PC WORLD

June 1993 $3.95

486 PCs for

$1000

50 Super Spreadsheet Tips

Windows NT: DOS for The '90s?

HP's New Low-Cost Laser Printer
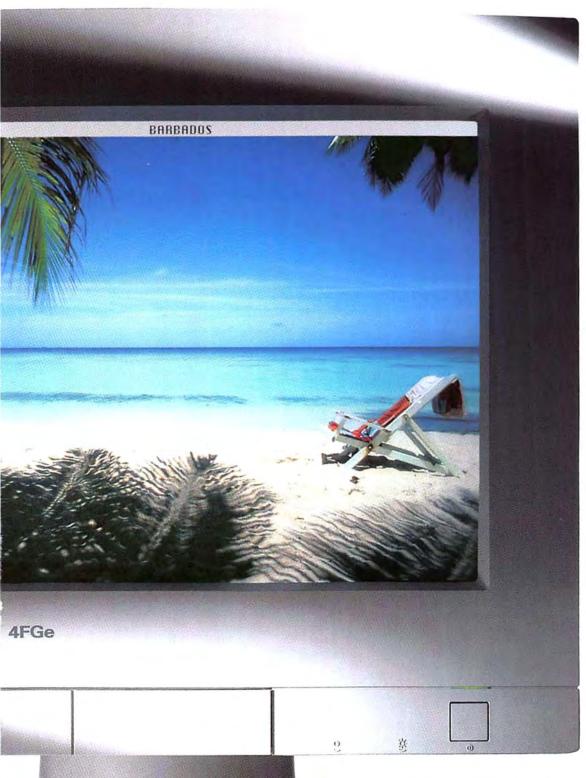
At Last! A Great 1-2-3 For Windows

33

25 SYSTEMS REVIEWED

But it'll be okay.

BARBADOS

4FGe

it'll BE in your face

All day Every DAY

PC WORLD

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Cover Story

486s for $1250

Cover photograph by Robert Cardin, digital composition by Varitel Select

Top of the News

Hard Disks/Caches

1993 World Class Awards

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WORLD CLASS
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Here's How

Departments

Resources

New Products

ZEOS® PCs are your best choice.

But don't take our word for it:

"...blew all competitors away—in some cases performing more than ten times as fast as competitors."

—PC Magazine, January 26, 1993

"An array of features to make a user's mouth water."

—PC Magazine,
January 26, 1993

"The ZEOS is the fastest 33-MHz 486-DX system we tested, and its performance even topped that of two 50-MHz 486DX2s."

—PC World,
February 1993,
Best Buy

Take Theirs.

"This is a fast, beautifully designed PC with an upgrade path that just won't quit. That spells Best Buy to us."

—PC World,
February 1993,
Best Buy

"Kudos for its excellent motherboard design, great performance, and thoughtful little extras...These features set the ZEOS apart from the crowd."

—PC Computing,
March 1993,
Best Value

"...look at ZEOS's new 486DX2-66... That's value pricing."
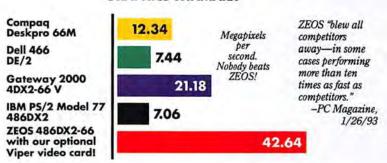
—Jim Seymour, *PC Magazine*, Feb. 9, 1993

WOW! HIGH-SPEED VESA LOCAL BUS VIDEO!

Local bus is the hottest performance enhancement going. It speeds your computer's performance by allowing peripherals—like video controllers and IDE disk drives—to connect *directly* to the CPU's bus, transferring data at full clock speed.

Your new ZEOS system features *two VESA-standard local bus slots*. VESA-standard is important—you

PC MAGAZINE LABS BENCHMARK TESTS: GRAPHICS WINMARK

	Megapixels per second.
Compaq Deskpro 66M	12.34
Dell 466 DE/2	7.44
Gateway 2000 4DX2-66 V	21.18
IBM PS/2 Model 77 486DX2	7.06
ZEOS 486DX2-66 with our optional Viper video card!	42.64

Megapixels per second. Nobody beats ZEOS!

ZEOS *"blew all competitors away—in some cases performing more than ten times as fast as competitors."*
—*PC Magazine,* 1/26/93

know you won't get stuck with some proprietary architecture that has no future. Check the competition; few meet the standard.

And ZEOS gives you *incredible* local bus video. *PC Magazine* tested a ZEOS system with our optional Viper video card. Their findings? The ZEOS *"blew all competitors away—in some cases performing more than ten times as fast as competitors."* This same #1-rated blazing Windows performance can be yours. Only from ZEOS!

DATA TRANSFER THAT'S OVER TWICE AS FAST. WITH LOCAL BUS IDE!

We take the same local bus technology and apply it to our built-in IDE drive controller. Your drive will be so fast you'll hardly know it's there! Dell doesn't have it; few others do either. ZEOS has it and so can you.

"IT'S HARD TO IMAGINE A BRIGHTER UPGRADE PICTURE." —*PC WORLD*

Now you can upgrade from any 486 as your needs change. You get more than just an overdrive socket—you get *upgradability all the way to Intel's Pentium™-based OverDrive™ processor.* And your ZIF (Zero Insertion Force) socket makes it so easy!

Yet CPU upgradability is only part of the story. Because you also get *eight expansion slots,* seven of which are open, giving you plenty of room to add to your system later. *And you get Flash BIOS, allowing for easy BIOS upgrades in the future by disk or modem!* Plus on-board SCSI for only $49. Add SCSI devices (such as CD-ROM) now or later

and you get high performance on-board SCSI that's *very* affordable.

"AN ARRAY OF FEATURES TO MAKE A USER'S MOUTH WATER."—*PC MAGAZINE*

If you spend as much time with your PC as we think you do, you know what a difference high-quality components can make. Such as *strong cases, floppy drives by Teac, and .28mm dot pitch SVGA monitors that are non-interlaced all the way up to 1024x768 resolution.*
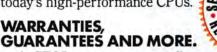
UL LISTING ON THE *ENTIRE SYSTEM.*

Another rare—and important—symbol of quality is the UL® Listing. We feel it says something about quality as well as safety. And it's *on the entire system* —not just the power supply. Most don't have it. You do.

NOT ONE, BUT TWO COOLING FANS.

While ZEOS systems run cooler than most with just one fan, we still give you two whisper-quiet ones. Because the cooler your system runs, the longer it will last. Particularly with today's high-performance CPUs.

WARRANTIES, GUARANTEES AND MORE.

At ZEOS, we support you *toll free, 24 hours a day, 365 days a year.* Your own ZEOS award-winning Technical Support is only a phone call away—*anytime* you need us.

And if you're not absolutely

convinced your new ZEOS PC is everything we say it is and more, *you have a full 30 days to return it to us for a complete, no-questions-asked refund.* Plus, you're covered by our One Year Limited Warranty, Express Parts Replacement Policy and Complete Customer Satisfaction Package.

FABULOUS FREE SOFTWARE—INCLUDING NEW LOTUS IMPROV!

You get your choice of a popular Windows application from Lotus—1-2-3, Ami Pro, Freelance Graphics, or new Lotus Improv, called the most "revolutionary

NOW: Larger drives, all with high-speed built-in cache. Up to 452MB!

Choice.

and accessible" spreadsheet ever. That's in addition to DOS 6.0 (plus enhanced tools), Windows, and the fabulous new Lotus Organizer—your own personal information manager highly recommended by *PC Magazine*. With all the free software you get with your new ZEOS system, you save hundreds of dollars!

IT ALL COMES DOWN TO VALUE.

No one gives you as much as ZEOS. At any price. And quite frankly, in the history of our company, we've never built better PCs than these. That means a lot from a company with *nine PC Magazine Editors' Choice* awards.

SO GIVE US A CALL!

When it comes right down to it, buying a ZEOS is the best purchase decision you can make. So why not give us a call right now and talk with your own friendly and knowledgeable ZEOS Systems Consultant. ZEOS is absolutely your best choice. And we don't just say it. *We guarantee it!*

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1395	1895	2295	2595	486SX-33
1595	2095	2495	2795	486DX-33
1695	2195	2595	2895	486DX2-50
1795	2295	2695	2995	486DX2-66
■	■	■	■	Intel 486 CPU
■	■	■	■	ZIF upgrade socket
2	4	8	16	MB of RAM expandable to 64MB on motherboard
107	214	340	452	High-speed IDE hard drive (MB)
32K	128K	128K	256K	Built-in hard drive cache
■	■	■	■	Local bus IDE hard drive interface
16	16	12	12	Seek time (ms)
■	■	■	■	1.2MB Teac floppy drive
	■	■	■	1.44MB Teac floppy drive
■				ZEOS 14" high-resolution mono VGA monitor
	■	■	■	ZEOS 14" high-resolution 1024x768 non-interlaced SVGA color monitor
.28	.28	.28	.28	Monitor dot pitch (mm)
■	■	■	■	1MB high-speed VESA local bus card with Windows accelerator
■	■	■	■	Eight expansion slots including two VESA local bus
■	■	■	■	Two serial ports, one parallel port
■	■	■	■	Shadow RAM/EMS support
■	■	■	■	Socket for optional on-board SCSI
■	■	■	■	Flash BIOS
■	■	■	■	High-capacity 200W power supply and built-in surge suppression
■	■	■	■	ZEOS SpaceSaver case with six drive bays
■	■	■	■	Two cooling fans
■	■	■	■	ZEOS 101-key tactile/click keyboard
■	■	■	■	Microsoft DOS 6.0 (plus enhanced tools)
	■	■	■	Microsoft Windows
	■	■	■	Microsoft Mouse
	■	■	■	Choice of Lotus Improv, 1-2-3, Ami Pro or Freelance
	■	■	■	Lotus Organizer
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■	■	■	■	One Year Limited Warranty

ler service card

Your ZEOS® Now with 386SL

"...if you're looking for a subnotebook and want to make next to no compromises, then the $1495 ZEOS Contenda is your best bet."

—*PC Week*, February 1, 1993

PC Week calls the ZEOS Contenda "the best yet of the new crop of lightweight, full-featured machines." We weren't satisfied with "best yet"— so we've made it *even better.* Because now you get your choice of a 386SL or 486SL CPU!

FEATURES THAT PULL NO PUNCHES.

Start by checking out the 386SL. The specs are on the left. It's impossible to find a notebook on the market today that's this light, this small, this affordable—and still gives you *so much power.* But it's all here.

For instance, there's the smart SL processor. According to *PC Magazine*, when it comes to notebooks, look for Intel's SL processor. The ZEOS Contenda's CPU extends your battery life significantly—because it's intelligent enough to power-down the memory, disks, modem and more when they're not in use.

Smaller than a notebook, powerful as a desktop. At only 3.9 lbs., the ZEOS Contenda keeps you light on your feet.

What's more, its features make it a pleasure to use. Such as a crisp, vibrant VGA backlit screen. A built-in track ball. Enough power and memory to easily run Windows. And at less than 4 pounds in weight, it's probably lighter than your briefcase!

Contenda:™
or 486SL CPU!

486SL OR 386SL:
IT COULD BE THE ONLY PC YOU'LL EVER NEED!

The 486SL gives you everything the 386SL version does, plus a few choice enhancements: 3.3 volt technology for added battery life, extra video RAM, PI local bus for Windows acceleration, and a high-speed floppy drive controller.

Take your pick. You'll find both Contendas give you the power and room for practically everything you'd use in a desktop system. You can easily run DOS, Windows and Windows applications. *And you can get all three*—including the new Lotus Organizer—the personal information manager that's so easy to use, it could make your DayTimer obsolete. Check out our upgrade packages for details. Then give us a call!

YOU GET CUSTOMER SUPPORT THAT'S THE BEST IN THE BUSINESS.

Our relationship with you doesn't end once we ship your Contenda. ZEOS pioneered comprehensive customer support, and it's what keeps our customers coming back again and again. We back all of our products with Toll-Free Technical Support, 24 hours a day, 365 days a year.

And we guarantee your satisfaction. If you're not absolutely convinced your new ZEOS Contenda is everything we say and more, you have a full 30 days to return it to us for a complete, no-questions-asked refund. Plus, you're covered by our One Year Limited Warranty and much more. You're going to be very satisfied. *We guarantee it!*

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486SL CONTENDA PACKAGE I:
$1795

- CPU: Intel 486SL operating at 3.3v
- Processor Speed: 25MHz
- Intel's PI local bus for video acceleration!
- Memory: 4MB operating at 3.3v
- Hard Drive: 80MB
- Display: VGA backlit, 640x480, .23mm dot pitch, Sharp 7.4" diagonal, up to 64 shades of gray
- 512K 3.3v video RAM
- Local bus video controller operating at 3.3v
- Battery: NiMH; operating time up to 5 hours with power management
- Size: 9.7" x 6.1"
- Weight: Only 3.9 lbs.
- Power Management: Fully featured, including Deturbo, Standby and Suspend to disk
- Keyboard: Comfortable 80-key with embedded numeric keypad
- I/O Ports: 1 serial and 1 parallel standard; ports for optional internal modem, external 3.5" floppy and external color VGA or SVGA monitor
- Pointing Device: Easy-to-use trackball
- Warranties and Guarantees: ZEOS award-winning 24-Hour Toll-Free Technical Support, 30-Day Absolute Satisfaction Guarantee, complete Customer Satisfaction Package

486SL CONTENDA PACKAGE II:
$1995

You get all of Pkg. I, plus external floppy, DOS, Windows and Lotus Organizer!

486SL CONTENDA PACKAGE III:
$2395

We upgrade Pkg. II to 8MB of RAM—and add a custom-fitted nylon carrying case, additional battery and fax/modem. Perfect for road warriors!

PC WORLD

WHY NOTEBOOK DESIGN IS
AND AIRPORTS AS IT IS ABOUT

AS MUCH ABOUT HOTELS MODEMS AND MOTHERBOARDS.

There are two ways to design a notebook PC: around a computer chip, or around a human being. And if you've used a Compaq, you undoubtedly know which of these approaches best describes our philosophy.

Now, of course, we at Compaq embrace innovative technology as much as anybody. We just don't think it serves much purpose without a thorough understanding of how people use it.

Which is why we look at airplane seats and hotel rooms as closely as circuit boards and serial ports. It is precisely this approach that enables us to build some of the most durable, reliable and useful notebooks on earth.

Notebook PCs with uniquely sophisticated power conservation tools so you get longer use out of the battery. Full-sized keyboards with familiar "hotkey" commands. And easy-to-read screens that rival the display quality of desktop systems.

Of course, even highly sophisticated features are worthless if they can't endure the punishment of daily use.

Which is why we subject our notebook PCs to testing that others simply couldn't withstand.

We drop them. We bake them. We freeze them. We even test new COMPAQ designs by opening and closing them ten thousand times to simulate years of normal use.
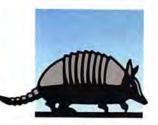
In short, we engineer our award-winning notebooks for the real world. A place that's filled with deadlines and flight cancellations and overhead storage compartments.

A place that can teach you as much about how to design notebooks as any computer lab on earth.

A help line that withstands the test of time. You can call our free 24-hour hotline seven days a week for as long as you own your computer.

Like the armadillo, Compaq notebooks feature built-in protection against the elements. In fact, our ruggedly engineered notebooks are among the most durable on earth.

COMPAQ
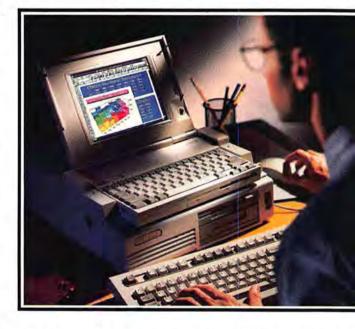
THE COMPAQ LTE LITE. FOR
THEIR TIME WORKING. AND

OK, we're not saying you live on three hours of sleep,

or that you eat Chinese takeout every night. And even

if you do, we're not saying that a COMPAQ LTE Lite

486SL notebook is suddenly going to change all that.

What we will say is that it could make your life a lot simpler. Particularly if you travel.

You see, on one hand, these new computers are lightweight, compact notebooks (6.3 pounds, 8.5" x 11"). They're available with three different screens: the COMPAQ UltraView – the world's only black and white, active matrix VGA; a 256-color active matrix; and the highly acclaimed passive monochrome MaxLight.

Simply slide the LTE Lite notebook into the COMPAQ Desktop Expansion Base and you have a full-function, fully connected desktop computer.

There's the integrated EasyPoint trackball. And each has a range of innovative power-conservation features to help extend battery life.

But what also makes these notebooks unique is

PEOPLE WHO SPEND HALF THE OTHER HALF WORKING.

that they double as full-sized, full-featured 486 desktop PCs.

By simply sliding your LTE Lite notebook into the COMPAQ Desktop Expansion Base, you're instantly connected to printers, peripherals and your network. No floppies, no fumbling with wires, no headaches. And the extra slots and drive bays increase expansion capabilities. Best of all, you're using the same hard drive. So whether you're in the office or on the road, your files are always with you. The expansion base also offers you a keylock to secure your notebook.

Of course, if you don't need all the functions of a full-sized PC, but want easy connection to your peripherals, choose the new Enhanced QuickConnect – a one-step system with integrated Ethernet and SCSI support.

And like all of our PCs, these notebooks are backed by CompaqCare. Which includes a free, three-year worldwide warranty, and a year of free on-site* service in the U.S. or Canada.

For more information about the COMPAQ LTE Lite 486SL notebooks, call 1-800-345-1518. Because if you work out of the office on a regular basis, you really lead two lives. So they're perfect for you. And you.

Unlike other 486 chips, the Intel 486SL, with an integrated numeric coprocessor, provides higher performance and extended battery life.

No wires, no interface boxes, no headaches. The optional fully integrated COMPAQ SpeedPAQ 144 Modem connects the LTE Lite directly to a cellular phone so you can send e-mail and faxes.

COMPAQ

*This service is provided by Contracted Service Providers and may not be available in certain geographic locations. Certain restrictions and exclusions apply. Monitors, battery packs and certain options are covered by a one-year warranty. For further details on our limited warranty, contact the Compaq Customer Support Center.

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COMPAQ CONTURA. THE AFFOR
LEAVE YOU WISHING YOU

Buying some low-priced 486 notebooks is like buying a bottom of the line car. You drive off without power steering or air conditioning or even floormats. If you get away with an AM radio, you've pulled off a coup.

At Compaq, however, we believe an affordable notebook shouldn't merely be the stripped-down, bare-bones version of a more expensive one.

Take the new 486SL Contura notebooks.

Although affordably priced, they're COMPAQ computers in the truest sense. They endure the same torturous testing as every other computer that we build.

Inside there's an Intel 486SL chip. Unlike the

4/25CX: *Active color VGA* ✦ *Integrated EasyPoint trackball* ✦ *NiMH battery* ✦ 4/25c: *Advanced passive color VGA* ✦ *COMPAQ Trackball* ✦ *NiMH battery* ✦ 4/25: *Monochrome VGA* ✦ *COMPAQ Trackball* ✦ *Enhanced NiCd battery*
All models: *Intel 25MHz 486SL with 8K cache and numeric coprocessor* ✦ *4MB RAM (up to 20MB)* ✦ *120MB or 209MB hard drive* ✦ *Pre-installed Microsoft Windows 3.1 and MS-DOS 5.0 as published by Compaq* **$1,999'**
4/25 starts under

486SX chip in comparably priced notebooks, this one has an integrated coprocessor. And it runs more efficiently, helping to extend battery life.

You have your choice of three Contura screens, all of which offer razor-sharp definition. There's

an active matrix screen that displays information in 256 colors. There's an advanced passive matrix color screen that offers 50% better contrast, and 33% improved response time over earlier passive technology. And there's a crisp and clear monochrome version as well.

The COMPAQ Contura 4/25CX comes with an

EasyPoint trackball that eliminates the need for a mouse. And all of the Contura models offer a unique feature called

DABLE NOTEBOOK THAT WON'T
COULD AFFORD MORE.

Hibernation. This allows you to shut your PC off quickly without losing

brings you right back to where you were.

Contura notebook PCs

batteries in as little as an hour. And a variety of modem options, including cellular, allow you to send and receive data and faxes anywhere.

All of which explains why the editors at *PC LapTop Computers Magazine* recently named our Contura the best value in notebook computers.

If you'd like to know more, give us a call at 1-800-345-1518, and ask us about Contura. The notebook PC designed to accommodate

Thanks to our advanced graphics accelerator, Contura blows the doors off most other Windows notebooks. In fact, it runs Windows 30% faster than most 486 machines.

*Nothing is backed like a Compaq because nothing is built like a Compaq. Contura includes a free three-year, worldwide warranty with a year of on-site** service in the US or Canada.*

any data, and marks the spot where you left off. When you start your PC up again, it automatically

also come with an external battery charger that lets you recharge

your budget limitations, not constantly remind you of them.

COMPAQ

Choices on the Desktop

With the announcement of Windows NT, Microsoft has given you a wider choice of desktop systems than ever. Along with Intel's 486 family and its formidable new Pentium chips, Digital Equipment's Alpha PC and Acer's MIPS R4000 PCs are platforms for NT. Cyrix and AMD are also hastening to market with high-end 486-compatible processors. The power of such chips to run PC software, like Pentium's, will encompass the world of Windows NT and extend to DOS applications and utilities as well.

Two things must happen to make moving to NT on Alpha or MIPS PCs worthwhile. First, all the major *Windows* applications must be made available for these systems. Second, the Alpha and the MIPS must show a decisive edge in performance over Intel-compatible PCs—decisive enough to entice people to give up backward compatibility with the host of utilities and applications for DOS and *Windows 3.1*.

We are working around the clock to assess the new NT processors, trying as always to measure real-world performance by testing with software that you buy and use.

Windows Versus Windows

Though Microsoft is the catalyst for bringing the *Windows* world a broader choice of CPUs, who will give us an alternative to *Windows?* IBM and Apple are the most promising challengers. But their Taligent joint venture will come too late. They need to act now.

IBM could restart the game by dropping the obscure and never-popular name *OS/2* in favor of *IBM Windows*. The FTC has ruled the term *Windows* generic, noting its wide use before the announcement of *Microsoft Windows*. Some companies, notably Quarterdeck, have never accepted or acknowledged Microsoft's ownership of the term. Such a move by IBM would not mis-

lead the computing public—*IBM Windows* does run *Microsoft Windows* applications. The time is ripe for a contest of merit—plain old competition.

Apple's opportunity to challenge Microsoft is even greater, because the most significant weakness of *Microsoft Windows* remains its user interface. If Apple transplanted its Macintosh operating system to the PC, Apple could win perhaps one-third of the desktops in North America within a year. But Apple can't do that, some say, because it would hurt Macintosh sales.

To the contrary: Apple's risk is greater if it fails to put millions more copies of the Macintosh operating system on PC-compatible desktops. This scenario is the most likely way for Apple to keep developers writing Mac applications rather than ignoring the Mac and focusing exclusively on *Windows*. All of the major Mac applications are moving to *Windows* anyway; witness *Quark-XPress* and *Photoshop*. This migration is sure to hurt Mac sales and Apple revenues.

The best strategy for Apple is to propagate the Macintosh operating system and seize a share of the vast revenue in the PC software market. Apple can surely make PCs easier to use and yet continue to integrate its own hardware and user interface so well that the Mac will remain an attractive hardware platform.

More Application Choices

In other coverage this month, Scott Spanbauer sizes up Windows NT for 1993 and the future in his article "Win-

dows NT: The New DOS?" *Top of the News* takes an in-depth look at the new *1-2-3 release 4.0 for Windows*. Richard Scoville and Randy Ross spent time with that product to determine whether Lotus has caught up with its archcompetitors in *Windows* spreadsheets, Microsoft and Borland. The news is good for spreadsheet wizards and businesspeople everywhere.

As with spreadsheets, the database competition for *Windows* is fierce. Our review "Databases Come to Windows" covers outstanding products from several vendors, including Microsoft and Borland.

As application choices broaden, hardware choices also keep getting better and cheaper. Our system review this month looks at 25 low-cost desktop 486s, some of which we expect to crash the $1000 barrier by the time you receive this issue.

PC World
Editor in Chief
Phil Lemmons

Phil Lemmons

Phil Lemmons, Editor in Chief

KELLY FALLON
RESEARCH ANALYST
FIRST USED IMPROV 2/3/93

HP Connectivity
More Affordable, Faster Performance

Ethernet Netware® Print Server $395.00

Printer Sharing 8 Serial Ports $695.00

Printer Sharing 4 Serial Ports $549.00

Printer Sharing 4 Parallel Ports $549.00

Network Print Servers For HP LaserJet MIO

BayTech has combined performance and affordability in the new Ethernet print server card. The LaserShare® PS-MIO easily installs into the MIO slot of your HP LaserJet Series 4, IIISi and 4Si laser printers.

The three key advantages LaserShare PS-MIO has over standard network printing are: speed, printer location, and congestion reduction. The fast through-put speeds allow downloading of large text and graphic files at the speed of your network. It increases file server efficiency by assuming the printing functions of the file server. You can locate your laser printer anywhere on the Novell Netware® 3.x compatible network by using either 10BASE2 or 10BASE-T connections.

For only $395.00 it is the best low cost, high performance print server available.

8 Can Share Your LaserJet

BayTech is pleased to offer a more diverse LaserShare product line with the inclusion of MIO expansion cards.

$50.⁰⁰ Rebate on LaserShare® MIO
Purchase a LaserShare before August 31, 1993 and receive a $50.00 rebate.

LaserShare allows up to 8 users to connect simultaneously to the MIO expansion slot of your HP LaserJet laser printer. LaserShare models are available with 4 parallel ports, and 4 or 8 serial ports. LaserShare's standard 1MB buffer is user expandable to 4MB. The LaserShare 4A-MIO is the only 4 parallel port card available for HP LaserJet MIO products.

Parallel input speeds of 70Kcps are the fastest in the industry. Use BayTech's Tran-x® for parallel printing, with serial port models, for distances more than 1,000 feet and speeds to 46Kcps.

Experience & Reliability

For 17 years, BayTech has been a leader in the design and manufacture of

data communication products including: Network Print Servers, Printer Sharing Solutions, Statistical Multiplexers and Data Acquisition Controllers. Call toll-free today to learn more about BayTech connectivity products.

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How New Is New Software, the Hard Drive Dispute, Art and Taxes

What Planet Are You From?

I was rather surprised by your claim in "Is Your New Software Secondhand?" [March] that retail stores have liberal return policies for software. In my experience, the opposite is true.

The question, "What other industry lets you take home a $500 item, use it for 30 days, then return it for a full refund if you're not satisfied?" is particularly ludicrous. Almost every industry I know of allows returns of big-ticket items. The article then compares software to movies, books, and music. Exactly what planet do you live on? I've never paid more than $25 for a cassette tape or CD, or over $30 for a movie, or over $100 for a book. How do such items compare to a $500 one?

The real problem is that in most instances buyers are not allowed to sample software before they purchase it. This restriction poses a severe problem for people who are forced to make software purchases based on reviews in magazines and little pictures on the back of the box.

Rick Vineyard, Springfield, Illinois

Editor's response: The sidebar "Many Happy Returns" compared return policies on various kinds of copyrighted materials. You're right—software is considerably more expensive than most books or CDs. Still, the rules governing software returns are more analogous to those for other (albeit less expensive) types of intellectual property than they are to big-ticket items, such as stereo or computer equipment, that are not governed by copyright laws.

Your call for the opportunity to test-drive software is well taken. Although some stores have demo PCs on which sales staff will install software you're considering purchasing, the practice is not yet commonplace. Such demo stations would go a long way toward helping people make more informed buying decisions—and thus cut back on software returns. —*Roberta Furger*

Sterilized Software

I was disgusted—although not surprised—by the information I read in "Is Your New Software Secondhand?" Stores shouldn't return disks to the shelf that have been in another machine. I'd like to ask software retailers a question: I prepare IV needles in a hospital. If I promised you that I sterilized a previously used needle, would you approve of my sticking you with it?

Kenneth E. Henson, Fort Campbell, Kentucky

Two out of Three Isn't Good

I read the article "Is Your New Software Secondhand?" with real interest. Your timing was perfect, because I just had the experience of buying previously opened software. I purchased a copy of *XTree Gold*, which does not come shrink-wrapped because—I believe—XTree Company is trying not to add to the massive amounts of plastic waste we generate. After I opened the package, I discovered that the disk envelope had already been torn open.

When I returned the package for an exchange, the store manager and I agreed that I should open the next package in the store. This package also had been tampered with. The third package that I opened was okay. Two out of three packages strikes me as an awfully high number from a store that claims all returned software is sent back to the vendor.

Dan Coppock, Novato, California

In the Back of the Store

The article "Is Your New Software Secondhand?" reminded me of a recent visit I made to a software retail store.

My son needed to answer the call of nature, and a sales clerk directed us to the rear of the store. On a table we noticed a large stack of opened software. Next to it stood a shrink-wrap machine. Is it possible that the software wholesaler requires that all returned software be shrink-wrapped before it's shipped back to them?

Steve Firestone, Van Nuys, California

STOP! Is Your NEW Software SECONDHAND?

And Hardware, Too

Your secondhand-software article was interesting, but software isn't the only area that needs to be monitored.

Last year I bought a printer—shrink-wrapped. When I got it home, I found no instruction manual and no instruction disk. The printer was covered with greasy fingerprints, and one of the printer cartridges was open and mangled.

I took it back to the store and waited 30 minutes while someone verified the box's contents. The manager said he couldn't refund my money because "the manual and disk are missing, the printer is dirty, the carrying case is missing (I had overlooked that omission), and one print cartridge is damaged." When I pointed out that these were the very reasons I was returning the unit, he said, "Oh, it must have been returned." After I hassled with him for another 30 minutes, he finally gave me a refund.

Bob Moore, Lakewood, Colorado

PHILIP KAAKE

Pundit Speaks Truth

It seems as if I have been reading *PC World* since the beginning of time. But Lincoln Spector's article "Tips to Organize Your Hard Disk" in the March issue is the first instance in my memory where any PC pundit has recommended what became obvious to me only after several attempts at organizing hard disks: Data files should be segregated from programs, either in their own branch of the directory tree or on their own disk or partition. I applaud Lincoln Spector for saying so in a public forum.
Rob Kirkland, via CompuServe

But Can He Count?

In his March article "Tips to Organize Your Hard Disk," Lincoln Spector notes that "You can't put DEC_SMITH.WK1 in both your C:\DATA\Q4 and your C:\DATA\SMITH directories." As a matter of fact, you can't put that file in any directory. Or has Lincoln Spector discovered a secret way that he can manage to cram nine letters into a standard DOS file name?
Howard L. Kusnetz, Houston, Texas

As Much Fun as Flat, Warm Soda

Lincoln Spector's article "Tips to Organize Your Hard Disk" was about as useful as a can of Pepsi left open overnight in the summer. To add to my misery, the sidebar "Lincoln's Favorite File Organization Tools" reads like some copywriter's dream rather than a "grizzled *PC World* veteran's" sincere efforts to educate. Words like *incredible*, *slick*, and *coolest* are better off elsewhere (guess where?).
Imran T. Ahmed, Fairfax, Virginia

Magellan Fan Club

I very much enjoyed reading "Tips to Organize Your Hard Disk." I was especially pleased to see that Lincoln Spector is a fan of *Magellan*. I too am a fan and have been touting this program since shortly after its release.

I called Lotus to find out if it will ever update *Magellan* to include *PKZip 2.x* support since all the BBS's seem to have upgraded their file compression. Their answer wasn't very encouraging. Maybe if we started a *Magellan* fan club, Lotus would be more likely to sit up and take notice.
Ronald B. Hirsch, Boca Raton Florida

Editor's response: There is something of a *Magellan* fan club on CompuServe. Type **GO LOTUSB**. You'll find plenty of other users who would like to see the program updated, tricks about how to use it, and even some homemade file viewers.
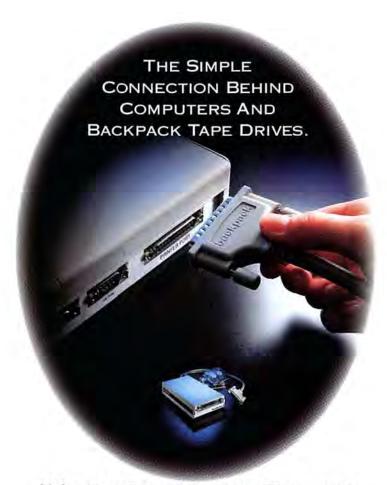
While Lotus is not likely to add *PKZip 2.x* support to *Magellan*, several other file management programs with similar capabilities, such as *Outside In*, *Norton Desktop for DOS*, *PC Tools*, and *XTree*, probably will include support for it in their next updates.
—*Lincoln Spector*

Fashionably Late?

Having just read the article "Deep in the Art of Taxes" [March], I think you could do your readers a service by reporting on how early someone can file a return using various tax preparation software.

I have just concluded a second frustrating year of trying to go modern with my tax filing. Last year I waited till well past my

$\mathcal{E}$VEN as his model aircraft *screamed* into the oak, our AST designer remained PREOCCUPIED with *thoughts of PCs.*

Even in their free time, our engineers are obsessed with PCs. A condition that can turn an

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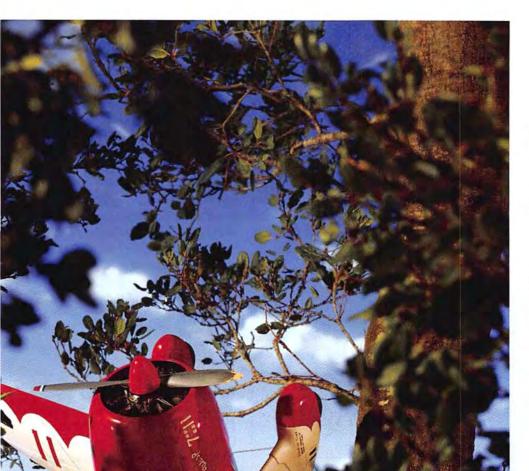
First, they enhanced Windows™ performance. Then, they improved

reliability while reducing costs by creating an upgradable, four-layer

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BYTE "1992 Award of Merit"
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(4/66D). InfoWorld "Buyers
Assurance Seal" (4/66D).

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PCs, just call 800-876-4AST.

AERODYNAMIC

A radio-controlled Gee Bee
Super Sportster. With an
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a top speed of 160 mph.
All optional, of course.

usual filing time so that I could use the final version of *Parsons' Personal Tax Edge*. The company promised that the final version would not be as late this year.

I can't vouch for the timeliness of *Parsons'* final version this year. After trying the early release and finding that it did not transfer *Quicken* data automatically, I decided to try *TurboTax 93*. While I found *TurboTax* capable of direct automatic transfer of *Quicken* data, I again had to wait past my usual filing time for the final version to arrive. After waiting till February 14 for the state version, I finally gave up and did my returns by hand.

James D. Rapp, Eau Claire, Wisconsin

Deeply Disappointed

The anticipation with which I began reading "Deep in the Art of Taxes" soon turned to disappointment when I saw the statement, "Although you can't substitute your printouts for the official state forms, the software companies sell plastic overlays to produce a legal photocopied state return." This assertion is not true for the program I use—*Andrew Tobias' TaxCut*. This package does generate printouts that I can file. Nor, I am confident, is it true for the other best-seller, *TurboTax*. Simple errors of fact like this lessen my confidence not only in the review but also in your magazine.

Michael D. Gordon, via CompuServe

Editor's response: An editing error altered the quoted statement so that instead of referring to only one program, *TaxPerfect*, it implied that none of the programs have fileable printouts. All the programs but *TaxPerfect* supply some state forms that you can file, although the particular states covered vary from package to package.

Pick a Boot

At the close of "Pick a Boot, Any Boot" [*Home Office*, March], Steve Bass mentions that DOS 6.0 is rumored to support multiple boots. One thing Bass doesn't mention is that DR DOS 6.0 supports multiple boots, and you can select what you want to load on the fly. Not only that, but DR DOS 6.0 is not merely rumored to provide hard disk compression, it does provide hard disk compression. Best of all, DR DOS is here now. While many people await the release of MS-DOS 6.0, some of us are apathetic about Microsoft's newest DOS. But we're eager to see what DR DOS 7.0 will provide.

John Elftmann, Omaha

Corrections and Clarifications

In the sidebar "Shareware on Line" in the April article "Great Software Under $50," we published the wrong phone number for America Online. The correct number is 800/827-6364.

In "Dot Matrix Lives!" in March, the table on pages 178 and 179 should have said that Star Micronics printers can print labels.

Mail your reactions, responses, and ideas to Letters, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Letters forum on PC World Online; CompuServe, 74055,412; MCI Mail, PC World Editorial; or 415/442-1891 (fax). Include your name, city, state, and phone number. We reserve the right to edit letters.

