and you're on your way."
Kathryn Mary Olsen
Professional Trainer

16. "I've tried 'em all. Nothing else compares. It's awesome."
Scott Roberts
Consultant

17. "Totally logical, human, instinctive, understandable."
Katherine J. Bartz
Consultant

18. "The only remotely comparable programs cost thousands."
Scott McGuirk
Business Consultant

19. "User-obvious, painless invoicing and accounts receivable."
Valon Cross
Programmer

20. "Peace of mind when used by employer or employee."
Donald K. Burden
Dentist

21. "I tested many accounting packages, and none came close."
Samuel Moeller
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22. "Super-quick, butt-kicking program! About time! Amen!"
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tors are flush mounted above the keyboard.

High marks go to the design team at Wyse for producing a functional notebook that's a delight to use and look at.

Circle Reader Service Number 313

ZENITH Z-NOTE 325L

ZENITH DATA SYSTEMS
2150 E. Lake Cook Rd.
Buffalo Grove, IL 60089
(800) 553-0331
List price: $2,949 with 85MB drive; $3,249 with 120MB drive
Warranty: one year, limited; extended-warranty, on-site, and loaner options available

Zenith has taken a different approach in designing its Z-Note 325L notebook. From its striking exterior design to its innovative expansion and power conservation features, Zenith has clearly eschewed the commonplace to claim a place above ordinary notebooks.

This is apparent starting with the almost paper white color of the notebook's plastic case. Clean, squared lines accented by a square-embossed trim give the Z-Note a businesslike appearance.

One of the unique features of the Z-Note is its liquid crystal display (LCD) system status panel. Rather than the usual bank of LED indicators to signify power, drive activity, and lock-key status, Zenith has built in a four-pane LCD window that keeps tabs on these functions by providing status icons in the window panes.

Individual icons show the status of AC power operation, standby mode, battery power operation, hard drive activity, floppy drive activity, port replicator, external CRT, modem, LAN controller, speaker, Num Lock, Caps Lock, Pad Lock, and Scroll Lock. With all these areas to provide user feedback for, Zenith's system status panel makes a great deal of sense.

In fact, the only LED indicator on the machine is a small power LED located in the center of the machine just below the display screen, which changes color according to the current power or battery conditions. This LED is visible with the lid in either the open or closed position, so you'll always know at a glance if the Z-Note is turned on.

The review unit came equipped with an 85MB hard drive and 4MB of RAM, a popular configuration for today's high-demand applications. If that isn't enough, the RAM can be expanded to 12MB using 2MB and 8MB memory expansion modules. The CPU of the Z-Note, an Intel 80386SL microprocessor, runs at 25 MHz, which gives the Z-Note a good balance of performance and power-conserving features. You can install an 80387SL math coprocessor in the available socket if you need the extra processing power.

Most of the ports (15-pin external video, parallel, mouse/keyboard, serial, and proprietary port replicator) reside behind a panel door at the rear of the machine, along with the AC power adapter jack. The high-density floppy drive is mounted on the right side along with the modem port access panel and the LAN port access panel. This notebook complies with IEEE 802.3 and Ethernet specifications—a connector for interfacing with a LAN adapter card is provided under this panel. The left side houses the battery and the security bracket, a hardened steel loop that provides a means of securing the notebook to a desktop or other stationary object with a cable and lock.

Zenith has taken a modular approach in its expandability for the Z-Note. For example, you can replace the ten-inch VGA LCD screen with an active matrix color VGA display screen, upgrade the hard disk to a 120MB unit, and replace the standard 1.44MB floppy drive with an ultra-high-density 2.88MB floppy drive. This approach makes sense for users who anticipate needing more features in the future; they can be added or upgraded when the need arises.

The Zenith Z-Note is easily the battery-life champion. This machine regularly delivered charge life times approaching 3 hours under continuous heavy-duty use and 4½–5 hours of usable life under average use with all of the power-saving features activated. The secret of this charge longevity lies in the Z-Note's NiMH (Nickel-Metal Hydride) battery pack that provides approximately 40 percent more operational time than a standard ni-cad battery pack.

Couple this battery life with the APM (Intel's Advanced Power Management) features of the SL chip and complementing support circuitry, and you have a notebook that can keep you computing all the way on a cross-country flight and still have some power left.

If you need a high-performance notebook for today that gives you plenty of expandability for tomorrow, the Z-Note 325L may be the ticket for you. ❐

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All Benchmark/Performance Testing is conducted by Computer Product Testing Services (CPTS), an independent testing and evaluation laboratory based in Manasquan, New Jersey. 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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NEWS & NOTES

Edited by Jill Champion

Golf Comes to Windows

Work-weary Windows users needing an afternoon break can relax by enjoying a few holes of golf without ever leaving the office—or Windows. Microsoft teamed up with Access, makers of the classy Links series of golf simulators, to bring you Microsoft Golf, a Links-type golf game that features photo-realistic and topographically accurate simulations of the Torrey Pines golf course in San Diego.

Suggested retail price for Microsoft Golf is $64.95. For more information, contact Microsoft, One Microsoft Way, Redmond, Washington 98052-6399; (206) 882-8080.

Perfected! takes most of the work out of data management with WordPerfect.

To get the most out of the new Microsoft Golf, look for COMPUTE's *Links Pro: The Official Guide to Links and Microsoft Golf* by former COMPUTE magazine editor Peter Scisco. The 320-page book covers all versions of Links as well as Microsoft Golf and includes in-depth strategies and professional advice for cutting strokes from your scores. The book also includes hole-by-hole, stroke-by-stroke strategies for all eight Links courses. Suggested retail price for *Links Pro* is $16.95. For more information, contact COMPUTE Books, 324 West Wendover Avenue, Suite 200, Greensboro, North Carolina 27408; (919) 275-9809. Or if you wish to order, call (800) 872-5627.

—Danielle Best

Perfected! Print Jobs

A program that saves hours on office procedures can also save manpower costs. That's the concept behind Perfected!, version 1.1, from Key Functions. Perfected! streamlines what would be time-consuming printer jobs and gives you professional-looking laser-printed results. All you need (besides Perfected!) is a computer, a laser printer, and WordPerfect 5.1.

Perfected! automates the merge process and maintains an address database in WordPerfect format. After entering names and addresses into the WordPerfect database, you can select data to create Rolodex address cards, address-book pages, business cards, nametags, telephone directories, office forms, lists, labels, and much more—without worrying about fonts and kerning, because everything is preformatted. The program also has procedures for invoicing, filing, writing financial reports, managing petty cash, and tracking calendars.

Suggested retail price for Perfected! is $149.95. To find out more, contact Key Functions, 60 Pleasant Boulevard, Suite J, Toronto, Ontario, Canada M4T 1K1; (416) 928-1943.

—Tracy Mygrant

Checkmate!

Can chess make a difference in learning? According to Fidelity Electronics, the world's largest manufacturer of electronic chess games, recent research suggests just that. American students introduced to chess in the classroom and in after-school programs are better able to master basic thinking skills, including reasoning, comprehension, and concentration. The game also increases communication and pattern-recognition skills and helps bolster self-confidence.

—Danielle Best

The Sound of Windows

Easy-to-use sound effects without expensive hardware—that's what Aristosoft is providing Microsoft Windows 3.1 users in Windows Sound Effects, Volume 1. You can add comments when editing reports and proposals or liven up normally dull presentations with 50 sound effects, including animals, music, and voices. Attach any of the sound effects to seven events defined by the Windows Sound Control Panel. For PC users with sound cards, off-the-shelf digitized sound effects are available for the first time.

The package retails for $29. Aristosoft plans to ship five new volumes by the end of the year, with 50 new sounds in each volume. For more information, contact Aristosoft, 6920 Koll Center Parkway, Suite 209, Pleasanton, California 94566; (800) 338-2629 or (800) 426-8288.

—Tracy Mygrant

Color Your Printouts

Want to spruce up your printouts? Add some color. New Canon bubble-jet print cartridges have been modified to print in red, blue, green, brown, and purple. Each cartridge is packaged with a bonus refill of ink, doubling the print yield.

The cartridge can be refilled numerous times. Refills are available in twin packs in all five colors as well as black. It takes only about 30 seconds to refill the cartridge, thanks to an accordion bottle and filler tube. The water-resistant refill ink is also formulated to prevent clogging.

The color cartridge with bo-

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nus refill sells for a suggested price of $54.95, while refill twin packs sell for $34.95. The cartridge can be used in any printer that uses BC-01 cartridges. To find out more, contact Repeat-O-Type, 665 State Highway 23, Wayne, New Jersey 07470; (800) 288-3330.

—Tracy Mygrant

A Stitch in Time

Dress Shop from LivingSoft prints custom-fitted clothing patterns for designing women who don't conform to an exact size. Once you've entered the 13 measurements required, you can select from 29 different patterns in a variety of cuts and styles tailored to your exact measurements.

Let your computer be your tailor and wear perfectly sized clothing, thanks to LivingSoft's Dress Shop.

Store and retrieve data from touch buttons—more versatile than bar codes for identification.

The program also eliminates the guesswork involved in trying to conform commercial patterns to your figure, because you can use the Dress Shop patterns as overlays for sizing patterns that you buy.

The patterns print out full-size on a dot-matrix printer with continuous-feed paper. If the printer isn't wide enough for a particular pattern piece, the pattern prints in sections, which you tape together.

Suggested retail price for Dress Shop is $99.95. For more information, sewing enthusiasts should contact LivingSoft, 1515 North Norma Street, Ridgecrest, California 93555; (800) 626-1262.

—Danielle Best

Fight Illiteracy

If your word processor's spelling checker and thesaurus leave you wishing for more, add Instant Definitions 3.0 from WordScience to your program. This pop-up dictionary, an update to Definitions Plus!, speedily accesses the 795-page *American Heritage Dictionary, Office Edition* and has some very desirable features not found in other spelling programs.

For instance, the DictionaryScan feature allows you to find words according to definition. Type in two words—*horse* and *mythology,* for example—and DictionaryScan will find a word based on your two entries—in this case, *centaur.* Ask about *money,* and DictionaryScan will generate a list of 194 related words. Currently, WordScience is offering a special double package as part of a special donation program designed to help combat illiteracy. The double package includes two complete sets of the software for the price of one. The company hopes buyers will donate their second set to Gifts in Kind America, a nonprofit organization working with WordScience, which will distribute the software to schools and literacy centers around the nation. In return for your donation, you receive a 50-percent tax deduction and the knowledge that you helped promote literacy in America.

Suggested retail price for Instant Definitions is $99.95. Definitions Plus! users can upgrade for $19.95. To find out more, contact WordScience, 1415 Oakland Boulevard, Suite 220, Walnut Creek, California 94596; (800) 869-9673.

—Danielle Best

Data-storing Buttons

Portable data collection just got more versatile than the standard bar-code method of reading and storing data. TouchProbe, a lightweight data reader about the size of a small pocket flashlight, transfers information to and from "touch buttons"—memory chips encased in small, water-resistant, stainless steel cases. Touch buttons, which can be attached to practically anything, work like electronic labels that the TouchProbe can access for reading information or storing data.

Suggested retail prices are $395.00 for the TouchProbe, $3.15 for individual buttons, and $277.00 for packs of 100 buttons. For more information, contact Videx, 1105 Northeast Circle Boulevard, Corvallis, Oregon 97330; (503) 758-0521.

—Tracy Mygrant

Companies 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. Although space is limited, all items will be considered for publication. ❐

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Trade Up!

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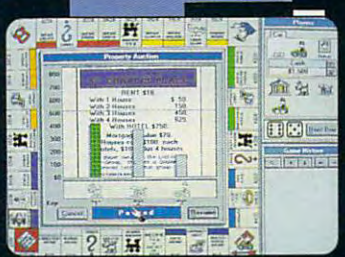
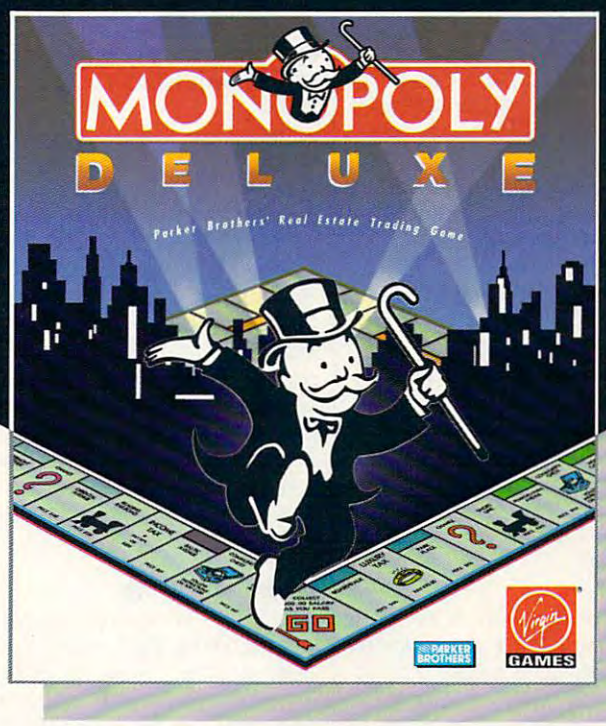
WINDOWS ™ version



IBM PC version

WINDOWS ™ version

IBM PC version



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FEEDBACK

Learning to append, making 3-D images real, encrypting secret messages, and BBSing with Robotics

Merging BASIC

I'm looking for a way to make a text file using QBASIC's INPUT statement. It would ask for a name and insert it into a text file on a certain line of the file. How would I do that?

WYATT EHRMAN
MEMPHIS, TN

No matter what the language, it's easy to create a text file or to append to (add to the end of) it. Inserting text into the beginning or middle of a file simply can't be done in any language, and that's what you're asking. DOS won't allow it. You'll have to create the whole file yourself, like this.

```
OPEN "letter.txt" FOR OUTPUT
 AS #1
PRINT #1, "COMPUTE's
 Feedback"
PRINT #1, "324 West Wendover
 Ave."
PRINT #1, "Ste. 200"
PRINT #1, "Greensboro, NC
 27408"
PRINT #1, ""
INPUT "Name to write into file?",
 EdName$
PRINT #1, "Dear "; EdName$; ":"
. . .
CLOSE #1
```

Another solution is to input your original file character by character and output it to another file until you reach the place where you want to insert the new text, output the new text to the new file, and then finish copying the original file to the new file. You might even take a cue from word processors and insert some specific text into the original file where the BASIC file should insert the text. Begin by creating the following file with a word processor. Name it mergfil.txt.

```
This is a letter for ??1 from ??2.
```

Then use the following program to enter the text that should appear in place of ??1 and ??2.

```
INPUT "Enter name 1: ",
 name$(1)
INPUT "Enter name 2: ",
 name$(2)
OPEN "c:\mergfil.txt" FOR INPUT
 AS #1
OPEN "c:\newfil.txt" FOR OUTPUT
 AS #2
WHILE NOT EOF(1)
C$ = INPUT$(1, #1)
IF C$ = "?" THEN c1$ =
 INPUT$(1, #1)
IF c1$ = "?" THEN
c2$ = INPUT$(1, #1): c1$ = ""
C$ = name$(VAL(c2$))
END IF
PRINT #2, C$;
WEND
CLOSE 1
CLOSE 2
```

In fact, anywhere the program finds ??1 in the letter, this string will be replaced by the name you entered as name 1, and name 2 will be inserted anywhere ??2 appears. To be sure it works, enter type newfil.txt *after you've run the BASIC program to see how the names were inserted.*

Premature Death

FastTrax, the defragmenter you recommended in your August article "How to Fine-Tune Your Hard Disk," is alive and well. FastTrax International is now managed by the author of the program, Mark Elfield. Our new address and phone are 880 Ensenada Avenue, Berkeley, California 94707; (510) 525-3510. We emphasize service and provide 24-hour recorded answers to frequently asked questions.

FastTrax allows you to specify the placement of each file and directory for optimum performance. FastTrax can optimize any DOS disk, including hard disks larger than 1GB, and can handle any combination of files, directories, directory levels, clusters, and file sizes.

CAROLINE DAY
OPERATIONS MANAGER
FASTTRAX INTERNATIONAL

3-D Printing

Computer-assisted mapping (CAM), based on contour lines and elevation figures, brings rolling landscapes, exotic terrains, and dramatic mountains to 3-D life. Is it possible, though, to directly transform these fleeting monitor images into physical, hands-on, three-dimensional models?

K. G. WELLS
CRESCENT CITY, CA

It's being done now, but the machines are somewhat expensive for home use. They range in price from about $25,000 to $250,000. Variously called prototyping machines or stereoscopic modelers, they use the computer data to control a dye laser that literally carves the shape out of a soft polymer. The process takes hours and is most often used by big corporations to make prototypes of such intricate shapes as turbines or high-precision parts. Those busts you saw of the Star Trek crew members in the time-travel sequences of Star Trek IV *were created using such a machine.*

Missing Information

I have a Tandy 1000 SX and an Okidata 2182A Microline printer. I bought a cable from Radio Shack, but it doesn't work with the Okidata. No matter what I do, I can't get the printer to work with the computer. Please help. I don't want to buy a new printer.

JON SAUER
ZION, IL

Your letter omits some important information. Do you know if the printer has worked at all with any other computers?

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For six months now, you've had the chance to win fabulous prizes by entering the monthly Compute SearchStakes. And next month you'll have the chance to win the SearchStakes Grand Prize by submitting the solution to any two monthly SearchStakes, plus the solution to the Grand Prize SearchStakes, to be featured in our upcoming December issue.

IT'S FUN TO PLAY

Each of the six picture disks displayed below is a portion of a photo or illustration taken from an ad in this issue. To solve the November SearchStakes, locate the ads from which these disks were taken and note the page number for each. If the ad has no page number, simply count that page or cover as zero. Then add up all six page numbers. That is the solution to this month's SearchStakes.