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FTC Crackdowns, Support Woes: Where Buyers Can Turn for Help

The Federal Trade Commission (FTC) has charged Business Computer Systems, a computer mail-order firm in Virginia Beach, Virginia, with failing to ship products on time (or at all) and with failing to issue refunds or credits as promised.

In papers filed in U.S. District Court in early March, the FTC asked, among other things, that the owners of Business Computer Systems (also known as BCS Group or Megasource) repay consumers the funds owed them for goods they never received.

Specifically, BCS founders Tal Shamgar (who allegedly also went by the names of Bob McGuire and Bob Jones) and David Masuck were charged with violating the Mail Order Rule by failing to ship products within stated time frames and by not giving customers the option to cancel their orders. The company was also charged with violating the rule by not making prompt refunds. (The rule requires that refunds on canceled orders must be shipped within seven days for cash or check sales and within one billing cycle for credit card sales.) The complaint also alleges that the owners misled customers by giving false information about when replacements for damaged or broken items would be sent.

Without admitting any guilt, BCS owners have agreed to comply with federal laws governing mail-order purchases and have established an escrow account from which they'll fund consumer redress. Carlton Bennett, attorney for the owners, said the company had already begun to take care of consumer complaints. "Ninety-nine percent of the complaints were misunderstandings," said Bennett, noting that refunds were already being processed prior to the FTC action.

As part of the agreement with the FTC, over the next six months BCS will provide the FTC with a monthly accounting of all refund requests, as well as information about when the refunds are issued.

Consumers who have outstanding complaints against BCS should write to Thomas Cohn, Division of Marketing Practices, Federal Trade Commission, Sixth St. and Pennsylvania Ave. NW, Rm. 238, Washington, DC 20580.

Cohn would not comment on whether the FTC's action against BCS was part of a larger effort to crack down on violators of the Mail Order Rule. He noted that the FTC receives numerous complaints on such alleged violations but does not have the resources to act on all of them. Cohn explained, "We look for a pattern of unlawful practices that affect a wide variety of customers in a wide variety of geographic areas."

Shop Talk

Dataworld Goes AWOL, Former Employees Start Repair Service

Can you tell me anything regarding the status of Dataworld in Pico Rivera, California? I recently purchased a computer from Dataworld and need to get in touch to ask a question.
Elbert Maloney, via CompuServe

Editor's note: We've received several letters asking about Dataworld, so we tried to contact the company. Its phones are disconnected, and its Pico Rivera offices are empty (but it does continue to pay the lease on the property and has made payments on other debts).

Although we were unable to reach the owners of the company, John and Paul Hsiao, we did speak with Bob Chang, the former sales manager of Dataworld. According to Chang, all of Dataworld's employees were laid off in October 1992, and the owners "burned all their bridges with employees, vendors, and customers."

Chang, with many of Dataworld's technical staff, has formed a service firm to repair laptops (which, he says, made up 90 percent of all Dataworld sales). The new firm, called Notebook Service Center (NSC), is located in Orange, California, and can be reached at 714/939-9140. NSC will repair Tandon laptops as well as Dataworld products.

Although the new company will not honor existing Dataworld warranties, customers whose products are still under warranty will receive a discount for any repair services.

Same Name, New Company

I am writing about a company called Bulldog Computer Products. It is located in Georgia and has been advertising for some time in various computer magazines.

PC World Consumer Watch Editor Roberta Furger

By Roberta Furger

BUG WATCH

ATI Mach32 Video Driver

A new version (Build 59) of this set of drivers for the ATI Graphics Ultra Pro graphics board is now available and fixes several bugs in the original drivers, including incompatibilities with the HP DeskJet printer and *WinFax Pro*. A "zipped" driver set, PRO59.ZIP, is available on both CompuServe (go ATITECH) and ATI's BBS for download. Users can also obtain a copy by calling ATI. One note to owners of Gateway 2000 DX2-66 systems: Gateway 2000 had not completed its own testing of Build 59 as of this writing and planned to continue offering an earlier version of the driver (Build 54) on its CompuServe forum (go GATEWAY) until testing was completed.
ATI Technologies
416/756-0718, 416/756-4591 (BBS)

Faxability Plus

Installation of Intel's *Faxability Plus for Windows* can stall or fail if the install routine is launched from within *Norton Desktop for Windows* or if any antivirus or erase-protect tools are memory resident during the install routine. Intel recommends users who encounter problems install the program from within *Windows'* Program Manager. If you're still unable to complete installation, disable any TSRs while you install the program.
Intel PC Enhancements Technical Support
503/629-7000

Kodak Photo CD

Kodak has confirmed that *Photo CD Access for Windows*, the software required to view and manipulate photos, and *Photo CD Access Developer Kit for Windows* will not reconstruct some "Poster" resolution images (2048 by 3072 pixels). High-contrast images are most likely to be affected by this problem, which causes streaks to appear across the image at that resolution.

Kodak has posted a fix for the problem on the CompuServe Multimedia forum; a disk version of the fix is also available from Kodak free of charge.
Kodak Information Center
800/242-2424 ext. 53

—Richard Melville

Have you run into a hardware incompatibility or a software bug? Call us at 415/978-3253 with the details. We'll investigate problems and report on those of broadest interest.

Richard Melville is an editorial intern for PC World.

My wife ordered a printer from this company just before Christmas, using a credit card. She didn't receive it, and after making several calls to the company, she was told Bulldog Computer had gone bankrupt and that new owners had purchased the rights to the name but not the assets (or liabilities) of the old company.

It seems questionable for a new entity to operate the company with the same name. I believe this to be misleading to the public and unethical business practice. How does the "new" Bulldog Computer Products compare with the "old" Bulldog?
Garey L. Cooper,
Huntington Beach, California

Editor's note: The name of a company is an asset that can be bought and sold, much like equipment or inventory.

That's what appears to have happened in the case of Bulldog Computer Products, but the purchase has caused a fair amount of confusion.

According to sources, the old Bulldog went into foreclosure in December 1992. In January of this year, the trade name and remaining assets were purchased from the bank by new owners, who are now doing business under the Bulldog company name and using the same phone number as the old company, says Jim Drawdy, president of the new Bulldog Computer Products.

According to Drawdy, he and his partner did not buy the corporation and therefore are not obligated to fulfill outstanding orders or repay creditors. "The bank foreclosed and sold off the assets of the old company," says Drawdy, noting that any accounts receivable went to the bank to pay off existing debt. "We're trying to assist anyone who calls [with support needs]," he says, "but there's nothing we can do about old accounts."

Attorneys at the Augusta, Georgia, law firm of Fulcher, Hagler, Reed, Hanks, and Harper, which represents the owners of the old Bulldog Computer Products, would not comment on the status of the company or on what, if any, recourse is available to customers who never received products they paid for. James McNair, a paralegal with the firm, would note only that a press release may be issued in the future to discuss what happened to the old Bulldog Computer Products.

No Response From Dallas Fax
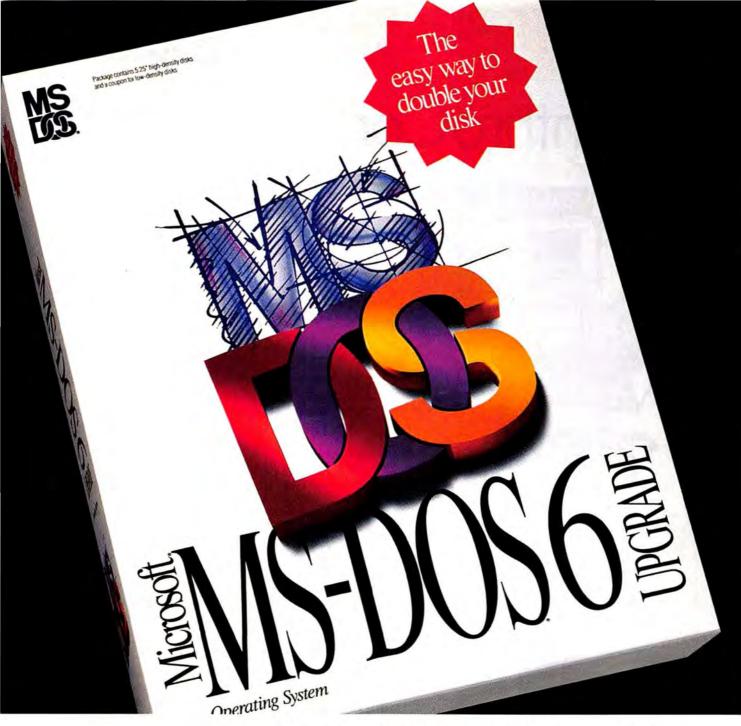
I am having serious trouble with a vendor called Dallas Fax, from whom I bought a 9600-bps modem with a lifetime warranty in March of last year. Some time ago I sent the modem in for repair, and I have been unable to get either a refund or a repaired modem. The modem never worked correctly, and now the company can't be found.
Greg Fields, Burke, Virginia

Editor's note: According to the Better Business Bureau for the metropolitan Dallas area, Dallas Fax vacated its offices and quit answering its phones in early February. The company had an "unsatisfactory record with the BBB," according to Director of Consumer Services Dianna Prickett; it received a large number of complaints and failed to respond to inquiries. Consumers complained that Dallas Fax failed to deliver products or process refunds. Because of these problems, Dallas Fax had its BBB membership revoked.

According to one former Dallas Fax customer, shortly before the company's phone lines were disconnected, employees began answering the phones as "Atel Computers." We were unable to obtain any additional information on Atel, however.

AddStor Tech Support: Help Needed

Two months ago I installed *SuperStor*, a data compression package from AddStor, to free up some space on my

The
easy way to
double your
disk

Package contains 5.25" high-density disks
and a coupon for low-density disks

MS DOS

Microsoft **MS-DOS6** UPGRADE
Operating System

YOUR HARD DISK JUST GOT DOUBLE THE ELBOW ROOM.

dblspace

Simply type it in and your disk has double the space.*

All those files and applications you've accumulated won't cramp your style anymore. Now our integrated disk compression doubles your disk space. Easily. Invisibly. Safely. And our improved memory management lets you extend your memory with just a few keystrokes. We've even added great new features

like backup, anti-virus and undelete tools for users of both MS-DOS® and Microsoft® Windows.™

So if you need more space, integrated disk compression in the MS-DOS 6 Upgrade operating system makes it easy to stretch out.

Microsoft
Making it easier

300MB hard disk. As an Xbase developer, I store large amounts of sample data and program code from various clients and was running out of room. The product performed wonderfully until recently, when it gave me an error message and then refused to recognize the drive. Suddenly, two days' worth of programming efforts were inaccessible.

I called AddStor's technical support as soon as the business opened the next day and got a recording saying to leave a message. Surprisingly, there was no option to be put on hold and wait for assistance. I left a detailed message but was not called back that day. The next day someone did call back three times while I was out, but each time I called back I got the same recording.

I have never had so much trouble getting support for any software package.
James Slater, Denver
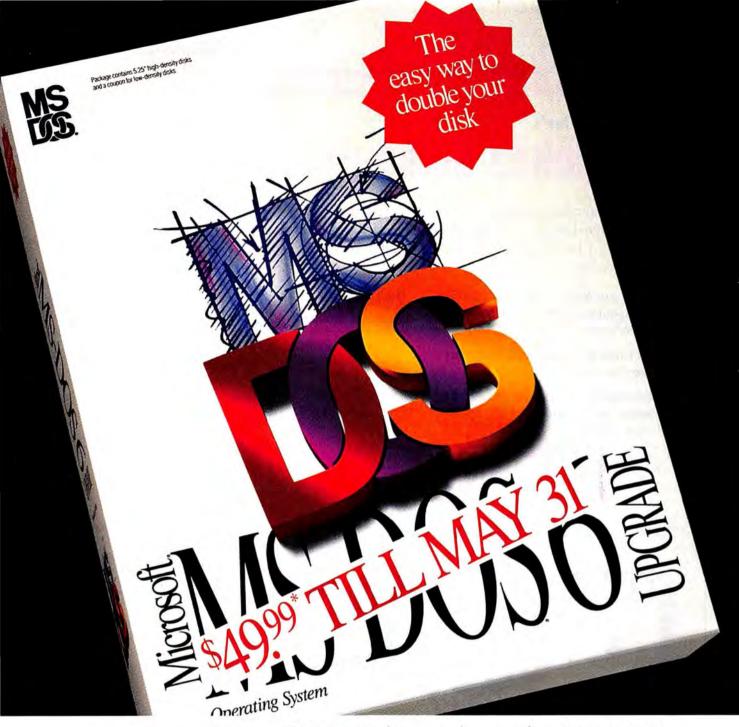
Editor's note: According to AddStor marketing manager Michael McMahon, the company's support volume had increased beyond the capabilities of its staff. To address these problems, the company implemented a new phone system at the end of January that includes a waiting queue. Customers calling AddStor technical support can now elect to be placed on hold until a technician becomes available.

Help for Frecom Customers

We at *PC World* have received several calls and letters from stranded customers of Frecom Communications, a Fremont, California, manufacturer of fax boards, modems, and fax software. The company went out of business at the end of last year. Frecom customers may be able to get support, however, through CXR Telcom Corporation, a San Jose, California, firm that had been manufacturing fax boards for Frecom prior to Frecom's demise.

According to CXR product manager Jim Schwalb, CXR began handling customer service calls for Frecom in September 1992 and is continuing to support Frecom products. Customers who bought Frecom products can obtain current software revisions free of charge from CXR. The company will also upgrade the fax boards or modems to current revisions at no charge if the technical support staff deems it necessary in order to fix a problem.

Schwalb says CXR is also working to fix

bugs in the Frecom fax software. CXR technical support can be reached Monday through Friday, 8 a.m. to 5 p.m. (PST), at 408/955-0561.

Unfortunately, Frecom customers who are owed money for orders placed prior to September of last year are out of luck, since CXR has no records to support those claims and does not have access to those funds.

NEC Kudos

I purchased a new NEC CD ROM drive by mail order in October 1991. Although I had niggling problems from the start, I never notified the vendor and didn't get around to contacting NEC until after the warranty had run out. In fact, I didn't even bother to send in the warranty cards.

When I finally called NEC, I was only hoping to get the address of a service center to which I could send the drive for repair at my own expense. To my surprise, however, the NEC technical support manager told me to return the drive to NEC for repair. The drive came back to me a few weeks later, *without* an invoice for repair costs, and it now works perfectly.

You can be sure there is more NEC hardware in my future.
Boyd C. Swingley, The Azores, Portugal

Think you've gotten a raw deal—or a great one? Mail the details to Consumer Watch, PC World, *501 Second St., #600 San Francisco, CA 94107; or send them electronically to the Consumer Watch forum on PC World Online; MCI Mail, PC World Editorial; CompuServe, 74055,412; or 415/442-1891 (fax). We'll investigate complaints and publish letters with broadest interest.*

POWER TIP no. 283

Multiple WordPerfect Copying

Here's a shortcut for copying the same block of text to several locations. Use <Ctrl>-<F4> to copy the block the first time; then move the cursor to the next place you want to copy the text to and press <Shift>-<F10><Enter>, which inserts the last piece of text that you moved or copied.

Carol N. Landsman
San Diego

Down the Hall and 1200 Miles Away

When your company sets up shop in another state, communication with the home office can become a thorny problem. Phones and fax machines can only do so much when you and a distant colleague need to review a spreadsheet at the same time. And those overnight mail bills can add up, too. This month J. Clark Ribordy, a CPA and controller at the Colorado Springs office of Sage Health Services of Evansville, Indiana, explains how he helped set up a wide area network that lets him work with his colleagues in the home office as if they were just down the hall. —*Ed.*

Making the Connection

As an accountant, I use my PC for practically everything I do, whether it's setting up a complicated *Excel* spreadsheet or looking at my schedule in *Futurus Team*. As much as I value my computer, however, I never thought about how much time computers save until my company opened another office 1200 miles away.

We're in the business of long-term health care. There are 24 employees in the home office, and 16 in Colorado Springs, Colorado. Routinely, life-and-death crises arise involving patients, their families, and the health care sites we manage. In these situations—not to mention in our day-to-day business operations—it's critical that the home and regional offices communicate immediately. But the distance between offices was making quick communication problematic.

For example, when I wanted my boss to view one of my worksheets, I had to print it, reduce it to fax size on a copier, and then ask our administrative assistant to fax the copy to the home office. Since the fax line was usually busy, this process could take a few anxious hours. Then the assistant on the other end would have to copy the murky fax back onto paper. By the time my boss tried to decipher them, my miraculous mathematics were about as legible as your average hieroglyphics. He'd call me to tell me he couldn't read the worksheet, and I'd end up paying Ma Bell for the privilege of reading the numbers to him or spending $12 to send a copy by overnight mail.

As a result of such misadventures, we were spending almost $900 a month just on phone bills and mail costs between offices, while we threw an unimaginable amount of money down the drain in unproductive labor.
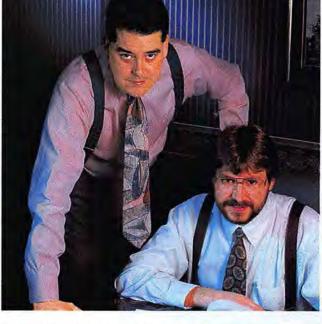
As the computer "expert" in our office, I volunteered to look into solutions, and found myself working hand in hand with Steve Knust, the computer networking expert in the home office. Our goal was to find a better way to share accounting and general office information between the two offices.

One option we considered was to set up a video teleconferencing system in each office that would let us hold meetings in real time. A little investigation revealed that the $70,000 price would give us some fancy video cameras and monitors, but it still wouldn't let us share computerized information.

Making a Net Work

Steve hit on a better solution: Set up a local area network in each office and link them through a dedicated data line. It would, in the end, allow our offices to communicate as if we were just down the hall from each other. This sounded simple and elegant, but it took some doing to get all the pieces in place.

Steve devised a system that took advantage of our existing computers and software, but added several new capabilities.

We first purchased two ALR 386 PCs—one for each office—to act as our network file servers. We installed Novell NetWare on each and linked the servers to several of our existing Dell 386 and 286 PCs. We also purchased two additional 386 PCs to act as gateways to our AS400 minicomputer, which we had long used to handle our accounting data. The gateways allow the mini to download to the PCs, and the PCs to upload to the mini. In addition, we picked up a router to determine what route the information would take between the two networks.

We also purchased ethernet cards for all the workstations, a high-speed laser printer, two 650MB SCSI hard disks, Teflon coaxial cabling, a remote controller for the AS400, a synchronous adapter and several Xircom pocket ethernet adapters, and a WAN electronic-mail module for *Futurus Team*.

Key to the new system was a dedicat-

> **J. Clark Ribordy (left) and Steve Knust of Sage Health Services.**

JOHN BLAIR

ed digital telephone link we leased from SP Telecommunications in Livonia, Michigan. Like Sprint, MCI, AT&T, and other large telecommunications firms, SPT offered to lay the data link and install everything, including the telephone jacks. The cost of the data link, including installation, was a flat rate of $650 per month. But there was a catch: We had to have the link multiplexed—split into two bandwidths—in order to accommodate connections between both the network and the minicomputer. So we also had to purchase a multiplexing data service–channel service unit, a modem that "interprets" among the router, the AS400 phone link, and the data link.

Finally, we invested in security. To avoid losing data during a power failure, we purchased a tape backup unit, a backup power supply, and dual hard drives that duplicate each other in case one should crash.

Wave the Magic WAN

The grand total for our purchases—hardware, software, cards, adapters, and cabling—came to approximately $56,000. It might sound like a big outlay, but the consensus is, it's been worth it.

Our new system allows everyone in the regional office to access any file on the server in the home office, and vice versa: It takes about 15 seconds for me to call up a spreadsheet that's sitting in a PC 1200 miles away. I can make changes to it, save it, and have it printed out in Evansville. I can use *Futurus Team* to keep in touch with my colleagues and do my scheduling. Better still, I can use the Chat function in *Futurus Team* to type a conversation in real time with someone in the other office—and say goodbye forever to steep phone bills.

With the dedicated data link, there's no per-access charge, no telephone charge, and no modem; and the fee remains the same no matter how many times we use the system. We estimate we're saving about $250 a month in telephone and mail costs.

But the major return on investment comes in lower labor costs. Before we installed the network, it took two assistants nearly full time just to handle all our interoffice communication, to the tune of at least $40,000 per year. Today, the assistants are doing more productive work in accounting and data entry, and we've cut our receptionist's hours by half. And since my boss

and I no longer play "spreadsheet tag," decisions that used to take hours now take a fraction of that time. We've calculated that the four salaried managers who use our networks save anywhere from 10 to 20 percent of their time, worth at least $33,000 in increased productivity. Add up the saved costs of two assistants, the $3000 per year in phone and mail costs, and a minimum of $33,000 in increased management productivity, and we've recouped our entire $56,000 investment in the first year alone.

A One-Month Project

Our project proceeded surprisingly quickly: We were able to do all our research, purchase all the components, and set up the entire system in less than a month. Steve had to invest a couple of weeks up front to do the research and set up the hardware and software, but today, managing the network doesn't take him more than a couple of days each month. Considering the time and expense we're saving, setting up our network is one of the smartest business decisions we've made.

If you use PCs to manage people and other resources in a business environment, we want to hear from you. Send your article idea—including a brief outline of your company, job, problem, and solution as well as your name, address, and phone number—to Real Problems, Real Solutions, PC World, 501 Second St. #600, San Francisco, CA 94107; or send it electronically to the Real Problems, Real Solutions forum on PC World Online; 415/442-1891 (fax); or call us at 415/978-3224. We pay $300 per published column. Sorry, we cannot acknowledge unpublished materials.
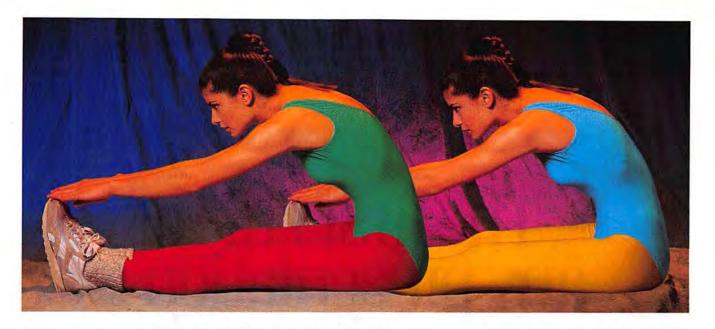
POWER TIP no. 284

Delete Without Asking
You don't always want to be prompted (Y/N) when you use the DEL *.* command—especially if you use it in a batch file. Try ECHO Y | DEL *.* instead; this will delete all the files in your current directory without asking for permission first.

Jason K. Douglas
York, Pennsylvania

The first rule of any presentation is keep it simple.

And it doesn't get any simpler than this.

Introducing Freelance Graphics for Windows, Release 2.0.

The first release of Freelance Graphics® won every major award in the presentation graphics category.

Now Lotus® enhances Release 2.0 with new features and improved usability that actually make the simple three-step process even simpler. In fact, it's now so fast, so friendly and so automatic, it's actually changing the way people use presentation graphics software.

Now people not only use Freelance Graphics to easily create beautiful last minute presentations, they use it to quickly generate handouts, even for informal meetings.

Release 2.0

PCComputing
MVP '92
WINNER

Let our SmartMasters be your guide.

Only Freelance Graphics has SmartMasters™ to automatically guide you through every step of the design process. You simply select the look you want, choose a page layout, and start filling in the blanks. It's that easy.

Just one click brings you a complete array of drawing, charting and editing tools, plus on-screen galleries for chart types, symbols, tables, and org. charts. You'll easily create professional quality output in overhead, slide, handout, and screen show formats. And a new toggle switch allows you to instantly view your presentation

1-2-3 LEAPFROGS EXCEL

A dynamite interface, an arsenal of charting features, and powerful version and database managers make the new 1-2-3 a winner.

TEST DRIVE ▶ *1-2-3 4.0 for Windows* is a solid winner. The program remedies most of the glaring shortcomings of *1.1*, the previous *Windows* release; it appropriates some of *Excel*'s and *Quattro Pro*'s best ideas; and it pushes the functionality envelope with a brainy, innovative database system plus a unique work-group Version Manager that offers a whole new way to use spreadsheets. While a few of *4.0*'s features don't yet have the versatility found in competing products, Lotus is finally on the right track.

Catching Up
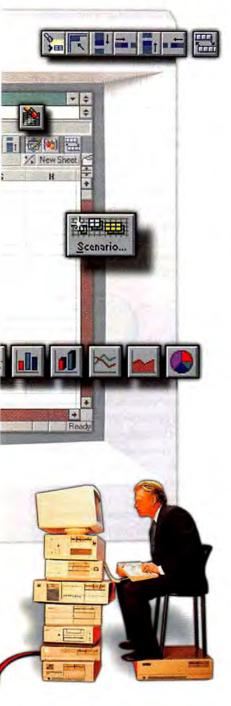
With release 4.0, the future of information systems becomes clear: a world of modular systems made of networked servers and PCs running client/server databases, workgroup software, and familiar business applications that enable workers to collaborate and communicate instantaneously. In this world, the spreadsheet will be your data center—an arena for assembling, analyzing, and presenting information from a variety of local and remote sources. Already, spreadsheet vendors are shaping products to this vision, concentrating on database access, presentation-quality graphics, and analytical tools. Release 4.0 brings this vision a step closer to reality.

The Look! The Feel! The Je ne Sais Quoi!

You'll see the difference in the interface with its streamlined, logical menu structure

AND QUATTRO

News Monitor

and well-organized dialog boxes. If you're upgrading from release 1.1, you'll spend a lot less time poring over the menus, wondering where the programmers have stashed some feature you need. And while the "classic" *1-2-3* slash-key menus are still there, you probably won't need them.

New tool bars offer myriad menu shortcuts, with well-designed intuitive icons. The status bar at the bottom of the worksheet is a mini-menu that lets you change the numeric format, the font, and other features of the current selection.

Menus and tool bars change as you select a cell, a graph, a database query, and so on. Ideally, this feature would provide an easy-to-grasp view of your options, but it needs some work. We found the context-sensitive tool bars less helpful when our task spanned several contexts; the tool we needed always seemed to be on the other tool bar. In contrast, *Excel*'s multiple–tool-bar approach is less aggressive but more flexible.

Performing Mouse Tricks

Release 4.0 has learned all the current mouse tricks. There's drag-and-drop for moving and copying (although you can't use it to insert a selection, as you can with *Excel*, and there's no warning if you overwrite destination cells). You can select entire columns and rows, and you can select (though you can't name) discontiguous ranges—a real boon for speeding up spreadsheet tasks.

Besides improving the basics, Lotus has thoughtfully standardized the left and right mouse button conventions. Click the right button, and you'll see a menu from which you can change the properties of a cell or other object; double-click, and you go to the dialog box where the object was created. For instance, right-click on a graph title, and you can change its font, box pattern, and so on; double-click to change its wording and placement. Another nice touch: The mouse
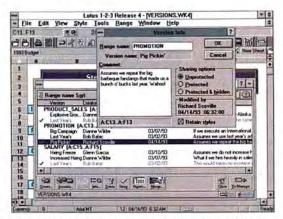
PLUG-AND-PLAY PC? Microsoft and Compaq will codevelop a new generation of easier-to-configure desktops; advanced portables; and hand-helds with pen interfaces and wireless communications. The companies will focus on developing *Windows*-based systems that are simpler to set up and use and that will include as standard such features as CD-quality audio, CD ROM drives, and built-in networking.

The agreement follows the March announcement of the Plug and Play ISA specification, a move by Microsoft, Compaq, Intel, and others to create a design for future PCs—systems that will configure software and hardware components automatically, with little user involvement (yes, like the Macintosh). No product details have been announced, and industry watchers don't expect to see Plug and Play products before the end of the year.

ACROBATIC FORMATTING: Adobe will introduce a software family able to convert virtually any document into a generic format that can be read by other computers, regardless of hardware platform, operating system, or even the application used to create the original document. The Acrobat family will include a Portable Document Format (PDF) Writer, which will translate even heavily formatted documents, such as graphics, desktop publishing, or spreadsheet files, into the PostScript-like PDF. Users with other Acrobat products can then view, store,

VERSION MANAGER provides sophisticated what-if tools.

pointer changes appearance to let you know whether a click will select a cell, a graph, an object, a graph axis, a line, a query object (more about query objects later), and so on.

3-D Without Funny Glasses

One of the great spreadsheet innovations is 3-D worksheets. Introduced in *1-2-3* release 3.0 (for DOS), they provide flexibility for model building and organizing work that a 2-D worksheet such as *Excel* can only ap-

proximate. Borland greatly improved this feature in *Quattro Pro for Windows* with a simple notebook metaphor. *1-2-3* mimics this paradigm: Its pages are nameable, with easy-to-select tabs for each worksheet. You can use sheet names to reference ranges in formulas, which makes them easier to read, and you can right-click on the corner of the sheet to change its global formatting properties. But in marked contrast to *QPW*, release 4.0 cannot link the sheets into named groups for formatting. Group formatting is still an all-or-nothing venture, as it was in the *3.*x releases.

Did we hear you ask about macros? Yes, *1-2-3 4.0 for Windows* has them, and fortunately, they are no longer keystroke oriented. Instead, there are over 250 new macro commands, such as {SELECT} to select ranges, {MENU-CREATE} to modify the menu bar, and {SET} to control the interface. As in release 3.0, you record your

actions in a special Transcript window, test and edit the macro there, then paste the macro commands back into the worksheet and name them to create the macro. However, the new release can also run all your old DOS *1-2-3* macros.

Decorative Touches

The new *1-2-3* has overtaken the competition at spreadsheet formatting. Anytime you want to decorate, you can select from one well-organized palette of 256 colors and another with 64 fill patterns. You can align all kinds of cell entries, not just labels; wrap text within a cell; and—a first for spreadsheet programs—rotate the entries within cells. Formatting styles are now easy to define and use. On the other hand, you still cannot create your own numeric formats, though *1-2-3* partially compensates for this shortcoming with additional @functions.

And speaking of @functions, you'll note 110 new ones. Many mimic those found in *Excel 4.0*, including math, engineering, financial, and statistical functions.

New Options for Low-Cost "Laser" Printing:

Good news for printer buyers—three technological developments will create lower-cost printers in 1994, according to industry analysts. The latest advance involves SoftBand, an image rendering technology developed by Phoenix Technologies. This banding technique reduces memory requirements of 600-dpi PostScript Level 2 printers from 6MB of DRAM to 2MB. (The technology is incorporated in Phoenix's PostScript Level 2 interpreter, PhoenixPage.) You may see low-end printers using PhoenixPage for close to $1000, says Paula Bursey, industry analyst at DataQuest. Currently, PostScript printers range from $1900 to $6000. Phoenix says 600-dpi PostScript printers with PhoenixPage will be available from a number of vendors by November of this year.
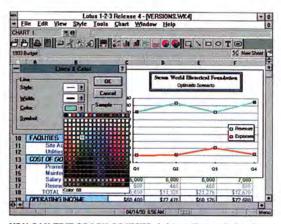
Another development likely to lower prices involves the printer's light source. New LED printers employ printheads with fewer moving parts than traditional laser printers. These units are less expensive and could prove more reliable. Some LED printers are already on the market, such as Okidata's 300-dpi OL 400, which carries a street price of around $590. Other vendors offering LED products include Samsung and Kyocera. And more such units are on the way, according to Marco Boer, senior printer analyst at International Data Corporation (IDC). "Next year, you'll see more vendors come out with LED printers—many in the $500 range," Boer says.

For *Windows* users, GDI (Graphics Device Interface) printers will offer a third way to save money on high-quality printing. GDI printers don't require a controller, the printer mechanism that translates file information between the PC and the printer. Instead, these printers are built to understand the *Windows* GDI command set and let your PC do the thinking. They also provide faster *Windows* printing. The only drawbacks: GDI printers work only with *Windows,* and they aren't suitable for networks with non-*Windows* computers because GDI printers can't interpret PCL or PostScript print jobs. Vendors are working steadily to improve GDI printers, and many more models will be available during 1994, according to IDC's Boer. He expects GDI printer unit sales will rise from this year's 80,000 to 250,000 in 1994 and jump to 560,000 in 1995.

Printer Futures

Projected unit sales by page description language

■ 1993 ■ 1994

Adobe PostScript, PostScript clones	701,000 / 740,000
PCL	1,990,000 / 2,125,000
Windows GDI	80,000 / 250,000

Source: International Data Corporation

YOU CAN EDIT GRAPH OBJECTS right on the worksheet.

Like *Excel*, *1-2-3 4.0 for Windows* sports a graphic annotation layer. You can rotate and flip objects and text—capabilities you don't get with competing products. A set of "designer frames" lets you add drop shadows, picture frames, and other borders to graphs. But you can't use drag-and-drop to copy graphic objects as you can in *Excel*. Nor can you snap objects to the worksheet grid, a trick that lets *Excel* users create precision drawings.

As for graphs, release 4.0 has not only corrected the problems of the previous version, its graphics are now simpler and more flexible than *Excel*'s or *QPW*'s. You no longer need go to a special window to edit a graph—you can do all your work right in the graph itself. If you want to print just the graph, select it and go to the print menu. If you want to arrange all your graph objects on a single worksheet page as you can in *QPW*, just move them there.

There's a slew of new chart types, including radar charts and error bars. Graphs can include up to 23 series, and you can assign any series to the left or right *y*-axis. Editing graphs is much easier than in *Excel*, especially adjusting the series, setting up multiple *y*-axes, and positioning titles.
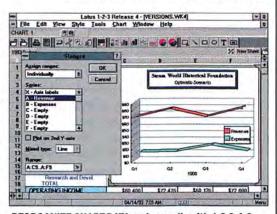
So when it comes to basic spreadsheet functionality, *1-2-3 4.0 for Windows* is on a par with its *Windows* peers. For work-group computing, however, *1-2-3* offers a couple of striking innovations, including a totally

revamped database manager and, for playing what-if with your colleagues, the new Version Manager.

This popular spreadsheet activity was made easier by *Excel 4.0*'s Scenario Manager, which lets you create multiple what-if scenarios and store them with a worksheet. *1-2-3 4.0 for Windows*' Version Manager greatly extends this capability.

Version Manager lets you record and organize versions, then toggle between them. A *version* is a set of alternative values, formulas, and styles assigned to a named range—what-if scenarios, for instance. Version Manager automatically records the user's ID and the date for each version. Once you've created alternative versions for ranges, you group them into scenarios with the Version Manager Index. Here you choose versions you want grouped together and store them as a named scenario. A best-case scenario, for instance, might include optimistic projec-

REORGANIZE CHART DATA series easily with 1-2-3 4.0.

tions for Sales and other named ranges, such as Cost of Goods and Administrative Expenses. The same version can appear in several scenarios.

This mix-and-match flexibility of versions and scenarios lets you handle complex models easily. In contrast, *Excel*'s scenario manager restricts each scenario to a single set of values, and you can't use alternative formulas or styles.

When it's time to sort through the alternatives, the Version Manager Index provides a

annotate, and print PDF files with essential formatting, graphical elements, typefaces, and text intact. Acrobat products are expected to ship in a *Windows* version by June with a street price of about $100 per user in five-user quantities, according to John Warnock, Adobe chairman and CEO. The company expects to release DOS and UNIX versions by fourth quarter 1993. Adobe says Acrobat products will store documents with their underlying file structure and formatting information. As a result, Acrobat applications can compress PDF files up to ten times more efficiently than imaging applications can compress their files. PDF files also offer better resolution on monitors and printers. In addition, because PDF files include text, you can search for words or even copy chunks of text into other applications.

GROUNDED NOTEBOOKS: At least one airline is banning the use of notebooks during takeoffs and landings, and others may follow, according to an airline trade group. Northwest Airlines now prohibits notebook use below 10,000 feet, following a recommendation in early April from the International Air Transport Association (IATA) that carriers limit the use of all electronic devices, including notebook PCs, tape players, and portable CD players, during takeoff and landing. The IATA has members from 213 airlines.

The ban was prompted by growing concern that these devices may generate interference that affects aircraft instrumentation, says IATA spokesman

Top of the News

master list of scenarios and versions. You can scroll through them and select a set to pop into the worksheet. The Index can also sort alternatives by criteria such as range name, author, version name, and date.

What-If for Work Groups

Version Manager offers features designed to facilitate the sharing of what-if information across a network. To provide an audit trail and make tracking versions easier, it stamps each new version with the author's network,

E-mail, or *1-2-3 4.0* ID, plus the date and time of the entry. Version Manager also lets you assign security attributes, such as read-only or hidden, to versions and scenarios.