IT'S EASY TO ENTER

Once you find the solution, you may enter the November SearchStakes automatically on a touch-tone phone by calling 1-900-454-8681 by 12/31/92. The cost for the call is $1.50 for the first minute, $1.00 for each additional minute. Average call is estimated to be 2–3 minutes. Callers must be 18 or older. You may also enter by mailing your answer on a 3" x 5" piece of paper, along with your name, address, and phone number, to: "November Compute SearchStakes," 324 West Wendover Avenue, Suite 200, Greensboro, N.C. 27408 by 12/31/92. No purchase necessary. For more information on how you may win this month's prize, valued at $1,500, please turn to page 51!

Virgin Games and *Compute* magazine. Enter early...and enter often!

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FEEDBACK

Does the cable work when installed on other systems? (It might just be a bad cable.) Does the printer work at all, perhaps printing garbage, or is there no output whatsoever? You may simply need to install a new printer driver for the software you're using. If your computer has more than one printer port, have you tried different ports?

Although COMPUTE doesn't respond to specific technical questions, we need to know all about your equipment in order to provide helpful information in "Feedback." If you're writing to us about a problem, we need to know all of the details. What software are you running? Have you tried different combinations of equipment? Are there any error messages? Not only will providing this kind of information make it easier to answer your question, but it will also make the response more useful to other readers.

Code Breaker

I want to encrypt a message with a password and then decrypt it again. I tried just raising the ASCII value of the letters in the message, but that was too easy to decipher.

AUBREY KILIAN
ALBERTON, TRANSVAAL, SOUTH AFRICA

A couple of times a year, we get a letter about encrypting files. There are many programs that will encrypt files for you. If you're writing your own, the secret is to use the password itself in the encryption process, as shown here. Begin by creating a text file to encrypt with a word processor, Edit, or Edlin. Save it with the name crypt.fil.

This file will be encrypted and decrypted.

Then run this BASIC program, which asks you for a password. It's a two-way encryptor. Running the very same program a second time with the same key decrypts the file.

```
INPUT "Enter name of file to en-
  crypt/decrypt: ", filename$
INPUT "Enter password: ",
  password$
OPEN filename$ FOR INPUT
  AS #1
OPEN "temp" FOR OUTPUT
  AS #2
passlen = LEN(password$)
WHILE NOT EOF(1)
c$ = INPUT$(1, #1)
FOR i = 1 TO passlen
c$ = CHR$(ASC(c$) XOR
  ASC(MID$(password$, 1, i)))
NEXT
```


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Alternate Entry Method: Print your name, address, and phone number on a 3" x 5" piece of paper. (1) To enter the monthly drawings, print the *Compute* issue date (month) and solution for that month on your entry and address your envelope to include the issue date (month), for example: "June Compute Searchstakes." (2) To enter the Grand Prize drawing, print the words "Grand Prize," the Grand Prize solution, plus the solution to any two previous monthly SearchStakes on your entry. Address your envelope: "Compute SearchStakes Grand Prize." Mail all entries, addressed as directed above, to: 324 West Wendover Avenue, Suite 200, Greensboro, N.C. 27408. Enter as often as you wish; each entry must be mailed separately. All write-in entries must be postmarked by 1/31/93 and received by 2/15/93.

For the solution(s), complete rules, and detailed description of prizes including prize values, send a self-addressed stamped envelope to Compute SearchStakes Solutions, Dept. RRS,1965 Broadway, NY, N.Y. 10023-5965 by 12/31/92: no return postage required for residents of VT and WA. Solutions and prize information will be provided through the issue date in which the request is received.

Odds determined by number of entries received, for example, 10,000 entries make odds 10,000 to 1. Prizes/Values: Grand Prize (1), minimum value $15,000-maximum value $40,000. Monthly prizes (6), one for each of the following *Compute* 1992 issue dates: June, July, August, September, October, and November, minimum value $1,500-maximum value $7,500. Maximum total prize value: $85,000. A description of each prize, including its approximate value, will appear in *Compute* prior to the first entry date for that prize. Prizes are not transferable or redeemable for cash. No substitution of prizes except as necessary, due to availability. Licensing, transportation, registration, and dealer charges, if applicable, are winner's responsibility. Winners may be required to pick up some prizes from the nearest dealership. Travel prizes must be from a major airport nearest winner's home and must be used within 12 months of award date. Additional restrictions may apply, i.e., local ordinances. Taxes are the winner's responsibility.

Open only to U.S. residents 18 and older, except employees and their families of Compute Int'l Ltd., POWER GROUP, INC., their respective subsidiaries, affiliates, and advertising agencies. All federal, state, local laws and regulations apply. Void where prohibited. This program is sponsored by Compute International Ltd., 1965 Broadway, NY, N.Y. 10023, (212) 496-6100. Monthly winners will be selected at random from among all eligible entries received by the judges by the following drawing dates: June issue-7/31/92, July issue-8/31/92, August issue-9/30/92, September issue-10/30/92, October issue-11/30/92, November issue-12/31/92. Grand Prize winner will be selected at random from among all eligible entries received by 2/15/93. Winners will be selected by POWER GROUP, INC., an independent judging organization whose decisions are final. Winners will be notified by mail and required to execute and return an affidavit of eligibility and release within 21 days of date on notification letter or alternates will be selected at random. Limit one winner per household.

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```
PRINT #2, c$;
WEND
CLOSE 1
CLOSE 2
SHELL "del " + filename$
SHELL "ren temp " + filename$
```

Run the program and enter crypt.fil *when prompted for the file to encrypt. Enter any word or series of characters as the key.*

When the program has run, enter type crypt.fil *to see the changes that have been wrought. Run the program again using the same file and key. Enter* type crypt.fil, *and it will be back to normal again.*

In answer to those looking for a program that will decrypt an encrypted file: As far as we know, there is no such program available.

U.S. Robotics Reply

I enjoyed your June Test Lab on portable products. I'd like to point out two inaccuracies, however.

Mr. Benford states that the WorldPort fax software bundled with the WorldPort 2496 doesn't include mini-BBS capabilities.

Actually, it does. The BBS has password security and provides a menu allowing users to leave or read E-mail, examine the list of available files, and upload or download files using XMODEM, YMODEM, or ASCII file transfer.

The article also says that the WorldPort 2496 doesn't operate in the background, but it does. The software uses a 45K TSR which supports background operations for sending and receiving.

MARSHALL TOPLANSKY
U.S. ROBOTICS
SKOKIE, IL

Benford replies: The WorldPort 2496 is an excellent product that does indeed feature background operation and a mini-BBS.

I apologize for any inconvenience or confusion about the features or capabilities of the 2496 that might have been caused by my review.

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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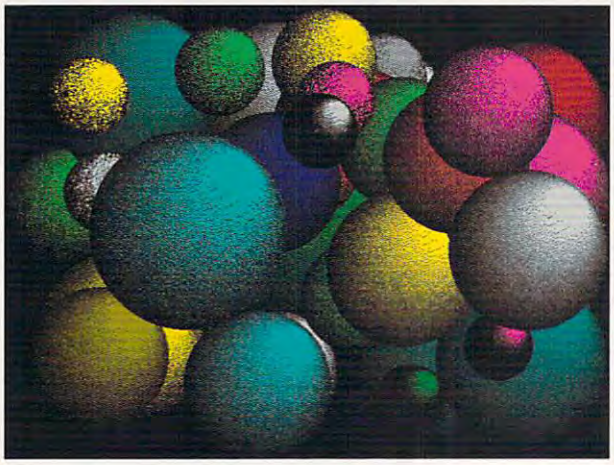
WINDOWS WORKSHOP

Clifton Karnes

BLANK YOUR WINDOWS 3.1 SCREENS ANYTIME

Screen savers have always been hot items with Windows users, as the sales figures for programs like After Dark and Intermission attest. Why are screen savers so popular? Three reasons. They protect your monitor from burn-in, they provide security from prying eyes, and they're fun. Microsoft must have realized not only that screen savers have a practical side but that users like them too, because it included screen savers as part of Windows 3.1.



Blanking a screen on demand becomes easy once you realize one secret about screen savers.

If you've never experimented with the Windows 3.1 screen savers, run Control Panel and double-click on Desktop. You'll find the screen saver section is near the middle of the Desktop dialog box.

You can choose the screen saver you want to use by name, you can select the delay (or interval of inactivity) before the screen blanks, and you can set up the screen saver. In Setup, you can often control the number of objects the saver displays and their speed, among other things.

After everything is set, if you leave your computer idle by not typing on the keyboard and not moving the mouse for the number of minutes specified in the saver's configuration, your screen will blank, and you'll be treated to an animated display (unless you've chosen Blank Screen, which, as the name suggests, displays a completely blank screen).

Savers shipped with Windows 3.1 include Blank Screen, Flying Windows, Lissajous Figures, Marquee, Mystify, and Starfield Simulation. These are pretty neat, but they can't compete with the screens in After Dark and Intermission. On the up side, they're free, and they don't use much in the way of additional resources.

There are still two essential things missing in the Windows 3.1 screen saver system, however. First, you *should* be able to run a screen blanker on demand. In other words, if someone comes into your office and you have sensitive material on your screen, you should be able to blank your screen immediately. Second, you should be able to cycle through all your screen savers instead of having to choose just one to use.

Here are the solutions.

Blanking a screen on demand becomes easy once you realize one secret about screen savers: They are executable files. They all have scr extensions, I hear you say. That's true, but for an experiment, make a copy of one of your savers as an executable file. Let's experiment with the Lissajous Figures saver. Simply copy sslissju.scr to sslissju.exe (screen savers begin with *ss* by convention).

Now run sslissju.exe. As you'll see, it's a runnable program. The only problem is that you'll get the setup screen and not the saver screen. That problem is easy to solve. Run sslissju.exe again, but this time add the /s parameter. When you type *sslissju.exe /s*, your screen will blank and fill with the Lissajous swirls.

Now, to blank your screen on demand, you can simply install sslissju.exe as a program on your desktop, in your favorite menu program, or both. You could make copies of all your screen saver files so they have exe extensions, and run them at will. There's a simpler way to do this, however, that doesn't involve cluttering up your disk with duplicate files. You simply tell Windows to treat the extension scr as a program. To do this, load WIN.INI in your favorite editor, and find the line that begins with *Programs=*. It will probably say *Programs=com exe bat pif.* Simply add *scr* to the end of this line, so it reads *Programs=com exe bat pif scr,* and reboot Windows.

Now you're ready to install any blanker on your desktop or your favorite launcher and run it. To run Lissajous, you'd use the command line *sslissjou.scr /s.* If you use BackMenu, installing a menu option for your saver is an excellent choice.

As for the second problem—that you can't cycle through savers—that has been solved by programmer Gordon Harris. He's written a program that allows you to cycle through all your installed screen savers. The package also comes with a number of excellent savers, including a large analog clock that floats across your screen. You can find Harris's Cycle Screen Saver on CompuServe and most other online services, or you can contact Data Arts, 3349 Humboldt Avenue, South Minneapolis, Minnesota 55408, (612) 825-5436. Cycle Screen Saver is shareware with a $5 registration fee. ❐

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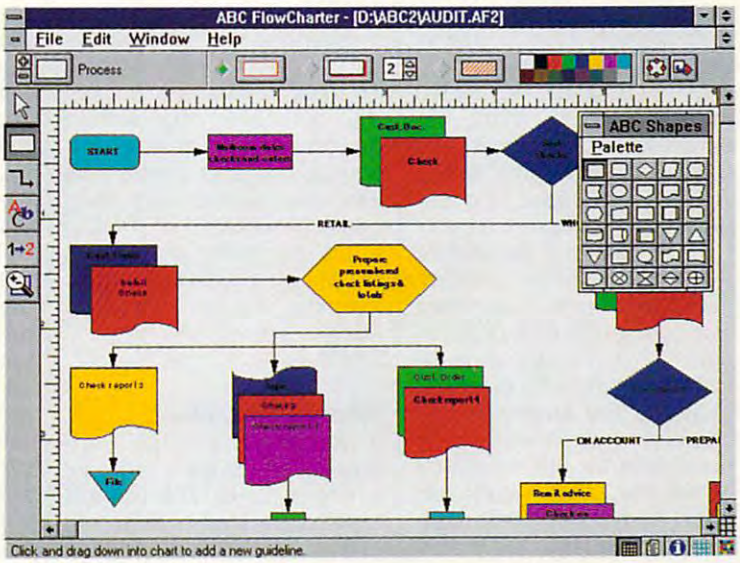

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TIPS & TOOLS

Edited by Richard C. Leinecker

Stop fragmentation before it begins, move your cursor faster in WordPerfect, and locate files quickly on your packed hard disk.

Organize System Files

If you've upgraded to MS-DOS 5.0, the system files io.sys and msdos.sys might not be the first files in your root directory. This increases the probability that your hard drive will become fragmented and slow down. That's because there's storage space before them on the drive. This storage space is occupied by other files.

If the files that are before the system files are deleted, then there's empty space just waiting to be filled. If DOS decides to write a very large file to the area, it'll fill the empty region and find another empty space somewhere else on the hard drive for the remainder of the file. That's a classic case of disk fragmentation. To read this large file that in part occupies the first part of the drive, the controller has to skip over sectors that are used for other files. This skip degrades performance and slows down disk access.

A disk optimizer or defragmenter may not move the system files to the beginning but just make sure every file is contiguous.

There is a solution. You can move them so they're the first two files in the root directory with the Disk Tool program in Norton Utilities 6.0. Run the Disk Tool program and select the procedure labeled Make a Disk Bootable and choose the C drive. The files will be relocated so they're the first files in the root directory, and your hard drive may perform better.

NICHOLAS F. CHAMPION
COSTA MESA, CA

Extended Keyboard Tips

The WordPerfect 5.1 manual lists two extended horizontal cursor movements. Home–left arrow (or right arrow) moves the cursor to the edge of the screen boundary, and Home-Home–left arrow (or right arrow) moves the cursor to the character next to the boundary.

I've found one it doesn't mention: Home-Home-Home–left arrow (or right arrow). This key combination moves the cursor to the screen boundary, even past formatting codes. This useful trick lets you bypass formatting codes like [ITALC] or [BOLD] at the beginning or end of a line when you want to insert unformatted text.

WILLIAM J. WOLFE
CHAMPAIGN, IL

Where's That File?

If you have a large hard drive, then it's easy to forget where a file is. The Chkdsk command with a /v argument makes a list of files and their paths on your hard drive. Combined with Find, this lets you look for a specific file. Here's a batch file that works great. To use it, type *locate* and the filename. If you wanted to find a file called mystuff.txt, you'd type *locate mystuff.txt*.

The /i argument after Find lets it do a search that isn't case sensitive. Here is the program locate.bat.