Version Manager also makes it easy to merge versions or scenarios from different worksheet files, handy when information resides on more than one server. For example, if you're assembling a departmental budget and you need line item estimates from, say, Human Resources and Information Systems, you might distribute a digital worksheet template to the appropriate managers. They could then create different versions on the template using Version Manager. You'd collect their data and use Version Manager's Merge feature to add the new versions to the original file.

A special benefit for users of *Lotus Notes 2.1* or later—save a spreadsheet in the NS4 format, and *Notes* treats the worksheet like a *Notes* database. This means users can concurrently read and write to the file. In addition, *Notes* can notify concurrent users when
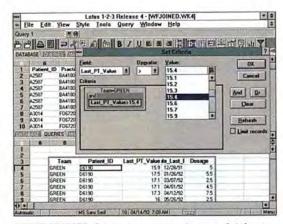

QUERY OBJECTS give you easy access to many databases.

new versions or scenarios are posted. *Notes* also provides worksheets with its robust security and replication technology, a file updating feature that keeps worksheet versions current across the company.

Version Manager offers the best projection and what-if capabilities we've seen, but its complexity takes getting used to, and we could recommend a few improvements. For example, not being able to edit version or scenario names is inconvenient. But such minor complaints aside, *1-2-3*'s Version Manager is the most potent new spreadsheet tool in a long time.

1-2-3 4.0 for Windows

This time Lotus got it right. The flexible Version Manager, powerful database query tools, new graphics features, and a revamped 3-D interface make this spreadsheet the nexus for your desktop data.
Key Features: Improved interface • Enhanced charting • 3-D worksheets • Version Manager • Database query tools
Pricing: $495, upgrade $129
Availability: June
Lotus Development Corp., 800/343-5414
Reader service no. 730

Windows 4.0:

It's been more than a year since Microsoft released *Windows 3.1*, and work is well under way on the next version. Windows 4.0 is expected a little more than a year from now.

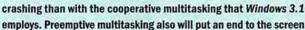Although Microsoft would not comment on this unannounced product, industry watchers say that based on what competitors are developing, Windows 4.0 will likely be a 32-bit operating system with improved multitasking, a better interface, and peer-to-peer networking. These features are also expected to appear in various combinations in products from companies such as IBM and Novell, says Andy Patrizio of the *Software Industry Bulletin*. Windows 4.0 will probably require a 386-class or faster PC and 4MB of RAM. (Windows NT is aimed at 486 systems and requires 16MB of RAM).

The 32-bit capabilities could make Windows 4.0 faster than its 16-bit predecessors at running certain graphics-intensive applications such as multimedia, but possibly slower with more mundane programs such as word processors or databases, said Jeff Tarter, editor of *Soft-letter*. Preemptive multitasking will let users run multiple applications and tasks simultaneously with less chance of crashing than with the cooperative multitasking that *Windows 3.1* employs. Preemptive multitasking also will put an end to the screen freezes and jerking and stuttering that can occur when *Windows* runs multiple applications. Multithreading capabilities let an application perform several tasks simultaneously, such as printing and opening files.

According to Jesse Berst, editor and publisher of the *Windows Watcher* newsletter, Windows 4.0 interface improvements might include an integrated Program Manager and File Manager. You also might find a browser, which would let you view various types of files or search on descriptions of items stored with the file instead of just on basic file attributes. Amy Wohl of Wohl Associates, a computer consulting company based in Bala-Cynwyd, Pennsylvania, says Microsoft might enable longer file names.

Anticipated Windows 4.0 Highlights

▸ Preemptive multitasking and multithreading
▸ Integrated 32-bit operating system
▸ Peer-to-peer networking
▸ Integrated Program Manager and File Manager
▸ Document/object browser

Scoping Out the Spreadsheet Contenders

● = Yes ▲ = Unlimited ○ = No

	1-2-3 4.0 for Windows	1-2-3 1.1 for Windows	Excel	Quattro Pro for Windows
Ease of use				
Drag-and-drop copy and move	●	○	●	●[1]
Select and name discontiguous ranges	●[2]	○	●	●
Right-click to change object properties	●	○	●	●
In-cell editing	●	○	○	○
Text wrap within cells	●	○	●	○
OLE client	●	○	●	●
OLE server	●	○	●	○
Analytics				
Automated multiworksheet consolidation	○	○	●	○
Automated what-if version management	●	○	●[3]	○
Statistical functions	54	10	71	10
Math, trig, and engineering functions	68	17	94	19
Financial functions	25	12	50	18
Outliner	○	○	●	○
Presentation				
Free-floating draw objects	●	○	●	●[4]
Edit graph objects on worksheet	●	○	○	○
Graph variables	23	6	▲	▲
User-defined number formats	○	○	●	●
Rotate cell entries	●	○	○	○
Center label in a range	●	●	●	○
Align numbers and formulas	●	○	●	●
Database access				
Relational queries	●	●	●	●
Calculated output fields	●	●	●[5]	●[5]
Dynamic links to external database	●	○	●	●
Direct access to SQL databases	●	●	●	○

[1] Can't drag single cells or insert a dragged range.
[2] Can select but not name a discontiguous range.
[3] Restricts each scenario to single set of values.
[4] Lacks a drawing layer for worksheet annotations.
[5] Excel via Q+E, Quattro via database desktop.

The Database

Ever since the first primitive land creatures discovered *VisiCalc*, the big bugaboo for PC users has been getting numbers from the databases where they're stored and into the spreadsheet without having to retype them. *1-2-3 3.0* introduced the DataLens system for relational querying of remote databases, but that solution has confounded all but the most advanced rocket scientists. The competition offers accessory query programs—*Excel*'s Q+E, for example. *QPW*'s solution, a *Paradox*-style DLL, is pretty much limited to Borland's data base formats.

Enter *1-2-3 4.0 for Windows*. Gone are input, criteria, and output ranges. In their place is the *query object*, which displays the records and fields you've selected. A query object floats on the worksheet like a graph, but you can reference the cells inside it for formulas and calculations.

To create a query, you use an integrated set of dialog boxes to indicate the table or tables you want to query (they can be spreadsheet ranges or external tables accessed through Data-Lens drivers) and the fields you want from them. A graphical dialog box provides step-by-step support as you build a selection statement. Click OK, and the items selected appear in the query object; whenever you select the object, the main menu displays the Query option to let you modify it. You can name the query and create multiple named queries on the same worksheet. A single query object can join data from separate tables, even if they have different sources, and query objects can display group totals, averages, and so on. As with release 3.*x*, queries can include calculated fields.

The Checkered Flag

1-2-3 4.0 for Windows is an aggressive player in a red-hot spreadsheet market. For the moment, its intuitive interface, glitzy graphics, network-aware Version Manager, and new database metaphor put it ahead of the pack. But look out: In this crowd, nobody sits still for long.

—Richard Scoville and Randy Ross

News Monitor

Terry Denny. Currently, authorities are not sure whether notebook PCs or other devices are creating the interference, Denny says. The interference level also varies from plane to plane; navigational systems on older aircraft are better shielded.

The last FAA study, conducted in 1988, concluded interference risks were minimal. But this February the FAA issued an advisory circular recommending some safety procedures and requesting comment from airlines on problems with electronic devices.

THE DOCTOR IS IN: Vendors are reacting to Compaq's enhanced service-and-support bundle introduced in early spring for PCs sold through its direct division. The Compaq bundle includes one year of on-site service with next-business-day response; two years of carry-in service; and lifetime telephone support all day, every day. AST's response: its Customer Care program for Premmia and Bravo desktops that provides one year of on-site and two years of carry-in service. Customers who bought any AST system in January or later also receive this service. The extended on-site support option is $59 for one year, $99 for two.

NEC responded with a three-year warranty for its Image and PowerMate desktop PCs and extended on-site service at $75 for two years. Customers who bought systems after February 1, 1993, are also eligible.

—Jeff Bertolucci, Laurianne McLaughlin, Randy Ross

In Touch on the Go

TEST DRIVE ▶ A much improved display, a more powerful processor, a swift new communications application from Lotus Development, and the ability to run off-the-shelf DOS software make the Hewlett-Packard 100LX my constant digital companion.

HP execs say the 100LX offers "unconscious portability." In other words, I don't need to hold an internal debate on the pros and cons of lugging a 7-pound modem—what some of

you might call a notebook—before scuttling to various meetings and cities. As a frequent traveler, I find a double meaning in HP's notion of unconscious portability, but that's another story. Suffice it to say that taking the 11-ounce 100LX with me soon became a no-brainer.

A proto-PDA (personal digital assistant), the 100LX is great for burst-mode communications. With its PCMCIA 2.0 slot, you can add devices such as a modem. The bundled *cc:Mail Mobile* software is easy to use, and unlike with the clunky *cc:Mail Remote* on my notebook, its interface lets you conduct all your communications and manage your mailbox from one menu bar via drop-down menus and pop-up dialog boxes. In the new interactive mode, you can view your in-box and select only those messages that you want to read and respond to, much as you can in the desktop version of *cc:Mail*.

HP also improved ergonomics

THE 100LX has built-in E-mail.

and muscle tone in the 100LX. The screen is the same size as the 95LX's, but its CGA display has 16 shades of gray and 25-line-by-80-character resolution. The 3-volt 100LX offers twice the battery life of the 95LX, yet it still requires just two AA batteries, which you can now recharge in the unit.

You get one megabyte of RAM and the power of an IBM PC XT with the 100LX; its 7.9-MHz 80C186 is 50 percent faster than the NEC V20 in the 95LX. A 9-pin serial port facilitates external modem and desktop hookups.
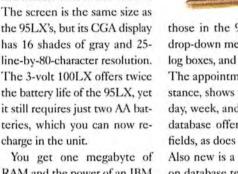
You can run DOS apps up to 300K in size, and the PIM applets are much improved over

those in the 95LX, thanks to drop-down menus, pop-up dialog boxes, and added functions. The appointment book, for instance, shows your schedule in day, week, and month views. A database offers user-definable fields, as does the phone book. Also new is a note taker, built on database technology so you can do word searches.

Like the 95LX, the 100LX suffers from a lilliputian keyboard, but the layout is improved, and a new color scheme makes keys easier to find.

The 100LX retails for $749, with a street price of $699.

—Russell Glitman

HP 100LX

This handy bantamweight PC runs DOS applications and includes a version of cc:Mail for on-the-go E-mail.

Key Features: cc:Mail Mobile
- **Runs DOS applications**
- **80C186 processor**
- **CGA screen**

Pricing: $749
Availability: Immediate
Hewlett-Packard,
503/757-2000

Reader service no. 726

Low-Cost Presentation Software:

Alpha Software's $79 *Bravo* offers features comparable to those of leading presentation graphics products that have street prices around $350.

Bravo offers several tools to help users work quickly. The package includes an outliner and a sorter to help you develop and organize ideas, a feature to let you print speaker's notes and handouts, and more than 60 design templates so you can create professional-looking presentations rapidly. These ready-made backgrounds are similar to those in *Freelance Graphics'* SmartMasters. *Bravo's* slide-show feature, which is also similar to its *Freelance* counterpart, lets you reorder screens and run your presentation.

For saving and modifying a presentation over time, *Bravo* allows users to create customized templates, a key feature found also in both *Freelance Graphics* and *Harvard Graphics*. According to Alpha Software's director of business development, Tim Stein, the program enables you to import data from *Windows* spreadsheets such

as *Excel*, and you can also update a presentation as your spreadsheet changes using Dynamic Data Exchange (DDE).

Along with the standard text and graphics features, you get a number of extras. You can change *kerning* (the spacing between letters) and condense, slant, and rotate text. *Bravo's* ten drawing tools are comparable to those of its more expensive competitors.

The software supports object linking and embedding (OLE), which means that multimedia fans can add sound or other OLE objects to their presentations. Alpha Software, 617/229-2924.

Reader service no. 727

HP LaserJet 4L Makes Itself at Home

TEST DRIVE ▶ Life is full of trade-offs. Take low-cost, 300-dpi personal laser printers. If you're looking for an office workhorse with speed and upgradability, you might consider Texas Instruments' $729 Micro-Writer or Epson's $799 Action Laser 1000. If you value aesthetics and ease of use over performance, Hewlett-Packard's $849 LaserJet 4L is the better choice. With its sleek design, light weight, and ergonomic enhancements, the HP 4L is stylish and unobtrusive. The trade-off with this great-looking machine? According to the PC World Test Lab, the HP 4L proved one of the slowest, least upgradable lasers in its price range.

When Small Is Beautiful

Aesthetics are a matter of personal preference. For a cramped desk, we like petite. The HP 4L's 14.5-by-14-inch footprint is comparable to the TI's and the Epson's; the real differences lie

in height and weight. The LaserJet 4L is just 6.5 inches high and weighs only 15.5 pounds. The Epson is 9 inches high and clocks in at 22 pounds, while the TI weighs 33 pounds.

Besides being sleek, the 4L is convenient. Doors on the side hide connectors for the power cord and printer cable. The front and top are free of buttons, switches, and LCD panels. Four small status lights indicate operations, such as printing in progress, and problems, such as paper jams. The 4L doesn't have an on/off switch. It turns on when you plug it in; powers down after each print job; and starts up when you send it a print job, touch the front panel button, open the top door, or insert paper. Printing when the 4L was powered down produced no noticeable delay.

In today's economy, frugal is also attractive. A draft mode, called EconoMode, conserves toner. HP claims this feature, which yields light but readable output, can cut printing costs in half. Unfortunately, this draft mode doesn't speed printing.

Full Featured, Multitalented

The printer uses HP's Resolution Enhancement Technology

and Microfine toner to produce 300-dpi print quality. Resolution enhancement isn't available on the TI and comes only as an option on the Epson. HP also uses a compression algo-

The HP 4L SAVES YOU MONEY on energy and printing costs.

rithm, called Memory Enhancement, to make the printer's standard 1MB of RAM work like 2MB. As a result, HP claims, you won't need more RAM to print full-page 300-dpi graphics, although the 4L supports 2MB.

In addition, the 4L includes HP's PCL 5 and 26 scalable Intellifonts, features neither the TI nor the Epson offers. A Bi-Tronics parallel port provides high-speed and two-way communications. The latter lets you change printer settings and view status messages from your

PC. The printer is rated at 8000 pages per month, midway between the Epson's 11,000 pages and the TI's 5000.

The 4L is powered by a 4-page-per-minute Canon engine and a Motorola 68000 processor. Although many personal lasers use the same processor, some, such as the TI and Epson, employ a faster engine. And that appears to make a difference. In PC World Test Lab performance, the HP 4L's average times were 39 percent slower than the Epson's and 21 percent slower than the TI's.

The 4L's limited upgradability is another drawback. Unlike its two competitors, the HP 4L can't be upgraded for PostScript. In addition, you can't expand its 100-sheet capacity by adding a second paper cassette. The single cassette handles A4, executive, letter-, and legal-size paper; a manual-feed slot handles envelopes, labels, and transparencies.

The HP 4L isn't for everybody or for every situation. But if you're looking for style, functionality, and basic laser performance, look no further.

—Randy Ross
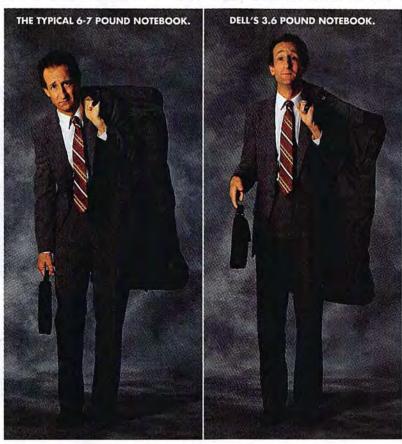
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hilean ambassador ving awareness tha sador explained th ness that political i instability and the

THE PRINT QUALITY OF HP LASERJET 4L OUTPUT, shown at right, is comparable to output from the much pricier HP LaserJet IIIsi.

JOHN GREENLEIGH

LOSE UP TO 3 POUNDS OVERNIGHT.

THE TYPICAL 6-7 POUND NOTEBOOK.   DELL'S 3.6 POUND NOTEBOOK.

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This small number gets you all these big numbers: 25MHz i386™ SL processor, 2MB of RAM, 60MB hard drive, 16KB cache, VGA Reflective (9.5", 640 x 480) LCD, external 3.5" diskette drive, and up to 4 hours of work from the NiMH battery. Not to mention MS-DOS®, Windows, and a mouse. And if you're really hungry for power, we can custom configure a system for you with up to 10MB RAM and 200MB hard drive.

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That's why we designed ClarisWorks™ for Windows to perform like a single application. With word processing, spreadsheet, database and graphics tools all easily at hand. So you can move effortlessly from one set of tools to another. Without jumping from one screen to another.

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PC Computing–March 1993

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MICROSOFT™
WINDOWS™
COMPATIBLE

cc:Mail for Windows Plays by Your Rules

Version 2.0 of *cc:Mail for Windows* comes to market with a powerful rules-based messaging feature that can automatically route your electronic mail to other users, store your messages in folders, and perform additional tasks for you. Version 2.0's redesigned interface makes it simpler for you to keep track of your incoming messages, folders, and bulletin board announcements. An improved text editor, a new spelling checker, better search capabilities, and a draft folder make the program easier to use.

Making the Rules

Undoubtedly *cc:Mail*'s greatest improvement is its rules-based processing. Lotus officials claim
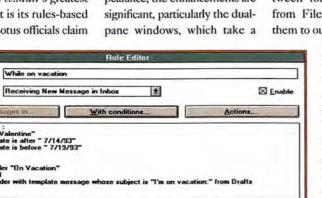
"total expenditures" could go to your budget folder.

Lotus product manager Karl Wong says *cc:Mail for Windows'* rules were designed with average business users in mind. You don't have to learn programming-like commands, and there are no difficult instructions. Instead, you establish rules using *pick lists* of predefined actions that perform tasks based on criteria such as message author or send time. Context-sensitive help is available for each step.

Enhanced Interface

Although Lotus wisely avoided making too many drastic changes to the program's appearance, the enhancements are significant, particularly the dual-pane windows, which take a

NEW RULES-BASED MESSAGING in cc:Mail for Windows 2.0 lets you automatically route messages to other users and file mail into folders.

also drag and drop messages between folders and drag files from File Manager to attach them to outgoing messages.

The draft and trash folders, which were first featured in *cc:Mail for DOS 4.0*, appear in the *Windows* version as well. The draft folder allows you to save a message as a draft document and revise it later, while the trash folder enables you to undelete any messages you erased by accident and control how long *cc:Mail for Windows* stores deleted messages.

Easier Editing

You'll also notice an improved text editor in version 2.0—a change that *cc:Mail for Windows 1.1* users will welcome. A new spelling checker, based on the 190,000-word Houghton Mifflin dictionary (the same found in other Lotus products), cuts down on misspelled memos.

You can now import and export text directly from files without having to use the *Windows* Clipboard. And advanced search-and-replace capabilities allow you to retrieve messages from your mail folders and directories.

cc:Mail for Windows 2.0 retains the pricing of the previous version. The server-based Platform Pack lists for $495. *cc:Mail for Windows 2.0* User Packs cost $345 for 10 users, $845 for 25 users, and $3295 for 100 users.

—Jeff Bertolucci

CC:MAIL FOR WINDOWS' ENHANCED INTERFACE makes it easier to point-and-click your way between in-box, folders, and bulletin boards.

rules let you automate any *cc:Mail* task that you currently do manually. Before leaving on vacation, you might use rules to forward incoming mail automatically to an assistant and send a form letter to each mail sender informing him or her of your absence. Or you might automatically forward messages that contain certain keywords or text strings to a specific folder—messages containing the string

cue from *Windows'* File Manager. A Container List pane on the left shows a collapsible outline of icons for the Inbox, Bulletin Board list, Folders, and so on; the right Contents List pane shows the headings of the items (Messages, Bulletin Boards, and so on) belonging to the item selected in the left pane; and a slider bar enables you to adjust the split between the panes. You can

trol how long *cc:Mail for Windows* stores deleted messages.

How to Survive If Your PC Maker Doesn't

When Sam Watts bought his 486 Windows Power Station PC from Compu-Sys, a direct vendor based in Irwindale, California, he thought he got a good deal. "It looked like the best bang for the buck," Watts says. But when his system arrived, it lacked the $265 fax-modem he had ordered, as well as proper documentation and the correct monitor cable. Watt called Compu-Sys two days later but "got no one," he says. After several days of calling, Watts finally reached a recording that said Compu-Sys was out of business.

Since Watts's credit card payment had already cleared, he was out $265. As if that wasn't enough, he had to drive 45 miles from his home in Branson, Missouri, to a computer repair shop in Springfield and spend $100 to get his new computer in working order.

Buying Smart in Tough Times

Watts's hard-luck story isn't unique. An increasing number of PC buyers are finding that their vendors have suddenly closed shop. As major companies like AST, Compaq, Dell, and IBM continue to slash prices and add features to their low-end lines, smaller vendors, unable to survive on ever-shrinking profit margins, bite the dust. Recent casualties include LodeStar Computers of City of Industry, California, and FastMicro of Phoenix, Arizona.
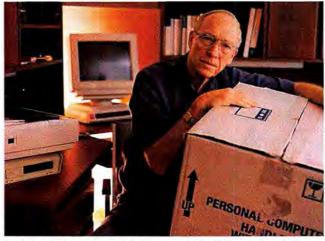
Hugo Huapaya of Miami Springs, Florida, bought a 50-MHz 486DX system from LodeStar Computers in December 1992. When his system arrived in January, Huapaya

noticed a number of things wrong with it. The system booted slowly, and neither the local bus design nor the mouse driver was what he had ordered.

Huapaya shipped his system back to LodeStar. "About three weeks later I got the system back with a note saying [LodeStar] had moved," Huapaya says. Now he has a computer he doesn't want, and his vendor is out of business.

Wisely, Huapaya had paid by credit card and immediately disputed the LodeStar charge, so he hasn't had to pay for the system. However, the disputed amount is still on his credit card statement, and Huapaya says it will take "a few more months" to clear the charge.

Know Thy Vendor

What's a savvy buyer to do? Use common sense, says Jennifer Crowl, spokesperson for the Direct Marketing Association in New York. To check a vendor's reputation for honesty and professionalism, Crowl recommends calling the Better Business Bureau in the city where the vendor is based. Ask if any complaints have been filed against the company, she says. And if you've never heard of the vendor, ask your colleagues and associates whether they've done business with the firm.

The smart buyer also investigates how long the vendor has

been in business, says Robert Zises, president of the National Computer Exchange in New York. He also recommends running a financial check on the company and calling the Consumer Affairs Department in the vendor's home state.

More tips from Zises: Get everything in writing, and always know the terms of your transaction. Take time to check out new equipment thoroughly, and ensure that the components and the configuration you receive are exactly what you ordered.

You may also want to sign a contract with a third-party service provider. Although most vendors provide at least one year of service with their systems (usually through an outside vendor), these contracts usually are void if the system vendor goes out of business.

—**Jeff Bertolucci**

BUYER BEWARE: Sam Watts received his 486 PC without the fax-modem he ordered; when he called his vendor, it had closed shop.

Buying During a Shakeout: Smart Tips for Savvy Shoppers

1. Check the Better Business Bureau in the vendor's city as well as the state Consumer Affairs Department to determine if complaints have been filed against the company.

2. Ask colleagues and business associates if they've done business with the company.

3. Get written confirmation from the vendor about pricing, warranty, and return policy.

4. Verify availability of merchandise and ship dates.

5. Don't pay cash. Use a credit card.

6. When your equipment arrives, make sure the configuration and components are what you ordered.

7. If the equipment is defective, keep a written diary of its problems and the steps you've taken to correct them (including phone calls to the vendor and return ship dates).

8. Before you return defective equipment, get a return merchandise authorization from the vendor.

9. Sign a service contract with a third-party service provider.

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Until 1994

To: PC Buyers
From: Your friends at
Gateway 2000

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We K

Guaranteed Price

We *guarantee* we'll sell you this 1994 upgrade at the best market price. At press time for this ad, we didn't have enough information to quote a price, but you can be sure it'll be terrific, possibly as low as $500. Call for details! The Pentium technology price guarantee is for a limited time only. If you purchase a Gateway 2000 Pentium technology ready system by August 15, 1993, you'll receive a written price guarantee for the processor you can buy in 1994.

Guaranteed Availability

We *guarantee* you can be among the first to get this next-generation OverDrive processor when it goes on the market. When you buy your 486 Pentium technology ready system this summer, you'll receive a personal upgrade reservation number. It's your guarantee of a special place in line to acquire this next-generation OverDrive processor when it ships in 1994. Our supply of upgrade processors will be offered in sequence to customers holding these reservation numbers. The sooner you buy your 486 system, the sooner you can get your OverDrive.

Get A Gateway During 486 Fest — It's The Smart Technology Move

When you buy a Gateway 2000 Pentium technology ready system during 486 Fest, you're investing in your technology future for a fraction of what you would pay for a Pentium-based system today.

Aren't you glad you peeked at our gift? Now you know Gateway 2000 offers the best value — today *and* tomorrow.

With Gateway's Pentium™ Technology Guarantee, You Have A Good Reason To Celebrate!

If you've been worried about keeping up with technology now that Intel's® Pentium processor has been announced, relax! Kick back and join the Gateway 2000 486 Fest, featuring great buys on 486 systems and our Pentium Technology Guarantee. It's a Gateway-exclusive offer that allows you to keep up with technology *and* save big bucks when you buy a Gateway 486 Pentium technology ready system this summer!

Gateway 2000
486 Fest

Guaranteed Upgradeability

We *guarantee* you can upgrade your Gateway 486 Pentium technology ready system to future Pentium processor technology products in 1994. This next-generation OverDrive processor will easily plug right into the ZIF (zero insertion force) socket already installed on your upgradeable Gateway 2000 system with no modifications. And, unlike many manufacturers, we've already had our systems heat tested for use with Pentium technology processors.

Guaranteed Performance

We *guarantee* your upgrade to Pentium technology will accelerate overall system performance by 50 to 100%. It's likely that your upgraded 486 system will outperform Pentium systems on the market today.

Pentium
Technology ™

Need a reason to celebrate? We're making this the best summer ever to buy a Gateway PC! During our 486 Fest, you'll find better-than-ever buys on all the fabulous systems in our product line. You'll think you died and went to hog heaven! Buy some fiesta goodies, invite a few party animals over and call us. We'll give you lots of reasons to party!

Party Reason — *Choosing a 486 system shows you're a smart buyer!*

A less astute buyer might go for a 386 or Pentium™ system, but you know where the real value is. Gateway 2000's desktop and Nomad PCs are now all 486 systems for good reason. With our great prices on 486 technology, 386 systems are no longer a smart buy. And first-generation Pentium systems are not a good value.

Even if you were willing to pay the steep premium other manufacturers are charging for Pentium systems, you'd have trouble getting one because availability is extremely limited. Our engineers say the Pentium systems in our lab run so hot, you could use one to heat a hog barn. Besides, Pentium systems on the market today will be outperformed quickly by improvements in Pentium technology. That's why we're not selling Pentium systems yet. At Gateway, we won't sell anything unless it's a good value for you.

In today's market a 486 machine is the way to go, especially now that all of our desktop ISA systems are Pentium technology ready and guaranteed to be upgradeable.
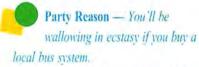
Party Reason — *If you pick a mini desktop, you'll save enough to invite the whole barnyard to your party.*

Gateway's mini-desktop systems — 4SX-25, 4SX-33 and 4DX-33 — are petite but powerful, based on an integrated design that incorporates many subsystems on the motherboard for the best price-performance ratio. All mini desktop systems include: 4 to 8MB RAM; a large and fast hard drive, operating on the local bus for even faster drive performance; a fast video chipset with 1MB; a brilliant, crisp display from the standard 14-inch CrystalScan™ non-interlaced, .28mm dot pitch color monitor; and more available expansion slots than you find in most small-footprint PCs. The combination of these features makes a cool Windows™

Gateway's 486 Fest!

machine for an unbeatable price. Now that's cause for celebration!

Party Reason — *You'll be wallowing in ecstasy if you buy a local bus system.*

Go ahead and splurge on our 4DX2-50V or 4DX2-66V models. We put ATI's™ Graphics Ultra Pro video card with 1MB VRAM on our VESA® local bus for results that will be the hit of your party.

Gateway 2000

486 Fest

Plus, these systems have a hefty 8 or 16MB RAM with cache, and party-hearty hard drives running on the local bus. You get an extra VESA local bus expansion slot, a 15-inch flat, square CrystalScan color monitor, and more free choices of application software than you'll find anywhere else.

Party Reason — *You'll get the CD-ROM drive you always wanted.*

It's included with our 4DX2-66 systems! Or you can upgrade any other standard configuration with a CD-ROM. We supply a free system CD when you purchase a PC with a CD-ROM drive. The CD includes Microsoft's® Multimedia Pack,™ designed to let you explore the value of multimedia technology. You get an interactive user's guide to Windows and a collection of sound, animation and video clips to use in business presentations and documents.

Party Reason — *You can have it your way at Gateway.*

We custom build each Gateway 2000 computer to your order. We'll gladly provide you with a quote on a special configuration. Call our sales department!

Party Reason — *You'll save money!*

Check the configurations and prices on the back page of this ad. We've gone hog-wild for 486 Fest!

Party Reason — *The wrappings!*

Your Gateway system comes in a black-and-white cow-spotted box. Some people use our boxes for end tables and playroom furniture. It will certainly be a conversation-starter at your party.

Party Reason — *Get our 486 Fest Best Buy!*

Check the back page of this ad for an unbelievably good buy on a smart 4DX2-66 local bus system configuration including 8MB RAM, 340MB hard drive and CD-ROM for only **$2495!**

The Gateway 2000 4DX2-50V at $2295 is a favorite with our three little pigs.

GATEWAY2000

8 0 0 - 8 4 6 - 2 0 6 5

Party On With Value-Priced Portable

Keep counting the reasons to celebrate during Gateway's 486 Fest! You'll find plenty when you look at our Nomad notebook PCs and computer peripherals!

Nomad Notebooks

Party Reason — *You'll get 486 desktop performance in a lightweight portable when you buy a Nomad.*

Why settle for a 386 notebook when you can get a powerful 486 Nomad in the same price range? All three Gateway 2000 Nomad models are 486 systems with snappy performance that's still rare in notebooks. Plus, they're smaller than many notebooks, weighing just 5.6 pounds and measuring 8.5" x 11" x 1.8". No other notebook this size can beat the Nomad 450DXL's combination of performance and battery life! In *PC Magazine's* Battery Rundown Test, Nomad systems operated up to six hours on a single battery with power management enabled.

Party Reason — *No more squinting at a dim and fuzzy display!*

Nomad screens are big and brilliant — a full 10" VGA backlit display with 64 gray scale. You can use your Nomad in all lighting conditions.

Party Reason — *Three cheers for a great keyboard and mouse!*

Nice feel! The 79-key touch-type keyboard is comfortable, quiet and fast. Nomad 450DXL models now also include Microsoft's® Ballpoint™ portable mouse with Quickport,™ standard.

We have lots of options for our Nomads, too. Call for details!

Peripherals

Party Reason — *You'll save money on connectivity tools!*

TelePath™ Fax/Modem. It's everything you ever wanted in an internal fax/modem, including a great price! The Gateway 2000 TelePath is a 14,400bps modem, V.32bis, with 9,600bps fax capability. It's compatible with the standard AT command set and is downwardly compatible with

lower modem speeds. Package includes software — WinFax Pro,® Crosstalk™ for Windows and Qmodem — plus a free CompuServe® trial membership. **$195**

Network Cards. Call for a selection of Ethernet cards and Token Ring adapters, installed and configured.

Microsoft Windows™ for WorkGroups. Networking made easy! Share files and printers, send electronic mail, schedule group meetings with the click of your mouse — and get everything you need in one inexpensive package. That's the beauty of Windows for Workgroups. Even a beginner can set up and configure a network with this fantastic product. Price includes an Ethernet adapter and software. Hardware and software are factory-installed. **$159**

Party Reason — *You'll save money on multimedia software and peripherals!*

CD-ROM Kit. You'll enter a whole new world of possibilities with your PC when you add a CD-ROM drive, giving you access to exciting new applications, databases and entertainment programs. With applications continually getting bigger, wouldn't it be convenient to get software on a single CD rather than piles of floppy disks?

Get galloping portability on your road trips with Gateway's top-of-the-line Nomad 450DXL.

And Peripherals!

Comparable CD-ROM drives usually retail for over $400. Manufactured specially for Gateway 2000, this kit includes CD-ROM, interface card and everything you need to add MPC-compliant CD-ROM to your PC. **$225**

Microsoft Windows Sound System.™ Here's the sound system designed for business, complete with a headset for private office use. You can "speak" commands to your PC for hands-free operation. Let your PC read numbers back to you for proofing spreadsheets. Embed audio messages in Windows OLE applications. Add audio to screen savers. Play your Ad Lib® and Sound Blaster™ games — and more! Our special Gateway price includes soundboard, microphone, headset and software. **$149**

Party Reason — *You'll save money on all kinds of extras from Gateway!*
Colorado Memory Systems™ **TBU.** 250MB internal automatic tape backup unit copies up to 9.5MB per minute with high-speed data compression. Reads previously formatted Archive™ tapes, too. Comes with easy-to-use DOS software, one tape and cable. 486 Fest price: **$195!**

CrystalScan™ **15-Inch Monitor.** Non-interlaced color monitor with flat, square screen. If the system you want is advertised with a 14-inch monitor, you can upgrade at the time of purchase to a 15-inch monitor for only **$100**.

Panasonic® **KXP2123 Color-Capable Printer.** Add color to your documents with this 24-pin dot matrix printer. Includes Adobe Type Manager.® Call for 486 Fest price!

Texas Instruments® **MicroLaser**™ **Plus Laser Printer**. Never before has such a small, Postscript® laser printer offered so much speed and economy. The MicroLaser Plus is only 13.4" x 14.2", yet it prints 9 pages per minute at 300dpi. Call for 486 Fest price!

We offer many other system options and upgrades, including 17" and 20" monitors, tape backup units, bigger hard drives, other software and more! Call today!

The software and peripherals listed here are sold only with the purchase of a system. For details on our complete line of extras for Gateway customers, ask for our special add-on components division when you call.

Gateway 2000

486 Fest

Celebrate! We Give You More Softwar

That's right! We have even more reasons to party during Gateway's 486 Fest! We offer more free choices of application software with our systems than any other manufacturer. Plus, all software is pre-installed and ready to run the moment your system arrives. Hooray! No installation hassles!

With Nomad, mini desktop and our 4DX2-66 Best Buy systems, you get Works, one of the best integrated software packages on the market.

Party Reason — *Microsoft Works for Windows.*

Works for Windows is the single program that combines all the tools you need to run a business: word processor, spreadsheet, database and electronic communications. It's simple to use yet provides power and functionality for advanced users.

With desktop and tower systems that include "choice of application software," you can select one of the following software packages. All applications are the latest versions.

Party Reason — *Microsoft Excel for Windows.*

Microsoft Excel gives you unprecedented power and analytical functions, outstanding reporting and presentation tools, and easy charting. Includes faster ways to work. Reviewers consistently choose Excel as the best spreadsheet for Windows. It's an *InfoWorld* Product of the Year!

Party Reason — *Microsoft Word for Windows.*

The original word-processing application for Windows is still the best selling! Drag and drop text and graphics around the page for easy creation of professional-looking documents. Existing WordPerfect® files (and other file formats) are usable in Word. You can even type a WordPerfect command and see Word's equivalent command automatically demonstrated on-screen!

Party Reason — *Microsoft Word and Bookshelf 92.* CD-ROM Edition.

The most popular word processor for Windows now becomes the ultimate writing tool with an entire electronic reference library full of multimedia sights and sounds! Includes dictionary, encyclopedia, thesaurus, atlas, quotations, and more.

Party Reason — *Microsoft PowerPoint for Windows.*

For easy, professional on-screen slide shows, overhead transparencies or 35mm slide presentations. Fast and flexible word processing, graphing, outlining and drawing tools give you more time to master your content instead of wrestling with your software.

Choices To Crow About!

Party Reason — *Microsoft Project for Windows.™*

Project management is easier and more flexible than ever! This program gives you the power and versatility to manage your schedules and resources more efficiently. That's why *PC Magazine, PC Week, PC World* and *Software Digest* call Project the best program in its category!

Party Reason — *The MS Entrepreneur Pack.*

Four great software packages in one! Microsoft Works,™ Publisher,™ Money™ and an Entertainment Pack.