```
chkdsk /v | find /i "%1"
```

MALCOM MCCAFFERTY
SACKVILLE, CA

Windows Shorts

I prefer to avoid the Windows title screen, so I type *win :* to start Windows but keep the title screen from appearing.

If you want to launch a Windows application but don't intend to use it right away, hold down the Shift key while double-clicking on the program's icon, causing it to be immediately minimized. That's easier than running an application and then minimizing it.

ARJUN NAYYAR
WEST REDDING, CT

Built-in Windows Help

I got tired of referring to my manuals each time I had a question about using one of my applications. I created a picture using the Windows paint program, Paintbrush, and saved it as a bmp file. The picture contained useful information that I often referred to the manuals to obtain. Now, I just move the windows to view the help instantly.

To create a picture file, run Paintbrush from the Accessories group. Draw all the help and art you want. You can load pcx files into Paintbrush as a backdrop if you want to get fancy. Then, choose Save from the File menu, enter your filename, click OK, and the file will be saved.

Now you need to run the Control Panel from the Main group. Double-click on the icon labeled Desktop that appears. Down toward the bottom of the dialog box will be the Wallpaper selector. Use the selector scroll bar to find your file, highlight it with a mouse click, and then click on the dialog OK box.

Each time Windows runs, your custom file will appear as the wallpaper providing all the reminders you can fit in the picture file.

LOUIS COLLADO
ST. CLOUD, FL

Easy Disk Reuse

I've got a million old junk disks lying around. Many times when I want to use them, though, I have to spend time deleting files and subdirectories. You can use the Format a:/q command if you have DOS 5.0 or higher, but if you have an earlier DOS, you can use a program I wrote called Newdisk. It clears a floppy disk in seconds with a single command.

You can type in Newdisk using the DOS Debug command. Make sure the DOS pro-

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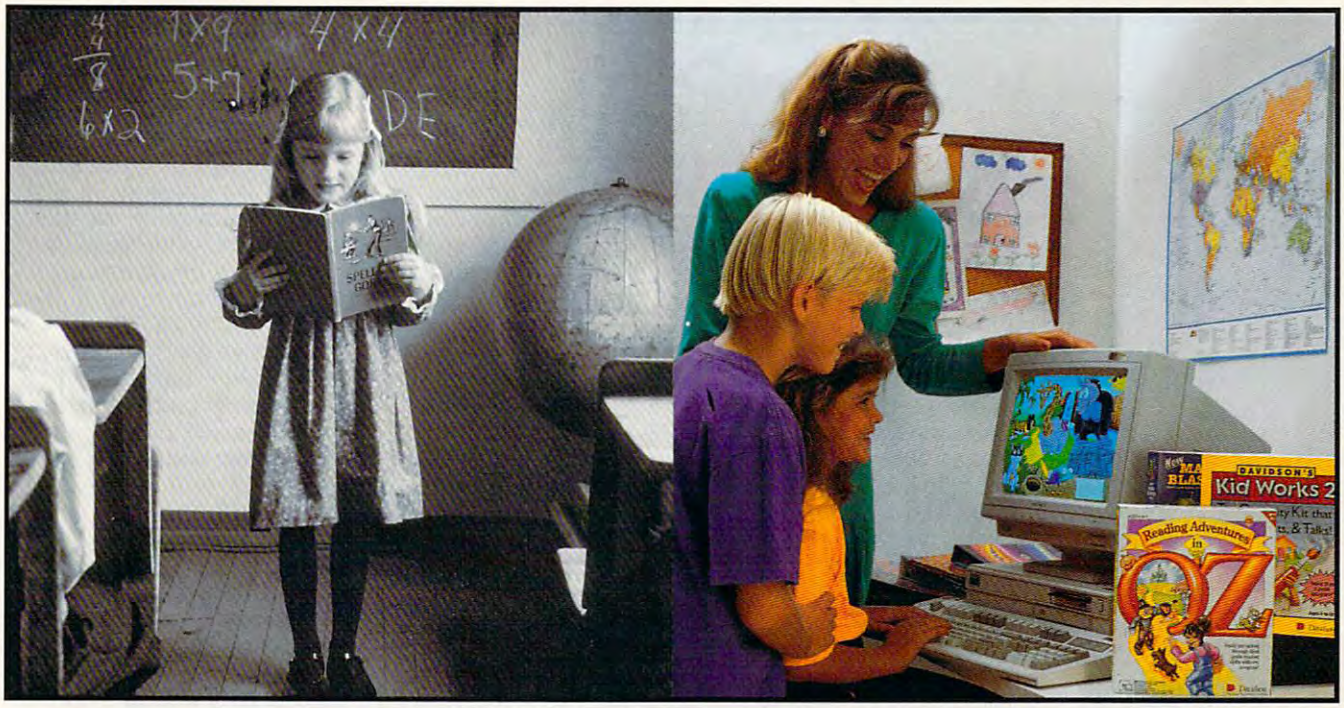
That was Then. This is Now.



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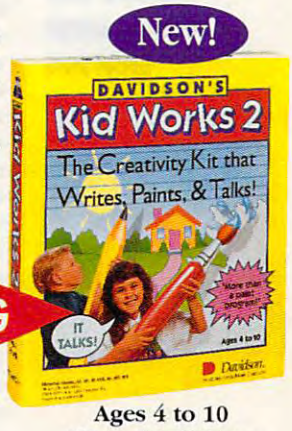

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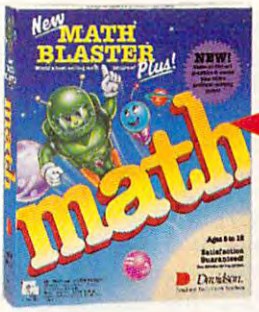

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Windows shortcuts and personalized Windows help, clearing disks in a hurry, and getting user input in batch programs

gram 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 newdisk.com
file not found
-e 100 be 80 00 ac 0a c0 74 61
-e 108 ac 3c 0d 74 5c 3c 20 74
-e 110 f7 4e 24 df 3c 41 7c 51
-e 118 3c 42 7f 4d 88 04 1e 8a
-e 120 d0 80 ea 40 b4 32 cd 21
-e 128 8a 47 0f 2a e4 8b 5f 09
-e 130 1f 89 44 02 c7 44 04 01
-e 138 00 b1 03 d3 eb 89 5c 06
-e 140 b9 02 00 51 2a e4 e8 3c
-e 148 00 bf a4 01 e8 2e 00 2a
-e 150 e4 fe c4 e8 2f 00 8b 4c
-e 158 02 e8 11 00 e2 fb 59 e2
-e 160 e2 8b 4c 06 e8 06 00 e2
-e 168 fb b4 4c cd 21 51 bf a1
-e 170 01 e8 09 00 2a e4 fe c4
-e 178 e8 0a 00 59 c3 2b c0 b9
-e 180 d0 07 f3 ab c3 8a 04 2c
-e 188 41 bb a1 01 b9 01 00 8b
-e 190 54 04 0a e4 75 04 cd 25
-e 198 eb 05 cd 26 ff 44 04 9d
-e 1a0 c3
-rcx
cx 0000
:a1
-w
writing 00a1 bytes
-q
```

If you're using the Checksum program from the July 1992 issue, you'll get a value of 062.

To use the program, just type *newdisk a* or *newdisk b*. Make sure you're in the root directory of the disk. If you have trouble writing to the disk, try using the Chdir \ command or remove the disk from the drive and reinsert it.

There aren't any warnings or prompts asking if you're sure you want to clear the disk. Once Newdisk is done, you won't be able to unerase any of the files because the root directory is overwritten with zeros. To unerase a file, the directory entry for the file must still be intact.

RICHARD C. LEINECKER
MIAMI, FL

Powerful Batch Files

I could've used this little gem years ago. I'm amazed it took me so long to invent it. Every time I create a batch file of any complexity, I rack my brain for ways to let users type in a text string. Oh, it can be done. But you use Copy con in a batch file and have users hit F6 and then Enter. That's not a very elegant way to write a batch file.

The little program I wrote accepts a string that's typed in and saves it to a file. The file can have any legal DOS filename and is specified as a command line argument. Once it's saved to disk, there are endless ways to use it.

First, though, the program. To enter this program, follow the directions for the Newdisk program above.

```
debug getline.com
file not found
-e 100 be 80 00 ac 0a c0 74 42
-e 108 ac 3c 0d 74 3d 3c 20 74
-e 110 f7 8b fe 4f ac 3c 0d 74
-e 118 04 3c 20 75 f7 c6 44 ff
-e 120 00 ba 4e 01 b4 0a cd 21
-e 128 8b d7 b4 3c 2b c9 cd 21
-e 130 8b d8 8a 0e 4f 01 ba 50
-e 138 01 b4 40 cd 21 b1 02 ba
-e 140 4c 01 b4 40 cd 21 b4 3e
-e 148 cd 21 cd 20 0d 0a 50
-rcx
cx 0000
:4f
-w
writing 004f bytes
-q
```

If you're using the Checksum program from the July 1992 issue, the value you'll get is 062. To use the program, just type *getline filename*, substituting the name of the file for *filename*. You'll be able to enter text, and it'll be saved to the file that you've specified.

Here's an example of using the Getline program in a batch file. Its purpose here is to keep a log of who uses WordPerfect and what they're using it for.

```
echo off
echo Please type in your name.
rem Here the Getline program
rem takes control and lets
rem the user enter in a text
rem string.
rem The string is saved
rem to a file I named $$.
getline $$
rem Here the file $$ is
rem concatenated to my file
rem called wplog.
type $$ >>wplog
echo Please make a note of what
echo you're using WordPerfect
echo for.
rem Once again, the Getline
rem program takes control and
rem lets the user enter in a text
rem string.
getline $$
rem Here again, the file $$ is
rem concatenated to my file
rem called wplog.
type $$ >>wplog
rem Delete the $$ file.
del $$
echo Thanks!
```

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 and send you a COMPUTE's PC clock radio while supplies last. ❐

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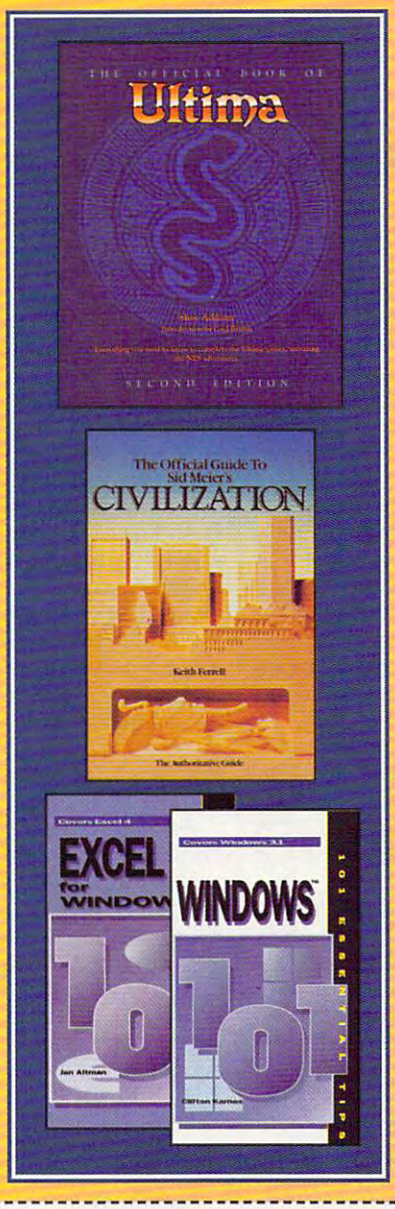

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INTRODOS

Tony Roberts

SURVIVAL TIPS FOR DOS HATERS

You can run from DOS, but you can't always hide: how to survive in an unfamiliar world.

Each year, new levels of insulation are erected between DOS and the average computer user. Batch files, menu programs, shell programs, and graphical user interfaces do what they can to eliminate the need for us to communicate with our machines at the DOS prompt.

These advances have made computers less frightening and less frustrating for users who are reluctant to sit down at the keyboard. (Those of us who are accused of living only to use computers do recognize that there are those who use computers only to earn a living.)

Even if you generally manage to avoid the DOS prompt, a little DOS knowledge will help you when you *do* face the dreaded C prompt. These tips should get you started.

Slashes (/) vs. backslashes (\). If you're confused about which slash to use when typing at the command line, keep in mind that backslashes are used as part of the filename path. Regular slashes are used to specify switches, or options for how a program should be run.

Chkdsk. If you use a hard drive, run the disk check utility every time you reboot your system. Include the command Chkdsk in your system's autoexec.bat file. Chkdsk determines if the disk's File Allocation Tables are intact and whether each file is in its proper place on the disk. If errors are reported, deal with them immediately—it takes only a few seconds. Well-maintained disks are much less prone to serious problems.

Dir. You're probably accustomed to using the Dir command to generate directories, but there are ways to use it more effectively. If your listings scroll past before you can get a good look at them, use the command Dir /p to pause the display after each screenful. If you know you're looking for a file that begins with the letter *s*, you could use the command Dir s*.* to instruct Dir to show you only files that begin with the letter *s*.

If you're using DOS 5.0, try Dir's other switches to sort the directory display the way you like it. Dir /od sorts by date. Dir /s displays the current directory and all its subdirectories. If you have one series of Dir switches you use all the time, instruct your system to use those switches by default by adding a line to the autoexec.bat file. I use the command Set dircmd=/l/ ogn to have my directories display in lower case, sorted by name, with subdirectories listed first.

Edit. Often, you need to make quick changes in a file—such as autoexec.bat or config.sys—but you don't need all the power of a word-processing program. Use DOS 5.0's Edit command. This is an easy-to-use text editor that's always handy. Don't worry; Edit is nothing like its older brother Edlin, a line-based text editor that has the distinction of being one of DOS's most confusing programs.

Format. Let's face it. Formatting disks is no picnic, but each of us has to deal with this chore. DOS 5.0 makes formatting easier than ever, so acquaint yourself with the switches that are appropriate for your size and type of disk. For example, the /f switch allows you to specify the size of the disk being formatted. If you have a 720K disk in drive B, use the command Format b: /f:720.

DOS 5.0's Format command is more forgiving than its predecessors. Now you can Unformat a disk if you realize quickly enough that you formatted the wrong disk. The Format command saves enough information about the disk to reconstruct it, should the Unformat procedure be necessary. This slows down the formatting, though, so if you're formatting a brand-new disk, save some time by executing the Format command with the /u switch. The *u* stands for *unconditional*. With this switch, DOS formats without saving data that might be useful in an Unformat operation.

Copy/Xcopy. Everyone copies files now and then. Usually, it's just a file or two from one disk to another. This is pretty straightforward, and the Copy command handles it well. If your copying becomes more complicated, however, look to the Xcopy command.

If you're copying several files, as with Copy *.* a:, Xcopy is faster because it reads and writes in batches of files rather than file by file. If you need to be selective about which files you copy, it's Xcopy to the rescue again. Xcopy includes switches that allow you to copy files based on the date the file was last modified or based on the status of the file's archive bit. The archive bit is turned on every time a change is made in a file. If you use Xcopy to copy changed files (those with the archive bit on), you provide yourself with a small backup system.

Help. Finally, one of the best things about DOS 5.0 is that it includes help for most commands. With this feature, you don't have to scurry for a manual to perform an unfamiliar routine. Typing *help xcopy*, for example, provides a screenful of information about how to use Xcopy and all its switches.

Call for help when you need it, and you'll be able to get back to your menu, shell, or graphical interface in no time. ❐

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PROGRAMMING POWER

Tom Campbell

USING PDS 7.1

We looked recently at several of Microsoft's BASIC dialects. This month's theme is Professional Development System 7.1, currently Microsoft's highest-end BASIC. PDS 7.1 is compatible with QuickBASIC and sports many more code generation options, OS/2 support, and incredibly powerful built-in ISAM database routines. Plus, it has a couple of libraries thrown in.

This month, we'll look at what you can do with the Presentation Graphics toolbox and how purchasing the $295 PDS 7.1 might be worthwhile just for that toolbox. If your billable time is worth $50 an hour, you could buy PDS 7.1 for a single business graphics project and have a topnotch development system after the gig is over.

If you've ever found a charting package lacking in flexibility, this month's PowerChart might well be what you need.

The toolbox has support for CGA, EGA, MCGA, VGA, Hercules, and Olivetti cards; and it uses Windows screen fonts. You're even licensed to distribute the half-dozen screen fonts that come with PDS 7.1 as part of your application.

If you've ever found a charting package lacking in flexibility, this month's PowerChart might well be what you need. A *data-driven* charting program, it creates its chart using its own command language. Feed it a text file, and it will create a chart or series of charts by reading the directions in the file and displaying the chart onscreen. Here's an example.

```
CHART 1 TYPE "BAR"
USE CHART 1
LABELS "Wayne's World", "Basic Instinct", "Lethal Weapon 3"
DATA 110.5, 87.9, 114.6
TITLE "Box Office in Millions"
JUSTIFY TITLE LEFT
SHOW
PAUSE
```

Put that in a text file called test.pc and run it through the PowerChart program by typing *pchart test.pc.* The chart will be shown on your graphics monitor and will await a keypress; then it will return to text mode. "Wait a minute," you say. "I did all that work just to create a bar chart? I could do that in Harvard Graphics in seconds!"

True. But PowerChart is an extensible language, one that you can add to by following the directions in the source code and program documentation. Don't like the way your graphics program displays axes? PowerChart gives you full control over how they're drawn, what pattern and color they use, and so on.

The JUSTIFY TITLE statement is included to show you how PowerChart changes a default value. Using a simple language also gives you the ability to write other programs in BASIC that generate source code for PowerChart. You might also notice that the source code listed above requires only 202 bytes of storage as a text file. Even the most parsimonious graphics file formats would have difficulty matching this figure.

To begin, you must first start QBX (remember that PDS 7.1 or higher must be used for this column; QuickBASIC doesn't come with the Presentation Graphics toolbox). To load the quick library for the toolbox, type *qbx /l chartbefr.*

If you start QBX without loading a quick library first, there's no way to load one without restarting. Another limitation is that you can only load one quick library at a time, so if you want features from several quick libraries, you'll have to monkey around with lib.exe to extract only those routines into a new library.

If you like to work in a separate directory for each project to avoid clutter, you should make sure that the QBX environment knows where you keep your libraries and include files. Choose Set Paths from the Options directory and write in the appropriate settings; on most systems, they would be c:include;c:src for include files and c:lib;c:src for library files.

The SRC directory is where the PDS 7.1 installation program puts all the graphics example files and the toolbox source. It also puts the font files there; that way, if you run a program such as the sample programs that come with PDS 7.1, it assumes the fonts are in the current directory.

PowerChart uses a general-purpose function called SearchPath, which takes a path-style string as its input and searches those directories for the named file. It also looks in the directory it started from, if you're using DOS 3.0 or higher (a DOS 2 program has no way of knowing from which directory it executed, but starting with version 3, that information is available just after the environment table).

PowerChart doesn't support all of BASIC 7's chart types, but adding to it is simple. Look at the TRANSLATE routine in translat.bas, and you'll see instructions on how to add chart types and examples of existing ones. That's why the first line of test.pc puts the word *bar* in quotes.

```
CHART 1 TYPE    "BAR".
```

Make it a string variable instead of a keyword, and you can add to SELECT CASE CHARTTYPE without adding keywords to the language. And later, you can even add chart types that aren't supported by the Presentation Graphics Toolbox, without disturbing the main parsing routines. Try *that,* Harvard Graphics! ❐

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SALT AND BATTERY

How to solve your laptop battery's memory problems

I *love* notebook computers!

That's my song. Hey, I'm on the road all the time. Without my notebook, I couldn't write books, articles, course handouts . . . heck, I'd be out of business.

For example, I recently did an Alaska-Ireland-England-Italy series of lectures. With the big Alaska flight coming up, I charged up two laptop batteries. I got about 45 minutes' work out of the first battery—less than I'd expected but not the end of the world. I saved my work, changed the battery, and powered up, expecting another 45 minutes or more. It was just when I was typing in a really great riff that the second battery died, after 15 minutes . . . and no warning.

Which reminds me of my other song or, perhaps better, dirge:

I *hate* laptop batteries!

I've owned six PCs that weighed less than eight pounds each and ran on batteries. And every one of them has left a pain in the pit of my stomach whenever I used it with on-board juice rather than AC power.

When the battery is new, all is well with the world, and you get almost two hours of work out of a 386SX notebook. But after six months, it's like playing Russian roulette every time you trust your work to batteries. Your car has a gas gauge; why can't a laptop tell you how much zap's left in its battery?

To find out, I called up Phil DeSantis. Phil is the marketing and sales manager for the Battery Systems Division of HM Electronics in San Diego. Phil's been in the battery business for 20 years, and I was quite surprised by some of the things that he told me.

It's pretty much common knowledge that the ni-cad batteries that are in laptops have a memory—a phenomenon whereby they remember how much they were charged up and eventually lose all charge capacity beyond the last charge.

For example, if you always recharge your battery when it still has a half charge on it, it'll eventually retain only the capacity to hold a half charge. That means that you have to be really religious about completely discharging your laptop before charging it again—no topping off.

All right, now, how many of you knew that or had heard something like it before? Hmmm . . . lots of hands raised. I'd heard that, too.

"Baloney," says Phil. "The 'memory' problem was solved years ago. You can charge and recharge your laptop all you like."

Hang on, you might be thinking; you can deny the memory phenomenon all you like, but it still happens. My old laptop batteries just don't take as much charge as they did when they were new.

Phil explains that the problem with your laptop's battery isn't memory; it's dendrites. These are salt-like crystalline formations that grow inside a battery when you overcharge it. When you try to charge a full battery, it gets hot, and the dendrites form.

Similarly, when you charge a battery that's empty or partially empty but hot, the charging process is much less efficient, and you get dendrite growth to boot. Dendrites act like an internal resistance in your battery, reducing its efficiency and its service time when charged.

So the person who plugs a laptop into the wall every night and gives it an eight-hour charge, when it only needs an hour or two, is doing the battery two hours of good and six hours of harm—and slowly growing a veritable dendrite farm.

Worse yet, the heat can cause other problems, such as internal chemical changes that cause short circuits right inside the battery. That kind of bad news means shorter battery life and greater heat.

Once your battery has dendrites, is it no good? No, it's recoverable. The battery can be conditioned. The way that's done is simple. Just discharge it until each cell produces no more than one volt—don't discharge any further, for reasons we'll take up in a few paragraphs—and then recharge. Do this discharge/recharge cycle three times, and most of the dendrites will be gone.

How Chargers Work

Ordinarily, a charger pumps power into a battery at about the same rate that the battery puts it out, though some go down to ½ that rate. That means a battery that can drain itself in one hour in the laptop should take no more than an hour or two to recharge itself.

Once it's charged, a certain amount of the charge dissipates, so a charger should then shift down to a tiny 1/20–1/50 of the previous charge rate.

The problem with this is that detecting when a battery is fully charged is a complicated process. Once the battery is full, a charger should detect a slight reverse voltage.

That's not completely reliable, however, as a slight power surge from the wall current could look like a voltage reversal. If the charger misses that voltage shift, it could notice that the battery is increasing in temperature.

Chargers today aren't very accurate in detecting when a

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Circle Reader Service Number 108

Mark Minasi

battery is full, and when they do detect it, they don't drop to 1/20 or 1/50 of the normal current—they only drop to 1/10. The result is a warming battery, with all the attendant problems.

Handling Your Battery

I had problems with the first battery that my notebook came with, problems that looked like memory problems. So I figured that the right thing to do was to completely discharge the battery.

Unfortunately, my laptop refused to run at all when the battery was low, so I never had a chance to completely discharge the battery. I had a brainstorm, however. As the battery pack is just four D-cell ni-cads, I just got a flashlight that took four D-cells and ran the flashlight until the light went out.

Rather pleased with myself, I did this through a few charge/discharge cycles, and then the batteries refused to charge at all.

"You did the exact wrong thing," Phil told me. (Now he tells me!) Ni-cads should never be discharged below one volt per cell. If you do that, they move into an unstable state and can reverse polarity.

Then when you try to recharge them, it's as if you put the batteries into the laptop backward before you started up the charge cycle, an activity that can be dangerous. In my case, my laptop heated up to over 130 degrees before giving up the ghost. Now that I have new batteries, it runs cool again.

And when you get a new battery, give it a good charge—don't worry about overcharging it the first time. The reason is something called stand loss. Here's how it works.

A battery discharges all by itself about 1 percent per day. Now suppose you have a laptop battery composed of four cells. This battery gets shipped over from Japan, sits in the warehouse, and sees a month or two of inactivity before you use it.

The problem is that each of the four cells discharges at a different rate, so the four of them may be in very different places in their discharge cycles. Remember the possible polarity reversal if the voltage drops below a volt? If you've got a cell that's at about one volt and turn on the laptop, you'll discharge all the cells, but the one that's on the fence may just flip.

This could leave you with a battery composed of three cells that agree on polarity and one that fights the others, with the resulting hot battery and short charge life.

One way to keep that from happening is to let your battery charge for 24 hours the first day that you get it. There will be some overcharge, but the effects of that are far outweighed by the benefits of ensuring that all the cells in your battery are in step.

Once you start using your laptop regularly, how should you handle the charging? First of all, try to get an idea of the

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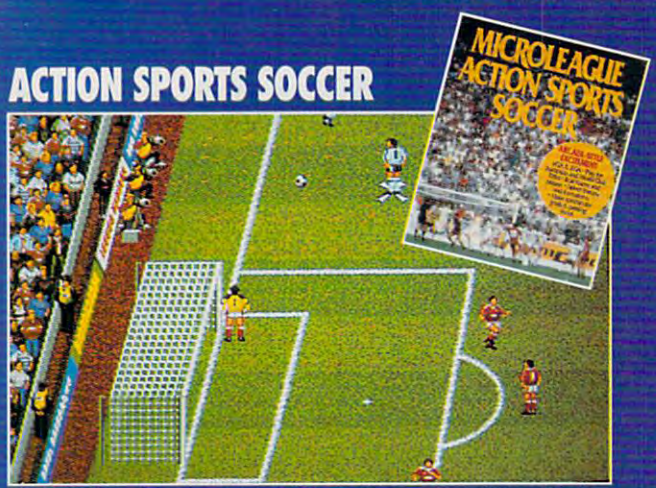

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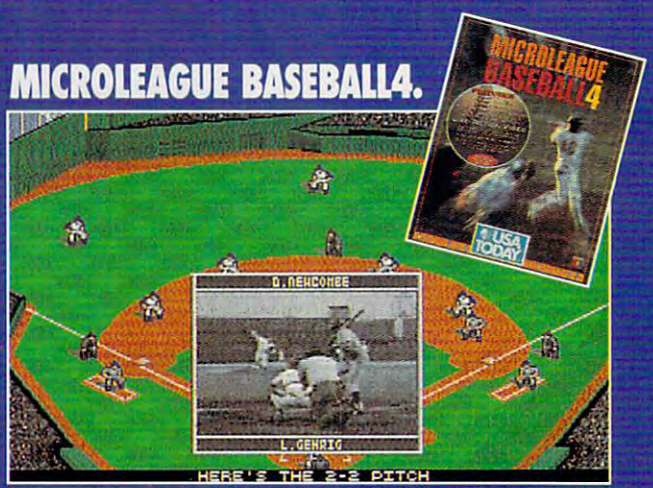

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ratio of charging time to running time.

Do an experiment to find out the longest running time for the battery. Then charge the battery for that amount of time, and see how long a run you get from that charge.

With a little experimentation, you can determine the running/charging time ratio that your system uses. Suppose you find that to get an hour's use from the battery, you must charge for 1½ hours. Then you should only recharge for the amount of time equal to how long you last used the computer while on batteries, multiplied by 1½.

Battery Gas Gauge

But what about my initial question? Why doesn't my laptop give me a warning sometime before it dies?

"Easy," says Phil. "Ni-cads have a funny discharge pattern. They give you just about full voltage, with very little decrease, until they quit." There's no straightforward way to know when your battery is about to die.

The computers that give you a percentage-depleted number are merely guessing, based on how long the battery's been running and when you last told the computer that you'd charged the battery. They assume the battery discharges at a pretty steady rate—a fairly heroic assumption.

What all this boils down to is that you can't trust the full- and low-power indicators on many laptops.

HM Electronics, however, sells a neat little doodad that solves many battery problems. This battery analyzer/charger unit does three things.

First, it charges your battery safely, as it knows when to stop charging. Once the battery has reached peak voltage, the charger continues to provide current, but only at a small fraction of the normal charging rate, so as not to heat up the battery and form dendrites.

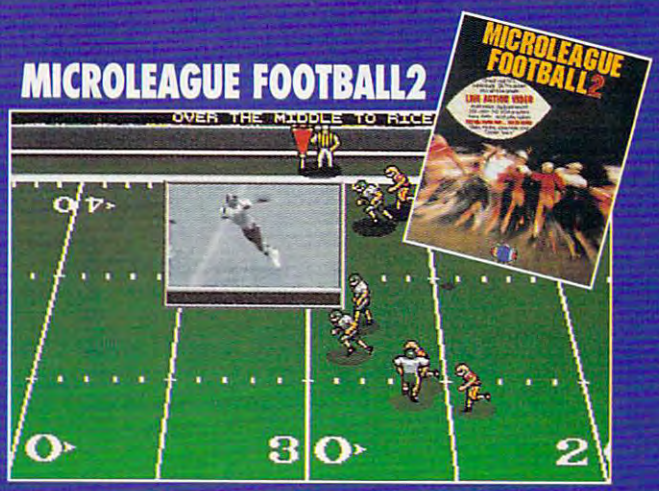
Second, it discharges the battery, which (1) discharges the battery safely, not allowing it to drop below one volt, and (2) monitors the discharge process, reporting exactly how much charge it held. You can use this to measure your battery's capacity, as you can charge and then discharge the battery to determine exactly how much juice it can hold.

Finally, it performs a conditioning function whereby it does three charge/discharge cycles, dedendriting your battery.

Currently, HM has units for only the Grid and Dataworld portables. I use one for my Dataworld portable, and I must admit that I love it. It has taken the mystery out of my battery capacity. It's as if I drove a car for years without a gas gauge, and all of a sudden someone installed one—I don't know how I lived without it.

The unit I bought cost $200, but Phil says that there should be a generic unit out for about $160 by the time you read this. ❐

MICROLEAGUE FOOTBALL2



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ON DISK

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KNOCKOUT PUNCH FOR UNWANTED FILES

Get ready for both work and play with this issue's PC Disk. We've found some exciting shareware that's sure to make you smile.

With these selections, you can quickly erase unwanted files, customize your DOS screen, set up a miniature BBS, handle any conversion problem, and, when the work's all done, deal yourself a couple of new Windows solitaire games and relax.

If you love Windows Solitaire, you will love Kings Corners, but it isn't as easy as it looks!

PDELETE

PDELETE is one of the finest DOS file-deleting utilities I've seen. If you can describe what you want removed from your hard disk (or hard disks), PDELETE can definitely remove it.

PDELETE allows you to delete files based on name, file date, attribute, or size. The program provides wildcard options that are much more sophisticated than those provided by DOS. When your Delete command is executed, a window opens, showing you what files are being deleted. This gives you a chance to haul out the undelete program if you see you've erased something by mistake.

One of the best features of PDELETE, though, is its test option. When you include the /tf (test first) switch after a command, the program shows you a list of the files that would have been deleted. Once you've verified that your command has been interpreted as expected, you can answer the program's prompt affirmatively and delete the files for real.

PDELETE also permits you to create an exclude file. In this file you can list filenames and paths that you wish to exclude from the PDELETE process, and PDELETE will skip them.

PDELETE is so fast and easy to use that I cleaned up all the hard disks on a small network in just a few minutes, and I was disappointed that I had so quickly run out of files to erase.

Programmer Norm Patriquin has been steadily refining PDELETE since its first release, in October 1986. The program, now in version 4.4, is shareware with a $20 registration fee.

The Universal Converter

Jeff Napier had fun programming The Universal Converter, and it shows. The Universal Converter lets you view nearly anything in whatever terms you please.

Need to know how many cups are in 45 gallons? Do you want to calculate how much you earn each second? Do you wonder about the ASCII value of *H?* Or do you have to compute the volume of a cylinder? The Universal Converter has the formulas for these conversions plus hundreds more you've probably never thought of. How long, for example, does it take light to travel all of the way across your bedroom?

Napier says the Universal Converter project began in an effort to take a break from regular programming projects. He built The Universal Converter on a laptop while riding in a car, curled up in a recliner, and sitting under a tree. Napier included more than 600 conversions in the program; once you get started, you'll want to try them all.

When Napier transferred the finished program from his laptop to his desktop computer, though, he was in for a big surprise. Napier says that the color combinations that worked so well in gray scales on the laptop "were entirely wacky" on a color monitor. But you won't see yellow text on a red screen with a purple border in the current version of The Universal Converter. Napier's changed the color scheme to a pleasing white, green, and blue combination.

The Universal Converter is shareware with a $29.95 registration fee.

TinyHost

If you're a two-computer per-

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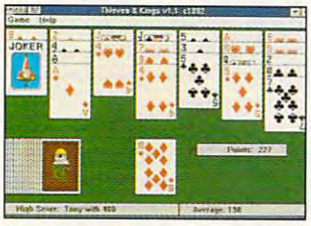
son (one at home, one at the office), TinyHost will solve one of your most common problems: leaving important files on the wrong system. Programmer Bruce Krobusek often found himself doing that, so he decided to create TinyHost.

PDELETE

The Universal Converter

TinyHost



Thieves and Kings

The program turns a computer into a miniature bulletin board system where you can dial in, view directories, and upload and download files. The program also includes operator chat, DOS shell capability, and message capability—and that's just the beginning.

TinyHost has most of the features of a full-blown BBS but not all the bells and whistles, the overhead, and the learning curve. It includes log-in and security provisions to protect your data and a ring-back option that makes the system easy to use on your regular voice line.

TinyHost supports up to 25 users and provides 11 security levels, making it practical to use as a small company BBS as well as a personal BBS. The shareware registration fee for TinyHost is $25.

Colors

Now you can put the best face on your DOS screens with Colors, an easy-to-use color-setting program. No more cryptic ANSI strings to remember. No trying to guess which color number refers to which color. With Colors, just tell it what colors you want.

For example, typing *colors blu on bla* gives you blue text on a black background, while typing *colors red on whi* gives you red type on a white background. Best of all, typing *colors nor* takes you right back to normal white on black when you've finished experimenting.

Aran Spence, who wrote the program and offers it as freeware, says he developed the utility after getting used to a similar feature that is part of the 4DOS operating system.

Thieves and Kings

Lovers of the Windows Solitaire game take note: Thieves and Kings brings two more solitaire games to your desktop, and both are highly addictive.

In Kings Corners, you try to fill in a 16-card grid with kings in the corners, queens on the sides, and jacks on the top and bottom. It's not as easy as it sounds.

The second game, 40 Thieves, is based on the solitaire standard known as Golf. Programmer Paul DeWolf has 2added a few twists to this version, though.

The deck includes wild cards that help prolong play, but each time you clear the table, one wild card is removed from the deck.

Also, 40 Thieves includes a two-player option, making the game great for family fun. Decide how many games you'll play, and the computer keeps running totals for each player. One word of warning: It's incredibly difficult to put this game away. I've been testing 40 Thieves for about three weeks, and my office mates think it's time I got on with my work.

This two-game shareware combination requires a $20 registration fee.

Many of the programs included on the PC Disk are shareware and are offered to you for your evaluation. When you find a shareware program that meets your needs and you intend to continue using the program, be sure to register it with the author.

If you are a shareware author and would like to submit your work for the PC Disk, you can send it directly to Tony Roberts at P.O. Box 10134, Greensboro, North Carolina 27404-0134. Due to the limited disk space available, your whole package should fit into an archive of no more than 100K. Please include a documentation file. ❐

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COMPUTE/NET

Troy Tucker

COMPUTE AND POWERVISION

A little more than a year ago, we entered into an agreement with GEnie and America Online to provide you with an electronic version of COMPUTE magazine. This project has provided us with a wealth of information and experience. We tested the waters, and now we're ready to apply what we've learned to a new online service—PowerVision.

Sign up for PowerVision through COMPUTE and take advantage of a great deal from U.S. Robotics on a 9600-bps fax/modem.

PowerVision is different from anything you've ever logged on to. PowerVision breaks the old text-based barrier by fusing the latest in communications technology with beautiful VGA graphics. After just one look, you will see online services in a whole new light. All the usual features, such as electronic mail and chat, can be found on PowerVision. The difference is that each has been graphically enhanced. Electronic mail can have the sender's photo attached. As you open the letter for reading, a VGA photo pops up on your screen.

This graphical enhancement doesn't slow the service to a snail's pace. State-of-the-art compression techniques and smart terminal software move at an impressive rate. The video download process takes about 10 seconds at 9600 bps (or about 30 seconds at 2400 bps).

Getting around in PowerVision is easy. Each online area is accessed by clicking on buttons or by pressing designated keys. Almost every screen is unique because the information providers design their own screens, buttons, icons, logos, and photos. Besides digitized photos, vector graphics can also be transmitted. This type of graphic is designed with special software, then compiled into a format that can be transmitted from the host computer. When photos and vector graphics are combined with bitmapped fonts and 3-D buttons, you get an online service that packs quite a visual punch.

The cost of PowerVision is very reasonable. The basic service fee is $18.95 per month with a connect charge of $.09 per minute. You get two hours of free connect time every month, and there is no additional charge for 9600-bps use. Many services are provided at no extra charge: shareware library access, electronic mail (up to 900 letters per month), discount shopping, discount travel, and personal ads.

Service	PowerVision	Prodigy	CompuServe
Basic service fee	$18.95	$12.95	$ 7.95
4 hours access time (1 hour nonbasic)	10.80	n/c	12.80
50 E-mail messages	n/c	5.00	n/c
3 letters to Congress	n/c	7.50	3.00
1 hour shareware access	n/c	14.95	12.80
Discount shopping	n/c	n/a	3.30
Total charges	$29.75	$40.40	$39.85

n/c = no charge; n/a = not available

If you make a cost comparison between PowerVision, Prodigy, and CompuServe, you'll find that it's cheaper to use PowerVision. Take a look at the table to see how they stack up.

As you can see, the additional features offered by PowerVision don't increase the basic cost. And, besides getting a better price, you get to enjoy $20 in free grocery coupons each month, free 9600-bps access, personals with parameter searching, electronic mail with photos, real-estate listings with photos, shareware, chat, and much more.