Party Reason — *Borland Paradox® for Windows.*

Paradox for Windows is the relational database that makes a powerful database easy to use. Now you have complete access to data, plus all the tools you need to create graphical applications in no time. Paradox for Windows works with existing Paradox for DOS and dBASE files without modification.

Party Reason — *The Windows Programmer Pack.*

Get everything you need to create programs for Windows: Microsoft QuickC for Windows,™ Visual Basic for Windows,™ Windows Control Development Kit,™ Windows Help Compiler™ and Windows Programmer's On-Line Reference.™

Party Reason — *Upgrade to the CD-ROM Edition of Microsoft Office.™*

You can upgrade from a choice of application software to Microsoft Office, CD-ROM version, for only $99! This single package has all the leading Windows applications: Word, Excel and PowerPoint.

The standard edition of MS Office is also available as an upgrade from a choice of application software for $175, or $499 as a second application.

Party Reason — *Upgrade from Works to choice of application.*

If the system you want comes with MS Works for Windows, you can upgrade to a choice of application software for only $100.

Software shown here is sold only with the purchase of a system. Software sold with systems includes the identical applications contained in retail packages but will not include the retail box. You get all master diskettes and manuals, shrink-wrapped and packaged in a Gateway 2000 box.

intel inside

Everyone's flocking to check out the life of the party. Gateway's 4DX2-66 Best Buy system shown with optional Labtec speakers.

GATEWAY2000

8 0 0 - 8 4 6 - 2 0 6 5

The Whole Herd Is Dedicated To Pro

Yes, this is the whole gang at Gateway 2000. We now number in excess of 2,000 people. We gathered everyone together for this 486 Fest kick-off photo so you could see all the friends you have in the business, and so we could renew our commitment to your complete satisfaction.

Despite some blustery weather, Ted, our president and founder, gave us an inspiring pep talk about customer satisfaction and value. He reminded us that we will be the best in this industry only as long as we remember the guiding principles of our company, best described in our mission statement:

We are Gateway 2000.
We care about and respect you, our customers.
We pledge to you that we will be honest, courteous
and friendly.

If we make a mistake, we will admit it.
If you're unhappy about something, we'll do
everything in our power to make it right.
We'll treat you as an individual and take special
care to see that your individual situation is
handled fairly.
We have fun working together, striving to be the
most knowledgeable, productive and successful team in the world.
We blend our talents to continually offer higher quality, more
innovative and useful products, at a value unmatched by
competitors.
We will always be happy but we will never be satisfied.
And we will continually improve everything we do.
We will succeed, together as a team.
We are Gateway 2000.
We are the only logical choice!
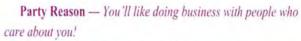
Gateway 2000
486
Fest

ling You With The Best Service!

Party Reason — *You'll like doing business with people who care about you!*

Each and every person in this photo rededicated his or her efforts to achieving these goals. Like a married couple going through a second wedding ceremony after many years of marriage, our energies were refocused on what's important. And what's important to us is *you!*

Party Reason — *You get excellent after-the-sale support!*

Every Gateway 2000 system comes with a **30-day money-back guarantee**. If you don't like your system, send it back within 30 days for a refund. All systems come with a **one-year limited warranty** and telephone **technical support** for the life of the system from our award-winning tech department. You also get an **automated fax service** to supply you with detailed documentation on over 150 technical subjects, and a **lifetime BBS membership** for additional technical support and online forums.

We offer **on-site service** to most locations in the country (factory service only for notebooks). **Replacement parts** leave our factory as quickly as possible; we pay overnight shipping. Plus we now have **interactive documentation** on desktop systems with pictures and text right on your hard drive (in addition to comprehensive hardware and software manuals).

Party Reason — *It's so easy! Just give us a call!*

We make it easy for you to buy a Gateway PC, with convenient payment options including major credit cards and C.O.D. terms. Net 30-day terms and leasing options are also available to qualified commercial customers.

For a truly celebrated value, the choice is black-and-white: Gateway's 4DX-33.

Gateway 2000's Party List

4SX-25

- 25MHz 486SX Intel® Processor
- 4MB RAM
- 3.5" Diskette Drive
- 80MB 17ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium™ Technology Ready**
- Windows Accelerated Video w/1MB DRAM
- 14" Color CrystalScan™ 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey™ Keyboard
- MS-DOS® 6, Diags, Windows™ & Mouse
- MS Works for Windows™ 2.0

$1295

4SX-33

- 33MHz 486SX Intel Processor
- 4MB RAM
- 5.25" & 3.5" Diskette Drives
- 170MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- MS Works for Windows 2.0

$1495

4DX-33

- 33MHz 486DX Intel Processor
- 8MB RAM, 64K Cache
- 5.25" & 3.5" Diskette Drives
- 212MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Mini Desktop Case
- 5 16-Bit ISA Slots
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- MS Works for Windows 2.0

$1895

4DX2-50V

- 50MHz 486DX2 Intel Processor
- 8MB RAM, 64K Cache
- 5.25" & 3.5" Diskette Drives
- 212MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- ATI™ Ultra Pro Video w/1MB VRAM on VL-Bus™
- 15" Color CrystalScan 1572FS
- Desktop Case (Tower Upgrade)
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- Choice of Application Software

$2295

4DX2-66 BEST BUY

- 66MHz 486DX2 Intel Processor
- 8MB RAM, 64K Cache
- 3.5" Diskette Drive
- CD-ROM Drive
- 340MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- Windows Accelerator w/1MB DRAM on VL-Bus
- 14" Color CrystalScan 1024NI
- Desktop Case (Tower Upgrade)
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- MS Multimedia Works, CD-ROM Edition

$2495

4DX2-66V

- 66MHz 486DX2 Intel Processor
- 16MB RAM, 256K Cache
- 3.5" Diskette Drive
- CD-ROM Drive
- 340MB 13ms IDE Hard Drive
- Local Bus IDE Interface
- **Intel Pentium Technology Ready**
- ATI Ultra Pro Video w/1MB VRAM on VL-Bus
- 15" Color CrystalScan 1572FS
- Desktop Case (Tower Upgrade)
- 7 16-Bit ISA Slots, 2 on VL-Bus
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- Choice of Application Software

$2995

4DX2-66E

- 66MHz 486DX2 Intel Processor
- 8MB RAM, 256K Cache
- 5.25" & 3.5" Diskette Drives
- 500MB 11ms SCSI Hard Drive
- 32-Bit EISA SCSI Controller
- Windows Accelerated Video w/ 1MB DRAM
- 14" Color CrystalScan 1024NI
- Tower Case
- 8 32-Bit EISA Slots
- 124-Key AnyKey Keyboard
- MS-DOS 6, Diags, Windows & Mouse
- Choice of Application Software

$3495

NOMAD 425SXL

- 25MHz 486SX Intel Processor
- 4MB RAM
- 3.5" Diskette Drive
- 120MB IDE Hard Drive
- Backlit 10" VGA Screen, 64 Gray Scale
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8," 5.6 Lbs.
- 6-Hr. NiCad Battery & AC Pack
- 1 Parallel / 1 Serial Port
- 79-Key Keyboard & FieldMouse™
- MS-DOS and Windows
- MS Works for Windows

$1995

NOMAD 450DXL

- 50MHz 486DX2 Intel Processor
- 3.5" Diskette Drive
- Backlit 10" VGA Screen, 64 Gray Scale
- Simultaneous Video with 1MB
- Size 8.5" x 11" x 1.8," 5.6 Lbs.
- 6-Hr. NiCad Battery & AC Pack
- 1 Parallel / 1 Serial Port
- 79-Key Keyboard & MS Ballpoint
- MS-DOS, Windows & Works for Windows

$2495
(With 4MB RAM and 120MB Hard Drive)

$2995
(With 8MB RAM and 200MB Hard Drive)

Printed on recycled paper with soy inks
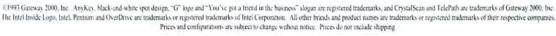
All hard drive sizes are manufacturer's specified capacities. Microsoft MS-DOS 6 can increase hard drive capacity through software compression.

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New Products

Contenda and WinBook Notes: Powerful, Affordable Lightweights

The ideal mobile computer would require no compromises: It would be lightweight and reasonably priced without sacrificing CPU power, screen brightness, and a comfortable keyboard. Today it's hard not to make a few compromises, but two new lightweights from Zeos Int'l and Micro Electronics strike an attractive balance—at prices that tip the scales in their favor.

The $1495 Zeos Contenda is a 3.9-pound subnotebook, but don't let its weight fool you. This 9.7-by-6.1-by-1.8-inch machine is sleek and powerful. The product beats competing subnotebooks, namely the Gateway 2000 HandBook and the pricier Dell 320SLi, in two key areas: CPU power and display. The Contenda's power-saving Intel 25-MHz 386SL processor is more powerful than the HandBook's Chips and Technologies 286-class processor and the 320SLi's Intel 20-MHz 386SL chip. Its 7½-inch, 64-gray-scale LCD screen is the only backlit VGA display of the three. So it's brighter and easier to read, particularly in low-light situations.

Big Enough to Type

Can you type on it? Yes. The 80-key keyboard has a solid feel, with alphanumeric keys that are slightly, but not noticeably, smaller than the keys on your desktop system and offer a full 3mm key travel. To save space, Zeos reduced the size of the <Shift>, <Enter>, and function keys, but this keyboard should be adequate for all but the largest hands. The only compromise is the use of a horizontal cursor key arrangement instead of the standard inverted T. The trackball, though minuscule, proved quite usable.
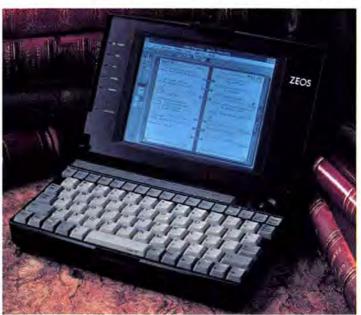
The Contenda has a nickel–metal-hydride battery that will power the system for up to 4 hours, according to the vendor, although some of our staff complained that it ran only 1½ hours in real use. The system's standard configuration includes 2MB of RAM upgradable to 10MB, and an 80MB hard drive. It also has an unusually small, light AC adapter. The Contenda can take an internal fax-modem and connections for an external floppy drive and a VGA monitor. It also has one serial and one parallel port.

A Winning NoteBook

The Micro Electronics Win-Book has achieved a new balance in weight and performance and should be of particular interest to Windows users. At only 5.4 pounds, the WinBook is billed as a notebook, but it makes its peers look like candidates for a weight-loss program.

This $1699 system measures 11 inches wide by 8¾ inches long by 1¾ inches deep and is cheaper than many notebooks that offer fewer features and less storage. Run by the power-saving Cyrix 25-MHz 486SLC processor, the WinBook system includes 4MB of RAM that's expandable to 8MB, and a roomy 120MB hard drive that's expandable to 250MB. The WinBook offers an easy-to-read 10-inch, backlit, 64-shade grayscale VGA LCD screen.

But what Windows users will appreciate most is the oversize 16mm trackball located beneath the 85-key keyboard—very similar to the Apple PowerBook's keyboard arrangement.

THE $1495 ZEOS CONTENDA is a 3.9-pound subnotebook with a power-saving Intel 25-MHz 386SL processor and a 7½-inch backlit VGA screen.

The large trackball buttons are located just below and are spacious. The alphanumeric keys are standard size and feel good.

The system also addresses a power management issue for Windows users by providing a Motorola chip set that helps the WinBook's nickel–metal-hydride battery run for almost 4 hours, according to the vendor.

The notebook offers six I/O options for peripherals, including a PCMCIA 2.0 slot and a connector for an external VGA monitor. It also sports a 2400/9600-bps fax-modem and an internal 1.44MB floppy drive.

—Laurianne McLaughlin

Contenda

This boxy 3.9-pound subnotebook with 386SL processor power features a backlit VGA display and a comfortable keyboard.

Zeos Int'l
800/554-5220,
612/633-4591,
612/633-1325 (fax)
List price: $1495
Reader service no. 640

WinBook

At 5.4 pounds, this notebook offers the features and storage found in higher-priced units, plus one of the best embedded trackballs around.

Micro Electronics
800/468-2162
List price: $1699
Reader service no. 641

CompuAdd 450SLC2: Bargain 486 Power

For those seeking 486 performance without the 486 price, CompuAdd's low-profile 450SLC2 desktop system offers a new choice: IBM's new clock doubler 486SLC2-50 processor. This processor performs on a par with Intel's 33-MHz 486DX, according to PC World Test Center lab tests, and the system is competitively priced at $1695.

The IBM 486SLC2-50 runs at 50 MHz internally and 25 MHz externally. The chip features a 16K on-board cache, double the amount found on Intel's 486SX and DX chips. This large cache improves performance, especially with *Windows* applications.

Put through its paces at the PC World Test Center, the CompuAdd 450SLC2 was clearly faster than 486SX-25 systems. Among a range of 486DX-33 systems, it placed close to the bottom on *Freelance Graphics* and *Excel* tests and finished in the middle of the pack on *Paradox* and *Word for Windows* tests.

The IBM-built motherboard integrates components to save system space. For example, a Western Digital 90C31 video accelerator and 1MB of video RAM offer 1024 by 768 resolution with up to 256 colors and a 72-Hz vertical refresh rate.

To save space, both floppy drives are packed into a single half-height 5¼-inch bay, leaving another externally accessible bay for a 3½-inch device. In addition, the system offers one internal drive bay for 3½-inch devices, five available expansion slots, 4MB of RAM expandable to 20MB, and a 14-inch interlaced super-VGA monitor.

—Laurianne McLaughlin

SLIM LOOK, SLIM PRICE: CompuAdd's $1695 450SLC2 features IBM's new clock doubler 486SLC2-50 processor.

Recordable CD ROM Drive Sets Price Low

Sometimes numbers really do tell the whole story. Case in point: Pinnacle Micro's new CD ROM recorders. Like other write-once CD ROM drives, Pinnacle's records up to 680MB of regular data, or 74 minutes of uncompressed sound, onto 5¼-inch compact disks. The performance of the Pinnacle drive is acceptable; it will write a 63-minute CD in slightly less than 1 hour, and the 300ms average seek time and 154-kilobytes-per-second transfer rate meet the demands of multimedia. Where the Pinnacle stands out is on price. At $4195, the RCD-

202 blows a hole in the CD ROM price floor; these devices have typically sold for $8000 and more.

Pinnacle's timing couldn't be better. Analysts expect 1.5 million CD ROM drives to be sold this year, and the major PC vendors now offer systems with them as standard equipment. With a recordable CD ROM device, corporate developers can master complex interactive presentations or simple catalog databases that can be updated easily—by issuing a new disk— and shared among employees and customers. There's no need to fuss over compatibility issues;

the RCD-202 can write disks using virtually every audio, video, mixed media, and data standard available, including Orange, Red, and Yellow book.

The generous storage capacity of the compact disks also makes CD ROM a logical choice for long-term data archiving. Because they're not rewritable, however, regular backups are still better left to other media, such as tape.

For all the power packed into the drive, the RCD-202 occupies surprisingly little space. The external model is roughly 2 by 10 by 10 inches and weighs less than 7 pounds.

There's also an internal, half-height version of the drive (the RCD-200) that sells for $4095. Both include a one-year parts and limited labor warranty.
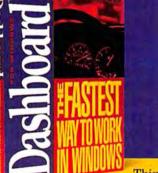
—Richard Melville

DASHBOARD? THIS BABY'S A VW WITH A JET ENGINE! JUST A COUPLE OF CLICKS AND KABLAM!! I'M WHIPPING THROUGH WINDOWS LIKE IT'S STANDING STILL. MARIO ANDRETTI... EAT MY DUST!

DASHBOARD? IT'S PRETTY FAST.

Think about it. No one would actually get speed-happy over a push-button utility panel for Windows®... Would they?

Well, Dashboard does have some lightning fast features. Like extended virtual screens that let you create, save and switch between up to 9 different full-screen views in a flash. Quick launch icons that launch your favorite applications with one click. And the "fuel" gauge with warning lights to instantly monitor your computer's memory, resources, and more.

Sure, it's got plenty of speedy features. But is that any reason to go crazy for the fastest way to work in Windows? Maybe you can ask Mario as you blow by.

1-800-554-1305 Ext. 603W

For more information or to order Dashboard, call now!
And just for fun, every 50th caller gets Dashboard FREE!*

Dashboard FOR WINDOWS

Packard Bell's New 486 Fleet Comes Complete With Navigator

With the launching of a new line of 486 desktop and minitower systems, Packard Bell is enticing first-time PC purchasers and power users alike with the introduction of a range of products that feature performance, expandability, and ease of use.

Those hopping on board for the first time will appreciate Packard Bell's Navigator, a self-help software tool that comes preloaded and employs simple menus and tutorials to help familiarize novices with their PC and with various bundled applications, including Microsoft's DOS 5.0, *Windows 3.1*, *Works for Windows*, and *Money*. Navigator, which sits on top of *Windows*, also offers a simple password protection option for applications, and point-and-click Packard Bell service-and-support information.

Power users: Rest assured Packard Bell hasn't forgotten you. System options are many; choose from among 68 configurations with processors ranging from a 25-MHz 486SX to a 66-

MHz 486DX2. Case options include a four-slot, four-bay desktop; a small-profile desktop with three slots and three bays; and a minitower with five slots and five bays. But what should really attract performance hounds is Power Pack, a full complement of new features including such enhancements as Packard Bell's proprietary local bus video, which has a graphics accelerator on the controller chip. Also, processors are housed in a ZIF socket that supports an Over-Drive or Pentium-class Over-Drive for DX2 processor. You can expand the external cache up to 512K, so should your system go Pentium, you'll have the cache to meet your processor's needs.

The systems cost between $1099 and $3999. In all, ten software packages come with each. Systems with modems have a *Prodigy* start-up kit; fax-modem–equipped systems include both *Prodigy* and *WinFax Lite*. The systems are covered by a one-year limited warranty that includes on-site service. Packard Bell offers 24-hour, seven-days-a-week live tech support, and automated support that lets users request answers from a menu of the most commonly asked questions.

—Richard Melville

PACKARD BELL'S NAVIGATOR is a self-help program for novices.

Tiny Hard Drives Boost Storage Capacity

Maxtor and MiniStor Peripherals are among the first hard drive manufacturers to roll out 1.8-inch drives for PCMCIA Type III card slots. Designed for an upcoming generation of mobile computers, the minidrives are ideal as primary storage devices or as high-capacity removable media for office and portable use.

Among the new drives, Maxtor's MXL-105-III has the highest capacity, with 105MB of storage. Constructed to withstand the rigors of the road, the Maxtor can take an operating shock of 100 g's and a nonoperating shock of 300 g's, according to the company. In lay terms, you could probably drop a notebook (with the MXL-105-III inside a PC card slot) from your waist to a carpeted floor without damaging the drive.

MiniStor's MiniPort series includes a new 42MB model that joins the company's 64MB drive for Type III slots. A slightly larger 85MB is available for custom PCMCIA slots. In addition to higher storage capacities, the new drives offer improved shock resistance, MiniStor says. An on-board sensor detects jolts of up to 200 g's and postpones write commands until the system is stable—good for saving a file on a bumpy flight.

The Maxtor and MiniStor drives are mounted on PC cards and exchange data with the system via a standard 68-pin PCMCIA 2.0 interface. Both will fit in Type III slots, which have more headroom for thicker, 10.5mm PC cards.

MiniStor officials expect their 85MB MiniPort to list for about $600; the 42MB model will cost

approximately $475. Pricing for Maxtor's MXL-105-III wasn't available at press time.

—Jeff Bertolucci

Windows at your fingertips.

WinBook, the first notebook computer designed specifically for Windows.

The new WinBook™ gives you all the power to run Windows, and the unique design to make it easier to use.

It features a built-in, centered trackball, which allows you to control cursor movements effortlessly with either thumb–without having to lift a single finger off the keyboard.

And the WinBook comes with the power and speed needed to run Windows effectively. You get 4MB of memory, the new ultrafast 486 SLC/E 25-MHz processor and the Motorola chipset which provides eight power-saving features, even while running Windows.

The WinBook was engineered for Micro Electronics, a division of MEI/Micro Center, Inc. MEI is America's

leading direct source for computer accessories. Micro Center has been selling PCs for more than 14 years–longer than IBM or Compaq–with over 736,000 units sold. And with over 2.2 million satisfied customers nationwide, they have developed a superior support staff, including top engineers and technical specialists. So you always get the highest quality product at the lowest possible price.

Before you choose a notebook computer, look at the only one designed for Windows.

The WinBook from Micro Electronics
—putting Windows at your fingertips.

Dual-button trackball centered under keyboard.

The 5.4 lb.WinBook was designed by award-winning Palo Alto Design.

- *Fast-acting Hitachi LCD screen for no cursor loss.*
- *512k video RAM for simultaneous display.*
- *Includes a 9600 baud send/4800 baud receive fax/2400 baud modem.*
- *Industry standard PCMCIA 2.0 slot for future expandability.*
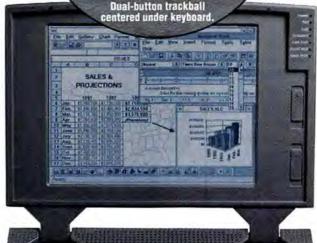
Eight Power-Saving Features
Including sleep mode for all I/O ports, HDD, and FDD to increase battery life.

Docking Station
With the available docking station, your WinBook instantly becomes a full-function desktop computer. Its two expansion slots allow you to add peripherals such as monitors, hard drives, CD-ROMs or an extended keyboard. **And it's just $399!**

— 3.5 floppy disk drive   PCMCIA 2.0 slot —

Longer Battery Life
The WinBook features NiMH 2300 MA batteries with gold-plated contacts. This allows it to run much longer than units with traditional NiCAD batteries— and there's no memory effect.

Warranty
- *45-day unconditional money-back warranty.*
- *24 hour burn-in protection.*
- *One year limited warranty on parts and labor.*

Service
- *72-hour service turnaround guarantee.*

Support
- *Toll-free technical support for the life of the computer.*

Payment Options
Visa, MasterCard, Discover, personal checks, COD's with cashiers check and Purchase Orders with approval.

Prices do not include applicable taxes, handling or shipping charges. Prices and specifications subject to change without notice.

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Specifications

Size/Weight
- 11" x 8 3/4" x 1 3/4"
- 5.4 lbs with battery

Pointing Device
- 16mm Alps dual-action, Microsoft compatible internal trackball

Battery
- 4 hours under normal usage
- Sanyo NiMH (no memory effect) 2300 MA with gold-plated contacts
- Worldwide auto-sensing AC adapter
- Quick 2-hour recharge

Power Management
- 8 power-saving features

Processor & Memory
- 486 SLC/E-25 CPU
- 4 MB RAM
- 1 MB ROM for Ami BIOS
- Motorola chipset & Cirrus VGA 6420
- 1k Internal Cache

Drives
- One built-in 1.44 MB 3.5" floppy drive
- Internal 120 MB (15ms) hard drive
- 250 MB (15ms) hard drive optional

Software
- Comes loaded with MS-DOS 5.0 and Microsoft Windows 3.1

Display
- Super-twisted 64 gray scale,10" LCD with CCFT-backlit
- 640 x 480 VGA resolution for LCD and 1024 x 768 for external monitor with 512k simultaneous display
- Adjustable contrast and brightness
- Visible LED indicator on cover-down

Keyboard
- Full-function keyboard with 85 keys and 4 inverted-T cursor control keys, 3.0 mm keyboard spacing

Modem
- Fax-9600 baud send/4800 baud receive/2400 baud modem

I/O Ports
- PCMCIA 2.0 slot
- Serial: 9-pin connector
- Parallel port
- Video: 15-pin connector for CRT
- 160-pin docking station
- PS/2 mouse interface/keyboard interface

Options
- 250 MB (15ms) hard drive
- 8 MB RAM
- Coprocessor
- Docking station

The WinBook for only
$1699
- 486 SLC/E 25 MHz

$1499
- 120 MB (15ms) HDD
- 4 MB RAM
- Fax Modem

- 80 MB (15ms) HDD
- 2 MB RAM
- Fax modem, Windows optional

No-risk, 45-day unconditional money-back guarantee.

Order the WinBook today. Call 1-800-468-1037

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New Software

Adobe Photoshop Provides Extraordinary Image Editing

Adobe Photoshop 2.5 for Windows is the latest and the greatest of the Macintosh design programs to migrate to the PC. It offers unequaled selection tools, precise masking and image editing controls, professional-quality print options, and an extremely flexible interface. The result is the most intuitive, enjoyable, and capable image editing package for the *Windows* environment.

Adobe Photoshop 2.5 for Windows' unbeatable selection tools should be considered essential equipment for retouching scanned images. In addition to the customary lasso and magic wand tools, which are used to select free-form and similarly colored areas, respectively, the program offers a Paths palette for selecting areas by drawing precise Bézier outlines. You can even edit a selection outline after the fact and save multiple outlines along with the image file. As a result, you can select any image—no matter how complicated—and return to that selection at any point in the future. You need an artist's touch to master the Paths palette, but once you do, you'll never go back.

If your scan is off-color and you don't know how to fix it, you can instruct *Adobe Photoshop* to automatically generate a collection of hue and brightness adjustments.

Color Correct

Reminiscent of the Assist mode in Caere's *Image Assistant*, the *Photoshop* function lets you experiment by selecting from thumbnail previews, rather than mucking about with technically named check boxes and obscure slider bars. For the novice, it's a perfect introduction to color correction theory—one that lets you work as you learn.

Like Aldus's *Photostyler*, *Photoshop* lets you change a scan's focus by applying filters to generalized areas or by using special drawing tools. Two new features, dodge and burn, let you lighten and darken portions. You can refine your actions by adjusting the highlights, midtones, or shadows. You can also change the exposure of either tool to intensify or diminish its effect.
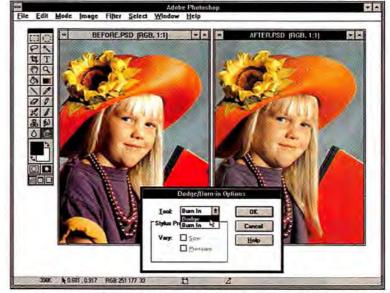
Negative Creation

If your interests run more toward creating images from scratch, *Photoshop* provides more brush options than any bit-map editor this side of Fractal Design's *Painter*. You can customize the shape of a brush tip, fade its edges to create soft glows and shadows, define the opacity of a brush stroke, and specify which colors will show through from the original image and how they're affected. Furthermore, brushes influence every drawing tool, including dodge and burn, and they're fully compatible with pressure-sensitive tablets.

If they gave out an award for the most print capabilities, *Photoshop* would win hands down.

Most image editors are satisfied with outputting CMYK color separations. *Photoshop* goes several steps further, offering support for an unprecedented five major color standards, including America's Pantone, England's Focoltone, Japan's Toyo, the newspaper standard ANPA, and the DTP-specific Trumatch.

The program also supports the printing of duotones, tritones, and quadtones, which extend the tonal range of black-and-white photographs by overprinting two, three, and four inks. The technique may seem a tad esoteric, but even if you're laying out a two-color newsletter, you can enhance the richness and depth of your images through the use of duotones.

Any list of *Photoshop's* capabilities is bound to leave out something. Suffice it to say that every option you've admired in a competing program probably can be found in *Photoshop* and feels more at home there. This

ADOBE PHOTOSHOP 2.5 FOR WINDOWS offers excellent selection tools, exact masking and image editing controls, a variety of sophisticated print options, and a powerful yet easy-to-use Windows interface.

quality comes at a price—$895, $100 more than high-priced editors, including *Photostyler* and *Ventura Software PicturePro*, and nearly five times the price of midrange programs such as ZSoft's $199 *PhotoFinish*—but you get what you pay for.

Now what remains to be seen is whether *Photoshop*, in topping off the recent migration of heavy Macintosh hitters like *QuarkXPress*, *Adobe Illustrator*, and *Aldus FreeHand*, will manage once and for all to legitimize the *Windows* platform as a viable design standard.

—**Deke McClelland**

Maps&Data: Charting a Better Presentation

MapInfo's *Maps&Data* is designed to enable the average business user to turn database and spreadsheet data containing geographical information, such as customer addresses, into high-quality maps useful for strategic planning and presentations.

This $395 *Windows* product is relatively inexpensive and easy to use: Traditional mapping programs with the data analysis and presentation capabilities of *Maps&Data* have included high-end features that drove prices into the $700 to $1000 range. Lower-priced mapping programs are designed for navigation; they generate directions, not presentation graphics.

Maps&Data employs drop-down menus and dialog boxes and prompts you through the map-making process. For example, you can create a map of proposed expansion sites for a hypothetical chain of stores in Massachusetts in about five mouse clicks. First you'd import a database of potential sites into *Maps&Data*. Once that's imported, the program identifies each site on a state map. To highlight targeted demographics near each site, say families
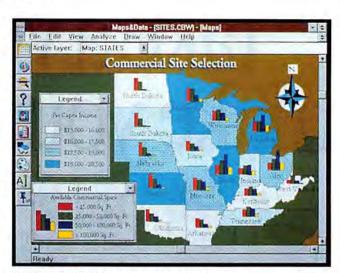
earning more than $50,000, you can import household income data from the program's 1990 U.S. census database. The software shows household income by county, using a color range.

In addition to U.S. demographic information on variables such as population, age, and buying power, the software includes some European and global data, including inflation rates, unemployment rates, and land area statistics. The product also provides global maps with country boundaries and capitals, and United States and state maps. More detailed maps show U.S. counties, cities, highways, and ZIP code areas.

Graphic and design features let you enhance maps with color ranges, fill patterns, pie and bar charts, and 100 symbols.

MAPS&DATA GIVES YOU AN EASY WAY to visualize, analyze, and present data. The program includes detailed maps and statistical data.

Maps&Data can import database and spreadsheet files from popular programs such as *dBASE*, *1-2-3*, and *Excel*. With its combination of statistics and

display power, *Maps&Data* offers a way to broaden and bolster presentations. Ross Perot would love it.

—Laurianne McLaughlin

Windows Development Easier With Visual C++

Software developers struggling with the steep learning curve of C++ and *Windows* programming will get a gigantic productivity boost from Microsoft's *Visual C++ 1.0* applications development system for *Windows*. This fully integrated *Windows*-based environment incorporates graphical tools to speed the development process. With *Visual C++*, you get virtually all the components of a *Windows* application.

A key productivity assist comes from the Visual Work-Bench, from which you can edit, build, debug, and browse code. You can launch powerful visual tools included with the package from here to build resources such as menus, dialogs, and icons; map resources to ap-

plication code; and generate skeleton applications—all with little code entry.

Also new within *Visual C++* is Microsoft Foundation Class (MFC) Library 2.0. It includes documents and views, tool bar and status bar classes, Object Linking and Embedding (OLE) 1.0 classes, dialog data exchange and validation (which helps validate data values entered into a dialog box), context-sensitive help, and support for *Visual Basic* custom controls.

The foundation classes provide the *C++* API for *Windows* and the canned functionality that can bring the power of thousands of lines of code into your programs, thus significantly reducing the amount of code that you will have to write.

The Standard Edition of *Visual C++* is $199, and *QuickC for Windows* users can upgrade for $79. The Professional Edition is $499, and *C* and *C++ 7.0* users can upgrade for $139.

—Rick Knoblaugh

We figured it would take a Wizard to make your job easier.

The real magic of Microsoft® Excel is that all of its innovative tools have been designed to do just one thing: make your everyday work easier.

In order to achieve this goal, our product development team spends countless hours studying the way you work with your spreadsheet. Listening to your needs. And even following your suggestions.

For example, we discovered that with your current spreadsheet it's often difficult to make the kind of charts you want. So we designed a tool called the ChartWizard. It's so easy to use, it actually helps you create a number of smart-looking charts on-screen, step-by-step.

What about the things you have to do over and over again? The things that are time-consuming and tedious? Like filling in dates. Adding up numbers? And formatting worksheets?

Well, with Autofill, Autosum,™ and Autoformat, you can now do all these everyday tasks with just a few clicks of the mouse. Or as fast as you can say "one, two, three."

All of which has helped more than a million people who use Lotus® 1-2-3® make the switch to Microsoft Excel: the spreadsheet for Windows.™

And finally, we've not only made Microsoft Excel for Windows easier to use, we've also made it easier to get. Right now, you can easily switch for
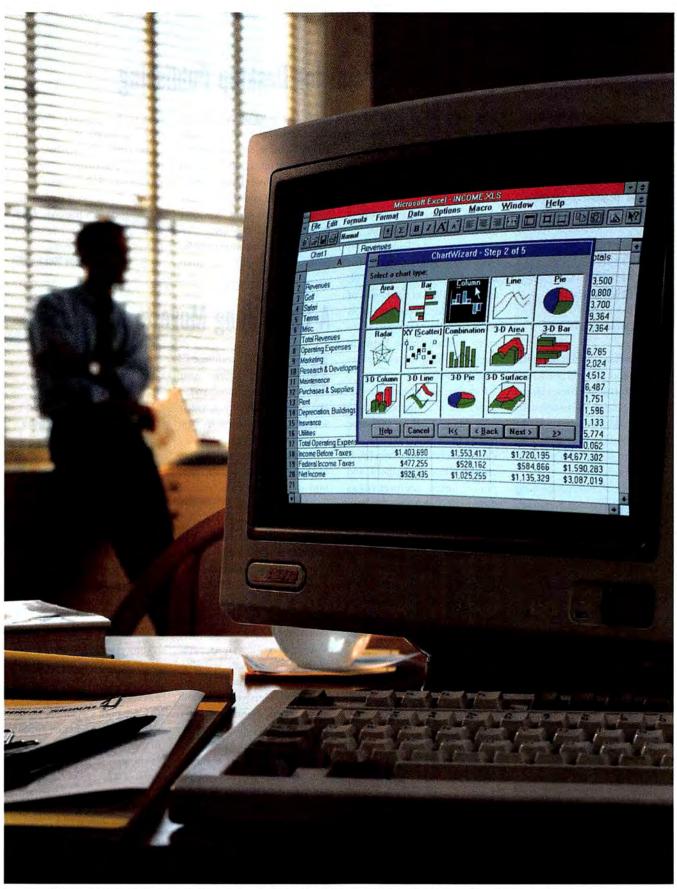
Over a million Lotus users have already made the switch to Microsoft Excel: the spreadsheet for Windows.*

as little as $129.† Just visit your nearest reseller, or give us a call at (800) 426-9400, Department HY8.

Then you can see for yourself why the most innovative spreadsheet actually feels a little like magic.

Microsoft®
Making it easier

With Microsoft Excel, making a great-looking chart has never been easier. That's because the ChartWizard tool helps you create smart-looking charts, step-by-step.

PagePlus 2.0: A New Low Price Point for Desktop Publishing

The bottom just fell out of the low-end desktop publishing market. Serif's latest release, *PagePlus 2.0 for Windows*, costs $59.95, addresses many of the criticisms of the last version, and offers features found in programs costing much more.

To make desktop publishing easy, Serif has added preformatted document templates and style sheet and master page capabilities. *PagePlus* maintains its *PageMaker*-like interface, which features a pasteup-board work area and toolboxes.

A text frames feature uses column blinds to control where text starts and ends. To create room for a graphic element, you drag the blind up. After importing the element, the text will flow around it. *PagePlus* also wraps text around irregularly shaped objects and now offers full text and image rotation.

An improved ChangeBar includes new graphics tools that let you adjust line color, fill color, and fill tint (intensity of color) quickly. New text tools let you modify text color, alignment, leading (space between lines), and kerning (space between letters).

PagePlus has production-oriented color features, starting with Pantone colors, the same palette used by commercial and Pantone-licensed desktop printers. (Monitors, applications, and printers often interpret colors differently—choosing a Pantone color ensures the color you choose is the color printed.)

PagePlus 2.0 for Windows supports two-color publishing, which lets you inexpensively add, say, a bright accent color to a black-and-white newsletter. Additionally, the software can create four-color process separations. An image colorize feature enables you to change the tint of a colored object, allowing you to place a light-colored graphic behind text. Another feature not found in many low-cost products is a table editor.

PagePlus isn't a substitute for professional publishing products such as *Ventura Publisher* and *PageMaker*, nor does it include clip art or scalable fonts (these are available in separate modules for $19.95 each).

Still, if you need basic page layout and color features, *PagePlus 2.0 for Windows* offers power at a painless price.

—Laurianne McLaughlin

DIRT-CHEAP DESKTOP PUBLISHING: PagePlus 2.0 for Windows costs just $59.95 but offers features found in programs costing much more. New text tools let you modify text color, alignment, and line spacing.

A Compelling Move to Multimedia

Don't let the multimedia bugaboo frighten you. Asymetrix's *Compel*, a $295 *Windows* program, brings video, sound, and animation to your on-screen presentations.