By the time you read this, COMPUTE will already be on PowerVision, and *Omni* magazine will soon follow. If you're interested in signing up for PowerVision, the basic software price is $79.95, which includes the price of a subscription to COMPUTE, *Omni*, *Longevity*, *Four Wheeler*, or any other General Media publication. The COMPUTE area is found under Premium Services and can be accessed by clicking on the appropriate button. The initial COMPUTE screen details which areas are free and which charge a premium. In general, the premium will be around $.20 per minute. You will not be charged a special rate for access to COMPUTE's software library. All file descriptions will include the unit cost for each download. Whether you download at 2400 or 9600 baud, the cost remains the same.

Everyone who signs up for PowerVision through COMPUTE can take advantage of a special offer from U.S. Robotics, a 9600-bps V.32bis fax/modem for only $279 (the external unit costs $299). For more information on the new COMPUTE/NET and PowerVision, circle number 102 on the Reader Service Card or write us at COMPUTE/NET, 324 West Wendover Avenue, Suite 200, Department PV, Greensboro, NC 27408. For faster action, you can complete the coupon on the COMPUTE/NET–PowerVision ad appearing in this issue. ❐

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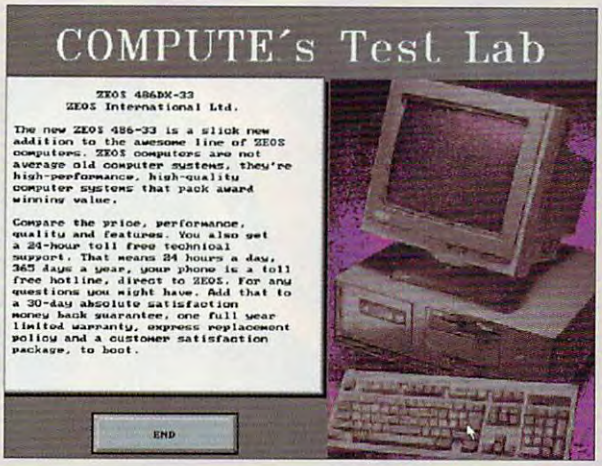

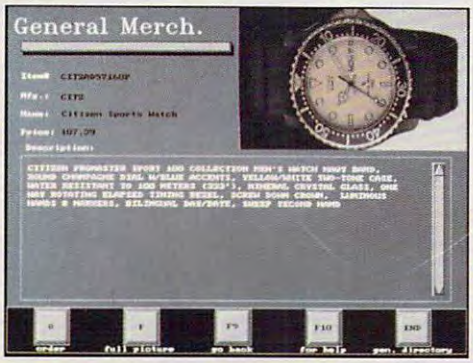

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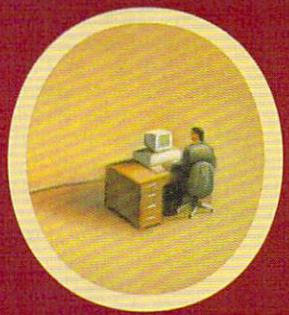
Painting
By Bill Bruning

You can't do business without contacts, and poorly managed contacts are worse than no contacts at all.

KEEPING IN CONTACT



By Daniel S. Janal

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Hundreds of Post-it notes greeted Ken Holyoak every morning when he went to work as president of Better Modular Buildings in Indianapolis. Not surprisingly, dozens of details fell by the wayside.

"I thought I could keep track, but this was not effective," he says. "The hard disk inside my brain was getting too full." If you've ever forgotten about a meeting or blown due dates, you can sympathize with Holyoak. He let perfectly good leads slip through his fingers because he couldn't keep track of the details.

One Percent Inspiration

If genius is in the details, contact management software programs that manage your contacts, notes, and meetings can help you become a genius.

These programs let you create a note card for each contact, complete with name, address, and phone number. You can then use the computer to automatically dial the number and open a notepad so you can keep notes. After the call, the computer asks when you need to call back. On that appointed date, the computer reminds you to make the call. The same process works for keeping track of your meetings, appointments, conferences. Most programs will let you print your notes as letters or faxes, or they'll hook into your word processor and keep a log of your correspondence. That way, you'll be able to look at a contact's records and see exactly how things stood the last time you spoke or corresponded. The program can keep track of any kind of information. If you're the type of person who forgets birthdays or needs to remember which client prefers gifts of white wine instead of red, then a contact manager is for you.

With more than 600 contact managers on the market, you can certainly have your pick. Although many offer generic call, record, and schedule functions that can be used by salespeople or anyone else who makes a lot of calls, others are targeted to specific industries, such as construction or public relations. Some are designed specifically to assist people on the road in exchanging data between desktop computers back home and palmtop computers.

For Holyoak, relief came with a program called PowerLeads!, which works under Windows.

"I call it up first thing in the morning. It tells me whom I need to call. It lets me prioritize my schedule and keeps track of what I am doing," says Holyoak, whose company makes modular buildings for commercial use. "It's always up and running. I found it keeps lots of little slips of paper off my desk and reminds me of things to do. The main thing is that it lets me keep track of leads, customers, and things I thought I could keep track of in my head."

Lost Time Is Not Found Again

Missing appointments and deadlines not only can be costly to an attorney but can lead to malpractice cases, according to the American Bar Association, which estimates that 60 percent of such cases were filed because attorneys blew deadlines.

That won't happen to Michael Jimmerson, an attorney in civil litigation and personal injury practice with Mesch, Clark, and Rothschild of Tucson. He uses PackRat, another Windows contact manager.

"It helps me prepare for court by keeping track of deadlines, dates, and phone conversations," he says. "I was looking for something to help me keep track of phone numbers, addresses, notes, and briefings. I need to be able to merge that data with my word processor."

He also manages to-do lists and calendar notes with PackRat. Before using this program, he experimented with other applications but found they did only part of the job.

"I used other packages, but they didn't integrate the information. For example, I called people with PC Tools but had notes in WordPerfect." To find data, he had to switch applications. "Now all the information is linked together. It has really opened up a whole new world of productivity for me."

Having all your records in one place is a prime benefit of a contact manager, because it can find data fast and plug it into the right spaces.

So if Jimmerson's writing letters, PackRat will type the names and addresses onto fax cover sheets or letters and envelopes. He also integrates the program with an electronic mail package to write to colleagues on ABAnet, an online service offered by the ABA.

"I talk to about 30 to 40 people a day, sometimes more," says Jimmerson, who has to manage more than 600 names in his telephone list. "PackRat saves time in small increments. It adds up to more than a half hour a day. You don't have to spend hours of time looking for notes. It is subtle but very powerful. I could not get along without it."

WORKING WITHIN THE STRUCTURE

If you're starting your recordkeeping system from scratch and want to type in new contacts when you meet them, you'd do well with just about any program mentioned in the article. However, if you have numerous records in your system, you could be in for a massive problem.

You see, each contact manager uses its own unique file format. For the contact manager to read your data, you first need to convert your current data to either ASCII or dBASE format. Some programs require the data to be in a certain order, or they won't read the data at all. Or they'll mismatch the data and fields so you'll find the company name where the phone number or the street address should be.

Some programs import data easily and quickly, like PowerLeads! and YourWay. Simply tell either program which file to read and then point and click on the field names.

Even with the best system, you will need to edit data. For instance, I exported data from my autodialer in an ASCII format. The name field contained both first and last names, like Smith, Betty. However, one program had separate fields for first and last names. I had to ask the new program to read the name field in the first name field and then manually type the last name in its proper place.

Another program required first and last names together, which was great for my autodialer output but bad for my database program, which used two fields for first and last names. Again, I had to edit data.

Finally, the autodialer used one field for the phone number, including area code. However, a contact manager required two fields. Again, in order to get the data in, I had to manually type the area code in the additional field.

Of course, I could've paid someone to retype my data from scratch. However, with 3000 contacts, this would've cost me a lot of time and money.

There's a crying need for a utility like Software Bridge or WORD FOR WORD that converts DOS-based word processor or database files to these contact managers. Fortunately, most BASIC languages contain commands that make reading and writing ASCII files a snap. If you store data in one format and you need to change it to another format, a brief and simple BASIC program could read one file format and convert it to another format. The highly structured nature of database files makes this even simpler.

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Management by Contact

Running a business with several people can be a challenge, but YourWay contact management software has helped Channing Blackwell, consultant and civil engineer, bring more regularity to Blackwell Engineering in Washington, D.C.

"It keeps our lives in order," he says. "With YourWay, we all have a general idea of what's going on the next day when we look at the master task list. Our plan is to network the software so everyone is cognizant of what is going on during the day. That way no one can say, 'I left my notebook at home.' There are no excuses."

The software keeps track of meetings with employees and with clients. Like many contact managers, YourWay rings an alarm to remind Blackwell of meetings.

"I was engrossed in a project, and the alarm went off," he says. "It's like this computer reaches out and taps me on the shoulder and says, 'Excuse me.' It gives you lead time. If you have to be at a certain place in an hour, the computer will tell you when to leave."

TeleMagic, another contact manager, has changed the way Bill Brawner does business.

"I can now think about solving the clients' problems instead of trying to keep track of them," says Brawner, whose four-year-old company in Morgan Hill, California, helps corporations lower their taxes through innovative programs—or at least lowers their cost of income tax preparation by 35–75 percent. "I talk to a lot of people, and I need to track the sales call results. Because of the way TeleMagic stores information, I can cross-reference my sales results. People tended to fall through the cracks of my 3 × 5 note card system. Now they get callbacks and letters on time. With the push of two buttons, I can send notes saying, 'Thank you for requesting information,' and confirming appointments and have it be so personalized without my having to think about it. It's so great. It's really increasing my productivity."

Clients have noticed the difference. "A couple of clients say, 'You seem to be right on time.' When I say, 'I'll give you a call next Tuesday,' and they get a call on Tuesday, they're impressed with the follow-through," he says. It's easy to follow through when you have the whole history on the screen. That way, you don't have to leave the phone to run for a file folder and shuffle index cards while trying to make small talk. When you make 20–30 calls a day, as Brawner does, that saves a lot of time.

When he visits clients, their information is at his side in a notebook computer.

"I can use it from the car with my car phone or in someone else's office. I can work on the client's project right there. It is extremely fast. I can usually find anything within five seconds," he says.

What Have You Done for Me Lately?

Keeping clients happy is one thing Pat Meier can do with ACT!, a contact management program with versions for DOS and Windows.

"One of the things our clients like is that they can call us and say, 'What have you done for me lately?' and I can say, 'Let me show you,'" says Meier, president of Pat Meier Associates, a public relations agency in San Francisco representing high-technology clients. "With a couple of keystrokes, I can pull out a contact management report and show them whom I contacted and what the results were."

She remembers in particular one time ACT! saved her: "One client asked me to call one reporter. After a few days, the client said, 'How come we haven't heard from this person yet?' I pulled up a record and showed how many times I called and there was no answer and I left messages," she says. "Turns out the reporter was out of town."

She can also improve productivity through ACT!'s word processor. Every month she creates a transaction list of out-of-pocket expenditures for each client by using Quicken. She saves the file to ASCII and then loads it into an ACT! template letter. "Voilá I had an instant invoice. Complete with invoice number."

Contact managers can also be used to update employees in field offices. Waterside Productions, a literary agency in Del Mar, California, uses TeleMagic to keep track of calls to publishers and writers. Every night, the computers talk to each other and update each other's databases so everyone knows the status of each project, says Matt Wagner, a Waterside agent who works from an office in Santa Monica.

Little wonder contact management software is one of the fastest growing segments in software development. Whether you need to be reminded of calls, meetings, appointments, or notes, there's nothing like the easy access to data in a contact manager.❑

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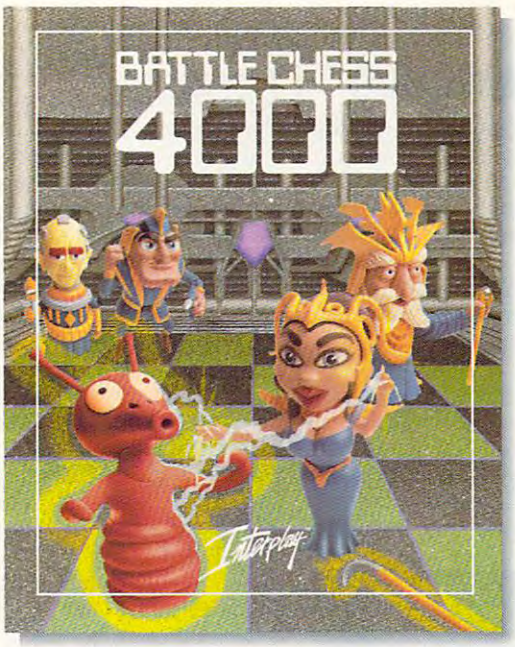

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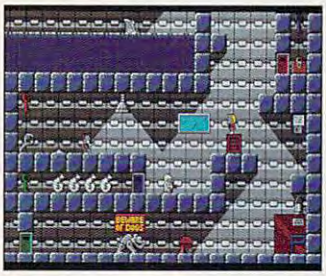

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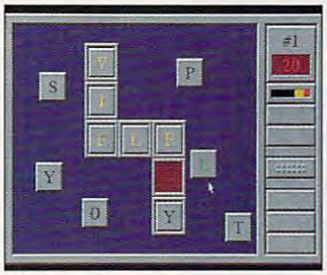

Make words and outscore the opposition with KrisKros.

First, there's Secret Agent, an awesome action-adventure game with full-screen scrolling. Then, there's KrisKros, a word game that quite simply blows other Scrabble-related games away. Both games are guaranteed to challenge everyone in your family and provide hours of fun.

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Secret Agent

Secret Agent: The Hunt for Red Rock Rover is a recent production from Apogee Software, one of the top shareware companies today. It's loaded with state-of-the-art features not found in most commercial games. First, there's the graphics. Secret Agent has huge levels with full-screen scrolling , much like those seen in Super Nintendo and Sega games. Other prominent features are multiple save and restore keys, joystick support, and EGA or VGA graphics.

Your mission begins when you parachute onto the island fortress of DVS, the world's most dangerous terrorist organization. You have to recover the stolen blueprints for the ultimate satellite weapon before it's too late. To complete your mission, you will need to knock out the vast security system, bypass dozens of clever and deadly traps, and overcome hundreds of multi-talented guards (such as thugs, ninjas, sharpshooters, knife throwers, and sentries) as well as several different types of attack robots.

Secret Agent runs on any IBM PC or compatible. EGA or VGA graphics and a hard disk are required. A joystick is optional. The registration price is $15.

KrisKros

KrisKros is a unique game for one to four players. Imagine a cross between Scrabble and a crossword puzzle, then sprinkle in liberal doses of strategy and timing, and you've got an idea of what KrisKros is about.

The object of the game is to form words by placing letter tiles on a grid similar to a small crossword puzzle. Scattered around the grid are 12 randomly selected letter tiles. To complete the puzzle, you have to put the tiles on the grid and form words. When you form a word that's in KrisKros's 7000-word dictionary, the letters turn yellow to let you know you have an acceptable combination. If it looks hopeless, you can get new letters anytime, but all the letters are replaced, including any that may already be forming a word.

Each player is given 90 seconds to complete a turn. If you finish the first grid with time to spare, you can try to complete more than one puzzle and get more points. However, if you don't complete the current puzzle before the time expires, then the points awarded for all previous patterns completed on your turn will be lost.

The number of points awarded for completion of each puzzle varies from 10 to 25, depending on the puzzle's difficulty. The winner is the player who reaches 500 points first.

KrisKros runs on any IBM PC or compatible (80286 or faster) with EGA or better graphics. A mouse and hard drive are required. The registration price is $15. ❐

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Jan Altman

MICROSOFT EXCEL 4.0

If you thought Microsoft Excel 3.0 just couldn't be any better, hold on to your hat. It is. Better mouse implementation, more shortcuts, and improved presentation features are just a few reasons you'll want to look into this upgrade.

Developers focused on user feedback when they upgraded Excel. Some 80 percent of the requests Microsoft received over its WISH phone line since the release of version 3.0 are fulfilled in Excel 4.0. Many of these improvements center on making user-intensive tasks easier and at times automatic. This is accomplished in part by the mouse.

Not since Word for DOS 5.0 has Microsoft taken such great advantage of the right mouse button, but it was worth the wait. Because of the numerous mouse shortcuts, I pull down menus at least 40 percent less often than before.

Following the lead of WinWord 2.0, Excel now incorporates Drag and Drop. This means you can drag the mouse to move or copy cells. Drag and Drop lets you select any range and drag its border to move it; an outline shows you exactly where to drop it. I can't imagine going through the Clipboard anymore—the chore of cutting and pasting is gone.

Autofill is a shortcut that cuts down on using Edit Fill and Data Series. Every selection now has a fill handle (a small square) in the lower right corner. Drag the fill handle to the right or down to perform an Edit Fill—a rather quick and elegant way to fill a range with formulas.

Use the fill handles to extend a series, too: Drag a cell that says January and create a series of months; drag Monday to create a series of days. If your initial selection is two or more cells with numbers, Excel will calculate the trend and extend the series as you drag. (The fill handle has an ingenious twist: Drag it to the top of a selection to perform an Edit Clear.)

Excel's most common editing and formatting operations have been condensed into new shortcut menus. Point to any cell and click the right mouse button. A small menu pops up with your favorite choices; for example, Cut, Copy, Paste, Clear, Delete, and Insert pop up from the Edit menu. You no longer have to move the mouse off the worksheet to drop down a menu. The right mouse button works on other parts of the screen, also. Row Height and Column Width are added to the above choices when you click on a row or column heading.

Toolbars can be customized and are task oriented.

Excel 4.0 comes with seven built-in toolbars (including one that mimics Excel 3.0's). The standard toolbar is chock-full of goodies, but if your idea of goodies differs from the default, you can easily change them with a couple of clicks and drags. Drag buttons around to change their order. Add another button by picking it from a box and dragging it onto a toolbar. If you add a button into empty space, a new toolbar is created.

A mere click of the right mouse button allows you to show or hide specific toolbars or display the box to customize them. Once you've shown a toolbar, it can be positioned onscreen wherever you drag it or be docked along the screen's edge.

The program includes an intricate set of add-in functions and macros. If you install the whole package, you'll need a scant 11MB of free space. (The minimum required for installation is about 5MB.) These add-ins range from the highly technical (specialized engineering, financial, and sta-

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tistical functions) to the simple but useful (Autosave, a custom color palette, a Word-like glossary, and so on). To use an add-in for the first time, pull down Options Add-Ins (the Add-In Manager is launched), select the add-in you want, and wait a few seconds. In most cases, a new command is added to a menu. (I experience a small delay when installing an add-in on my 20-MHz 386SX, but your experience may be different.)

Many of Excel's glossy new features are complex add-in macros. The Crosstab ReportWizard is a handy database-reporting device that gives you a summary or comparison of specific data. Scenario Manager lets you create different what-if scenarios and views of your data in a single file and then print them. You can also create slide-show presentations that include worksheets, charts, and even graphics from other applications. And Worksheet Auditor will report on errors in your worksheet.

Lotus 1-2-3 users will find that Microsoft has gone all out to win them over. Macro Interpreter allows Lotus 1-2-3 users to continue running their old macros unmodified. They can also call Excel macros from within Lotus macros to take advantage of Excel's powerful macro language.

File format compatibility is also worth noting. Excel reads and writes Lotus 1-2-3 WKS, WK1, and WK3 file formats as well as Impress files, FMT, and FM3.

To further help Lotus users make the transition, there's interactive online help that demonstrates how to execute Lotus commands in Excel. And an onscreen tutorial provides hands-on practice for important Excel features.

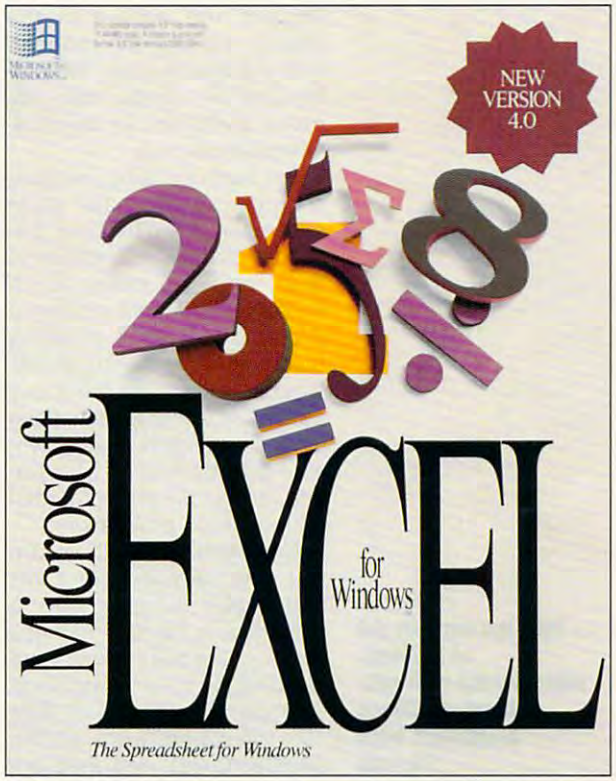
Excel has become much more intuitive; the aforementioned Autofill, shortcut menus, and customizable toolbars attest to this. But there are many other ways in which it keeps a step ahead of you. When you're typing in a function and forget the closing parenthesis, Excel enters it for you. When you create a formula that refers to formatted cells, Excel automatically applies the same number format to the formula. You no longer have to split panes before you freeze them; if you go to Window Freeze Panes, Excel first splits them at the location of the cursor.

Chart creation also requires less thinking, and ChartWizard is great for those unfamiliar with the process. When you're working with a chart, the chart toolbar appears on the screen automatically. Three-dimensional charts can be rotated with a drag of the mouse. And, yes, even charts have shortcut menus.

You'll also see ways in which Excel and Word are becoming more alike. Excel now includes a spelling checker, a glossary, a document comparison function, a zoom factor (you can even fit the selected area onto the page automatically), and the ability to open several files at once. And you have much more control over printing, page layout, and graphic objects.

In spite of it all, I still have a wish list. I wish I could still operate Window Arrange All from the menu (it now requires going into a dialog box). I wish Formula Goto would place a cell in the middle of the screen where I could see it in context (it winds up in the lower right corner). And I wish Microsoft would standardize its shortcuts: This program would be even better if you could double-click on the status bar to get the Goto box (Word does that) or if a little window would pop up and direct you when you drag a scroll box on the scroll bar (Project does that). But these details are so minor that their absence does not in any way detract from the beauty of the program.

Excel is truly a program that lives up to its name. It's simple and elegant, and it puts power into your hands. The more I use it, the more I feel that I'm seeing the software of the future. ❐



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PERSONAL PRODUCTIVITY

Rosalind Resnick

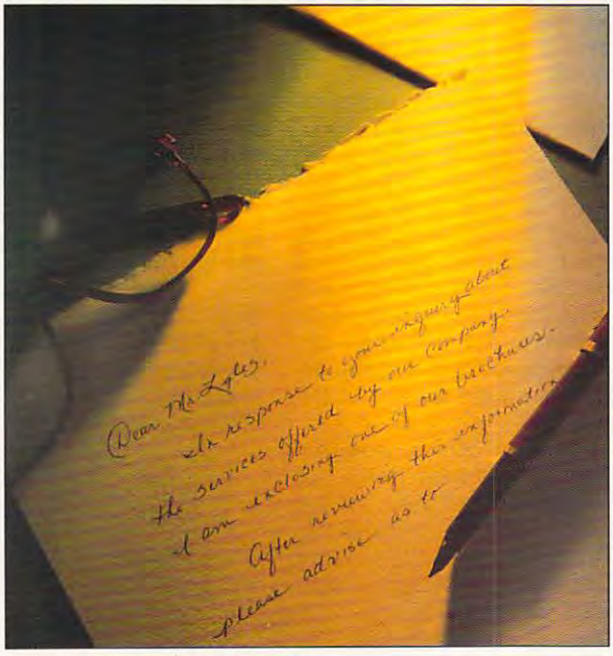
CORRESPONDENCE SCHOOL

Despite the advent of the phone, the fax, the modem, and the Post-it note, the old-fashioned art of letter writing remains a vital skill for home office professionals.

For many small businesses, a prompt, well-written letter can mean the difference between money collected on time and a major cash crunch, a satisfied customer and an ex-customer, a thriving company and a bankrupt one. Trouble is, despite the many advances in communications technology, few business owners have the time to sit down and tap out a full-length letter on their word processors.

Now, fortunately, there are two new software programs that make letter writing a snap. One is Parsons Technology's Personal Advocate ($69.00; Parsons Technology, One Parsons Drive, P.O. Box 100, Hiawatha, Iowa 52233; 800-223-6925), designed primarily with the individual consumer in mind, which churns out everything from complaints to the Better Business Bureau to demands for past-due alimony and child support. Personal Advocate requires an IBM PC compatible computer, hard drive, 512K RAM, DOS v. 2.11 or higher. There's also MyQuickWriter ($24.95; MySoftware Company, 1259 El Camino Real, Suite 167, Menlo Park, California 94025; 415-325-9372), intended for the small-business crowd, that lets users tailor a series of form letters to create their own collection notices, product announcements, thank-you letters, and other correspondence. MyQuickWriter requires an IBM PC compatible computer, 512K RAM, DOS v. 2.0 or higher

Take the anguish out of business letter writing with new correspondence processors from Parsons and MySoftware.



Both programs are quick, easy to learn, and simple to use. Personal Advocate provides interactive templates that prompt users to fill in the blanks; MyQuickWriter lets users edit prewritten form letters. Both programs allow letters to be printed out or saved as ASCII text files for further refinement on the word processor of the user's choice.

Of the two programs, Personal Advocate clearly covers more turf. Aimed at helping consumers cut through red tape to get action, receive information, or just express their views, Personal Advocate is capable of spitting out close to 40 of the most commonly written letters to credit, consumer, and governmental agencies. Personal Advocate also includes an expandable address book database of roughly 2500 names, addresses, and phone numbers of major corporations, Better Business Bureaus, consumer groups, and other organizations across the country.

Also, Personal Advocate goes out of its way to make sure you do things right. Every time a blank space appears in one of the letter templates, a prompt appears at the bottom of the screen to tell you what to do. If you forget to fill in a blank, a help screen pops up, commanding you to go back and insert the missing data. In addition, there's a glossary of legal and technical terms, an expert guide help system, and a shortcut key list, plus special features like mouse support, a math calculator, a notepad, a calendar, and resizable windows. On the other hand, Personal Advocate hogs a lot of disk space—over 3MB.

MyQuickWriter, by contrast, is a more modest program that, for the home office professional, is probably more useful. Though MyQuickWriter lacks an address book, online prompts, mouse support, and a number of other niceties, it takes up only half a megabyte of storage and churns out all the standard business correspondence plus a nifty QuickFax form. MyQuickWriter's letters, while a little less polished than Personal Advocate's, are short, businesslike, and to the point. Especially noteworthy is a series of 30-day, 60-day, and 90-day past-due collection letters, each progressively more threatening.

MyQuickWriter also offers vital editing features, such as a spelling checker, search-and-replace capability, page numbering, autoindent, and a novel formatting feature that instantly converts correspondence into memos, business letters, and five other styles.

At the same time, some of MyQuickWriter's letters are hackneyed. On the other hand, these PC-generated business letters do get the job done and do it fast. After all, 'tis better to have mailed a trite but grammatically correct form letter than never to have mailed at all. ❐

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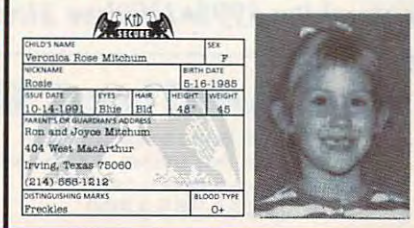

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PALMTOP STRATEGIES

By Rosalind Resnick

Tools to make lives easier and work more efficient or just executive toys? If you think palmtops are too small to do useful work, read on.

Painting by Tim Teebken

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Reed Barker, an agricultural researcher for the U.S. Department of Agriculture who works in Corvallis, Oregon, has what some people might consider the world's most boring job.

It used to be much worse—before he bought a palmtop computer.

That's because, as a geneticist, Barker spends much of his time studying plants to gauge the effects of various pesticides. Before he bought his hand-held HP 95LX, this often meant spending four hours at a stretch examining some 4000 plants while his assistant took notes. The handwritten jottings then had to be typed into the desktop computer back at his office, another four-hour chore.

Now that Barker's got a palmtop, his assistant merely enters the numerical ratings into a palmtop-size Lotus 1-2-3 spreadsheet and "dumps" the data into his Macintosh without any retyping. From there, the data can be manipulated quickly and easily.

"I can't do without it," Barker says.

Barker is not alone. These days, everyone from doctors and teachers to airplane pilots and major league pitchers are using palmtop computers to manage their business and professional activities. Nearly 400,000 palmtops were shipped worldwide in 1990, mostly in Japan, according to Dataquest, the market research firm. By 1994, palmtop sales are expected to top 5.2 million units.

A Computer for Every Pocket

Unlike larger portables such as laptops and notebooks, a palmtop typically weighs in at a pound or less, runs on AA batteries that last for weeks, and can be purchased for as little as a few hundred dollars. Many business users, such as sales managers and real-estate brokers, use palmtops to gather data in the field for later transmission to desktops; a few palmtop enthusiasts have junked their desktop computers altogether, making palmtops their main machines.

Nanci Williams, for one. Williams, who runs a home-based public relations firm in San Jose, California, needed a computer to take with her as she traveled to clients' offices throughout the Bay Area. Scrapping the idea of buying a laptop after finding out how heavy they were to lug around, Williams opted for a palmtop. Four years ago, she bought a Poqet PC.

"The Poqet literally just slipped into my briefcase," Williams says.

About a year ago, Williams got divorced. Her husband got the couple's desktop computer; Williams got the palmtop and the printer. Replacing the desktop, she says, is not a priority. With her Poqet, she can take notes, write press releases, track billings, store contact names and addresses, even keep her calendar.

The only problem, she says, is convincing skeptical clients to accept it.

"Nobody believes that this thing I carry around with me is actually a computer," Williams says. "They tell me, 'I want you to do my job on a real computer.'"

Not a Toy

Kyle Shannon, a graphic artist and aspiring screenwriter who lives in New York and uses a Poqet to jot down notes for his scripts, says "It looks like a toy. People don't realize that something this small could be this powerful."

Clearly, palmtop computers have come a long way. Ten years ago, Hewlett-Packard—the maker of the HP 95LX—introduced one of the first hand-held computers, the HP 75C. Weighing in at 26 ounces and powered by a rechargeable ni-cad battery that could operate for only 30 hours, it featured a 32-character display; a proprietary operating system; and 16K RAM. The price: nearly $1,000.

Today's palmtops are full-featured DOS-compatible computers that, with the exception of Poqet's top-of-the-line PoqetCom (formerly called the Poqet Communicating Computer), cost far less. The HP 95LX, for example, offers built-in software such as the popular Lotus 1-2-3 spreadsheet program, an appointment book with alarms, a world time clock, a phone book, a memo editor, data-communications software, a file manager, and an advanced financial calculator that operates in either algebraic or reverse Polish notation. One-key access allows users to launch applications instantly and move among them without losing their place.

Getting in Touch

Like larger portables, palmtops are gaining the ability to communicate with computers in remote locations, enabling business and professional users to scan E-mail, send faxes, and search online databases. The PoqetCom, which retails for $4,995, includes communications software, a 9600-baud fax/modem, and serial and parallel ports. For wireless communications via the ARDIS network (a radio network analogous to cellular telephone technology), the PoqetCom even has a built-in radio. A WorldPort 2400 Modem with a serial adapter or cable is available for $250 to $260 for other Poqet models.

More and more palmtop software is becoming available, too. Besides the Lotus 1-2-3 spreadsheet program that comes bundled with the machine, the HP 95LX offers customized applications for doctors, pilots, sales reps, and other business and professional users. The FX-7 Flight Pak from Paragon Technologies, for example, provides pilots with a comprehensive set of flight-planning tools. CM Software's Pocket Salesforce is a contact management program that allows users to enter company records, sales leads, and other marketing information into a portable database. And Computer Books' Patient Management software lets physicians keep track of their patients' medical histories, medications, and lab results.

For the Atari Portfolio, another palmtop, Pulse Metric's Dynapulse program offers a computerized blood-pressure and pulse-rate measuring system. Features include systolic, diastolic, mean arterial pressure, and pulse rate measurements with clinical-graded accuracy. Essex Marketing Services offers UTIL, an interactive FORTH programming system designed to run on the Portfolio.

But today's palmtop market is not limited to DOS compatibles alone. There's also a thriving market for hand-held electronic organizers, such as Sharp's Wizard. LINK Resources, a New York–based consulting firm, estimates that 13.4 percent of U.S. households own an electronic organizer and that the number is expected to rise.

Calendar Computer

Though electronic organizers can't run PC software, they do provide basic personal information tools such as an appointment book, phone book, notepad, and calculator. Many also offer add-in software available on proprietary integrated circuit cards. Communications links are available, too. Sharp recently unveiled its OZ-8B02 Organizer Fax/Modem, a 4800-baud pocket fax/300-baud modem that gives the Wizard standard terminal and send-only fax capabilities. This means that Wizard users can now send and receive messages through virtually all E-mail systems, including AT&T Easy Link, U.S. Sprint SprintMail, MCI Mail, CompuServe, and GEnie.

The uses people have found for their Wizard organizers are as varied as the people who buy them. Relief pitcher Rob Murphy of the Seattle Mariners has compiled a pocket database of hitters in the American League. Each batter's name is stored alphabetically along with the hitter's style and other notes. To track his effectiveness, Murphy also records the pitches that he throws, the first and

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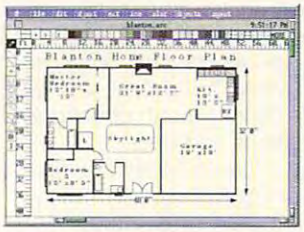

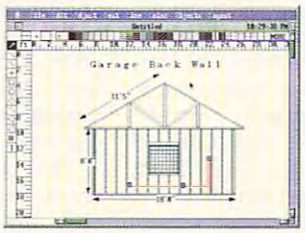

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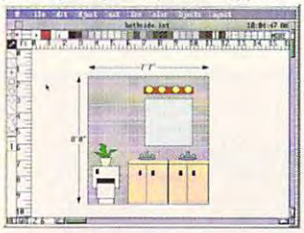

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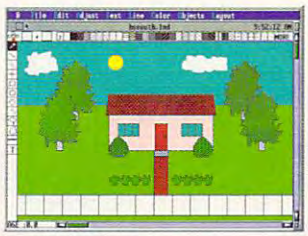

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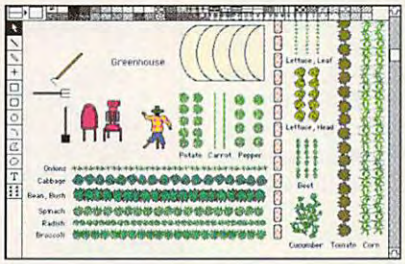

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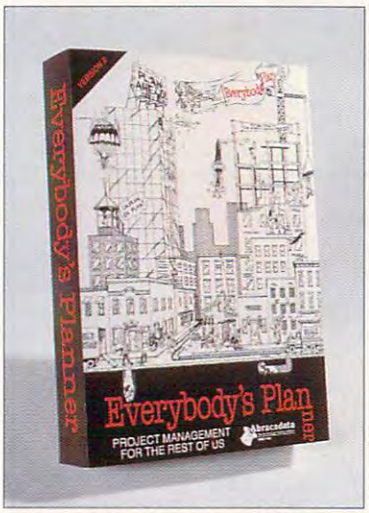

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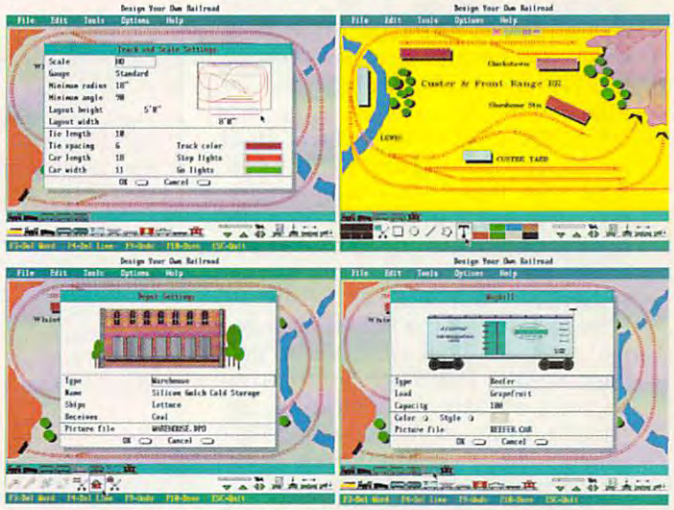

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last pitch of each at bat, and the result. Likewise, Fordham University rowing coach Ted Bonanno of Bronx, New York, uses the Wizard to track the performance of his oarsmen.