Compel hides the complexity of weaving multiple file types into a coherent presentation, and it's easy to use, thanks to a well-conceived design that's a surprise for a 1.0 release. Built around the classic slide metaphor used by programs like Lotus's *Freelance*, Microsoft's *PowerPoint*, and Aldus's *Persuasion*, *Compel* has plenty of familiar tools, including slide sorter and outline views, capable text management, and plenty of templates and clip art. *Compel* also lets you link, edit, and control sound and video files and create interactive hyperlinked presentations.

Compel works with a variety of sound and video files, including WAV, MIDI, AVI, and DVI. You incorporate sound, video, and animation elements in a presentation by linking them into slides and setting them to play or halt upon a specific action (entering a slide, clicking a mouse, and so on). This capability goes well beyond basic OLE support—which *Compel*

also offers—letting you coordinate presentation resources.

Asymetrix uses the right mouse button to call up context-sensitive menus for selected objects, à la *Quattro Pro* and *Excel*. In addition, the program's icon tool bar takes some of the guesswork out of deciphering the program's symbols: A description of its function appears in the lower left corner whenever the mouse passes over it on the tool bar.

While other presentation packages focus on outputs to slides, transparencies, and paper, *Compel* concentrates on making PC-based presentations work and provides a run-time engine so that you can play *Compel* presentations without installing the program.

—Michael Desmond

PackRat 5.0: This May Be the PIM You Use

With *PackRat 5.0*, Polaris Software has turned its erstwhile personal information manager (PIM) into a desktop shell that uses the file folder metaphor to let you organize your work and applications.

The enhancements are apparent as soon as you begin loading the program: A new installation process helps you harness *PackRat*'s massive feature set for your particular needs, with predefined work space setups tailored to specific professions, such as legal, medical/dental, sales/marketing, and MIS.
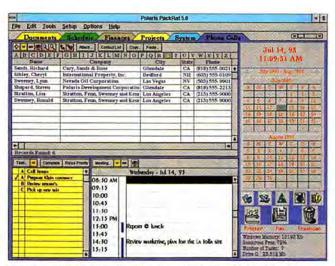
In *PackRat 5.0*, you use file folders to organize your work and access applications, creating a virtual desktop information center. You can define each folder and fill it with documents and applications to organize your jobs any way you want, be it by project, client, accounting month, or sales region. *PackRat* is as flexible as you are—you can keep your schedule in a folder by itself, all your spreadsheets in one place, or all your documents and spreadsheets for one project in the same place. There's no software limit to the number of folders you can place on your desktop. They can dis-

play as a whole stack, with the tabs oriented to the top of your screen or to the left side. Alternatively, you can hide the tabs and choose your folders from a list instead.

The fundamental strength of the $395 *PackRat 5.0* lies in its application handling capabilities. You can place application icons in a folder for instant access to the programs you use with that work. And even better, *PackRat 5.0* uses Object Linking and Embedding (OLE) to place data files in folders as OLE clients. Because these files are objects unto themselves, you don't have to launch an application to view them, yet they maintain a relationship to their originating files, so you can stay up-to-date as changes occur. A network

A TYPICAL SCHEDULE FOLDER in PackRat 5.0 might include a calendar, a clock, system information, and a Gantt chart of appointments.

version of *PackRat 5.0* is scheduled to ship this summer.

PackRat has a reputation for being the mother of all PIMs. While the program's new inter-

face and functionality stretch the definition of a PIM, they also make it far easier and more practical to use.

—**Melissa R. Riofrio**

askSam for Windows: The Friendly Power Tool

The *askSam* database program lets you search volumes of text and order unstructured data. Until now, all this power was reserved for users who could brave the product's idiosyncratic interface and cryptic command language.

Now in *Windows*, the $395 product addresses these drawbacks with a friendly interface, a graphical report writer, and features designed to increase usability.

Perhaps the most significant improvement is the graphical query builder, which makes it easy to generate proximity, Boolean, and other complex searches. You pick options from a series of drop-down menus and dialog boxes that build the searches for you. Likewise, a

graphical menu- and mouse-driven report writer enables you to sort, lay out, and print data without cryptic commands.

Though creating a database structure was never difficult with the DOS version of *ask-Sam*, the *Windows* version includes at least 20 templates that make it even easier.

For amending and appending databases, *askSam for Windows* includes full-blown word processing functions, including formatting, not available in its DOS counterpart. The *Windows* product can also import data in more formats, such as *WordPerfect 5.x*, *dBASE*, and RTF.

askSam for Windows is slower than the DOS version, and it doesn't contain any of the relational capabilities of the current

DOS product. Moreover, applications written for the DOS product will not run under the *Windows* version. Still, for the average computer user, trading power for ease of use is probably a sacrifice worth making.

—**Randy Ross**

LANtastic 5.0: More Features, Easier to Manage

When it comes to features, power, and ease of use, Artisoft's *LANtastic* is widely regarded as the king of peer-to-peer LANs. A Best Buy in *PC World* in June 1992, *LANtastic*'s latest release offers a host of innovative features for both users and administrators, including a network scrapbook for storing text, graphics and sound files, voice chat capabilities, and improved file security.

First the fun stuff. Artisoft has launched an impressive counterattack to Microsoft's *Windows for Workgroups* by adding some features you'll find in Microsoft's peer-to-peer LAN and a few you won't. *LANtastic 5.0*'s network Scrapbook—similar to *WFW*'s Clipbook—lets *Windows* users share text, graphics, and even sound files. Click on the Scrapbook icon, then copy and paste the contents into other *Windows* applications (sound files appear as icons). You can create additional Scrapbooks to store items relating to a specific project. For example, a Scrapbook for a presentation might contain text, charts, and spreadsheets pertaining to the project.

Ready for Voice

In addition to a Chat utility that lets *Windows* users exchange messages in real time, *LANtastic 5.0*'s Voice Chat feature allows real-time voice conversations over the network. However, only *Windows* PCs with Artisoft's $99 Sounding Board, an add-in sound card, can use the Voice Chat feature.

Voice Chat comes in handy for work-group tasks such as editing a business document stored in the network Scrapbook. Also, it's a convenient way to have in-office confer-

ARTISOFT'S LANTASTIC 5.0 includes a new Scrapbook feature that lets Windows users share text, graphics, and sound items across a network.

ence calls without tying up the phone lines. A pop-up message informs you when another user wants to chat. You click on the Chat window, select Call, then talk using the telephone handset that ships with each Sounding Board.

LANtastic 5.0 has two bonuses for users with sound boards: LAN Radio and voice error messaging. LAN Radio lets you plug a radio or CD player into any Artisoft Sounding Board on the network and broadcast news, information, or music on your choice of 100 channels. Voice error messaging lets LAN administrators record error or tutorial messages for users—helpful for guiding novices through a difficult software installation, for instance. (You can also download prerecorded messages from Artisoft's Artifacts BBS.)

200 More Users

LANtastic 5.0 supports up to 500 users, which is 200 more than the previous version. Because it lets administrators redi-

rect disk drive and printer connections, users can access drives and printers on non-*LANtastic* servers, such as those running Novell NetWare.

Powerful security enhancements let you set user access rights on a file-by-file basis. For instance, a shared directory on a workstation might contain both private and public files. Also, certain users may be granted read, write, and delete privileges, while others have read-only access.

Administrative Options

New ACL (Access Control List) groups give network chiefs an easier way to set up user privileges. Administrators can create access accounts for individual users, as well as for different departments in the organization, such as sales, shipping, or senior management.

LANtastic users with the new "O" (or "operator") rights can automatically receive notification of major events that can affect security or slow network performance, including access

violations and printer errors on remote servers. And network administrators can receive audit information on user log-ins and log-outs and on queuing and printing activity.

Pricing of *LANtastic 5.0* varies. *LANtastic* Network Starter Kits, which include add-in network cards and version 5.0 software for two PCs, cost $659 for the DOS version and $759 for the *Windows*-DOS version. A 6-user license is $1499, a 12-user $2899 (both include hardware and software). If you already own network cards, the software-only *LANtastic 5.0* for DOS costs $119 for 1 user, $659 for 6 users, $1189 for 12 users, and $2999 for 500 users. The software-only *Windows*-DOS version is $139 for 1 user, $779 for 6 users, $1429 for 12 users, and $3499 for 500 users.

Like the previous versions of *LANtastic*, version 5.0 includes built-in E-mail. With its innovative user features and improved management tools, *LANtastic* will likely retain the top spot among its peers.

—Jeff Bertolucci

LANtastic 5.0

Artisoft improves its peer-to-peer LAN by adding a network scrapbook, voice capabilities, and easier administrative management tools.

Artisoft Inc.
800/846-9726,
602/293-8065 (fax)
List price: $119 to $3499
Reader service no. 654

If you think it's painful writing a report, imagine what it's like reading it.

No matter what type of document you're writing, Epson® has something that could benefit you as well as your readers. The Epson Color Scanner. A tool that easily could've been named the Epson "Add A Picture and Some Interest To Your Documents" Machine.

The rationale behind using one is simple. People like pictures. In fact, probably more than words. And besides being pleasing to look at, pictures often communicate faster than words, which means your audience will grasp your message more quickly, too.

What's unique about Epson scanners is that they come with more than the prerequisite wires and cables. With our optional interface kit, you get a full version of the best software around: Micrografx® Picture Publisher® 3.1. Then we toss in a Caere® OmniPage® Direct OCR TryPack to help you scan in text. And whether you pick our 600C or 800C scanner, you get 24-bit single pass color scanning with almost 17 million colors.

Epson also offers handy add-ons, like a transparency unit for scanning slides, or an auto-document feeder to cut down on all of that time-consuming lid lifting. And, as always, we give a one year warranty. Not that you'll need it given the way we make things around here, but just so you know we're there if you need us.

So why not look into an Epson Color Scanner for your office? After all, it couldn't hurt to test one out. And besides, your clients would probably really appreciate it.

Before.

After.

Want to learn more about scanners? Call 1-800-289-3776 and ask for representative 72 and we'll send you our free booklet.

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Desktops   Scanners   Dot Matrix   Lasers   Notebooks

Kingston DataCard

Kingston Technology's Data-Card lets Micro Channel users add disk storage and RAM inexpensively and uses only one expansion slot. The Data-Card is an add-in board with either an 85MB, a 127MB, or a 209MB 2½-inch Winchester hard drive (16ms access time) with four SIMM sockets. The 16-bit version for PS/2s with a 286, 386SX, 386SLC, or 486-SLC processor holds up to 16MB of RAM; the 32-bit version for PS/2s with a 386DX or 486 CPU holds up to 64MB (four 16MB SIMMs). For IBM PS/2 systems, some of which have only three expansion slots, the DataCard multifunction board is a compact way to add system resources. The Data-Card is also compatible with Micro Channel systems from NCR, Olivetti, and Memorex-Telex. The DataCard costs $545 (85MB drive), $695 (127MB drive), or $895 (209MB drive). Kingston Technology, 800/835-6575, 714/435-2600.

Reader service no. 655

Forecast for Excel

Forecast for Excel is a spreadsheet add-in for business planning previously available only for *1-2-3* and *Symphony* users. With *Forecast*, you can turn raw spreadsheet data into forecasts and analyses without complex statistical software. The program is useful for budget preparation, cash flow forecasts, and market analyses. *Forecast* uses three analytical techniques: time-series analysis, multiple regression, and statistical analysis. You can pick from several different models, including linear, exponential, hyperbolic or S-curve trends, and exponential smoothing. For additional accu-

racy and reliability, *Forecast* lets you make seasonal adjustments to your data. It offers spreadsheetlike menus for easy data importing and works with *Excel*'s built-in publishing features to create presentations. *Forecast for Excel* works only with *Excel 4.0*. The program costs $165. Intex Solutions, 617/449-6222, 617/444-2318 (fax).

Reader service no. 657

Flexibak Plus

Dysan Int'l now includes *Flexibak Plus* backup software with every box of ten 3½-inch or 5¼-inch floppy disks. This DOS backup utility allows full, incremental, and selective backups. It keeps a library of files, compares files since the last backup to floppies, and lets you know if any files are missing from your hard drive—useful in tracking down accidentally deleted files. *Flexibak Plus* also offers file compression that shrinks files by a ratio of up to 20 to 1. The *Flexibak Plus* offer is good through June 30 or while supplies last. The high-density Dysan floppies cost $12.99. Dysan Int'l, 800/422-3455, 408/945-4235 (fax).

Reader service no. 656

Epson Stylus 800

Over the past year, ink jet printers have quietly become the fastest-growing segment of the printer market, in large part because they deliver laser-quality text output for about half the price of low-end lasers. The Stylus 800 uses Epson's new ink jet technology, which the company claims delivers sharper resolution at a lower cost.

The printer delivers 360-dpi resolution at speeds of up to 3 pages per minute, and operation at a quiet 45 to 47 decibels (about the same as most lasers). The Stylus 800 also provides an adequate 100-sheet paper tray and seven internal fonts (four of

EPSON'S STYLUS 800 ink jet printer delivers 360-dpi resolution at speeds of up to 3 pages per minute. It comes with a 100-sheet paper tray and seven internal fonts (four scalable) and operates at a quiet 45 to 47 decibels.

them scalable), all at a list price of $449. Epson America, 800/289-3776, 800/922-8911.

Reader service no. 658

Minuteman Alliance, Tripp Lite BC 400
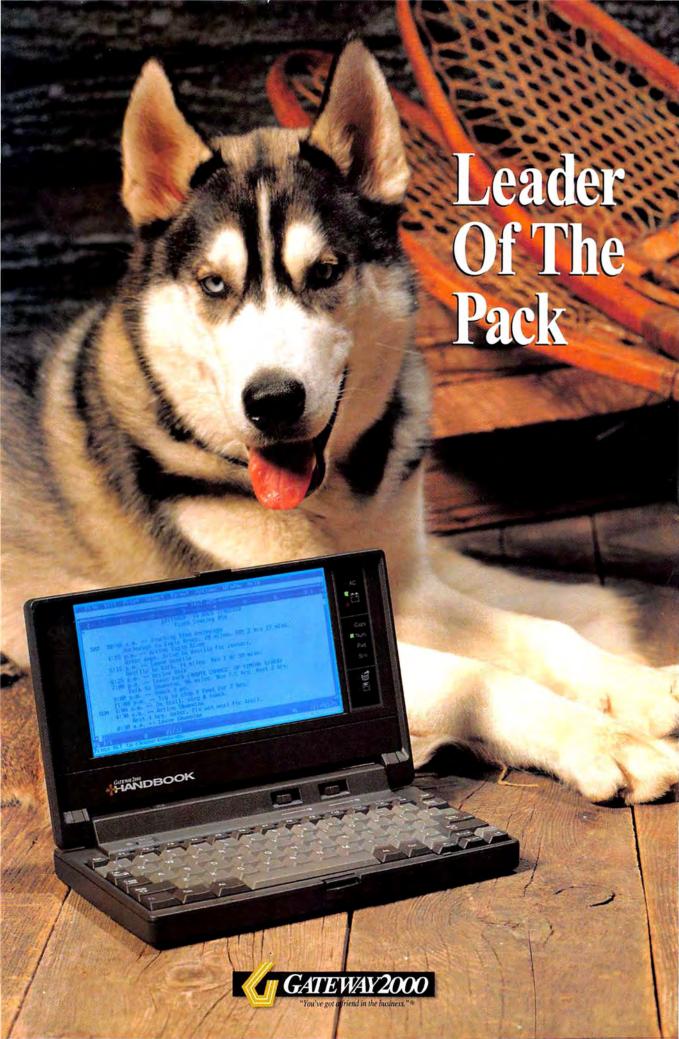
Lightning, power surges, blackouts: Any of these can trash a day's work—if not your entire system. Insurance for your PC comes in the form of uninterruptible power supplies (UPS) that power your system during blackouts and protect it from power surges. Minuteman's Alliance UPS series consists of the A300 and the network-ready A425. With both, you get backup protection in case of power failure, 2ms response time to power surges, and wall socket testing to detect outlets with bad grounding. The pricier A425 provides an extra 125 volts of backup protection for a total

of 425 volts (versus 300 volts for the A300), as well as the capability to bring down your network during a power outage. Taking the insurance concept one step further, Tripp Lite's BC 400—in addition to providing 400 volts of backup power—carries $25,000 of insurance coverage for the replacement or repair of connected equipment damaged by any surge, including direct lightning. The Minuteman Alliance A300 is $159, the Alliance A425 $259, and the Tripp Lite BC 400 $219. Minuteman, 800/238-7272.

Reader service no. 725

Tripp Lite, 312/329-1601.

Reader service no. 659

DataPerfect 2.3 for DOS

WordPerfect's latest version of its menu-driven database for DOS has an improved menu system, database diagnostic utilities, phone dialing capability, and improved mathematical, statistical, and financial analysis features. Quick Merge, a new report feature, lets you create *WordPerfect 5.0* or *5.1* merge files with named fields for enhanced reporting. Bundled
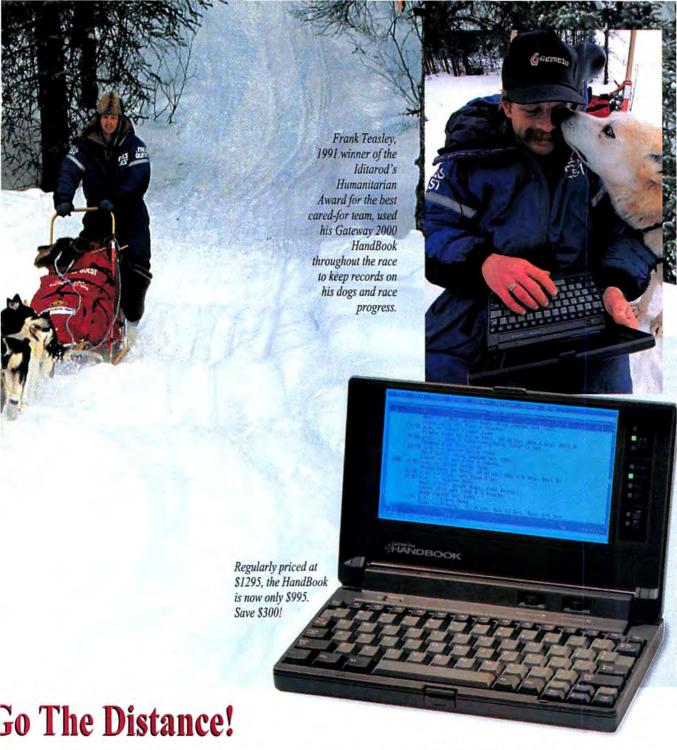
Gateway's HandBook Is The First Portable To C

On March 6, 1993, 68 men and women, 1,253 dogs and one portable computer left the starting line in the 21st running of the Iditarod dogsled marathon. Not all of the men, women and dogs made it through nearly 1,100 miles of blinding snow, howling wind, mountainous terrain and sub-zero temperatures – but the PC did!

It was the first time anyone ever took a portable all the way from Anchorage to Nome on a dogsled. Appropriately, the first portable PC to go the distance was the first product in an entirely new category of portables; the unique and innovative product that defined new standards for portable PCs: the HandBook, pioneered by Gateway 2000. At just 2.75 pounds, measuring

only 6 x 10 inches yet including a 40MB hard drive, a backlit, use-it-anywhere screen and comfortable keyboard, the HandBook was the only choice for Iditarod musher Frank Teasley.

"I've always wanted a way to carry my racing strategy with me and to record my progress during the race," said Frank. "But I can't afford any extra weight on the dogsled, and you don't find many electrical outlets on the trail. The HandBook easily fit in the dogsled, and I used it at checkpoints to review details of the trail ahead, information on my competition, and notes on my dogs." Because he couldn't recharge batteries on the trail, Frank ran his HandBook on AA batteries kept warm in his parka.

Frank Teasley, 1991 winner of the Iditarod's Humanitarian Award for the best cared-for team, used his Gateway 2000 HandBook throughout the race to keep records on his dogs and race progress.

Regularly priced at $1295, the HandBook is now only $995. Save $300!

Go The Distance!

Frank said the HandBook's exclusive auto-resume feature was a big plus, too. Being able to open the HandBook and start working exactly where he left off made it effortless to use.

Although the dogs slept an average of 12 hours a day during the race, Frank was lucky to sleep 45 minutes daily. He was busy making straw beds, putting ointment on the dogs' feet, replacing their polar fleece booties, preparing their food, repairing harnesses and repacking while the dogs rested. "Sleep deprivation can be hazardous to a musher's ability to focus on details. The HandBook kept me on top of my schedule so I could concentrate on the dogs and they could concentrate on what they love best: the race."

Frank concluded, "There's not another computer small enough or powerful enough to come through for us the way the HandBook did."

It's a PC that's the perfect companion in even the most demanding situations, even if you never leave your office. Get the leader of the pack: Gateway 2000's HandBook!

STRATEGIC MAPPING'S EUROSTAT EDITIONS make obtaining postal codes for European cities (London is shown), as well as detailed market and demographic information, a simple matter of point and click.

utilities include predesigned checkbook, bibliographic, invoicing, and billing databases, so you can load and run *Data-Perfect* without even needing to set up the databases first. *Data-Perfect 2.3* lists for $495; $129 for *WordPerfect* users. WordPerfect Corp., 800/451-5151.

Reader service no. 660

Searcher 3.0 for Windows, Searcher Professional 2.0

WINDOWS Looking for an inexpensive *Windows* file manager? New versions of *Searcher* and *Searcher Professional* will do everything your file manager does, and a bit more. *Searcher 3.0* is a classic file and text finder, capable of locating a file by name, date, size, or text string. *Searcher* sleuths anywhere on your system, including all local and network drives, and reads most word processing, ASCII, and *PKzip* (version 1.x) files. *Searcher Professional* adds the capability to program your keyboard's function keys for quick access to common tasks. For example, you could link a function key to a *Word for Windows*

macro that speeds text searches within the word processor. *Searcher's* Free Launch, a variation on *Windows'* Task Manager, lets you launch and terminate multiple applications with a single command. There's also a nifty file tree for graphical representation of your directory structure. Either product is worth a look if you're unsatisfied with your current file manager. *Searcher 3.0* costs $29.95 (plus $2 shipping and handling); *Searcher Pro 2.0* costs $59.95 (plus $4 shipping and handling) and includes a 60-day money-back guarantee. Cognitronix, 619/549-8955.

Reader service no. 665

Strategic Mapping's Eurostat Editions

The elimination of European trade barriers has created an interesting opportunity for users of desktop mapping software. Strategic Mapping and the Statistical Office of the European Communities—Eurostat—have pooled resources to make population, birth, death, employment, income, and economic data available for the entire

European market. You can buy any of Strategic Mapping's three desktop mapping programs in the Eurostat edition: *Atlas GIS* for $3095, *Atlas Pro* for $955, or *Atlas MapMaker* for $475. If you already have a desktop mapping program and just want the facts, you can purchase the European data for $495. In addition, you can order more detailed street-level information. Strategic Mapping, 408/970-9600.

Reader service no. 661

Diamond Stealth Pro VLB, Viper VLB

Decisions, decisions. Choosing a VESA-compliant local bus graphics accelerator is a lot tougher now that Diamond is selling its speedy Stealth Pro VLB and Viper VLB cards. The Stealth Pro VLB uses fast VRAM and is based on S3's 928 chip, delivering 16 colors at 1280 by 1024 resolution and 72-Hz screen refresh in the 1MB configuration. With 2MB of VRAM, the Stealth Pro displays 256 colors at 1280 by 1024, or 16.8 million colors at 800 by 600. The Viper VLB uses Weitek's new P9000 chip set and 2MB of VRAM to deliver 256 colors at 1024 by 768 resolution, or 16.8 million colors at 800 by 600. The Viper card delivers flicker-free, 74-Hz refresh rates at both settings. The Stealth Pro VLB costs $349 with 1MB of VRAM and $499 with 2MB. The Viper VLB costs $549. Diamond Computer Systems, 408/736-2000.

Reader service no. 662

FileMaker Pro Translator

WINDOWS If you're using Symantec's *Q&A* database program and you're thinking about making the switch to a *Windows*

database, you may have considered Claris's *FileMaker Pro*. After all, *FileMaker* is essentially a *Q&A*-like flat-file database with strong graphical capabilities. In order to attract *Q&A* users thinking of going GUI, Claris has developed a *Q&A*-to–*FileMaker Pro* translation program, which, for all intents and purposes, it's giving away.

FileMaker Pro Translator has an official list price of $49, but the company is giving it away free to any registered *FileMaker Pro* user. In addition, you can download the program from America Online or CompuServe. Claris Corp., 408/727-8227, 408/987-3932 (fax).
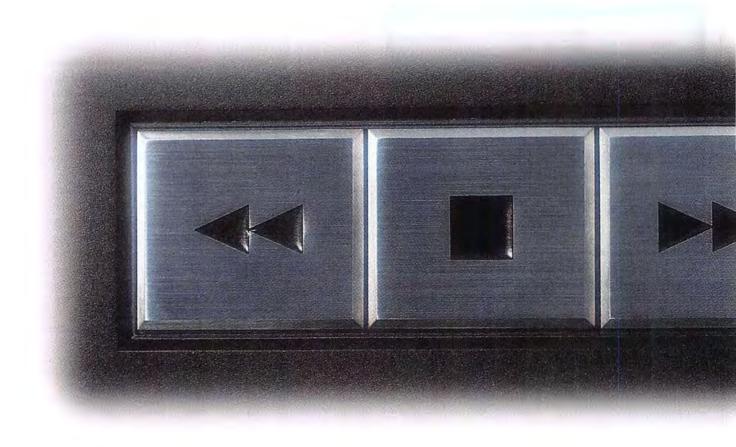
Reader service no. 663

Matrox MGA Impression Boards

Matrox is leveraging its workstation expertise to deliver a line of graphics accelerator boards based on its new 64-bit MGA chip set. The MGA Impression line comes standard with 3MB of VRAM. It employs a video memory bus that's twice the width of competing chips to deliver enhanced performance in common screen operations like bit-block transfers, which occur when you move large blocks of text, and screen draws. These boards can display 16.8 million colors at a full 1024 by 768 resolution at 80 Hz. All boards are available in ISA, Micro Channel, and VL bus configurations, with EISA and PCI variants to follow. The MGA Impression lists for $1299 in ISA, MCA, and VL versions. Matrox, 514/685-2630.

Reader service no. 664

For more information about any product, contact the manufacturer or circle the number on the reader service card.

Intel's video
brings the same easy

Introducing Indeo™ technology and the Smart Video Recorder from Intel.

When it comes to putting video technology on your PC, Intel knows exactly which buttons to push.

Intel's Indeo™ technology is the first video compression technology that lets you capture and compress video in one single step. (Now that's easy.) And the Smart Video Recorder is the first video capture board that takes advantage of Indeo technology. Which means adding the impact of motion video to your business presentations is faster and simpler than you ever imagined.
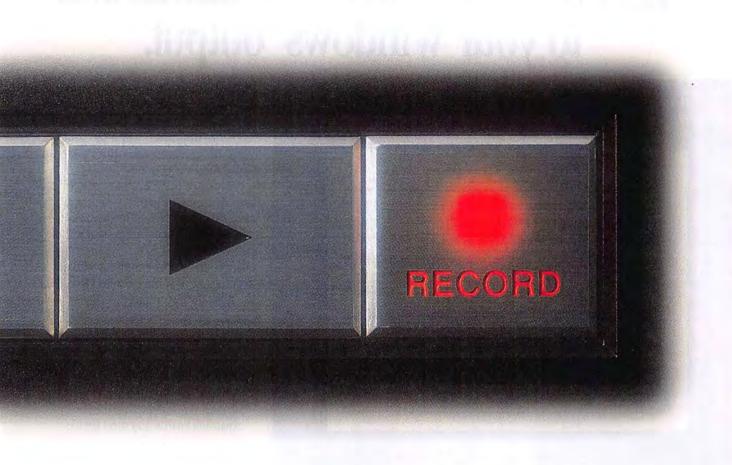
Recording with the Smart Video Recorder is as simple as pushing a button. And it's fast. It only takes one minute to capture and compress a one-minute video clip. (Other boards take up to 15 minutes.) One-step recording also cuts the Smart Video Recorder's disk space requirements

technology
concept to your PC.

dramatically—it takes about 9MB to record a 60-second clip. Other systems may require more than 50MB to record the same clip.
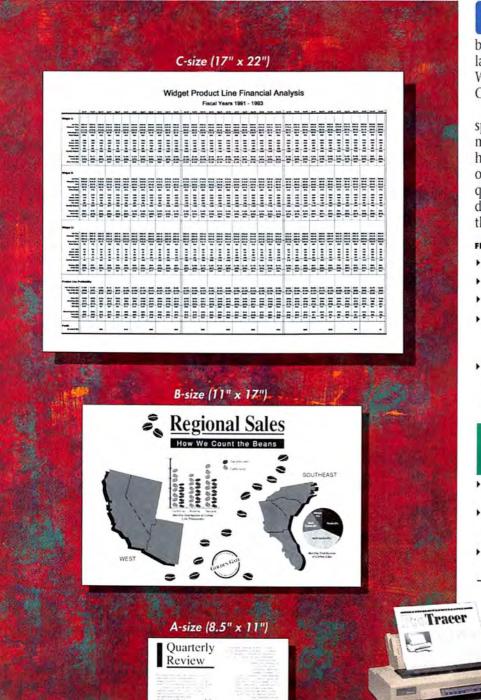
A key component of Indeo technology, scalable performance adjusts playback quality based on your system's processing power. And you don't need special hardware for playback. Scalable performance gives you the best playback possible from the computer you have now, and whatever computer you may use in the future.

You can get started right away, too, because Microsoft Video for Windows* and Asymetrix

Compel* and MediaBlitz* software programs are included in the Intel Smart Video Recorder box.

To learn more about Indeo technology and the Smart Video Recorder, call 1-800-538-3373, ext. 1153. Or to receive information immediately, call Intel's automated FaxBACK® service at 1-800-525-3019 and ask for document 9874. Because with Intel, PC video is all fast forward.

intel.

Marketplace

A Monthly Survey of Prices on Popular Models

Over the Counter

What you pay at retail stores for popular PCs (with monitors)

n/a = not applicable

	CPU/speed (MHz)	RAM (MB)	Hard disk (MB)	List price	Average street price
386-class desktop PCs					
AST Bravo 3/33s	AMD386SX-33	4	120	$1495	$1380
ALR Flyer SC 3/33s	i386SX-33	2	80	$1098	$990
DECpc 333sx LP	i386SX-33	4	52	$1399	$1399
HP Vectra 386s/25	i386SX-25	2	84	$2398	$1990
IBM PS/ValuePoint 325T	IBM386SLC-25	2	80	$1339	$1339
AST Power Premium 3/33 [1]	i386DX-33	4	210	$3460	$3003
Compaq Deskpro 3/33i	i386DX-33	4	120	$2332	$2104
486SX-class desktop PCs					
AST Bravo 4/33s	i486SX-33	8	213	$2360	$2175
Compaq ProLinea 4/25s	i486SX-25	4	240	$1812	$1674
Epson America Progression 486SX/25	i486SX-25	4	240	$2618	$2318
Gateway 2000 4SX-33	i486SX-33	4	170	$1495	$1495
IBM PS/2 Model 85XP 486 [2]	i486SX-33	8	212	$4739	$4215
NEC Image 425	i486SX-25	4	170	$2468	$2208
Samsung Deskmaster 486C/25	Cx486SLC-25	2	200	[3]	$2105
ZDS Z-Station 433Sh	i486SX-33	4	200	[3]	$2200
486DX-class desktop PCs					
AST Bravo 4/66d	i486DX2-66	8	210	$3260	$3026
Compaq ProLinea 4/33	i486DX-33	4	240	$2032	$1850
DECpc 466d2 LP	i486DX2-66	8	245	$2949	$2949
Dell 466/M	i486DX2-66	8	320	$3249	$3249
Gateway 2000 4DX2-66V	i486DX2-66	8	340	$2895	$2895
Hewlett-Packard Vectra 486/66U	i486DX2-66	4	240	$4358	$3858
Hyundai 466D2	i486DX2-66	8	360	$2995	$2995
IBM PS/ValuePoint 433DX	i486DX-33	8	120	$1989	$1989
Insight 486DX2-66	i486DX2-66	4	210	$2199	$2199
Zeos 486DX/33	i486DX-33	8	245	$2395	$2395
Portable PCs					
AST PowerExec 3/25SL	i386SL-25	4	60	$2395	$1895
Compaq Contura 3/25	i386SL-25	4	120	[3]	$1652
Compudyne 386SL/25	i386SL-25	2	80	[3]	$1499
Dell 320SLi	i386SL-20	2	80	$1849	$1849
Dell Dimension NL25	i386SL-25	2	80	$1599	$1599
Gateway 2000 Nomad 450DXL	i486DX2-50	8	200	$2995	$2995
Hewlett-Packard 95LX	NEC V20-5	1	n/a	[3]	$559
Hyundai Courier Spectra	Cx486SLC-25	4	120	$2699	$2699
IBM ThinkPad 700	IBM486SLC-25	4	80	$2750	$2567
NEC UltraLite SL/20	i386SL-20	2	80	$1699	$1439
Swan 486/SLC/25 Notebook	Cx486SLC-25	2	80	$1795	$1795
TI TravelMate 4000WinDX	i486DX-25	4	120	$3299	$2933
Toshiba T4400C	i486SX-25	4	120	$3999	$3610
ZDS Z-Note 325Lc	i386SL-25	4	120	$3392	$3392

From a national survey of more than 180 dealers by International Data Corporation. Figures are based on at least four price quotes for each machine in the manufacturer's standard configuration with monitor.
[1] Uses EISA bus. [2] Uses MCA bus. [3] No price available.

The Top-Selling Used PCs

Based on 1993 sales volume as of April 1

1	IBM PS/2 Model 70	6	Dell 386 desktops
2	Gateway 386 desktops	7	Compaq SLT/286 laptop
3	Compaq LTE/386 notebook	8	Northgate 286 desktops
4	AST 386 notebook	9	Toshiba 2000 notebook
5	IBM PS/2 Model 80	10	Gateway 286 desktops

If your company has unwanted 386-based PCs, the time is right to sell them, according to John Hastings, president of the American Computer Exchange. His company brokers sales of used PCs. The current top sellers in the used market are 386 desktops, and you'll have the best chance of unloading them from now until December, says Hastings. After December, 486 prices should drop in reaction to new Cyrix and AMD processors and Intel's Pentium, and used 386 prices may plummet. Right now, strong demand for 386s continues among home users and businesses that want to try Windows, Hastings says.

Source: American Computer Exchange, Atlanta, Georgia

The Most Valuable Used PCs

Systems that have retained the greatest value

	1988 street price	1993 used price	Percent of value retained
1 Gateway 386/16	$2950	$850	37.7
2 Toshiba 5200 (386-based portable)	$5950	$1500	36.5
3 Zeos 386/20	$3150	$900	36.0
4 AST Premium/386 Model 300	$3454	$950	34.5
5 Dell System 310	$4099	$925	31.4

In deciding whether to sell or keep an old PC, consider how much of your investment can be recouped. According to American Computer Exchange president John Hastings, three factors help a PC retain value—a respected brand name, industry-standard components, and a reasonable initial price. If your used system meets these criteria, it is a good candidate for resale. No-name PCs don't garner much on the used-PC market, Hastings says, and it's best to pass them on to other employees.

Source: American Computer Exchange, Atlanta, Georgia

Each year PC WORLD's readers cast their ballots for the best hardware and software products on the market. Fill out your World Class Awards ballot this year and you'll also get a chance to

Win
PRIZES WORTH
$50,000

For a chance to win this year's top-rated hardware and software products, simply return your completed 1993 World Class Award ballot. And you may be one of three lucky winners to receive state-of-the-art prizes—worth nearly $50,000!

3 Grand Prize Winners

Take home the World Class winners! A selection of the winning products, from the top 486 desktop to the best spreadsheet package, will be awarded to our three grand prize recipients.

First prize: Power and productivity with the world's most popular 486 desktop system, laser printer, software collection, and more!

Second prize: Take your office on the road with the highest-ranked notebook, removable/portable drive, modem, software collection, and more!

Third prize: The heavy hitter in the lightweight category with the top-rated subnotebook, modem, software collection, and more!

Your opinion counts! And we'd like to thank you for it by automatically entering your name to win thousands of dollars worth of fantastic prizes. So let your voice be heard! Don't delay!

Guaranteed Prizes!
For Hundreds of Early-Bird Entries

Be one of the first 500 readers to send in your ballot before June 30, 1993 and get an exclusive *PC World* wrist and mouse pad combination. The ballot is postage-paid, so grab a pen and vote today! Tell us what YOU think…and we'll publish the results, along with YOUR photo and actual prizes YOU'VE won, in our December 1993 issue.

How to Enter

By voting, you make yourself instantly eligible to win your share of prizes worth almost $50,000! Winners will be selected from a random drawing and notified personally by *PC World*'s editor-in-chief no later than November 1, 1993. Mail or fax your entry to *PC World* today!

Voting is easy! Simply write the names of your favorite PC products on the official World Class Awards ballot attached, and return it to *PC World*. Fill out as many categories as you wish. The product receiving the most votes in each category will be designated a World Class Award winner.

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1 9 9 3

First Prize Winning super 486 desktop computer
PLUS...the winning laser printer, sound board, CD ROM drive, fax-modem board, scanner, modem and pointing device, and your choice of 15 winning software packages. Estimated value $28,000!

Second Prize Winning notebook computer
PLUS...the winning ink jet printer, removable/portable drive, modem, and your choice of 10 winning software packages. Estimated value $14,000!

Third Prize Winning subnotebook computer
PLUS...the winning dot matrix printer, modem, extra battery pack, carrying case, and your choice of 5 winning software packages. Estimated value $8,000!

Category Descriptions: To help you cast your votes, we've supplied background information on product categories that may need additional explanation.

Hardware

Laptop/notebook computer: A battery-powered portable computer typically measuring 12 by 10 by 2 inches or smaller and weighing 6 to 10 pounds.

Subnotebook computer: A battery-powered portable computer typically measuring 5 by 8 by 2 inches or smaller and weighing less than 6 pounds; has usable touch-type keyboard.

Fax-modem board: An add-in card that lets you send and receive faxes and communicate with other PCs, on-line services, and BBS's.

Graphics accelerator board: A high-resolution video board that speeds up operations in Windows and other graphical applications.

Removable/portable drive: A hard disk drive that can be physically removed from your PC and used on another similarly equipped PC.

Pointing device: Mouse, trackball, light pen, digitizing tablet, and so on.

Most promising newcomer: Hardware released after December 1992 that you feel has had the greatest impact on personal computing.

Best service and support: The hardware company that provides the best service and support—considering cost, hours available, responsiveness, length of warranty, on-site repair, toll-free numbers, extended warranties, turnaround policy, and related services such as a customer BBS or on-line forum.

Software

Desktop publishing: Program used to produce high-quality newsletters, brochures, reports, magazines, books, and other publications.

Presentation graphics: Program used primarily for producing charts for business presentations.

Draw software: Program for creating drawings, highly detailed technical illustrations, graphics, and fine art.

Image-editing/paint software: Program for manipulating artwork and scanned photos as bit-mapped images, allowing you to edit, cut, paste, airbrush, and more.

OCR software: Program that converts characters on a scanned page into text.

CD ROM title: Any software in CD ROM format (i.e., applications, multimedia, encyclopedias and other references, and so on).

Accounting: Program that provides double-entry accounting capabilities. General ledger, accounts receivable, accounts payable, and other modules may be integrated in one package or available separately.

Personal finance: Program used to track personal expenses and income; does not include accounting packages (see previous).

Most promising newcomer: Software released after December 1992 that you feel

has had the greatest impact on personal computing.

Best service and support: The software company that provides the best service and support—considering cost, hours available, responsiveness, length of warranty, toll-free numbers, extended warranties, and related services such as a customer BBS or on-line forum.

Other

Best mail-order company: Tell us which mail-order company you'd recommend when buying software and hardware—considering cost, technical support, on-site repair facilities, refund and return policies, and so on.

BBS/on-line service: Vote for the best electronic bulletin board or on-line service offering E-mail, specialized databases, interactive forums, public domain and shareware programs, and so on.

QUESTIONS?

Call 800/234-0455, and we'll be happy to assist you in completing your ballot.

PC WORLD 1993 World Class Awards Official Ballot and Entry Form

Dear Reader: Please use this official ballot and entry form to vote for products you are familiar with and would recommend, based on their performance and value. Choose only one product per category. **You don't have to vote in all categories to be eligible for the contest prizes.** Eligible products must be IBM PC compatible and commercially available as of May 1, 1993. To ensure accuracy, please supply (1) the manufacturer's name, (2) the name of the product, and (3) the model number for hardware or the version number—if applicable—for software. For Quickest Entry, Fax Your Ballot to *PC World* Today! 415/974-7404 **Remember...the deadline to mail or fax your ballot is June 30, 1993! Only one entry per person, and all entries must be submitted on an official ballot and entry form. If you don't have an official ballot and entry form, you can get one by sending a stamped, self-addressed envelope to *PC World*, World Class Ballot Request, 501 Second St. #600, San Francisco, CA 94107. Please call 800/234-0455 with questions or for assistance in completing your ballot.**

Name		Title	
Company			
Street			
City		State	ZIP
Daytime phone			
Please print or type all information			
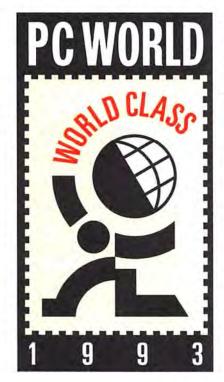
HARDWARE	Manufacturer	Name of Product	Model Number	
Sample entry	XYZ Company	SuperPC 486SX	33	
Desktop computer				1
Laptop/notebook computer				2
Subnotebook computer				3
Laser printer				4
Dot matrix printer				5
Ink jet printer				6
Color printer				7
Monitor				8
Fax-modem board				9
Graphics accelerator board				10
Sound board				11
Hard disk drive				12
Removable/portable drive				13
CD ROM drive				14
Tape backup drive				15
Scanner				16
Pointing device				17
Most promising newcomer				18
Best service and support				19

SOFTWARE	Manufacturer	Name of Product	Version Number	
Word processing				20
Spreadsheet				21
Database (personal/professional)				22
Communications				23
Desktop publishing				24
Font package				25
Presentation graphics				26
Draw software				27
Image-editing/paint software				28
Operating system/environment				29
LAN operating system				30
LAN E-mail package				31
Fax software				32
Utility				33
Backup software				34
Forms software				35
OCR software				36
CD ROM title				37
Computer-aided design				38
Programming language				39
Project manager				40
Personal information manager				41
Accounting				42
Personal finance				43
Tax planning/preparation				44
Game				45
Shareware				46
Most promising newcomer				47
Best service and support				48

OTHER				
Best mail-order company				49
Best on-line service/BBS				50

93WC-SUB

Guaranteed Prizes

to the **first 500** readers who **return** their ballots to *PC World* before **June 30 1993**

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Contest Rules

Entries must be postmarked no later than June 30, 1993. Each person may enter the contest only once. Type or print your choices on the official World Class Award ballot and entry form on the other side of this page. Your entry must include your name, address, and daytime telephone number. Employees of product manufacturers are eligible to vote for any products other than those sold by their companies; violators will disqualify their company's product. Employees of PC World Communications, Inc., their agents, and their immediate family are not eligible. Please tape the form closed (DO NOT staple) when mailing. Grand prize winners will be selected by random drawing from entries.

Your chances of winning are better than ever!

Fold here and mail today! Please tape; do not staple.
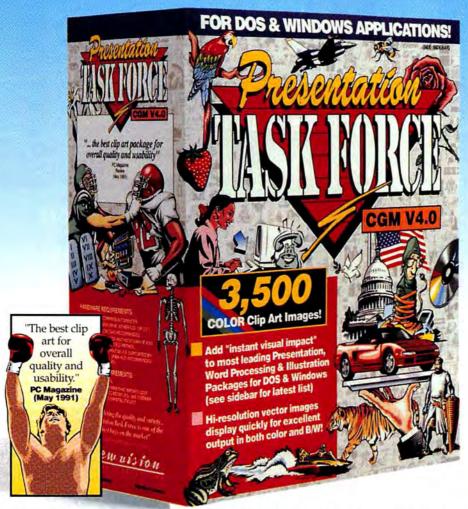
ATTN: *PC World* **Research Department**
1993 World Class Awards Ballot
501 Second St. #600
San Francisco, CA 94107-9833

Think you can't afford a 486? With prices approaching

$1000, you shouldn't consider anything less. We pick the

best of 25 price leaders powered by a variety of 486 CPUs,

from Intel's 486SX-25 to Cyrix's 486DLC-40.

Clockwise from top left:
Micro Express ME 486DLC/40,
Acma 486SX-33 VESA,
USA Flex 486SX/25,
Blackship BLK 486DX/33 LB,
Diamond DT 486DLC/40

486s for

$1250

Setting out to buy a brand-new computer—even a basic business PC—is a bit like shopping for a new car. Just as you can't help dreaming about a Rolls Royce or a Corvette, you *have* to check out those top-of-the-line 486DX2-66s. But your budget can't support the monthly payment—and in your heart, you know you don't

By Rex Farrance and Melissa R. Riofrio

need that kind of raw horsepower just to turn out basic reports and spreadsheets.

Does that mean you have to kiss your 486 dreams good-bye? Not on your life. We went on a bargain hunt for complete systems costing $1250 or less, and we were blown away by what we came up with—at last summer's price for a 386SX. Vendors didn't get an easy ride, either: We insisted on 486s only—in a configuration adequate for DOS business use. That adds up to at least 2MB of RAM, one floppy drive, a 60MB hard disk, VGA and a color display, a keyboard, and DOS 5.0 (DOS 6.0 had not been released). Out of 25 vendors submitting PCs that made it

MARC SIMON

into our review, 16 met or beat our price, and only 2 exceeded our mark by more than 10 percent. The least expensive machine of all was the Netis Technology N425VL, which costs just $1025 with 4MB of RAM and an 80MB hard disk.

The Processor Hit Parade

The PCs in this review present a surprisingly diverse array of processors. Most prevalent was the Intel 486SX-25, which powered thirteen of these workhorses. A single lower-speed 486SX-20 entered the race. These 20- and 25-MHz CPUs are common in budget systems; while capable, they're the least powerful of the Intel 486s. Only one 486SX-25 system achieved the combination of value and quality it takes to win a *PC World* Best Buy.

Intel no longer has a monopoly on the 486 market, however. We also tested two PCs using the new Cyrix 486DLC-40. The systems based on this 40-MHz CPU were not only fast—nailing down two of the ten top positions overall—they're also great values. Both PCs bearing these new processors earned Best Buys, and one, the Micro Express ME 486DLC/40, rated as the top overall value.

In addition, we checked out five low-cost PCs using Intel's new 486SX-33. These systems also made a fine showing at the high end of the value curve. And one of the 486SX-33s achieved a Best Buy along with one of three bargain PCs we received based on the reliable and speedy 486DX-33. To round out our group, we had a surprise appearance from one of the most powerful PC processors available—the 50-MHz 486DX beating at the heart of the Auva 486DX/50 Model S10.

Moving in Fast Company

The first step in any *PC World* review is taken in the PC World Test Center, where our technicians put in long hours running systems through the wringer. Test Center director Greg Smith confirmed our own gut instincts—DOS applications would be the sole testing option for this review. Why? Although systems with only 2MB of RAM can run some basic *Windows* applications, they can't complete our *Windows* benchmarks. With that in mind, the test center ran a suite of DOS business application tests using the popular *WordPerfect 5.1*, *1-2-3 3.1*, *Harvard Graphics 3.0*, and *Paradox 3.5*.

It was no surprise that the Auva 486DX/50 Model S10—with its muscular 50-MHz Intel 486DX processor—wound up as the top dog in overall performance. But we weren't expecting the Cyrix-based Micro Express ME 486DLC/40 to power its way into second

Best Buys
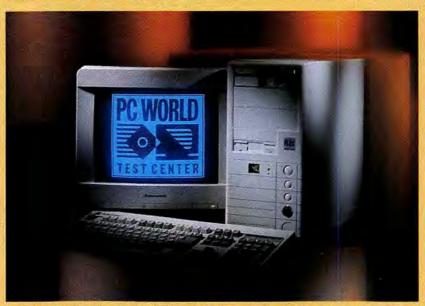
Low prices, great performance, excellent support—the five Best Buys in this review prove that these days top value doesn't demand top dollar. While they all came with 4MB of RAM and at least 64K of secondary RAM cache, the variety of processors shows that you can find excellent performance anywhere along the 486 spectrum, whether the processor comes from Intel or Cyrix. The best of the best, the Micro Express ME 486DLC/40, placed among the top five in all categories. Close behind, the Acma scored high in performance, the Blackship in performance and service, and the USA Flex in service. The Diamond DT 486DLC/40 earned its Best Buy with a smooth blend of speed, expandability, and design. The Polywell, the Netis, the Keydata, the ATronics, the Packard Bell, and the CUI systems were nipping at all their heels.

1. Micro Express ME 486DLC/40 (page 119)

2. Acma 486SX-33 VESA (page 105)

3. Blackship BLK 486DX/33 LB (page 110)

4. USA Flex 486SX/25 (page 126)

5. Diamond DT 486DLC/40 (page 111)

The Best Buy Micro Express ME 486DLC/40 is our overall top value. Both Cyrix 486DLC-40 systems in our review proved to be outstanding values.

place—even with the help of its 512K IDE caching hard disk controller. The next five positions were filled by 33-MHz Intel 486s—four SXs and one DX.

The 33-MHz 486DX has earned its reputation as the business standard for desktop PCs, and our tests indicate that the 486SX—substantially identical except for its lack of a math coprocessor—stacks up very well against the DX in handling most business applications. Past looks at systems based on the 33-MHz Cyrix 486DLC revealed performance comparable to the Intel 486SX-25. The 40-MHz Cyrix 486DLC PCs, however, performed on a higher level, taking two of the top ten spots overall. None of the 25-MHz 486SXs managed to break into the top ten.

Upgradability—The Key to a Faster Tomorrow

You buy a 486 primarily to increase your working speed and gain the power to handle more demanding applications. But even if your PC isn't pressed into processor-intensive service right now, it may be in the future. That brings up a second critical reason for choosing a 486: upgradability. The ability to upgrade is particularly important in a system that isn't already near the top of the performance curve—for example, a 486SX-25. Fortunately, all the systems in this review can be upgraded to an Intel OverDrive CPU—the easiest and most cost-effective way to increase your processing speed. Twenty-one machines also have adjustable or upgradable system clocks. This combination of features enables you to reset the system clock on, for example, a 25-MHz 486SX system to 33 MHz and install a powerful 66-MHz OverDrive Chip.

A number of PCs in this roundup have CPUs soldered either directly onto the motherboard or onto a card that plugs into a processor socket. The former have upgrade sockets, and the latter can have their processors removed and replaced. In either case, you can upgrade using an OverDrive CPU, although in the former case you can't remove and reuse the original CPU. The AST Bravo 4/25 provides a unique upgrade to its immovable CPU: You install a card containing a CPU socket and external memory cache in a special connector on the motherboard.

Putting It All Together

Careful attention to configuration and expandability will maximize the use you get out of an affordable PC. For example, memory has a big impact on performance and sets the threshold for *Windows* use. Half a dozen of the computers came equipped with our basic RAM requirement: 2MB, which is adequate for most DOS word processing and light spreadsheet or database work. You need more RAM for running *Windows*, and 18 machines came with the 4MB you need for basic work in that environment. One vendor, Packard Bell, really went whole hog with its PB425/8—loading it up with a *Windows*-optimized 8MB of RAM.

Although all 486s have an internal, performance-boosting memory cache, we were pleased to learn that almost all of these affordable systems came with a secondary memory cache. Only three—the ALR Flyer SD 4/25s Model 80DW, the Quill Qtech PCS-4S25, and the Silicon Valley SVC 486SX/33 35 Pylon II—came unequipped to hold a second-level cache. Almost three-fourths of the other systems provided at least a 64K secondary RAM cache, and the majority of those had either a 128K or 256K cache. Past PC World Test Center benchmarks indicate that a second-level cache gives a system a 7 to 10 percent speed boost in typical business applications. With that in mind, we advise buying a system with at least 64K of secondary memory cache.

Hard disks are one of the most expensive components in any system, and we expected to feel the storage pinch. Surprisingly, however, Polywell was the only vendor that sent us the 60MB hard disk we consider the minimum for practical DOS use. Nineteen other PCs came with 80MB drives—the minimum starter size for *Windows* users. AST, ATS, and Diamond sent computers with a more liberal 120MB of storage. The Gateway 2000 4SX-25 provided a truly generous 170MB drive, and the Packard Bell PB425/8 had an impressive 245MB hard disk. As is common with most current PCs intended for desktop use, all these systems came with IDE drives.

Best Price

The cheapest systems in this review are almost all 486SX-25s. You wouldn't expect to find the fastest or most feature-packed systems here, but smack in the middle of this group sits our premier Best Buy, the Micro Express, which shows that a low price *can* translate to top-notch value.

1. **Netis Technology N425VL** (page 120)
2. **Quill Qtech PCS-4S25** (page 124)
3. **Micro Express ME 486DLC/40** (page 119)
4. **CAF Gold 3D** (page 110)
5. **ALR Flyer SD 4/25s Model 80DW** (page 105)

Best Service and Support

Even at these price levels, compromising on service and support would be penny-wise and pound-foolish. If you want toll-free support and free or low-priced on-site service, look no further. All but a few systems in this review provided adequate support, but among the top five you'll find three Best Buys.

1. **Micro Express ME 486DLC/40** (page 119)
2. **USA Flex 486SX/25** (page 126)
3. **CUI Advantage 486/25SX** (page 110)
4. **Blackship BLK 486DX/33 LB** (page 110)
5. **Dell 425s/L** (page 111)

Best Performance

Auva's 486DX/50 Model S10, the one system that came with a 50-MHz 486DX processor, took the lead in this race. But the real winner here is you. Hot on the heels of the Auva was the Micro Express ME 486DLC/40 that topped our Best Buy list, with two other Best Buys coming up close. Among such company, *fast* and *cheap* are badges of honor.

1. **Auva 486DX/50 Model S10** (page 106)
2. **Micro Express ME 486DLC/40** (page 119)
3. **Acma 486SX-33 VESA** (page 105)
4. **Blackship BLK 486DX/33 LB** (page 110)
5. **ATronics ATI-486SX/33** (page 106)

Affordable Expandability

As with any PC, you need enough expansion slots and drive bays to accommodate present and future peripherals. If you're planning to hook your computer up to a network, you'll probably have server access, and typically you'll be able to get by with a total of three bays—one internal and two externally accessible—and three or four free expansion slots. But for a stand-alone PC, you'll want at least one more bay and one more slot.

Pay careful attention to the number of externally accessible bays. You're likely to need to add a second floppy drive, if your system doesn't already have one, and you'll probably want at least one other accessible bay free to accommodate a tape backup or CD ROM drive. In a pinch, you can always buy external drives—but you'll pay $100 or more extra and sacrifice some desk space. Another way to keep an accessible drive bay free is to use a combination floppy drive, which fits both standard floppy formats into a single half-height 5¼-inch bay. However, none of these bargain-priced systems came with a combo drive.

A Fast Look at Video

Your video subsystem—graphics adapter and monitor—can make or break a system purchase. All the vendors except Netis Technology and Quill Computer Products provided accelerated video. While graphics accelerators are generally desirable and becoming standard, we consider them essential if you're planning to run *Windows*. If you're thinking of doing heavy-duty graphics work, you can improve on a 16-bit accelerator by using a 32-bit local bus accelerator running at system clock speed rather than at the 8-MHz rate of a typical 16-bit expansion slot. Four systems here have local bus video: The Best Buy Acma 486SX-33 VESA, the Gateway 2000 4SX-25, and the Polywell Poly 486-33V, and the Best Buy USA Flex 486SX/25.

In addition, although all the monitors had a 14-inch diagonal, some vendors managed to provide extra quality. For example, the monitor with the Best Buy Acma 486SX-33 VESA supports a non-interlaced display and a 70-Hz vertical refresh rate at top 1024 by 768 resolution. That combination should minimize flicker and be easier on the eyes for most users. In this competitive market, you can get a quality video system with an inexpensive machine.

Keeping Service in the Picture

Service and support issues are crucial, whether you're paying top dollar for your machine or buying a bargain. Warranties on the PCs we're reviewing here vary from a one-year minimum to the fantastic three-year coverage that comes with the Xinetron X/LAN Station 486SX. Since labor is often one of the most expensive components of a repair job, it's worth noting that Polywell will repair its equipment free of labor costs for an amazing five years. Over two-thirds of the vendors provide a year of on-site service for $100 or less, and nine throw it in free with your system purchase.

Most of the time technical problems are minor; that's when you need quick, competent advice—preferably delivered without your having to make a toll call. Auva and Silicon Valley have no central support lines, leaving you dependent on dealers who may be untrained or ill-equipped for tech support. Among the other vendors,

ATS, CAF, Netis, Quill, and Tandy make you pay the toll; the rest have toll-free lines. With the current welcome trend toward improved service and support, we're seeing more weekend support, electronic BBS's, and fax lines. We base our evaluations not only on company policies but on calls we make incognito that simulate real technical problems. This time, Micro Express, USA Flex, and CUI formed a tight cluster at the top of our service and support chart.

The Best of the Best

We found so many terrific values, it was hard to stop at only five Best Buys. After sweating out our evaluation, we settled on five excellent systems that meet or better our price point. As a bonus, all give you the RAM and storage you need in a basic *Windows* workstation. The top overall value is the Micro Express ME 486DLC/40. This standout system is built around the new 40-MHz Cyrix DLC chip, and it presented a staggering résumé, nailing down an excellent rating on performance, price, *and* service and support. Its second-place showing in performance was exceeded only by a system using a 50-MHz Intel 486DX. In addition, the ME 486DLC/40's $1150 direct price is one of the best here, and Micro Express had the top rating on service and support.

The Acma 486SX-33 VESA turned in a close second in overall value, earning its Best Buy with a fine blend of hot performance, local bus video, and a terrific monitor. Almost tied with the Acma,

> We found so many terrific values, it was hard to stop at only five Best Buys. After sweating out our evaluation, we settled on five excellent systems that meet or better our price point.

the Blackship BLK 486DX/33 LB puts together a winning mixture of speed and service and support to merit its Best Buy.

Of the thirteen systems reviewed that were based on the Intel 486SX-25 CPU, only the USA Flex 486SX/25 earned a Best Buy. USA Flex accomplished this by presenting a well-balanced package that included local bus video and a local bus IDE drive connector and one of the highest service and support scores here. Finally, Diamond won its first *PC World* Best Buy with its DT 486DLC/40 system, based on the Cyrix 486DLC-40 CPU. The easily upgradable Diamond system has an even mix of quick performance, good expandability, and sound design. The presence of two out of two 40-MHz Cyrix DLC systems in our winner's circle suggests that value-priced 486DLC-40 systems deserve close consideration.

After getting our hands on 25 inexpensive 486s, one message comes through loud and clear: You don't have to give up processing power, upgradability, or quality to put an ultra-affordable system on your desk. No matter what your application, one of the 486s reviewed here can handle it. After looking at values like these, we can't see why you'd consider anything less.

Rex Farrance is an associate editor and Melissa R. Riofrio is an assistant editor for PC World. *Rex can be reached on PC World Online as REXFARRANC (see page 10 for more information).*

For more information about all products in this article, circle reader service no. 902.

Acma 486SX-33 VESA

Acma systems have hit the sweet spot in so many *PC World* reviews—winning Best Buys in October, November, and February—that we were eager to see what kind of PC Acma produces for $1249. The 486SX-33 VESA turned out to be just the kind of value we were hunting for.

Acma paired the hot new Intel 33-MHz 486SX CPU with 128K of secondary memory cache. This combination helped the system nail down third place in overall performance, with a sparkling second-place showing on the *Paradox* test, a strong third-place tie on *WordPerfect*, and a more-than-respectable fifth on *1-2-3* and *Harvard Graphics*. If you don't use a program that is dependent on a coprocessor to crank up its speed, our tests indicate that the 486SX-33's performance is comparable to the 486DX-33's. But if you need more speed and a coprocessor to handle CAD or another application in the future, you can always extract the SX chip and install a hot 66-MHz 486 OverDrive.

The 486SX-33 VESA isn't a stripped system by any means. With 4MB of RAM, an 80MB hard disk, and a Diamond Stealth 24 VLB local bus accelerator card with 1MB of DRAM, the Acma can run *Windows* at a good clip. What's more, you get a Mag LX1460 monitor, which can run 70 Hz noninterlaced at its top 1024 by 768 resolution. That should relieve any worries you might have about eyestrain. When you need room to add peripherals—such as a sound board or a SCSI host adapter—you'll find plenty in the Acma's six free slots, one of which will accept a VESA local bus card. All four drive bays are externally accessible, so you have room to add a second floppy drive and a tape or CD ROM drive.

Acma gives you other nice touches, such as a neat little cover for the reset, power, and turbo buttons, and the key lock—great for warding off accidental resets when you're working at home, especially if you have small children around who are a little too eager to lend a hand. And the company prints safety warnings and a checklist for basic troubleshooting on top of the power supply inside the case. Service and support is solid, too. The Acma comes with a year of free on-site service and toll-free technical support—even on Saturdays. The tech staff proved both responsive and competent.

So what is there not to like? Well, system memory is positioned under the power supply, which makes it a little awkward to upgrade. Balancing this quibble against the PC's many strong points, however, resulted in the second-best overall value in our roundup. In fact, this system is more than just one of the gems in this month's review: For our money, the Best Buy Acma 486SX-33 VESA would stand out on any desktop.

ALR Flyer SD 4/25s Model 80DW
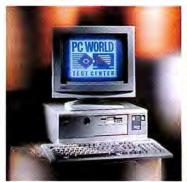
It surprised us to find an ALR 486 available for less than $1200 direct from the manufacturer—even with just 2MB of RAM installed. Granted, ALR has done plenty recently to lighten up the price side of its price-means-quality design. And to the company's credit, it has maintained the quality and innovative design of its PCs. Furthermore, ALR's service and support standards are excellent, exceeding those of most vendors. For example, the Flyer SD 4/25s Model 80DW we reviewed here is backed with toll-free technical support 11 hours a day, with Saturday support as well. Responsiveness is terrific, and advice is helpful and accurate. Fax support? BBS support? ALR covers all the bases and tops it off with an on-site service policy covering the first year for a nominal $9.95.

This Flyer model is a low-profile unit designed for use on a LAN or where expandability isn't vital. There are only three drive bays, with two already filled. The system also has just three free expansion slots. In addition, ALR managed to fit a proprietary 16-bit slot—designed to fit ALR's fax-modem, SCSI host adapter, or ethernet adapter—into an unused corner of the baby motherboard.

This PC isn't a top performer: The 25-MHz Intel 486SX has limitations, and there's no secondary RAM cache to help out. The Flyer managed lower midrange performance overall, although it fell to last on the *1-2-3* benchmark and next to last on *Paradox*. This PC is worth considering if you need a LAN station and want to buy from a name vendor with a fine track record. If you need speed and expandability, however, you can find a better fit elsewhere.

AST Bravo 4/25s

AST is well known as a manufacturer of fast, high-quality systems. In February, the 66-MHz Bravo 4/66D won a Best Buy partly by beating all comers on performance. The AST Bravo 4/25s in this
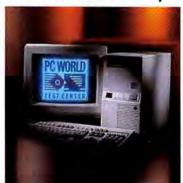
review is also reasonably quick, especially considering that it's a 25-MHz 486SX. While the system's performance was midrange overall, it outran all but one of its twelve 486SX-25 classmates. Storage and memory are quite generous for an entry-level box, too, with 4MB of RAM and a 120MB hard drive.

The 25-MHz 486SX CPU is soldered onto the motherboard. To upgrade your CPU you purchase a secondary RAM cache module, which contains a CPU socket. Whereas the AST we reviewed in February was one of the most reasonably priced 486DX2-66s we've run into, this $1450 system has the second-heftiest price in our roundup. AST does throw in *Windows* and a mouse, however, and an expensive monitor that supports a noninterlaced display at 1024 by 768 resolution.

Our system had two free externally accessible bays and four free slots. Service and support is excellent, with a year of free on-site service, toll-free technical support, a BBS, and fax support. Although the AST Bravo 4/25s seems pricey for a 486SX-25, if you want a fine *Windows* system, the great video setup and top service make AST's entry worth considering.

ATronics ATI-486SX/33

VITAL STATISTICS
Direct price: $1295
Processor: i486SX-33
PROS: Fast, expandable
CONS: Priced over $1250, CPU hard to access
Contact: ATronics Int'l, 800/488-7776, 510/656-8400
Reader service no. 673
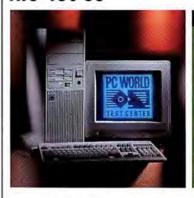
ATronics has impressed us time and again with its capability to address specific product needs. In January, the company sent us one of the best $2500 *Windows* PCs we've ever seen—assembling a Best Buy array of powerful, well-considered components—and hitting our price point right on the nose. In this review, the ATronics overshot our target price by $45 but also delivered more than our minimum configuration. The 4MB of RAM and 80MB hard disk, for example, make the difference between being able to run *Windows* or not, and the powerful 33-MHz 486SX processor and generous 256K of external RAM cache ensured that the ATI-486SX/33 would not get mired on the bottom of the performance chart. In fact, this system ranked number five in overall performance and sped past all but two other machines on the *Harvard Graphics* and disk-intensive *Paradox* benchmarks.

The ATronics unit is a short minitower model with a single floppy drive and room left for three more externally accessible drives. You also have plenty of space for installing peripherals in the six free expansion slots. Upgrading this system wouldn't be entirely painless, however; you'd have to pull the 3½-inch drive cage to extract the CPU. That quibble aside, this motherboard gives you the option of installing a new 50-MHz clock and putting in a 486DX-50, or you can take the more logical path of retaining the 33-MHz oscillator and installing a 66-MHz OverDrive.

The ATronics service and support picture looks good too, with toll-free support and a responsive technical staff who answered every query perfectly. A first-year on-site policy costs $99. The only support drawbacks are the lack of BBS and weekend support. The ATI-486SX/33 came with the performance, RAM, and storage it took to break into a jam-packed top ten of overall values.

ATS 486-33

VITAL STATISTICS
Direct price: $1300
Processor: 486DX-33
PROS: 120MB hard disk, four-year labor warranty
CONS: No toll-free tech support, priced over $1250
Contact: ATS Computers, 619/279-1305
Reader service no. 674
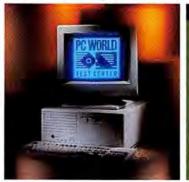
The ATS entry in our affordable 486 sweepstakes is a roomy half-size tower unit. Even with the single 5¼-inch floppy drive and 120MB hard drive installed, there's room aplenty for two internal and four externally accessible drives. A half-dozen free 8/16-bit slots should meet any desktop user's needs.

This PC doesn't lack power: It combines an Intel 486DX-33 with a 256K secondary memory cache to crank out very good overall performance. If you need more speed in the future, you can upgrade to a hot-running 66-MHz OverDrive upgrade.

The 14-inch Shamrock monitor makes a fine team with the Diamond Speedstar graphics accelerator with 1MB of DRAM. ATS also gives you some service extras, such as a four-year labor warranty to complement the one-year parts warranty. The tech support staff was responsive and accurate. But on-site service is a pricey 10 percent of system cost—or $130 for this $1300 PC. And you have to pay the toll on ATS's central support line. This is a good system, all the same—so good that if the company had toll-free support and less-expensive on-site service, it would have rated a Best Buy.

Auva 486DX/50 Model S10

VITAL STATISTICS
Street price: $1299
Processor: 486DX-50
PROS: Fastest system in roundup
CONS: Priced over $1250, no central support
Contact: Auva, 714/562-6988
Reader service no. 675

We're not surprised to see a 50-MHz processor in a server or a CAD workstation, but we were blown away to find one inside a $1299 PC submitted as an affordable 486. The Auva

Does Your Keyboard Speak...

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The Key Tronic TRAK101™ keyboard offers all the features of an enhanced 101-key layout with the added power of an integrated trackball that's customizable for ease of use and enhanced productivity. The TRAK101 is *the* keyboard for Windows.

...Word Processing?

The KB101 PLUS™ keyboard from Key Tronic offers all the features of an enhanced 101-key layout with the added benefits of larger backspace and return keys. The KB101 PLUS features high performance capacitance switch technology, double-shot molded keycaps and a durable enclosure.

...Macros?

The FLASH101™ keyboard from Key Tronic offers unique styling, all of the features of an enhanced 101-key layout, plus the added power of on-screen programmability. The FLASH101 lets you quickly preview function keys, macros and other programmed keystrokes right on your CRT.

...Spreadsheets?
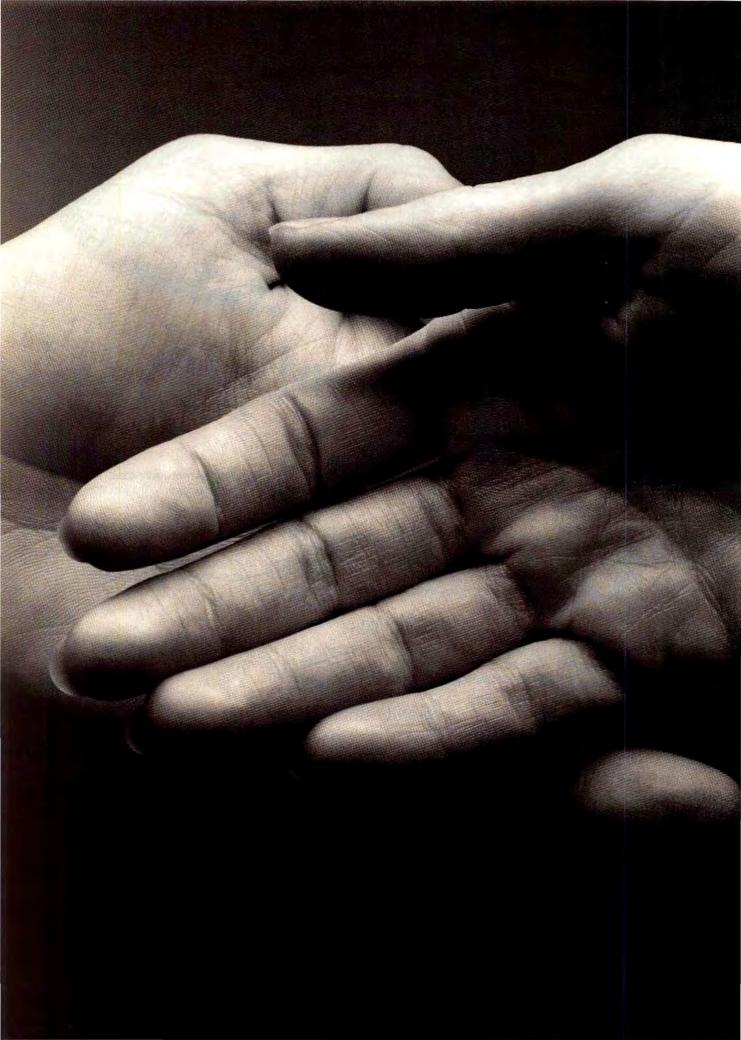
The ABACUS™ on-line keypad from Key Tronic offers a uniquely functional and dramatically styled keypad that has been designed with calculator functions, F-key references (Mac version only), page control functions (PC version only) and a *Send Key*™ that pastes calculations directly into your text or spreadsheet.
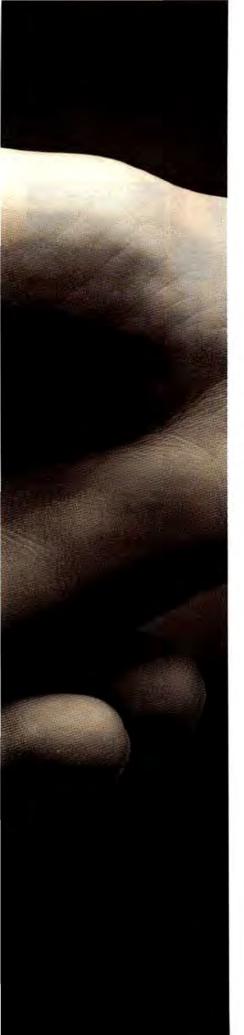
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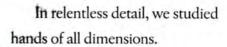
TO DESIGN OUR NEW MOUSE, WE STARTED BY READING PALMS.

In relentless detail, we studied hands of all dimensions.

We consulted professors of kinesiology, engineers, ergonomists and computer users. We used digital fiber optics to analyze the human hand. We followed it in motion.

The result is a new Microsoft® Mouse that is, well, anatomically correct. Uncommonly comfortable.

The palm is perfectly supported. Left or right handed, the grip is comfortable. Fingertips fall naturally into place. A click feels just right.