And Robert Dunn, a Mountain View, California, writer of children's books, uses the Wizard to collect his thoughts and ideas, boosting his productivity.

"While I keep daily working hours, a writer is writing and thinking all of the time," Dunn says. "What truly amazes me is how much time I spend each day waiting for someone or something beyond my control. I've composed many of my best four-line rhymes while waiting in doctors' offices, post offices, airports, and even traffic jams."

In addition to the Wizard, Sharp also markets the PC-3000, featuring a CGA 640 × 200 pixel LCD screen, a 10-MHz 80C88A processor, 1MB of RAM, and 1MB of ROM. It can be connected to a 3½-inch disk drive, but its principal storage is on memory cards.

Zenith Data Systems recently introduced two pocket organizers, the ZDS-106 and the ZDS-112. The 64K ZDS-106 and the 128K ZDS 112 feature equipment and software for transferring files to a PC. And Casio has long manufactured its B.O.S.S. organizer.

Limited Resources

Despite the many advantages of palmtops, however, users say that they still have a long way to go. One drawback is the tiny keyboard and display screen, which can make word processing a challenge. Another problem is the relative shortage of memory, which can hamper storage of lengthy text files and software programs. The Atari Portfolio, for example, comes with only 256K of ROM and 128K of RAM, which can be expanded to 640K. That's far less than the amount of memory that comes with most PC compatibles on the market these days.

Buying additional memory can get expensive fast. A 512K SRAM PC Storage Card for the Poqet, for example, retails for $295, while a 2MB card costs $1,095. That's why Shannon, the aspiring screenwriter, says he purchased an 3½-inch DOS-compatible external floppy drive (list price, $495) for transferring data.

Another problem is the relatively slim selection of compatible software. Palmtops are too small to run conventional 5¼-inch and 3½-inch floppy disks and require software applications burned into tiny ROM cards. Even using the external floppy drive mentioned above, users would have trouble using most DOS applications on a palmtop primarily because of its small screen size. Another problem is that some palmtops automatically shut down the microprocessor between keystrokes to prolong battery life. This can cause some conventional programs to terminate or make mistakes. Lucy Honig, a Hewlett-Packard spokesperson, says that software loaded into the HP 95LX must be XT compatible and warns that some graphics displays won't show up. That still leaves a fairly large selection of software. "About 85 percent of the off-the-shelf software will run with no problem on the Poqet," says Matt Schmist, a Poqet spokesperson.

Barker, the agricultural researcher, notes that his HP 95LX runs only Lotus 1-2-3 and not the Microsoft Excel spreadsheet program he uses on his desktop Macintosh. This has forced him to master both software programs. Shannon, for his part, says he's currently beta-testing an interactive scriptwriting program for a software company that he hopes will one day come out with a version for the Poqet. Ironically, the biggest problem with palmtops may be their small size. Unlike a laptop computer, palmtops are as easy to leave on a customer's desk as a pair of sunglasses. Lose your palmtop, users say, and you wave goodbye to hundreds or even thousands of dollars' worth of valuable customer contacts and data.

"My biggest fear is that I'm going to leave mine somewhere someday," says Williams, the home-based marketing consultant. "I'm surprised I haven't done that already."

Even so, say the palmtop enthusiasts, once you've experienced the freedom of truly portable computing, there's no going back to the desktop grind. ❑

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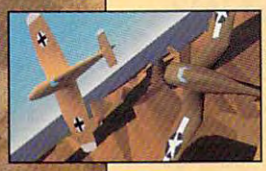

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ART WORKS

Robert Bixby

TWO IMPORTANT DESKTOP ADVANCES

The pace of advance in computer software quickens all the time. Once you could count on a piece of software's remaining current for 18 months to two years with minor updates to add a feature, clean up a bug, and so forth. But lately, less than a year goes by between major upgrades of some software. You can thank the intense competition for market share, the advances in programming and hardware that make more features possible, and the conventional wisdom that anything new is better than anything old.

Two new products are now out for desktop publishing—Ami Pro 3.0 and CorelDRAW! 3.0. Since I've had the privilege of working with the betas and writing about each of these products, I'd like to introduce some of their most important improvements to you.

It's good news for desktop publishers: CorelDRAW! and Ami Pro both turn three.

Ami Pro has added a slew of new macros, a grammar checker, drag-and-drop editing, newly designed icons, and dozens of smaller convenience features. For example, the SmartIcon option is much more logical than in the previous version and even includes a tiny paint program so you can edit your icons and create new ones.

You can view files without opening them, making it easier to locate the specific file you want to work on.

The Ami Pro File menu will show the last four files accessed so you can load them instantly by clicking on their names in the File menu. It now prints envelopes with a special menu option.

A Clean Screen option eliminates all the distracting little Windows doodads like menu bars and scroll bars, allowing you to work with Ami Pro more as you would work with a traditional DOS word processor while retaining the advantages of WYSIWYG. Don't worry, though, the menus are an Alt-key combination away. Most touch-typists hate accessing menus via the mouse, anyway. If you want to retain some part of the Windows display during Clean Screen, Lotus has allowed for that, too.

The right mouse button has been provided with new powers. Right-clicking on a paragraph will call up the Modify Style dialog box, and right-clicking on a frame will call up the Modify Frame dialog box. Ami Pro 3.0 is full of little improvements that make writing even more effortless while making Ami Pro even more powerful than last year's winner of the COMPUTE Choice award for best word-processing program: Ami Pro 2.0.

CorelDRAW! is the graphics success story of the Windows age. CorelDRAW! 2.0 was a significant advance over 1.2 about a year ago. But CorelDRAW! 3.0 is literally in a league by itself. It's one of the best drawing programs available, with better text handling than before and a more standard drawing interface (no more side-by-side wireframe and preview—now there's only one window, in which you can elect to see wireframe or preview). Extrude has taken a quantum leap, allowing you to shade all sides of an extruded object and allowing for a positionable light source. The extruded object can be rotated in three dimensions. But there's even bigger news.

First, WFNBOSS is history. CorelDRAW! now works with TrueType fonts, eliminating the need for font conversion.

CorelPHOTO-PAINT! is a powerful paint program capable of performing darkroom-like magic on scanned grayscale or color photographs. It includes image-editing features like contrast, edge sharpening, and posterizing. You can fill shapes with gradients and patterns, or clone images from one location to another.

If you're considering one of the powerful graphing and charting programs for business use, consider CorelDRAW!. It now comes with CorelCHART! to generate bar, pie, and area charts; histograms; scattergrams; and many other kinds of charts, including several kinds of shaded 3-D graphs.

Once you have your charts created, you might want to put them into a presentation. If so, Corel has provided CorelSHOW!, an extremely simple presentation program that makes displaying your charts and CorelDRAW! drawings a snap. It's the easiest presentation package I've seen yet. And not only will it show drawings from its sister applications, but it has a special button that allows you to import documents, graphics, animation, or sounds from other Windows applications. ❐

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PATHWAYS

Steven Anzovin

ASIMOV ON DISK

I met the late Isaac Asimov more than 20 years ago, when he came to give a talk at a local college on "The Future of the Earth." Most of the audience, including me, came to hear him because he was a famous SF writer. His film, the cult classic *Fantastic Voyage*, had been released only a year or so before, but he was already one of the most prolific and popular nonfiction authors of all time, with more than 100 books to his credit. (His life total was just under 500 volumes, on nearly every subject imaginable, from the Bible to biochemistry to dirty limericks.) Asimov, sporting the muttonchop whiskers that became his trademark, was witty and ebullient, though he didn't have anything particularly hopeful to say about the fate of the world. No small talk for Asimov: "If our technical civilization destroys itself, as is not unlikely," he remarked heartily to me, "the survivors will not be able to rebuild it, because most of the metal ores will already have been mined from the earth." Still, I came away with the idea that if Asimov thought it was worthwhile to keep on writing, there must be reason to hope.

Author Isaac Asimov maintained his distance from computers, but Knowledge Adventure was able to put his talents to use in Science Adventure.

His death last April at the age of 72 reminded me that Isaac Asimov, by the sheer weight and quality of his output, did more than anyone else to raise the level of science awareness in this country. Carl Sagan called him "a natural resource, a Renaissance man born out of his time—thank God." And I'll wager that most of today's computer developers were inspired to think about thinking machines by his famous robot stories. After all, it's Asimov's robots, with their deceptively simple rules of moral conduct, that today's roboticists dream of building. In fact, Joseph Engelberger, who with George Devol was the first commercial developer of robots in the U.S., was inspired to enter the field by reading Asimov's *I, Robot*.

Oddly enough, Asimov never wrote a book about computers. In fact, this compulsive writer apparently didn't have much use for computers at all. By his own account, Asimov drafted all his tens of millions of words not on a word processor but on a typewriter. Asimov knew exactly what he wanted to say, and he said it right the first time.

Interestingly, in his 1953 novel, *Second Foundation*, Asimov does describe a distinctly Mac-like portable word processor owned by the book's teenage heroine, Arkady Darell, who lives in the far future. She's thrilled because her father has bought her a model that prints in a flowery, violet-inked script that's perfect for her galactic-history term paper. Even more exciting, she doesn't need to type any longer, because this new model understands and accurately transcribes human speech. Asimov appears to have been the first to predict that practical speech recognition would require another 50,000 years of development.

While Asimov didn't write much about computers, shortly before his death he did lend his efforts to an educational software program about the history of science called Science Adventure (published by Knowledge Adventure, 4502 Dyer Street, La Crescenta, California 91214; 818-542-4200; $79.95). Science Adventure, like its popular sibling Knowledge Adventure, is an interactive multimedia reference tool and game that encourages curious students to wander through a body of knowledge by pointing and clicking. The program looks handsome, with a clever and responsive interface, many striking 256-color VGA pictures, and some cool digitized sounds, but its biggest asset is the onscreen text, adapted from the 1989 book *Asimov's Chronology of Science and Discovery*.

A couple of the good things about Asimov's science writing is that he doesn't offer perfectly neutral informational prose and that he doesn't suffer fools, even brilliant fools, gladly. In the entry for Darwin, for example, he lets us know that Darwin was "naive" for believing his work on the origin of species was so self-evident that everyone would agree with him. And he notes that the seventeenth-century battle royal between Isaac Newton and Wilhelm Gottfried Leibniz over who invented calculus "poisoned the scientific community" to the detriment of everyone. That's the kind of valuable detail we've learned to expect from Asimov. ❐

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Explore heavenly bodies and discover the workings of our closest celestial neighbors in this great introduction to our solar system.

Peter Scisco

ORBITS

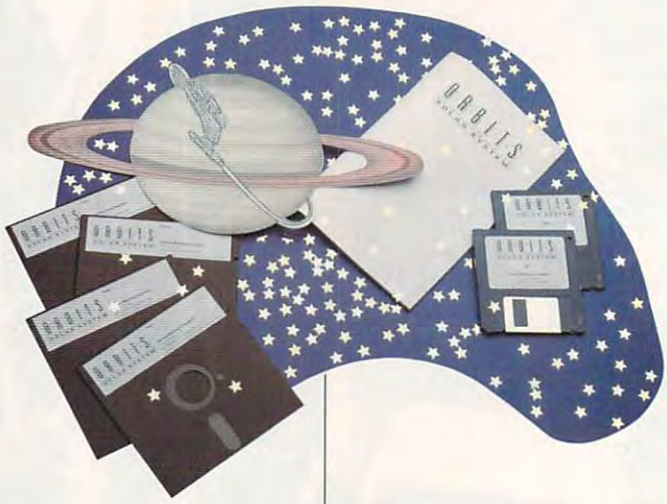
Outer space may be considered the final frontier in the popular imagination, but in the context of the celestial universe, there's nothing final about it. The universe may or may not have enough mass to sustain itself; it may or may not at some point begin a slow collapse into nothingness. What we know about the cosmos is dwarfed by the very subject we study.

Orbits helps amateur cosmologists understand the dynamics of the universe by bringing the final frontier into our own backyard. Rather than casting its eye outward to the stars, Orbits limits its study to the solar system of which our earth is part. This family of planets, circling a medium-sized star, serves as a fine introductory point to the study of astronomy.

The program's design is clean, simple, and easily navigated. Small touches, like using a tiny space shuttle as a cursor, create a feeling of adventure and fun. The promise of adventure makes it easier to approach the complex workings of the solar system and its planets.

In general terms, the program is divided into animated displays that describe the solar system, written explanations, and a series of "games" (orbital simulations and a jigsaw puzzle) that allow the user to experiment with the gravitational laws that control orbits and reconstruct jumbled pictures of space objects.

The descriptive parts of the program are listed at the top of the animated main menu screen. Here, our solar system is divided into its main components: sun, earth, moon, and planets. You can choose to have the screen animated or not. The animation consists of colored bands, or rings, that define the orbits of the planets around the sun and their relative position to each other as seen from a perspective just above the plane of the solar system. The General menu includes such topics as gravity and the motions of planets; it offers a path into the study of orbital mechanics. In addition to selecting from the pull-down menus, users can move the cursor over any of the solar system bodies to gain access to information about a particular planet or celestial body.



If Orbits concerned itself only with pretty pictures and animated display, its usefulness would be short-lived. But the information that accompanies the still pictures and animations is accurate and presented in a manner appealing to beginning astronomers of any age. The program makes use of authoritative sources for both its explanations and its graphic displays. These sources include NASA and the Jet Propulsion Laboratory at the California Institute of Technology in Pasadena, California.

The blend of graphic displays and explanatory notes is seamless and graceful. For example, if you're interested in the earth's moon, you can explore lunar features, study the moon's internal structure, and compare the moon to other bodies in the solar system. Each of these selections, or paths, branches to more specific areas of study.

A student interested in lunar features could explore maria (the dark plains created by ancient lava flows), craters, rays (bright streaks emanating from craters, believed to be composed of rock and dust thrown up at the time of impact), atmosphere, and such lesser features as lunar mountains and the steep crevasses called rills.

Every planet is covered in the same way, as are asteroids, comets, and the sun. Each discussion includes the subject's distinct characteristics and offers pictures and animations that explain the ideas behind the words.

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But, as Einstein might say, all of these voyages of discovery are relative. An eager student may journey into the core of the moon or explore the atmosphere of Jupiter. But what can be made of the facts encountered? Orbits boosts the process of discovery by allowing users to compare planetary descriptions side by side. The juxtaposition of facts and pictures creates a basis of comparison that helps users envision the facts and details that describe the solar system.

A parent using this program with a child, for example, might compare the structure of Mars with the structure of the earth to illustrate the similarities of the two. Or a student studying the earth's moon might compare that body with the earth and discover enough similarities to fuel a school report.

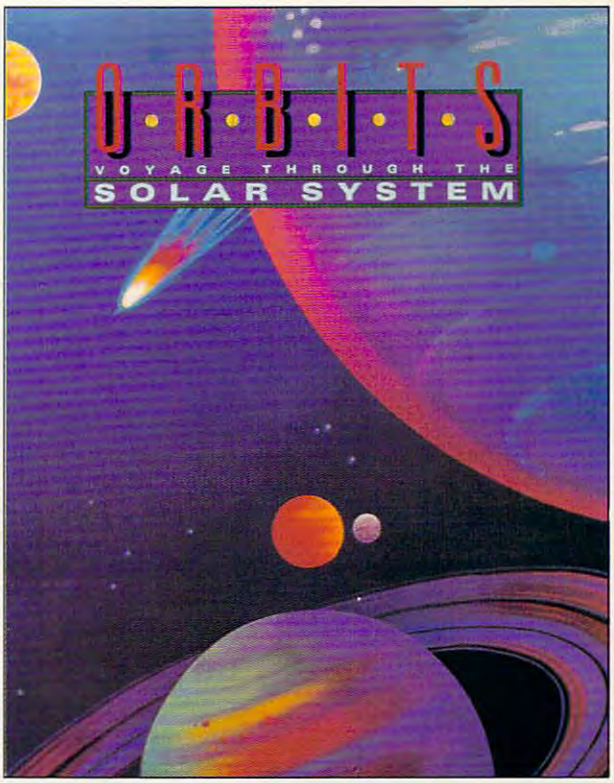
Once you've studied the major planets and other bodies that constitute our solar system, you can begin a journey into the physics and phenomena that play a role in our tiny corner of the galaxy. Detailed and animated explanations for eclipses, phases of the moon, gravitational attraction, and orbital mechanics make it easy to understand the dynamics behind them.

For example, eclipses both lunar and solar are displayed in a split-screen fashion that makes the alignment of the earth, moon, and sun understandable. The top part of the screen is from a perspective outside the earth's orbit; you can see the moon revolving around the earth and how it crosses between the sun and the earth, blocking the light (solar eclipse). At the bottom of the screen, the view is from the earth, looking toward the sun. You can see the shadow of the moon as it passes over the sun and compare that to the position of the moon, sun, and earth as displayed above.