This mouse even looks good. Intriguingly asymmetrical. Yet it somehow reminds you of the gentle curves of a human form.

Did we mention that it also has some innovative new software features? They allow you to customize the mouse, so it works the way you like to work.

Try the new Microsoft Mouse. If you're not comfortable, we'll refund your money. Guaranteed. Details are on the box, which you can quickly get your hands on at a computer store near you.

Microsoft
Making it easier
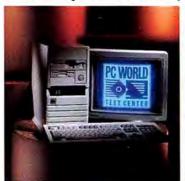
486DX/50 Model S10 features a full 50-MHz Intel 486DX CPU, a 256K secondary memory cache, and 4MB of RAM. Riding the wings of this powerful combination, the Auva soared to number one in overall performance, first on the *1-2-3* and *Paradox* benchmarks, and second on *WordPerfect* and *Harvard Graphics*.

The story doesn't end with speed. There's good expandability in the compact case, even with two floppy drives and a hard disk installed. You can add two more externally accessible drives, and Auva got five free slots onto the tiny motherboard.

Unfortunately, Auva provides no central support for purchasers, nor does it require dealer support training. That means if you buy this PC, you must make sure your dealer is competent and will remain available to give reliable technical support. There is a support line for dealers, but the lack of end-user support is hard to swallow. Auva won't sell you an on-site service policy either. Otherwise, this is a very good PC. But in our opinion, unless your confidence in your dealer is unbounded, you shouldn't consider a product with this level of support.

Blackship BLK 486DX/33 LB

VITAL STATISTICS

Direct price: $1250
Processor: 486DX-33
PROS: Fast, both floppy drives, excellent service
CONS: None
Contact: Blackship Computer Systems, 800/531-7447, 408/432-7500
Reader service no. 676

Blackship always seems to deliver real value to budget-conscious buyers, and the BLK 486DX/33 LB is no exception. This PC offered so much more than we were asking for, we *had* to give it a Best Buy. A 486DX-33 processor in a $1250 unit is always a great deal and virtually guarantees good performance in this price class.
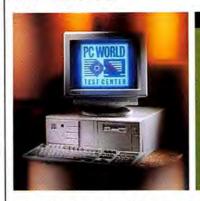
With 4MB of RAM and a 64K secondary RAM cache, this unit came in fourth on overall performance and a sterling second on the *1-2-3* benchmark. These results reinforce our contention that the first 64K of external RAM cache gives the biggest payoff. If you think you'll want a larger cache, however, ask Blackship to install it before you complete your purchase. That way you won't have to remove the drive cage to do your own upgrade.

You'll be pleased to learn that this handsome little minitower comes with both floppy drives and an 80MB hard disk. And you have room for two more externally accessible drives plus six free 8/16-bit slots (including two VESA local bus slots). The versatile motherboard supports speeds from 20 MHz to 50 MHz, opening an array of upgrade possibilities. The most logical choice for a future speed boost would be to swap in a 66-MHz OverDrive CPU.

Buying a PC without solid service and support is like forgetting to buckle up for a long road trip. With Blackship, the belt is securely fastened. The toll-free tech support lines are staffed by courteous, competent, and responsive technicians. And the support BBS and

fax service is handy, too. To top it off, a year of free on-site service comes with your PC, and the company's two-day turnaround service policy is just fine. All this in a computer that costs $1250 direct from the vendor spells Best Buy in our book.

CAF Gold 3D

VITAL STATISTICS

Street price: $1195
Processor: i486SX-25
PROS: Excellent price, expandable, good accessibility
CONS: No toll-free support, mediocre performance
Contact: CAF Technology, 818/369-3690
Reader service no. 677
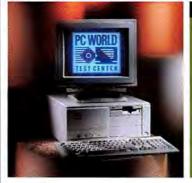
The CAF Gold 3D is a good-looking Intel 486SX-25 system with a terrific $1195 street price. Its roomy desktop case gives you plenty of space for drives and peripherals, with five drive bays paired with five free slots (four 8/16 bit and one 8 bit). Accessibility is near perfect. The motherboard supports a clock swap to 33 MHz, and the CPU socket accepts up to a 66-MHz OverDrive.

Buyers of this system may want to take advantage of that upgrade path: Even with 64K of secondary RAM cache installed, the CAF runs about 14 percent slower than the 486SX-25 class leader overall. The system came with our minimum 2MB of RAM, and unfortunately, CAF filled up all eight RAM sockets with 256K SIMMs. So if you want to install more memory, you'll have to pull at least some of the old RAM, and you'll have to buy extra RAM to replace it.

It appears CAF cut some corners on its graphics accelerator, as the Trident 9000 unit has a minimal 256K of video RAM. The service mix has its lumps as well: The lack of both toll-free central tech support and an on-site service option stuck in our throats. Great price, expandability, and accessibility make this system a pretty fair value. But the top competitors have better support and give you a lot more bang for your buck.

CUI Advantage 486/25SX

VITAL STATISTICS

Street price: $1207
Processor: i486SX-25
PROS: Excellent service, expandable
CONS: Mediocre performance
Contact: CUI, 800/458-6686, 408/241-9170
Reader service no. 678

A computer doesn't get too far in *PC World* without solid service backing, and CUI knows how to support its products. Our research tells us that tech support responsiveness and

accuracy are at the top of your list, so we pay attention to time spent on the phone and the answers we get. We got through immediately on CUI's toll-free lines, and the technicians steered us right in every case. CUI charges a reasonable 5 percent of system cost for a year of on-site service, or $60.35 on the Advantage 486/25SX. If a repair requires a trip to the service center, the company will turn it around in a single day. That kind of care adds up to one of the highest service and support scores here—not bad for a system with a street price of just $1207.

Unfortunately, this PC is pretty slow, even for a 486SX-25. That was a bit surprising, considering that it has a 256K secondary RAM cache. The Advantage 486/25SX wound up second slowest overall and dead last on the *Harvard Graphics* test. This poor performance hurt the Advantage, dropping it way down in the rankings.

This PC has some intriguing design points. The plastic flat-pack processor is soldered to a circuit board that plugs into the CPU socket. That way, you can still upgrade by extracting the CPU assembly and installing a new processor. The motherboard supports replaceable clocks up to 33 MHz, so you can use an OverDrive as fast as 66 MHz. Expandability is good for a compact box, with six free slots (four 8/16 bit and two 8 bit) and three free drive bays, all of which will accept a removable-media drive.

Accessibility to the motherboard is good, except it's a little hard to get to the memory. If we rated on service alone, the CUI Advantage 486/25SX would have our ringing endorsement, but we think you're better off buying a faster PC.

Dell 425s/L

VITAL STATISTICS

Direct price: $1299
Processor: i486SX-25
PROS: Excellent service and support, OverDrive for DX2 upgrade
CONS: Priced over $1250
Contact: Dell, 800/289-3355, 512/338-4400
Reader service no. 679
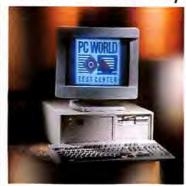
Many buyers won't buy anything *but* a Dell computer. For them, Dell is an island of stability in an unfriendly sea that's swallowing small and large vendors alike. They don't want to hear about this vendor's speed or that vendor's bargain prices. As far as these folks are concerned, they're not just buying a PC, they're buying the backing of the company that sells it.

Dell sent us its new 425s/L model, with an Intel 486SX-25 CPU, 4MB of RAM, and an 80MB hard disk. This PC might do best hooked up to a LAN, as it has just three 8/16-bit slots for expansion. You can add 128K of secondary memory cache, although none was installed in our test system. You wouldn't know from its performance, however, as the Dell displayed better-than-average speed for a 486SX-25 and a respectable midpack overall showing.

This model has an easy-open case and an innovative modular design. The case bottom and removable peripherals cage is of a light, tough plastic. And the single floppy drive fits in an adapter

that snaps in and out of one of two externally accessible bays. Dell was thinking of your future when it put this box together. You can extract the SX CPU and add a 50-MHz OverDrive, or you can move the jumpers and put in a 486DX-33 or even a 66-MHz Over-Drive. And to make sure this PC grows with you into the next generation, Dell provided the 238-pin socket for the Pentium-based OverDrive for DX2.

One reason Dell has retained such brand-loyalty is its terrific support, with toll-free lines that have recently gone to 24-hour-a-day, year-round service. Fax, BBS, a year of free on-site service—what more could you ask? This is one of the most upgradable PCs here, although it isn't the fastest. But its buyers won't mind. It's a Dell.

Diamond DT 486DLC/40

VITAL STATISTICS

Direct price: $1225
Processor: Cyrix 486DLC-40
PROS: Easy to upgrade, 120MB hard drive, good performance
CONS: None
Contact: Diamond Technologies, 800/989-7253, 714/252-1008
Reader service no. 680

After reading this review, you may conclude that Cyrix 486DLC-40 really spells Best Buy, because both systems in the review that use this hot new 40-MHz CPU earned top honors. Both the Diamond DT 486DLC/40 system and the Micro Express ME 486DLC/40 are winners here. You can't draw grand conclusions from such a limited sample, but the results do suggest that the 486DLC-40 offers remarkable value in affordable systems.

The Diamond Technologies system achieves a splendid overall balance. It's fast, making our top ten and even beating out one 486SX-33. And if your application can use a 387 (which is inside every Intel 486 but not in the 486DLC), you'll welcome the Diamond's installed Cyrix FastMath coprocessor. Further adding to the speed, Diamond provided a 256K secondary RAM cache. You get 4MB of RAM and a 120MB hard disk—not bad for a $1225 economy box. The video system is solid too, and the Western Digital graphics accelerator is loaded up with 1MB of RAM. Diamond sweetened the pot with a free mouse.

If you need a future speed boost, you can replace the system clock and pop an Intel OverDrive CPU into the upgrade socket. There's room to move under the hood, with good access to everything. Six free 8/16-bit slots is generous in a compact box, and all three of the available drive bays are externally accessible.

Diamond's service policies look good too, starting with the 15 months' parts and 24 months' labor warranties. Add on a toll-free tech line, great responsiveness, and solid accuracy; stir in a year of on-site service for $75 and a two-day turnaround service policy; and you have a solid protection recipe. A quibble? No fax or BBS support and no support on weekends. So what do you get when you cross a hot new processor with a well-designed, well-supported, upgradable PC? A Best Buy, of course.

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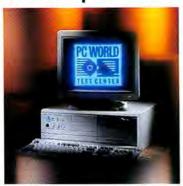
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Central Point Software ᴵⁿᶜ

First Computer FCS 486SX-33

VITAL STATISTICS
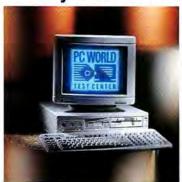
Direct price: $1199

Processor: i486SX-33

PROS: Very good price, dust-protected keyboard

CONS: Sub-par performance for a 486SX-33, no on-site service

Contact: First Computer, 800/325-1911, 404/441-1911

Reader service no. 681

The First Computer FCS 486SX-33 comes with a 33-MHz Intel 486SX teamed with a 128K secondary RAM cache—a combo suggestive of both hot performance and a price higher than $1199. Unfortunately, the FCS 486SX-33's speed didn't live up to expectations. Its overall rating was almost 17 percent slower than the next slowest 33-MHz PC and was surpassed by almost half the 25-MHz 486SXs. That's not what we expect from a 33-MHz machine.

Service and support is very good in most respects: The toll-free support is responsive, and we got flawless advice. Unfortunately, there's no on-site service option with this model.

The FCS 486SX-33 came with just 2MB of RAM. The flat performance is frustrating, because this PC has a lot to recommend it. The full desktop case provides ample expandability in six free slots and three free externally accessible bays. The vendor even threw in a keyboard with a flip-up dust protector. In fact, we fell in love at first sight with this low-cost 33-MHz machine. But its 25-MHz 486SX-class performance did much to cool our ardor.

Gateway 2000 4SX-25

VITAL STATISTICS

Direct price: $1495

Processor: i486SX-25

PROS: Great software bundle, 170MB hard disk

CONS: Priced over $1250, poor response, no free drive bays

Contact: Gateway 2000, 800/846-2000

Reader service no. 682
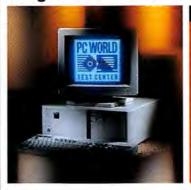
For many, Gateway 2000's name is synonymous with value. Users have purchased Gateway systems in droves, taking advantage of ultra-competitive prices, outstanding design, and super service—including long hours of toll-free support and a year of free on-site service. Ironically, Gateway's fantastic success has thrown a stumbling block in its path. Gateway customers have struggled of late to get through on the company's toll-free service lines. In our own support checks, we found the lines busy more often than not. This poor responsiveness hurt Gateway's usually outstanding service rating.

The handsome, low-profile $1495 Gateway 2000 4SX-25 didn't make our price point. But the system comes with 4MB of RAM, a

170MB hard disk, Microsoft *Windows* and *Works for Windows*, antivirus, disk optimization, and data recovery tools from Central Point's *PC Tools 8.0* and Diagsoft's *QA Plus*. Oh yeah—you also get both standard floppy drives, a mouse, and integrated local bus video with 1MB of DRAM.

There's room for a lot of cards in the five free expansion slots, but all the drive bays are already filled—a problem if you want to add an internal CD ROM or tape drive. Despite its high price compared to the other systems, this PC offers a lot of extras for users who won't need to add more internal drives. Gateway is on a crash program to increase its support staff and phone lines. We're hoping we can report soon that the company has returned to the form that won it our Service Excellence award. [*Editor's note: At press time, Gateway told us it no longer offers this PC with a 486SX-25 CPU. The new model is identical in price and features and uses an i486SX-33.*]

Insight 486-33 MHz ValueLine

VITAL STATISTICS

Direct price: $1249

Processor: i486DX-33

PROS: Fast performance on *1-2-3*

CONS: No on-site service option, limited video resolution

Contact: Insight Computers, 800/927-7848, 602/350-1176

Reader service no. 683

Insight's 33-MHz Intel 486DX offering clearly isn't lacking in power—not when it can virtually match the performance of the second-fastest PC in this roundup on the processor-intensive *1-2-3* benchmark and is just 25 percent overall behind the scorching 50-MHz Auva system. The 486DX CPU gives you the advantage of a built-in math coprocessor, and the Aten motherboard comes with 64K of secondary RAM cache installed (expandable to 256K). In addition, Insight provides 4MB of RAM and still manages to squeeze in at a dollar under our $1250 price point.

All the drive bays in the Insight's case are accessible. With three of those bays free and six free expansion slots, you shouldn't ever find yourself hurting for peripheral or drive capacity. The company bundles a mouse and *Dr. Solomon's Anti-Virus* and throws in *Stacker 2.0* in case you want to use its real-time compression to double your native 80MB hard drive capacity. The video subsystem isn't anything special, however. The graphics accelerator has just 256K of DRAM installed, and the Premier Innovations 41 monitor won't support anything beyond standard 640 by 480 VGA resolution.

Service and support is mostly a positive story. While responsiveness was a little spotty, our questions were answered accurately. Furthermore, the support lines are toll-free and available on weekends. And just before press time, Insight told us it was extending its support hours around the clock. Unfortunately, there's no on-site service option, although the company insists that it does everything it can to mitigate the lack of on-site service by pouring resources into its existing service channels. On balance, this is a pretty solid value-priced computer—especially considering the bundled extras.

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PC Director of Direct Response
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MVP

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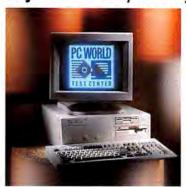
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Keydata 486SX/25 Keystation

VITAL STATISTICS
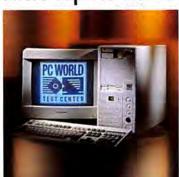
Direct price: $1245
Processor: i486SX-25
PROS: Good service and support
CONS: Limited expandability
Contact: Keydata, 800/486-4800, 908/755-0350
Reader service no. 684

We'll say right up front that the Keydata 486SX/25 Keystation is a really good value, with all the desktop essentials. You get 4MB of RAM, a 256K secondary RAM cache, and both standard floppy drives. In addition, the company combined a Cirrus Logic graphics accelerator with 512K of DRAM and a noninterlaced Korea Data Systems monitor to produce a top-notch video subsystem.

The 486SX/25 Keystation has plenty of peripheral potential in five free expansion slots. There's only one free drive bay, but it's externally accessible. In terms of performance, the Keystation beat all the other 486SX-25 systems on the *Harvard Graphics* and *Paradox* tests—and on *Harvard Graphics* it even outdistanced three 33-MHz systems. The 25-MHz Intel 486SX CPU is hard-wired—but onto a circuit board that plugs into the CPU socket. This approach allows the company to minimize costs and still leaves you with an upgrade path. If you replace the 25-MHz oscillator with a clock that ticks at 33 MHz, you can upgrade all the way to a 66-MHz OverDrive.

Keydata's service and support prescription should make it easy to maintain a healthy PC. It starts with an 18-month parts and labor warranty and a year of free on-site service. On top of that, the toll-free tech line connects to responsive technical support reps. Keydata doesn't have a BBS but will fax you support documentation. If you're looking for a fast 486SX-25 system with a fine video setup, this Keystation could be just what the doctor ordered.

Micro Express ME 486DLC/40

VITAL STATISTICS

Direct price: $1150
Processor: Cyrix 486DLC-40
PROS: Great price, service, and performance
CONS: None
Contact: Micro Express, 800/989-9900, 714/852-1400
Reader service no. 685

Say something good about this machine. Go ahead. And while you're at it, heap on a bunch of superlatives—chances are you'll be right on the mark! Overall, this is the best low-cost PC we've ever reviewed—bar none. Let's start with the fiery new 40-MHz Cyrix 486DLC processor, designed for use in affordable PCs like this one. Cyrix seems to have hit a home run with this CPU—it delivers just the right combination of speed and economy to score big at this price point. Speaking of economy, Micro Express has really managed to deliver the goods. Is a $1150 direct price with 4MB of RAM, 128K of secondary RAM cache, and a 512K caching IDE disk controller affordable enough for you? The half-size tower design leaves a generous four drive positions free, three of which are externally accessible. And if you like to add in peripherals, this system's five free slots will oblige.

Micro Express recognized that even buyers of an inexpensive Cyrix-based PC would want to keep the path open to Intel's attractive OverDrive upgrade. So the motherboard has a replaceable system clock and an upgrade socket that will accept Intel OverDrive CPUs. This PC is so fast, however, that you'll probably love it just the way it is. It took a 50-MHz Intel 486DX to unseat the ME 486DLC/40 from first place in overall performance. But the Micro Express nailed top position on the *WordPerfect* and *Harvard Graphics* tests and came in fourth on *Paradox*. The caching controller gave the ME 486DLC/40 an extra edge in our performance suite, as we test without disk caching software installed. Loading a software cache with some of the other fast systems would make the Micro Express machine's performance seem somewhat less transcendental, but any way you slice it, this is a hot PC.

We've saved the best course for last: Micro Express service earned the top rating in the review. How? Well, try making a toll-free support call at midnight on Christmas Eve if you want to find out. Does that mean 24-hour, year-round tech support? You bet. And you won't give up responsiveness or accuracy. You get a two-year parts and labor warranty, and a year of on-site service costs a reasonable $50. Two-day turnaround and fax support more than make up for the lack of a BBS. That brings us right back where we started: This Best Buy PC is an easy winner in every category.

MIS 425SX

VITAL STATISTICS

Direct price: $1279
Processor: i486SX-25
PROS: Fine service and support
CONS: Poor graphics resolution
Contact: MicroNiche Information Systems, 800/733-9188, 408/730-9188
Reader service no. 686

We love it when products cluster near the top of a category in our reviews because it means you have an abundance of value to choose from. That's how this month's service section looks: The top seven positions are packed as tightly as a bunch of bananas, and MIS is right in the group. They all have a one-day-turnaround service policy, and our probe of toll-free central support yielded immediate response and accurate answers. If you want on-site service, it will cost you a mere $45 for the first year, and fax support is free. The

only demerits come from the lack of weekend and BBS support.

The system's average performance is exactly what you'd expect from a 25-MHz 486SX—adequate for a starter PC. The MIS 425SX's hardwired 25-MHz Intel 486SX CPU is soldered in place, a move that cuts costs. To make sure you're not facing premature obsolescence, the motherboard also has an upgrade socket. Drop in an OverDrive CPU, and you're cranking along at a clock-doubled 50 MHz. MIS installed no secondary RAM cache, but the system has the capacity for 256K, and the slot for the cache card makes the cache upgrade one of the easiest in this review.

You can access everything you need to inside the case very easily. There's plenty of room for peripherals in six slots, and each of the three free drive bays can hold a removable-media drive. MIS supplied a vanilla video setup, however: There's only 256K of DRAM on the Cirrus Logic accelerator, and the ViewSonic 1 monitor is capable of only standard 640 by 480 VGA display. To its credit, the monitor supports noninterlaced output at that resolution. There's nothing about the MIS system that will boost it to stardom, but it is a solid value. And its vendor's service policies make the company worthy of your attention.

Netis N425VL

VITAL STATISTICS
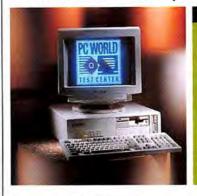
Direct price: $1025
Processor: i486SX-25
PROS: Best price in roundup, two free local bus slots
CONS: No toll-free technical support
Contact: Netis Technology, 408/263-0368
Reader service no. 687

The Netis N425VL is a system that will grab the bargain hunter's attention. Where else can you find an Intel 486SX-25 with 4MB of RAM, a 64K secondary RAM cache, and an 80MB hard disk for $1025? If that sounds good, you also get a motherboard with two local bus slots.

As with the Key Data system in this review, the CPU is soldered onto a module that plugs into the CPU socket. You get two free VESA local bus slots, although Netis supplied a 16-bit Acumos SVGA card. In addition, the motherboard provides four free 8/16-bit slots and two free 8-bit slots. All three free drive bays support drives you can access from the outside of the case.

When it comes to getting around inside the desktop case, your access to the CPU is slightly pinched, and the secondary memory cache is placed beneath the drive cage. Even though the internal appearance is cluttered, however, you can reach the memory fairly easily. The service and support scores were good overall, with a two-day turnaround policy and BBS, fax, and Saturday support. Calls were answered right away and accurately. You have to pay the toll on your support calls, however—pretty tough if you're calling this Sunnyvale, California, vendor from New York. And the on-site service is $100 for a year. But with a buy-in as low as $1025, this PC still shines as a good value and a bargain hunter's dream.

Packard Bell PB425/8

VITAL STATISTICS

Street price: $1299
Processor: i486SX-25
PROS: 8MB of RAM, 245MB hard disk, free software
CONS: Poor support responsiveness, priced over $1250
Contact: Packard Bell, 818/886-9998
Reader service no. 688

The Packard Bell PB425/8 is a one-stop shop for the entry-level buyer. It's loaded up with *Windows*, Packard Bell's version of *1-2-3 for Windows*, and *Lotus Write for Windows*. The system is *Windows*-optimized with 8MB of RAM, two floppy drives, and a huge, 245MB hard disk. You even get an internal modem with this PC—that's pretty impressive, considering it missed our price point by less than $50.

Performance is good for a 25-MHz 486SX, helped by a 128K secondary RAM cache to a finish near the median overall. And the PB425/8 managed to tie two 33-MHz PCs for third place on the *WordPerfect* test. The one free drive bay is externally accessible, and all four expansion slots are free.

The one place where Packard Bell stumbled is service and support. You wouldn't know it by the policies: Calls are toll-free and available 24 hours a day, seven days a week. Packard Bell provides fax and BBS support, and you don't pay a dime for a year of on-site service. There's a support line for dealers, although you're not likely to get support from many of the discount outlets selling Packard Bells. Our main problem was getting through when we called. We dealt with one unanswered call and two recordings asking us to call back between 10 p.m. and 5 a.m. In addition, some of the advice we got didn't solve our problems. The poor responsiveness and accuracy dragged down service scores that would have otherwise been good, and the overall rating of the machine suffered. That's too bad, because this system offers an extremely attractive bundle of extras that represents a hidden savings of hundreds of dollars.

Affordable 486 Prices Stabilize

This is the eleventh time we've run a system review that includes late list price information we researched just before going to press. Last summer and fall, prices plunged so radically it was hard to tally the changes. Now, however, costs seem to have leveled—at least for the moment. In fact, these affordable 486s had the smallest two-month price movement we've seen in the last year. The Blackship BLK 486DX/33 LB's direct price dropped $55 to $1195, making this Best Buy an even better value. And the least expensive 486 in our review—the Netis Technology N425VL—dipped $50, breaking the $1000 barrier at $975. Finally, Quill Computer Products trimmed $50 off the price of its Qtech PCS-4S25, which you can now buy for $1049.

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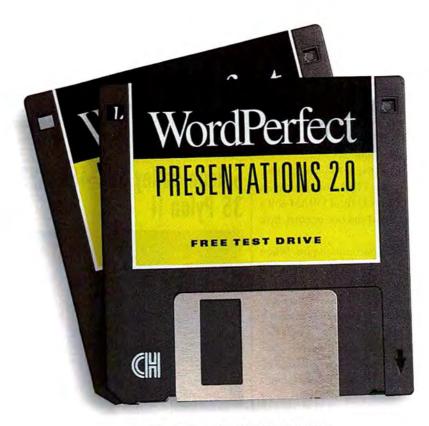
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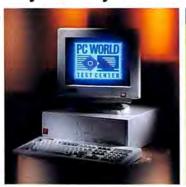
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Polywell Poly 486-33V

VITAL STATISTICS
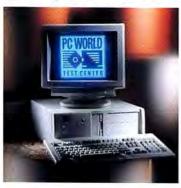
Direct price: $1250
Processor: 486SX-33
PROS: Fast; five-year labor warranty; OverDrive for DX2 socket
CONS: 60MB hard disk
Contact: Polywell Computers, 800/999-1278, 415/583-7222
Reader service no. 689

The Poly 486-33V is value enough to barely miss a Best Buy. It hit our price right on the nose while providing 4MB of RAM, a 128K secondary RAM cache, local bus video and drive controllers, *and* a 238-pin Intel ZIF socket that will accept Intel's projected OverDrive for DX2. The drawback edging it out of the winner's circle was a 60MB hard disk—within our minimum guidelines, but the smallest here. This 33-MHz Intel 486SX's performance missed the fastest five overall by a single percentage point.

The system has two local bus slots and five 8/16-bit slots. This configuration leaves four slots free, with the VESA slots filled by an Orchid local bus graphics accelerator with 1MB of DRAM and a local bus drive controller card. Two external and one internal drive bays remain free.

Polywell service and support offers an uncommon plus. When your one-year parts and labor warranty runs out, the company will provide free repair and labor for four additional years. If you need on-site service, you can buy a year for $75. The six-day-a-week technical support is responsive and accurate. Fax support rounds out the service picture. As we said, this system missed a Best Buy by a whisker in a review that's so packed with great deals it gives new meaning to the phrase "no room at the top." Any way you look at it, this is a superb PC. The only thing keeping it from being a super *Windows* machine is its small 60MB hard disk.

Quill Qtech PCS-4S25

VITAL STATISTICS

Direct price: $1099
Processor: i486SX-25
PROS: Excellent price
CONS: Mediocre performance, no toll-free support
Contact: Quill Computer Products, 708/634-6650
Reader service no. 690
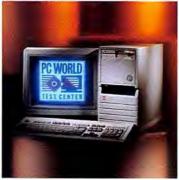
Misers take note: The Quill Qtech PCS-4S25-2 combines an Intel 486SX-25, 4MB of RAM, and an 80MB hard disk—and serves it up for under $1100. And of the 25 systems we reviewed here, only the Netis Technology N425VL system costs less. The system comes housed in a handsome compact case that gives you

three unfilled drive bays, all of which are externally accessible.

The system has six free slots (three 8 bit and three 8/16 bit) and will support any of the current Intel OverDrive CPUs—all the way up to 66 MHz if you swap out the current system clock for a 33-MHz oscillator. One important caution before you put on the pressure it takes to seat a new CPU, however: The end of the motherboard under the upgrade socket is unsupported. Better brace it—or chance cracking the system board.

The possibilities of a buyer wanting to upgrade quickly are strong. This system was slow in our tests, uncomfortably close to the bottom overall and last on the *WordPerfect* test. We suspect that the absence of secondary memory caching has something to do with this lackluster showing. Unfortunately, there's no provision for a RAM cache upgrade.

If you value longevity, Quill is a company that's been selling business products since 1956. The two-day turnaround policy, year of free on-site service, and BBS and fax support are great. And we received good advice, although we had to wait 2 to 3 hours for some callbacks. Our main complaint is the absence of toll-free support lines. The Quill Qtech PCS-4S25 isn't a bad system, although it's not a wise choice for those who value top performance.

Silicon Valley SVC 486SX/33 35 Pylon II

VITAL STATISTICS

Street price: $1215
Processor: i486SX-33
PROS: Fast; two-year warranty
CONS: Conditional service and support
Contact: Silicon Valley Computer, 415/967-1100
Reader service no. 691

The Silicon Valley SVC 486SX/33 35 Pylon II is a speedy machine at a tempting $1215 price. You get a 33-MHz Intel 486SX with 4MB of RAM and an 80MB hard disk. That's not bad, considering that this system zipped past five of the other seven 33-MHz 486s to finish in a virtual tie for fourth on the *Harvard Graphics* test.

The minitower unit has three externally accessible bays free. The baby motherboard provides six free slots and supports OverDrive processors to 66 MHz.

Everything sounds great so far, right? Great speed, attractive price—if only service and support could match the rest of the package. Don't get us wrong: There's nothing wrong with the two-year warranty. But Silicon Valley's central end-user support is available only to users who buy direct. Silicon Valley provides dealers with a dedicated support line, but it doesn't require training or keeping an inventory of parts in stock. The company recently added an on-site service option for $99 a year and has a very slow service turnaround of a week or longer. As a system manufacturer, SVC obviously knows what it's doing, but it needs to add just a little more polish to its service and support to match up to our Best Buys.

Tandy 425 SX

Many buyers depend on hands-on access when they make a PC purchase, and they want to discuss any problems in person. Tandy has always appealed to that kind of buyer. Purchasing a Tandy system is as convenient as a visit to a local Radio Shack, and the company's longevity promotes buyer confidence. Tandy started a factory-direct program last fall to augment its carryout sales. You work with a Radio Shack representative in the store to configure your system. The rep phones in the order, Tandy custom-configures your PC, and you get the system within five business days.

The low-profile Tandy 425 SX came in at $1324—over our target price—although the company threw in *Windows* and a mouse. If you use *Windows*, however, spend the extra $45 it takes to bump the 2MB of RAM up to 4MB. Tandy didn't fill the sockets, but there's space for 256K of secondary RAM cache next to the soldered-down 486SX-25 and upgrade socket. A 128K cache would add $69 to the price, but this PC could use the boost, as the Tandy was second to last or last on every benchmark. Accessibility to the five free slots and two free externally accessible bays is good.

Tandy gives depot service where you bought your PC but doesn't require dedicated staff. On-site service runs $129 for the first year. When we called central tech support, we experienced long waits—frustrating when the call is on our dime. Tandy is a solid company, but you can get better performance and service elsewhere.

USA Flex 486SX/25
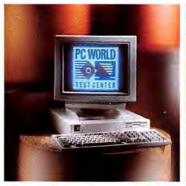
From experience, we expect USA Flex to come up with good, innovative PCs. But in the area of service and support, high expectation has turned into certainty. With that in mind, we're pleased to report that USA Flex has put together another Best Buy combo with its USA Flex 486SX/25. The

machine is good—and service and support is better than ever.

USA Flex put together a cunning blend of new-age components to enhance performance, such as a motherboard with two VESA slots, a hot local bus graphics accelerator, and a 32-bit drive controller. Performance on our disk-intensive *Paradox* test bears witness to the controller's success: Only two other 486SX-25s did better. With a 66-MHz OverDrive upgrade path available, these enhancements guard against obsolescence. USA Flex provided 4MB of RAM, a 256K secondary RAM cache, *Windows*, and a mouse. The compact case accommodates four free accessible drive bays, and the motherboard provides six free slots.

As we said at the outset, USA Flex service and support are great. Responding to your need for protection in a changing market, we recently tightened our already tough service ratings. USA Flex ran our new gauntlet unscathed, right on the heels of the top-rated Micro Express. USA Flex also has responsive 24-hour year-round toll-free support. If your problem can't be handled on the phone, an on-site service rep will visit you free for the first year. BBS and fax support round out the service lineup. When we planned this low-cost roundup, we expected to get nothing *but* 486SX-25s for review. Even after checking out the Best Buy USA Flex 486SX/25's powerful competition, we've decided we'd still be happy to get this one.

Xinetron X/LAN Station 486SX

The handsome, super-slimline Xinetron X/LAN Station 486SX is a plug-and-play LAN client, ready to connect and configure right out of the box. Ours came with an ethernet option, which handles either Coaxial Thinnet or 10Base-T, and Xinetron also offers an Arcnet option. Both of these LAN cards fit the Xinetron's special slot-saving motherboard connector. The system provides four free horizontal card positions. Xinetron did well to fit four bays into this tiny package, leaving both an externally accessible and an internal bay free. You can't install a 5¼-inch floppy drive in this PC, however, as all the bays are 3½-inch form factor.

In its quest for ultimate versatility, Xinetron's motherboard can handle everything from a 386DX through a 66-MHz 486 OverDrive CPU and Intel, Cyrix, and Weitek math coprocessors. Because of this machine's 20-MHz 486SX, it's a relatively pedestrian performer, winding up close to the bottom overall.

The warranty is an outstanding three years, technical support is toll-free, and Xinetron offers both BBS and fax support. By the time you read this article, Xinetron will have finalized pricing on an on-site service option. The Xinetron entry isn't a bad network workstation, but for our money, it needs a faster processor.

New Cx486DLC-40, i486SX-33 Almost Match i486DX-50!

System	WordPerfect 5.1	1-2-3 3.1	Harvard Graphics 3.0	Paradox 3.5
Auva 486DX/50 Model S10 (Intel 486DX-50)	149	158	282	319
Micro Express ME 486DLC/40* (Cx486DLC-40)	122	238	244	350
Acma 486SX-33 VESA* (Intel 486SX-33)	157	212	307	337
Blackship BLK 486DX/33 LB* (Intel 486DX-33)	170	200	315	383
ATronics ATI-486SX/33 (Intel 486SX-33)	177	217	304	349
Polywell Poly 486-33V (Intel 486SX-33)	157	210	312	434
Silicon Valley SVC 486SX/33 35 Pylon II (Intel 486SX-33)	170	223	305	376
ATS 486-33 (Intel 486DX-33)	178	210	362	386
Insight 486-33 MHz ValueLine (Intel 486DX-33)	173	202	341	438
Diamond DT 486DLC/40* (Cx486DLC-40)	185	236	311	494
Packard Bell PB425/8 (Intel 486SX-25)	157	259	410	454
AST Bravo 4/25s (Intel 486SX-25)	171	267	349	452
Keydata 486SX/25 Keystation (Intel 486SX-25)	184	264	339	439
Netis N425VL (Intel 486SX-25)	185	263	358	443
Dell 425s/L (Intel 486SX-25)	177	264	349	492
USA Flex 486SX/25* (Intel 486SX-25)	196	267	399	448
First Computer FCS 486SX-33 (Intel 486SX-33)	201	242	370	528
MIS 425SX (Intel 486SX-25)	195	272	378	472
Gateway 2000 4SX-25 (Intel 486SX-25)	182	286	440	505
CAF Gold 3D (Intel 486SX-25)	206	281	410	509
ALR Flyer SD 4/25s Model 80DW (Intel 486SX-25)	202	307	370	540
Xinetron X/LAN Station 486SX (Intel 486SX-20)	211	285	452	534
Quill Qtech PCS-4S25 (Intel 486SX-25)	223	289	410	534
CUI Advantage 486/25SX (Intel 486SX-25)	202	276	647	475
Tandy 425 SX (Intel 486SX-25)	213	305	456	552

*Best Buy

Systems are arranged in order of overall speed, from fastest at top to slowest at bottom.

All tests results in seconds.

Methodology
We asked vendors to send us a 486 system with at least 2MB of RAM, one floppy drive, a 60MB hard drive, a VGA controller with color monitor, a keyboard, and DOS 5.0. We configured all our applications for standard VGA mode (640 by 480 pixels at 16 colors for graphical applications and 80 columns by 25 lines for text-mode applications).

WordPerfect 5.1
We start with a simple memo, employ a variety of common formatting features, add several pages of text, and print the result. Then we load a large formatted document and add a graphic. We preview the result several times and print the document.