Likewise, the relationship between the sun, moon, and earth as it affects the phases of the moon is made clear through another well-presented bit of animation. Although an astronomy hobbyist could do the same on paper by observing the position of the moon throughout a full cycle and by sketching the moon's phases at separate stages of the cycle, the animated display in Orbits provides more instant recognition.

Orbits provides more than information and tools for understanding; it also includes an extremely challenging orbital simulator. To gain entry to this part of the program, select the Other menu and then select Orbital Mechanics. From here you can brush up on Kepler's Laws (you probably remember all of those) and see the importance of Kepler's mathematical theories to the study of our solar system.

With a clear understanding of orbital mechanics (or with at least a hearty sense of adventure), you can choose to play Orbit-Trek, which tests your knowledge under different conditions. You may select from four different missions: Near Earth, which is a good shakedown cruise for your newly acquired skills; Deploy, which requires that you reach and maintain a specific orbit and then launch a satellite; Intercept, which requires that you capture an orbiting satellite; and Rendezvous, which tests your ability to match orbits with a second satellite and fly in formation.



The Orbit-Trek games employ a control panel from which you select the direction and strength of your navigational thrusters. Early experimentation with the game sometimes results in a fifth scenario, which could be called Lost in Space. Just for fun, see how far you can drift from the earth before you reach the point of no return.

With its combination of authoritative explanations and well-designed graphic displays, Orbits is a very good computer-based introduction to our nearest heavenly neighbors. By illustrating the workings of the family of planets we call the solar system, Orbits lays the groundwork for a continuing mission. ❐

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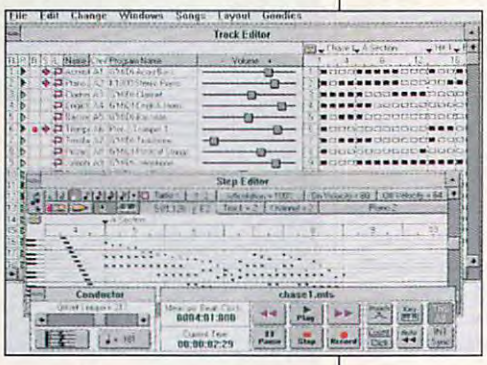
MULTIMEDIA PC

David English

WINDOWS GOES MIDI

I confess. Until recently, I did almost all my MIDI work on a Macintosh. It wasn't really my fault. I just couldn't find programs on the PC that were as powerful and easy to use as Opcode's Vision and Mark of the Unicorn's Performer—both available only on the Mac. Fortunately, that's beginning to change. Two new Windows-based MIDI sequencing programs have made making music on the PC just as much fun as it is on the Mac.



Master Tracks Pro 4.5 features a new easier-to-use Track Sheet.

You may be wondering, What is MIDI, and what is a sequencing program? MIDI stands for Musical Instrument Digital Interface. It's a communications standard that allows electronic musical instruments to talk to computers and to each other. Most electronic keyboards have a MIDI interface built in, and most sound cards (including the popular Sound Blaster and Pro Audio Spectrum cards) come with a MIDI interface or offer one as an option. If you're running Windows 3.1 or Windows 3.0 with the multimedia extensions, you're ready for the flood of Windows-based MIDI programs.

A sequencing program is a sort of elaborate tape recorder that records and plays back MIDI music. It doesn't actually record sounds; instead, it records the various on and off positions of the keyboard's keys as you play, along with the force that you use to strike each key (the harder you strike a key, the louder it sounds) and the time that passes between each note. Taken together, this is enough information to play back a nearly identical performance when used with the same or a similar musical instrument.

Because a sequencing program records a limited amount of information when compared to a full audio recording, MIDI is especially appropriate for multimedia applications and presentations. Where a typical audio recording might take up 10MB when recorded in 16-bit stereo, that same music, stored as a MIDI performance, would take up less than 100K. And because you can use a sequencing program to edit MIDI data much as you would use a word processor to edit words and sentences, you can easily alter the music to fit your needs.

Either of these new sequencing programs would suit the needs of a professional musician, weekend composer, or multimedia artist. The first, Cakewalk Professional for Windows (Twelve Tone Systems, P.O. Box 760, Watertown, Massachusetts 02272; 800-234-1171; $349), has a number of exciting features, most notably the ability to mix real audio data (in WAV format) with MIDI sequences. You can use the program with Windows' Media Control Interface (MCI) to control other multimedia devices during playback. In addition to the usual piano-roll and event-list notation of MIDI notes, this latest version of Cakewalk lets you view and edit your notes in staff notation—the kind you see with traditional sheet music. The program even includes its own built-in programming language and sample programs, so you can write your own editing commands.

While Cakewalk is new to Windows, Master Tracks Pro 4.5 for Windows (Passport Designs, 100 Stone Pine Road, Half Moon Bay, California 94019; 415-726-0280; $395) is a substantial upgrade to the very first MIDI sequencing program for MPCs (Multimedia PCs). New features include the ability to perform many editing functions while the music is playing, an easier-to-use Track Sheet (song and track information are now in one area), and recordable volume faders. The program has special support for the Miracle Piano Teaching System, allowing you to hook up your Miracle keyboard to your computer's serial or MIDI interface. And while Master Tracks doesn't offer staff notation, you can export your files to either of Passport's notation programs, Encore for Windows ($595) and MusicTime for Windows ($249). A stripped-down version of Master Tracks, called Trax for Windows, is also available from Passport. At $99, it's one of the best bargains in music software and a great way to get started with MIDI.

I tried both programs with a MultiSound board, a Sound Canvas, and a Miracle keyboard, and had no problems at all. These are highly sophisticated programs that are surprisingly easy to use. If you've wanted to make music with MIDI, and you're looking for a program that you won't easily outgrow, you can't go wrong with either program. ❐

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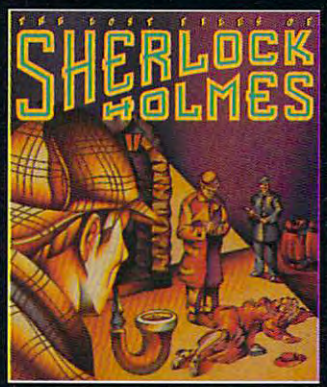

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ACES OF THE PACIFIC

For two hours on December 7, 1941, the skies cracked and rained terror upon the Hawaiian island of Oahu. The Japanese Navy's surprise attack on Pearl Harbor left more than 2400 military and civilian casualties. Dive bombers and torpedo planes destroyed or badly damaged more than 300 aircraft and 18 ships of the U.S. Pacific Fleet. A stunned nation officially entered World War II.

It's easy to say what you would've done had you been there to fight; now, with Aces of the Pacific, you can put your money where your mouth is. An incredible air combat simulation, Aces may be too realistic for the faint of heart. The vintage bombers are meticulously rendered, complete with sometimes unpredictable power and inherent design flaws. Computer-controlled pilots seem to have real-life intelligence and intuition. And the graphics and sound effects will make you think you've actually stepped back in time and entered the scene you see onscreen.

Aces salutes the historic events, budding technology, and heroism of this unique theater of conflict. Designed by Dynamix cofounder Damon Slye, Aces soars above and beyond his best-selling World War I combat simulation, Red Baron. Indeed, this tribute to the Pacific campaigns captures the passion and spirit of a generation better than any previous effort in the genre.

The true stars of the show are the more than 30 types of vintage fighters and bombers, each with distinctive flight characteristics painstakingly reproduced here. Some will amaze you with their innovative craftsmanship and intuitive control; others will ultimately scare the wits out of you with their untamed power and intrinsic design flaws.

First-time flyers should complete the game's comprehensive training missions. Here, you can learn the intricacies of each aircraft and fine-tune techniques like dive bombing and carrier landings. Many such tests of skill and courage have never before been realistically implemented in a computer simulation.

Veteran pilots eager to see action can choose from ten types of single missions. Match wits with a famous ace or learn team effort as you direct a squadron against your enemy counterparts. As in Red Baron, the designers simulated real-life combat intelligence for all computer-controlled pilots. The results are some of the most entertaining, heart-pounding aerial ballets ever to grace the computer screen.

Players can also choose from a variety of individual historic missions or embark on a career campaign. Among the game's many preflight variables is the ability to choose which side and branch of service to fly for: the U.S. (Navy, Marines, or Army Air Force) or Japan (Navy or Air Force). This decision immediately limits or expands your courses of action and available aircraft. For example, become a U.S. Navy flier and choose from 33 missions divided among five historic campaigns. Likewise, the game includes seven campaigns (24 missions) for Japanese Navy pilots.

Historic missions cover the entire spectrum of the war. The choices are as historically rich and varied as they are challenging. Do well, and receive service medals and special commendations.

Other single missions test your ability to complete specific combat objectives: combat air patrol, fighter sweeps, emergency scramble, bomber escort, bomber interception, strikes against shipping and ground attacks. Multiply each by more than two dozen

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user-defined mission conditions, and play value soars to staggering heights. The number of pilots on either side, their skill level, and their aircraft may be changed. Three levels of overall realism include such fine points as gun jams, changing weather, and midair collisions. There are also three levels of combat difficulty and flight-model realism.

Graphics consist of textured solid-fill polygons and bitmapped overlays, beautifully rendered from a 256-color VGA palette. Although the visuals break no new ground in the genre, they are clean, bright, and fast—by far the best of any Dynamix simulation. You'll need at least a 386-based computer running at 25 MHz to enjoy the sophisticated flight mechanics and full graphic splendor. Users can tweak the frame rate, as well as world and aircraft detail, if the simulation runs too slowly.

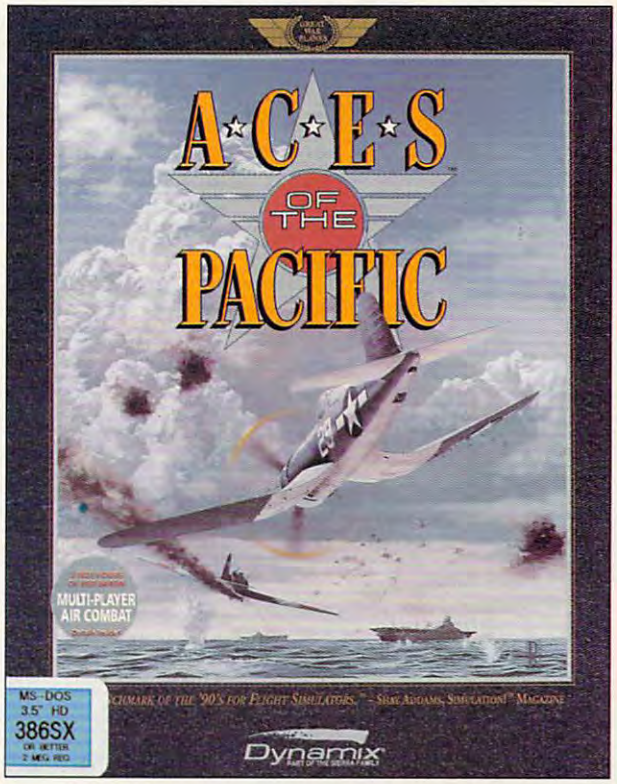
Steep hardware requirements pay off with generous special effects, like the bubbling path of a torpedo or the splash of bullets strafing the water. Views of cockpits boast a digitized quality, while external views feature dramatic light-and-shadow effects. Sound effects are also vivid, from the whines peculiar to different models of radial engines to the remarkable Doppler shifts of passing aircraft. Explosions, however, could use a little more oomph to match the brilliant pyrotechnics.

The game can be played with keyboard or mouse, although a joystick offers the best response and most realistic feel. The simulation also supports a second joystick for rudder control and for flight-specific devices such as yoke, rudder pedals, and the Thrustmaster Flight Control System. Dynamix's joystick routines have significantly improved since Red Baron and A-10 Tank Killer, but they still tend to slip out of calibration easily. The designers should put this problem near the top of their list of things to fix in their next project.

Blemishes are few but noticeable. The handsomely illustrated 233-page manual, faultless in its details of war history, aircraft specifications, and combat tactics, falls short when describing actual gameplay. As if written too far in advance of the final release, the manual virtually omits discussion of the mission scenarios. Too bad, since onscreen preflight instructions are limited to short, vague descriptions. Ironically, one source of valuable information—reconnaissance data gathered from the navigation flight map—is mentioned in the manual but is not present in the actual game.

Initial releases of Aces had some annoying bugs, as well as some poorly though-out features. Dynamix has been very receptive to user feedback and bug reports and has released a series of patch files that fix reported bugs and add some new features, such as changeable waypoints. These patches are available on online networks and the Sierra BBS.

No air combat simulation is complete without a mission recorder, and Dynamix provides one of the best. The playback screen uses VCR-style controls to rewind, pause, single-frame advance and fast-forward. The recorder's only shortcoming is its lack of incremental rewind; miss an important moment, and the tape must be replayed from the beginning. Editing controls let you move and rotate the camera in three dimensions, and you can switch between friend, foe, or independent views. Use this feature to confirm kills, study mistakes, and watch attacks from any angle. Because each change in camera movement and perspective can be saved to tape, would-be directors can use this feature to create intricate combat films. A special demo function will even play such films full-frame, without the VCR overlay.



Breathtaking in scope and great fun to play, Aces of the Pacific might be the most widely appealing combat simulator on the market. You won't want to miss this one. ❐

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GAMEPLAY

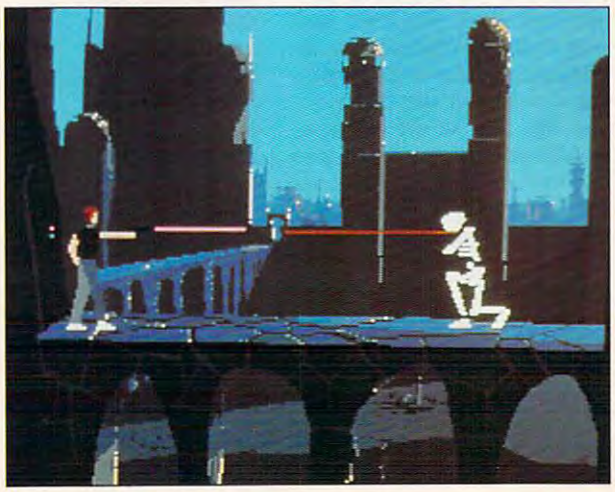
David Sears

CINEMA INFERNO

Computer industry commentators often compare adventure games to films, but most contemporary games resemble good films no more than modern films resemble *The Great Train Robbery.* Pretty pictures and droopy animation don't make great cinema, and it's time we became more critical of B-movie videogames—games that don't fulfill the computer's potential for action and involvement.

Out of this World (Interplay) is a prime example of just how filmic a game can be. Bucking the trend of large design teams, Eric Chahi, who is artist, designer, and programmer, hurls players into a surrealistic other world while maintaining extreme playability. Inspired by the world's first laser disc–based game, Dragon's Lair, but possessing the critical eye of a director, Chahi saw through the glitz and into the heart of that game's prime failure: It offers little interactivity. Push the joystick forward, pull it back—the laser disc driver shows you what happens next. There are no alternate paths to save the princess; a single mistake means annihilation. In Chahi's alternative world, players interact with the environment as they work to return to Earth. There are no seams between scenes here, no annoying dropouts as disk drives struggle to load megabytes of graphics data. This fluidly animated marvel requires only 1.5MB of your hard drive.

Artist, designer, and programmer Eric Chahi hurls players into a surrealistic other world while maintaining extreme playability in Out of This World.



In film school, students learn to make the most of available resources. After all, early artistic efforts rarely have corporate funding. In contrast, few computer game designers exploit personal computers to their natural limits.

Sometimes game designers push the hardware to the edge, but as often as not, they're pushing in the wrong direction. In the eighties, for instance, filled polygon animation was largely abandoned (except in flight simulators). Digitized games today seem bent on their own brand of cinéma vérité, the height of realism. But most people don't have gigabyte hard drives to handle the files a fully digitized game would require.

Instead of turning to digitizing, game designers should develop faster, more detailed polygon animation systems.

And designers should allow us to dabble in plot development, not force-feed us whole chunks of story in which we can't participate.

Computers can inexpensively simulate special effects. The rippling of water in Out of this World puts us immediately below the surface, where light refraction causes marvelous distortion. Explosions flash white, accompanied by suitable booms and crashes. These effects cross the screen boundary to fill the room. They ease us toward the suspension of disbelief, a priceless commodity for anyone about to spend several days playing a game.

Soundtracks don't tax the hardware, either. While cinema purists may declare that a Spielbergian score manipulates emotion, we should welcome this in a game. In spite of our concern with cinematic quality, we do still play games for the sheer joy of play. Designers should pack the most punch possible into every thrill.

Special effects and music don't necessarily make good films. The basics of lighting and direction don't matter much when the film will play out on a computer. Editing technique, however, remains as important for PC movies as for the big screen. Cutting on action establishes the pace. In Out of this World, when a venomous worm strikes, you don't just fall down dead. First, you're treated to an extreme closeup of the deadly thing's spiked appendage, followed by an immediate cut to another extreme closeup, this time of a deadly slash to your knee. Then, at last, you fall. But these events occur so quickly that you don't have time to realize that joystick control has been taken away. No long interludes here—the action almost never stops.

Out of this World plays on every platform at the same speed with the same quality. Chahi might've added photorealistic backgrounds, but most players will happily settle for his distinctive and beautiful matte paintings instead.

Can we expect a series of auteur games from Chahi and Interplay? Unfortunately, it won't happen in the immediate future. Chahi's at work on real film at the moment—the big-screen sort—and won't begin work on another computer project for a year or so. Maybe soaring sales of Out of this World will give other game companies the cue to rethink their production values, though, and we won't have to wait quite so long for more interactive cinema. ❐

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