1-2-3 3.1
We use several worksheets and recalculate each several times based on different assumptions, starting with a variable-rate mortgage projection. Using a series of worksheets, we examine a budget model and create several charts and a summary. Finally, we print and save the altered worksheets.

Harvard Graphics 3.0
We launch a script to create a series of slides based mostly on prepared spreadsheets. We include a title page with an embedded graphic, a series of charts, and a table of data. After previewing the entire presentation, we print it.

Paradox 3.5
To exercise *Paradox's* relational capabilities, we post several transactions to an order-entry database (which includes several linked tables). We perform a series of queries and print a set of mailing labels.

Data based on tests designed and conducted by the PC World Test Center. Testing performed by Susan Silvius and Ulrike Diehlmann. All rights reserved.

Nobody has eve
into a laser pri

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INFO WORLD
RECOMMENDED PRODUCT

DIRECT TRENDS

MARKETING
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W E E K L Y

Wall Street Dow Jones Up for the Year

r piled so much nter for so little.

With a personal laser printer under $1,000, you normally have to give up one thing for another. Like speed. Or print quality. Or flexible paper handling.

Well, the new Epson® ActionLaser™ 1000 is way under $1,000. And as you can see from the large stack on the left, we've piled more into it than any other printer in its price range.

Like speed, for example. We clock in at 6 pages per minute, compared with a slow 4 pages per minute for the leading laser in the same price range.

Then there's print quality. Our blacks are blacker and our lines print finer, thanks to Epson's exclusive MicroArt Printing.

If you're really a stickler for sharpness, you can spend a little more (but still less than $1,000!) for our ActionLaser 1500, with Epson's RITech resolution improvement technology. As well as 13 scalable fonts.

Add a 150-sheet paper tray that handles multiple paper sizes including envelopes, and you can see why Epson laser printers win industry award after award.

Now for the things you can't see. Our ActionLasers have a two-year warranty instead of the typical one year. Plus the toll-free Epson Connection hotline to answer your questions.

Only Epson gives you so much, for so little. Even our booklet, "What You Should Know Before Buying a Laser Printer," is absolutely free. To send for it, call 800-289-3776.

EPSON

FEATURES COMPARISON

All This for as Little as $1025? Believe It!

● Yes
○ No
n/a = not applicable

	Acma 486SX-33 VESA (BEST BUY)	ALR Flyer SD 4/25s 800W	AST Bravo 4/25s	ATronics ATI-486SX/33	ATS 486-33	Auva 486DX/50 Model S10	Blackship BLK 486DX/33 LB (BEST BUY)	CAF Gold 3D	CUI Advantage 486/25SX	Dell 425s/L
Standard features										
Selling price as of 2/2/93[1]	$1249	$1198[2]	$1450[2]	$1295	$1300[3]	$1299	$1250	$1195	$1207	$1299
CPU	i486SX-33	i486SX-25	i486SX-25	i486SX-33	i486DX-33	i486DX-50	i486DX-33	i486SX-25	i486SX-25	i486SX-25
RAM installed/capacity (MB)	4/32	2/16	4/64	4/64	4/32	4/32	4/64	2/32	2/32	4/64
Secondary RAM cache installed/maximum (K)	128/256	0/0	0/256	256/256	256/256	256/256	64/1024	64/256	256/256	0/128
Number of floppy drives	1	1	1	1	1	2	2	1	1	1
Hard disk	Conner CP30084E	Conner CP30084E	WD Caviar 2120	Conner CP30084E	WD Caviar 2120	Quantum ProDrive	Quantum ProDrive	Conner CP30084E	Maxtor 7080AT	Quantum ProDrive
Hard disk size (MB)	80	80	120	80	120	80	80	80	80	80
Motherboard manufacturer	Impression	ALR	AST	ATI	Amptron	Auva	Blackship	CAF	CUI	Dell
Graphics controller	Diamond Stealth 24 VLB	WDC	Cirrus Logic	VGA Mentor	Diamond Speedstar 24X	Trident	Trident JAX-8212	Trident 9000	Oak Technologies	S3
Graphics adapter memory	1MB	512K	1MB	512K	1MB	512K	1MB	256K	512K	512K
Monitor	Mag LX1460	ALR TE1420	AST SVGA-NI N461D	CTX CVP-5468A	Shamrock SRC 1452	Samtron SC-431VII	KFC	Tatung SVGA	Goldstar 1460 SVGA	Dell DLT439
Expandability										
Free 32/16/8-bit expansion slots	0/5/1	0/3/0	0/4/0	0/5/1	0/6/0	0/4/1	0/6/0	0/4/1	0/4/2	0/3/0
VESA local bus slots/number free[7]	2/1	0	0	0	0	0	2/2	0	0	0
Externally accessible 3½-inch/5¼-inch drive bays	1/3	1/1	0/2	2/2	2/3	1/3	2/2	2/3	1/3	0/2
Internal 3½-inch/5¼-inch drive bays	0/0	1/0	2/1	1/0	3/0	1/0	1/0	2/0	1/0	1/0
User-adjustable or user-replaceable system clock	●	○[8]	○	●	●	●	●	●	●	●
Accepts OverDrive CPU	●	●	●	●	●	●	●	●	●	●
ZIF socket	○	○	○	○	○	○	○	○	○	○
Design and construction										
Case	compact	compact	compact	minitower	minitower	compact	minitower	desktop	compact	compact
Parallel/serial/mouse/game ports	1/2/0/1	1/2/1/0	1/2/1/0	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/1/0
Service and support										
Warranty (months)	12	12	12	12	12[10]	12	12	12	12	12
On-site service price per year	free	$9.95	free	$99	$130[13]	none	free	none	$60.35[14]	free
Turnaround policy (days at service center)	4	3	7 or more	3	2	○	2	3	1	none
Free unlimited support	●	●	●	●	●	○	●	●	●	●
Central support	●	●	●	●	●	○	●	●	●	●
Toll-free support number	●	●	●	●	○	○	●	○	●	●
Daily support (hours)	11	11	14	9	8.5	○	9	8.5	9	24
Saturday/Sunday support	●[16]	●[16]	●[16]	○	●[16]	○	○	○	○	●
Electronic BBS support	●	●	●	○	●	○	●	○	●	●
Fax support	●	●	●	●	●	○	●	●	●	●
Dedicated support staff required	n/a	n/a	○	n/a	n/a	○	n/a	○	○	n/a
Support staff training required	n/a	n/a	○	n/a	n/a	○	n/a	○	○	n/a
Dedicated support line for dealers	n/a	n/a	●	n/a	n/a	●	n/a	○	●	n/a
Inventory and parts requirement	n/a	n/a	○	n/a	n/a	○	n/a	○	○	n/a

[1] All systems include at least a 60MB hard drive and one floppy drive, VGA and color monitor, keyboard, and DOS 5.0. Selling price is either direct or the lowest price we found in calls made to multiple dealers.

[2] Includes Windows 3.1 and a mouse.

[3] Includes a mouse.

[4] Includes Windows 3.1, Central Point Anti-Virus, Central Point Backup, QA Plus, Microsoft Works for Windows 2.0.

[5] Includes mouse, OEM/FindVirus version of Dr. Solomon's Anti-Virus Software, and Stacker 2.0.

BEST BUY / System Comparison

	Diamond DT 486DLC/40	First Computer FCS 486SX-33	Gateway 2000 4SX-25	Insight 486-33 MHz ValueLine	Keydata Keystation 486SX/25	Micro Express ME 486DLC/40	MIS 425SX	Netis N425VL	Packard Bell PB425/8	Polywell Poly 486-33V	Quill Qtech PCS-4S25	Silicon Valley SVC 486SX/33 (35 Pylon II)	Tandy 425 SX	USA Flex 486SX/25	Xinetron X/LAN Station 486SX
Price	$1225[3]	$1199	$1495[4]	$1249[5]	$1245[3]	$1150	$1279	$1025	$1299[6]	$1250	$1099	$1215	$1324[2]	$1249[2]	$1249
CPU	Cx486DLC-40	i486SX-33	i486SX-25	i486DX-33	i486SX-25	Cx486DLC-40	i486SX-25	i486SX-25	i486SX-25	i486SX-33	i486SX-25	i486SX-33	i486SX-25	i486SX-25	i486SX-20
RAM	4/32	2/128	4/64	4/64	4/32	4/32	4/64	4/32	8/20	4/32	4/32	4/32	2/40	4/64	2/32
Cache	256/256	128/1024	0/256	64/256	256/256	128/256	0/256	64/256	128/1024	128/256	0/0	0/0	0/256	256/1024	64/256
	1	1	2	1	2	2	1	1	2	1	1	1	1	1	1
Hard drive	Maxtor 7120AT	Maxtor 7080AT	WD Caviar 170	WD Caviar 280	WD Caviar 280	WD Caviar 280	Quantum ProDrive	Quantum ProDrive	Seagate ST3283A	Conner CP30064H	Maxtor 7080AT	Conner CP30084E	WD Caviar 280	WD Caviar 280	Conner CP30084E
Capacity	120	80	170	80	80	80	80	80	245	60	80	80	80	80	80
Vendor	S&A Labs	Aten	Gateway 2000	Aten	Silicon Star	Micro Express	Micronics	Free Technology	Packard Bell	Polywell	TMC	Silicon Valley	Tandy	Flex	Xinetron
Graphics	OEM WD GUI Graphics Adapter	JAX-8212 VGA Graphics	WDC-90C31	DFI VG7700	JAX-8224A V1	WD OEM GUI Graphics Adapter	JAX-8223d/v2	AVGA2	Oak Technology	Orchid	Boca VGAPlus	Trident TVGA 9000	WDC	STB PowerGraph VL-24	Trident JAX-8216A/VI
Graphics memory	1MB	1MB	1MB	256K	512K	1MB	256K	512K	1MB	1MB	512K	512K	512K	1MB	512K
Monitor	Diamond Superama FM 360	KFC CK1428	Gateway CrystalScan 1024NI	Premier Innovations 41	Korea Data Systems SVGA	Micro Express	ViewSonic 1	CTX CVP5468A	Packard Bell P38538 SVGA	Polywell	Q-Tech/Tatung CM14SBM	KFC	Tandy VGM-225	CTX CVP-5439A	Socos CM1402

Slots / Bays

	Diamond	First Computer	Gateway 2000	Insight	Keydata	Micro Express	MIS	Netis	Packard Bell	Polywell	Quill Qtech	Silicon Valley	Tandy	USA Flex	Xinetron
	0/6/0	0/4/2	0/5/0	0/5/1	0/4/1	0/5/0	0/6/0	0/4/2	0/4/0	0/4/0	0/3/3	0/4/2	0/5/0	0/6/0	0/4/0
	0	0	0	0	0	0	0	2/2	0	2/0	0	0	0	2/0	0
	2/3	2/3	1/1	2/3	1/2	2/3	2/3	1/3	1/2	1/2	2/3	2/2	1/2	2/3	2/0
	0/0	0/0	1/0	0/0	1/0	1/1	0/0	1/0	1/0	1/1	0/0	1/0	1/0	2/0	2/0
	●	●	●	●	○	●	○	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	○	○	○	○	○	○	○	○	○	●	○	○	○	○	○

Case / Drive Bays

	Diamond	First Computer	Gateway 2000	Insight	Keydata	Micro Express	MIS	Netis	Packard Bell	Polywell	Quill Qtech	Silicon Valley	Tandy	USA Flex	Xinetron
Type	compact	desktop	compact	compact	compact	minitower	compact	compact	compact	desktop	compact	minitower	compact	compact	compact
Bays	1/2/0/0	1/2/0/1	1/2/1/0	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/2/0/1	1/1/1/1	1/2/0/1	1/2/0/1	1/2/0/0	1/2/1/0	1/2/0/1	1/2/0/0[9]

Warranty / Support

	Diamond	First Computer	Gateway 2000	Insight	Keydata	Micro Express	MIS	Netis	Packard Bell	Polywell	Quill Qtech	Silicon Valley	Tandy	USA Flex	Xinetron
Months	15[11]	12	12	12	18	24	12	12	12	12[12]	12	24	12	12	36
Cost	$75	none	free	none	free	$50	$45	$100	free	$75	free	$99	$129	free	[15]
Days	2	1	none	none	1	2	1	2	4	2	2	7 or more	2	2	2
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	●	●	●	●	●	●	●	○	●	●	○	○	○	●	●
Hours	9	9	18	12	11	24	10	10	24	9	10	9	9	24	9
	○	○	●[16]	●	●[16]	●	○	●[16]	●	●[16]	○	○	○	●	○
	○	○	○	○	○	○	○	●	●	○	●	●	●	●	●
	○	○	●	●	●	●	●	●	●	●	●	●	●	●	●
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	○	●	n/a	○	○	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	○	○	n/a	○	○	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	●	●	n/a	●	●	n/a	n/a
	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	○	○	n/a	○	○	n/a	n/a

6 Includes Windows 3.1, mouse, 1-2-3 for Windows for Packard Bell version 1.0a, Lotus Write for Windows 2.0.
7 Also included in free 32/16/8-bit slot count.
8 CPU card system with 33-MHz cards available.
9 Network ports (ethernet or ARCnet)
10 One year parts, four years labor warranty.
11 15 months parts, 24 months labor warranty.
12 One year parts, five years labor warranty.
13 On-site service costs 10 percent of system price.
14 On-site service costs 5 percent of system price.
15 Price not available at press time.
16 Saturday only.

NETWORKING FOR THOSE TRYING TO RUN A BUSINESS. NOT A COMPUTER.

50

Spreadsheet

Tips

Today's spreadsheets are smarter than you think.

Unlock their power with these

50 tips, tricks, and shortcuts for Excel,

Quattro Pro, and various versions of 1-2-3.
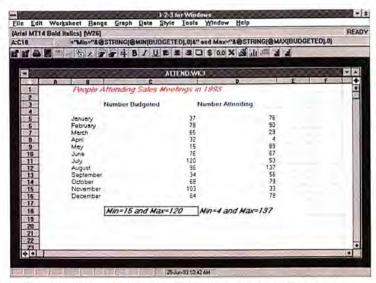
E ver get the feeling that your spreadsheet is guarding secrets about what it can really do? And who has time to coax those secrets out? You probably don't, but we do. We prowled on-line services, cornered our writers and editors, and scoured published works for clues to *Excel*, *Quattro Pro* for both DOS and *Windows*, and every flavor of *1-2-3*. From the developers who wrote the software to the people who use it every day, we tapped experts who have delved below the surface of these programs. So read on.

We've organized these tips by program so you can see at a glance which section applies to you. But remember, what works with one spreadsheet often requires only a few minor changes to work with others. For general advice that will work in any program, check out the Tips for All Types section.

Edited by Christina Wood and Michael Desmond

CARIE HENRIE

PUT TWO VALUES IN A SINGLE CELL with a formula that displays the minimum and maximum values in a range in any spreadsheet program.

Tips for All Types

1

Random Numbers

Need to generate random numbers? To simulate a six-sided die, enter **1** in cell A1 and **6** in cell B1. In a different cell, type the formula **@INT(@RAND()*(B1A1+−1))+A1** for *1-2-3* and *Quattro Pro* or **=INT(RAND()*(B1−A1+1))+A1** for *Excel*. (*Excel* users who've installed the Add-in Functions add-in macro can use the formula **=RANDBETWEEN(A1,B1)**.

Every time you recalculate, the formula will display a new random integer between 1 and 6. If you need a random number between, say, 100 and 400, just enter **100** in A1 and **400** in B1 and recalculate.

2

A Range by Any Other Name

1-2-3, *Quattro Pro*, and *Excel* let you assign names to cells or groups of cells. Once you assign a name to a column, row, or range of cells, you can use the name to specify that range in any formula or reference .

To create a range name in *Excel*, select the cells you want to identify, select *Formula•Define Name*, and enter a name at the prompt. To test it, enter a few numbers inside and outside the named region, and enter **=SUM(*name*)** (*name* is your range name). Your formula totals all the numbers in the range.

For all flavors of *1-2-3* use */Range•Name•Create*, enter a name, select the area to name, and press **<Enter>** twice. In *Quattro Pro* use *Edit•Names•Create* and enter the name. Do the test above using **@SUM(*name*)** to total the numbers entered in the named range.

3

Get the Most Out of That Cell

For a lean, tight worksheet, use a formula to display two or more values in one cell. Suppose you have a range named Budgeted and want to know its maximum and minimum values. The formula (using *1-2-3*'s syntax) **+"Min="& @STRING(@MIN(BUDGETED),0)&" and Max ="&@STRING (@MAX(BUDGETED),0)** will show both values in a single cell.

If the largest value in Budgeted is 120 and the smallest is 15, the formula will return the string 'Min=15 and Max=120'.

Normally it takes four cells to display this information (two for the values and two for the labels). However, this tech-

nique allows you to display all the information in a single cell.

4

Exact Matches for Lookups

The Lookup function found in virtually every spreadsheet program is handy. It lets you search a worksheet for a value. But it's not foolproof. If it can't find an exact match, it settles for the largest number less than the one you're seeking. If, say, you're searching an inventory database for a part number, you don't want approximate matches. You only want to know if the part is there.

This technique returns 'NA' if an exact match isn't found. A two-column part list named List has part numbers in the first column and descriptions in the second. Type the part number you want into a cell named Part. The formula **@IF(@LOOKUP(PART, LIST,0)=PART,@VLOOKUP(PART,LIST, 1),@NA)**, which works in all versions of *1-2-3* and *Quattro Pro*, returns the corresponding description only if the part number is present.

In *Excel*, **=IF(VLOOKUP(PART,LIST,1) =PART,VLOOKUP(PART,LIST,2),NA())** is the equivalent formula.

5

Don't Divide by Zero

If you use spreadsheets to track budgets, you probably calculate percentage changes from year to year. Problem is, the formula +(*current−previous*)/*previous*, fumbles when you track a category without a value in the previous year. It's trying to divide by zero—a spreadsheet no-no. Use the IF function to test for a zero value and display a message if zero is found.

In *1-2-3* and *Quattro Pro*, use **@IF(*previous*=0,@NA,(*current−pre-**

vious*)/*previous). In *Excel*, use **=IF(*previous*=0, NA(),(*current−previous*)/ *previous*)**.

If you don't like the @NA or NA() function's display, you can replace it with a string such as **"No previous value"**.

6

Stock Market Format

NYSE stock market quotes are printed with a plus or minus sign, two spaces or digits, and a fraction if needed. *Excel* can display decimal values as fractions and can customize formats to match stock quotes: Select the range to format, select *Format•Number*, and select *Fraction* from the Category list box. Replace the entry in the Code box with **+?? ?/?;[Red]−?? ?/?** and select *OK*.

1-2-3 and *Quattro Pro* don't have a fraction format or let you customize your own. But you can use a pair of formulas to convert a value into a string in NYSE stock market format—and for text screens and mono-spaced printouts, to pad it with spaces to right-justify the quote. Assume the decimal value is in cell A1. In B1, enter **@IF(A1< 0,"−","+")&&@IF(@ABS(A1) <10," ","")&@IF (@ABS(A1),1," ",@STRING(@ABS(@INT (A1)),0))&" "&&@CHOOSE(@ABS (A1−@INT(A1))*8," ","1/8","1/4", "3/8","1/2","5/8","3/4","7/8")** (there's one space between the third, fifth, and sixth pair of quotes, and three spaces between the seventh pair). In cell C1 of *Quattro Pro*, *Quattro Pro for Windows*, or *1-2-3 for Windows*, enter **@IF(A1*8=@INT(A1* 8),B1, "ENTRY ERROR")** and set right alignment for column C. For *1-2-3* only, put **@IF(A1*8=@INT(A1* 8),@REPEAT(" ",@CELL("width",C1)− @LENGTH(B1))&B1,"ENTRY ERROR")** in C1. This last formula uses @CELL() to determine the width of the cell, so you'll have to recalculate (**<F9>**) if you change the width of column C. Also remember that you can't

perform calculations on these strings, so you'll need to use the original values in any formulas.

7

Round 'Em Up!

If you're calculating items that can't be divided, you might want your spreadsheet to round numbers up. For instance, to determine how many four-person cars you need to rent for 13 employees attending a trade show, you'd create a formula that divides 13 by 4—**+13/4** in *1-2-3* or *Quattro Pro* and **=13/4** in *Excel*—and use the ROUND function to round it to an integer. In this case, the value is 3.25, which the ROUND function then returns as 3. Problem is, someone will end up riding in the trunk. Trick the spreadsheet into always rounding up by adding .49 to the quotient, causing it to bump up to the next integer if things don't divide out right. (If the divisor is greater than 100 but less than or equal to 1000, add .499 instead of .49 to the quotient; if the divisor is greater than 1000 but less than or equal to 10,000, add .4999; and so on.) Your formula is **@ROUND(13/4+.49,0)** for *1-2-3* and *Quattro Pro* and **=ROUND(13/4+.49,0)** for *Excel*. You can

also replace the number 13 in these formulas with a cell address or name—and enter the number of attendees in that cell—to make repeated calculations simpler.
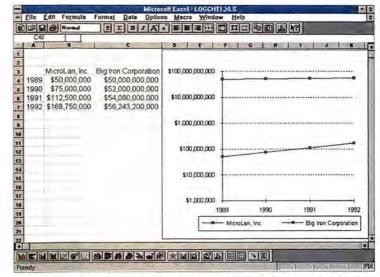
8

Copy Formula Parts

Here's a *Windows*-only tip: Everyone knows when you use the Clipboard to copy cells and ranges of cells, *Windows* adjusts the copied formula's relative references to reflect the move. But if you paste the copy while editing a cell, you can bypass the reference adjustment and get an exact copy. You needn't copy an entire cell: Just copy a piece of a cell's formula by selecting that portion on the editing bar.

In *Excel* and *Quattro Pro for Windows*, both *Edit•Copy* and *Edit•Paste* work when you're editing a cell. You can also use **<Ctrl>-<Insert>** and **<Shift>-<Insert>**, respectively, to cut and paste. In *1-2-3 for Windows*, you must use the keyboard commands because you can't access the menus while editing a cell.

A LOGARITHMIC CHART shows the relative change of each of these two companies much better than a standard bar chart does.

9

Logarithmically Scaled Charts

A bar chart comparing a $50 billion company growing at 4 percent with a $50 million company growing at 50 percent fails to show the small company's million dollar changes. A logarithmically scaled chart clearly shows the relative differences between the companies. In *Excel*, select a type of chart from the Gallery menu; in the dialog box, you can identify a logarithmically scaled chart by the grid lines squeezed together toward one end of the chart selection icon. If the type you want doesn't offer log scaling, select it anyway, then select the chart's *Y*-axis. From the menus select *Format• Scale•Logarithmic Scale*. In *1-2-3/W*, use *Chart•Axis•Y* or *2nd Y•Logarithmic*. In *Quattro Pro for Windows*, select *Property• Y Axis•Log*.

10

What's the Correlation?

The best way to detect a correlation between two sets of data—say

monthly advertising expenditures and monthly sales—is to calculate the correlation coefficient. A positive coefficient means more advertising is associated with more sales. A negative coefficient means months with more advertising generally have lower sales (bad news). A coefficient near zero means sales and advertising expenses don't correspond in any systematic way. (The coefficient ranges from –1 to +1.)

Assume you have two ranges called Advert and Sales (note: they must have the same number of values). In *1-2-3*, select */Data•Regression•X-Range*, type **Advert** (or press **<F3>** and select the range), and press **<Enter>**. Select *Y-Range*, type (or use **<F3>** to select) **Sales**, and press **<Enter>**. Now select *Output Range* and specify the upper-left cell of any blank four-column-by-nine-row area. Select *Go* to calculate. To find the correlation coefficient, calculate R Squared's square root and make it negative if X Coefficient(s) is negative: In the cell where you want the result to appear, enter **@IF(** and point to the cell that contains the value of the X Coefficient(s). Type **<0,–@SQRT(** and point to the cell containing

FIND THE CORRELATION BETWEEN TWO SETS OF DATA with a formula that plots the correlation coefficient in any spreadsheet program.

the value of R Squared. Type),@SQRT(and point to R Squared's value again. Press))<Enter>. Note that if the data changes, you must rerun the regression (/Data•Regression•Go) to update regression data and the correlation coefficient.

This example uses *1-2-3*, but you can get these results from *Quattro Pro* and *Quattro Pro for Windows* using the *Tools•Advanced Math•Regression* command: Use <F3> to set Independent to **Advert** and Dependent to **Sales** and indicate any empty cell for Output. Then set up the square root formula. In *Excel*, there's no need to deal with regression or *X* coefficients: Simply enter =CORREL(ADVERT, SALES) in any blank cell.

11

Correlation Revisited

If your spreadsheet has a built-in function called SUMPRODUCT there's another way to calculate a correlation coefficient: Assume the two ranges are called X and Y (they must have the same number of values). The formula (@COUNT(X)*@SUM-PRODUCT(X,Y)@SUM(X)*@SUM(Y))/(@SQRT(@COUNT (X)*@SUMPRODUCT(X,X)−@SUM(X)^2)*@SQRT(@COUNT (X)*@SUMPRODUCT(Y,Y)−@SUM(Y)^2)) will return the correlation coefficient for the two sets of data. (In *Excel*, you need to start the formula with = and omit all of the @ signs.)

1-2-3 for DOS

12

Get There With End

To see all 8192 rows and 256 columns of a worksheet, your screen would have to be 7 yards wide and 61 yards long. That's why the <End> key is so useful. Press <End> followed by <Home> and the cell pointer jumps to the bottom right corner of the *active* portion of a spreadsheet. Put the cell pointer on a blank cell and press <End><Right> and the pointer jumps to the *first* non-blank cell. If no non-blank cells are in that direction, the pointer jumps to column IV. Put the pointer on a non-blank cell and press <End><Right> to jump to the cell before the next blank cell (the *last* non-blank cell in that range of non-blank cells).

13

End Tedious Formulas

Jumping around with the <End> key (see tip 12) is also useful for creating formulas. Say you want to total a column of numbers. Type @SUM(in the cell where you want the total to appear. Move the cell pointer to the top of the column of numbers (on the first number you want to include). Press <Period> to anchor the range. Then press <End><Down>. The pointer jumps to the last number in the column, highlighting the cells, and adding their range address to your formula. Type the close parentheses and you're done.

14

Navigating Directories

When you select /File•Retrieve in *1-2-3*, you get a list of worksheets, if any, in the current directory. You can press <Backspace> to work back up the directory tree if there's a worksheet or subdirectory in that directory. (However, <Backspace> will lose that function if at some point you select a directory that doesn't have a worksheet or subdirectory.)

15

Doing Negative Numbers

It's easy to display negative numbers in parenthesis in release 2.2 and later spreadsheets. First format the cells where the numbers will be displayed with /Range•Format•, or /Range•Format•Currency. Then change the global default

TURN ORDINARY SYMBOLS ON THEIR EAR with a quick trick that can add emphasis to your spreadsheets.

for numbers with /Worksheet•Global•Default•Other•International•Negative•Parenthesis•Quit•Quit. If you want negative numbers always displayed in parentheses, rather than just in the current session, choose *Update* between the two Quits.

16

What's That Range Name?

You can use *1-2-3*'s GOTO (<F5>) command to get to a named range even if you can't quite remember its name. After you press <F5>, press <F3>. *1-2-3* will list all the range names in the current document, and you can simply select the one you want. In fact, <F3> will list range names any time you are prompted for a range.

17

Fetch Wysiwyg at the Outset

1-2-3's Wysiwyg add-in can be useful, but it's also a memory hog. Only sacrifice memory for the files that need it by setting selected files to launch Wysiwyg when opened. Open a file, press <Alt>-<F10>, and select /Settings•File•Set. Highlight WYSIWYG.PLC and press <Enter>. Now choose *No* and *Quit* to return to Ready mode. Although Wysiwyg will not be active this session, it will load whenever you open this file in the future.

18

Flipping Symbols

Symbol characters, such as arrows, help draw attention to parts of a worksheet. But if you can't find an arrow (or symbol) that points in the right direction—straight up, say—here's a handy trick.

In *1-2-3 3.4*, launch Wysiwyg (<Alt>-<F10>). Enter a centered character in a blank cell. For this example, use ^d because that's an arrow in *1-2-3*'s Symbol font. With the cell pointer on the cell with the *d*, click on the font changer SmartIcon in the first palette (it has a big *A* and a little *a*). Keep clicking that icon to scroll through the font names (they appear at the top left corner of the screen). When you see {XSYM12}, press <Enter>. Press <F2> to edit the

cell and put your cursor after the caret (^) and under the *d*. Then press **<Ctrl>-AR<End><Ctrl>-E <Enter>**. That left-pointing arrow will now be pointing up!

19
Send Yourself a Message
You can use the @IF function to alert yourself to a certain condition in a spreadsheet—such as a balance sheet that's out of balance. In prominent, unused cells, place the functions **@IF(Bottomline <> 0,"","Out of Balance")** and **@IF(Bottomline <> 0,"","Check Bottom Line")**. Then name the cell that calculates the bottom line **Bottomline**. Every time you recalculate the worksheet, it tests for the condition. If the condition doesn't exist, the cell remains blank. If it does, the error messages 'Out of Balance' and 'Check Bottom Line' appear.

20
Avoiding the Autoexec Macro
Sometimes you want to open a spreadsheet to view its data without running its Autoexec macro. You can, of course, press **<Ctrl>-<Break>** if you're fast on the draw. For those with slower reflexes, there's an easier way: In a new, empty worksheet, select */File•Combine•Copy• Entire-File* and the file you want to load. This brings up the file, but omits range names and bypasses the Autoexec macro.

21
Start Macros With SmartIcons
Link your macros to *1-2-3 3.4* SmartIcons and you can run them with a mouse click. You can even customize icons with your own labels and images.

In the seventh palette, click on the icon that looks like a bold U and a pencil tip. The Assign Macro to User Icon dialog box appears. If necessary, select *Next Icon* until you find an unused icon. Click in the Icon Description field and type

a line describing what your macro does. You can type the macro into the Macro Text field or indicate where it's located on your worksheet by selecting *Get Macro from Sheet*, highlighting the macro, and pressing **<Enter>**.

Click the icon with the left mouse button to run your macro. Your descriptive label shows when you put the mouse pointer on the icon and hold down the right mouse button.

22
Tricky Loan Calculation
Want to know how many payments you need to pay off a loan? Trick the @TERM function in release 2.01 and later into doing it for you. Usually, you use the function—the syntax is @TERM (*payment, rate,futurevalue*)—to calculate how many years of, for example, $2000-a-year payments it will take for your retirement savings to grow to $100,000 (if your savings earn 9 percent a year). The actual formula for this example is @TERM(2000,.09,100000). But enter a negative future value, and @TERM calculates the number of payments needed to pay off a loan. For example, to calculate how many $250-a-month payments will pay off a $5000 car loan (if you pay 1 percent interest a month), use the formula @TERM(250,.01,-5000).

1-2-3 for Windows
23
White Mice Can't Jump
If you use the mouse to move between sheets in a 3-D worksheet, you could be wasting time fumbling around. Let the

<Ctrl> key put some spring in your pace. Press **<Ctrl>-<Page Up>** while in a sheet, and you instantly jump down one level. **<Ctrl>-<Page Down>** leaps up a sheet. If you want to get back to sheet A, press **<Ctrl>-<Home>**.

24
Custom SmartFill
1-2-3 for Windows 1.1's Smart-Fill command fills in numbers, months, and days of the week, similar to features in other spreadsheets. But it has a major advantage: You can customize the series to suit your needs. Open the SMARTFLL.INI file found in the *1-2-3 for Windows* directory in any text editor. (If it's not there, you must install the SmartPak disk that's included with release 1.1.) You'll find two series in the file that show how to lay out your own series. If you were, say,

entering the names of people in your workgroup, create a new series. It might look like:
```
[SET 3]
ITEM1=Arnold
ITEM2=Bart
ITEM6=Garth
ITEM5=Joel
ITEM4=Lisa
ITEM3=Maggie
```
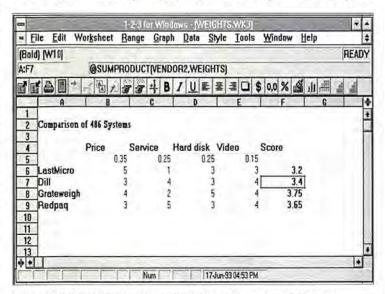
Order the names hierarchically, alphabetically, or any way you want. Their item numbers determine their fill sequence. Save and close SMARTFLL.INI. Go back to *1-2-3/W*, type **Bart** in a cell, select that cell and ten adjacent cells. Then choose *Tools•SmartPak•SmartFill*. The other names will appear in item-number order, starting over when the end of the sequence is reached.

25
Supercharged Decision Making
Making decisions is confusing when considering the relative importance of many factors. Here's a macro that turns decision making into a science.

Say you want to purchase computers for your office. You've narrowed the choice to four models: LastMicro, Dill, Grateweigh, and Redpaq. You

have four criteria (of various relative importance) you want to apply to your decision: price (35 percent), service (25 percent), hard disk size (25 percent), and video speed (15 percent).

Enter your four categories in columns B through E on one row. Then enter the vendor names two rows lower in column

	Price	Service	Hard disk	Video	Score
	0.35	0.25	0.25	0.15	
LastMicro	5	1	3	3	3.2
Dill	3	4	3	4	3.4
Grateweigh	4	2	5	4	3.75
Redpaq	3	5	3	4	3.65

Comparison of 486 Systems

TURN DECISION MAKING INTO A SCIENCE by weighting your choices on a spreadsheet using 1-2-3 for Windows' SUMPRODUCT function.

A. Name the vendor rows **VENDOR1**, **VENDOR2**, **VENDOR3**, and **VENDOR4**. Enter the percentage value (.35, .20, etc.) in the row under the categories to assign weights to them. Name this row **WEIGHTS**. Using data from a *PC World* review, enter a value between 1 and 5 (five is the best score) for each model in each category. Type the formula @SUMPRODUCT(VENDOR1,WEIGHTS) in the first empty cell in the VENDOR1 row. Repeat, using the appropriate name (VENDOR2, etc.) in the three cells below. The @SUMPRODUCT formula multiplies each score by its weight and adds them together to return a rating for each model.

26

Speeding Up Linked Formulas

It's easy to build linked formulas in *1-2-3 for Windows*. With two or more worksheets on the desktop, just point and click to build formulas between worksheets. You can even link both WK1 and WK3 files with the same command. (WK1 files

work with *1-2-3 for Windows* as well as *1-2-3 2.x*.) Unrestrained use of linked worksheets, however, can cause serious delays when loading files.

Bonus Tips for 1-2-3 for Windows Release 4

Editing the Way It Oughta Be

Tired of moving the pointer up to the status line to edit your formulas? The brand-new release of *1-2-3 for Windows* makes that extra mouse move obsolete. To edit the contents of a cell right in the worksheet, simply double-click on the cell.

Fully Functional

Don't bother memorizing the exact name or syntax of the @function you want; simply click the @Function tool above the SmartIcons tool bar and select from the drop-down list box. Your func-

tion lands in the selected cell with a cheat line for the syntax in place.

The default @function drop-down box comes with a selection of commonly used commands, but you can customize that menu to include the @functions you use most often. To add, say, @DAYS—which calculates the number of days between two dates—click the @Function tool, then click *Menu*. You'll get a new dialog box. Select @DAYS from the list of @functions and pick a position for your new menu item in the Current Menu list box. Click *OK*.

Here are some tricks for avoiding lulls: Load the source file before the destination file, use WK3 instead of WK1 files, and build your models with multiple worksheets instead of multiple files.

27

Do-It-Yourself Timeline in 1-2-3/W

Timelines help manage complex projects. But who wants to buy a project management pro-

gram when *1-2-3 for Windows* can do the job?

Create a table with **Planning**, **Research**, **Execution**, and **Analysis** entered in A4..A7, and **Projected**

Start, Actual Start, and Actual End entered in B3..D3 as shown in the figure below. Select B4..D7, then select *Range• Format* and type 1 to select the first date format. Our project starts on July 1, so enter 7/1/93 in all four cells beneath Projected Start. In the next two columns, enter the actual start and completion dates of each activity as shown.

Select A4..A7, select *Edit• Quick Copy*, type F4, and press <Enter>. Select G4..H7, select *Range• Format*, and select *General* from the Format list box. In cell G4, enter the formula +C4-B4 and copy it to the three rows below. (This formula calculates how many days into the project an activity begins.) In H4, enter +D4-C4 and copy it to H4..H7. (This calculates the days from the beginning of the activity to its end.)

Now you can create your timeline. Select F4..H7, choose *Graph• New*, and click *OK* to bring up a graph. Select *Chart•Type*, click the Bar radio button, choose *Horizontal* in the Orientation section, click the bottom chart icon in the center of the dialog box, and
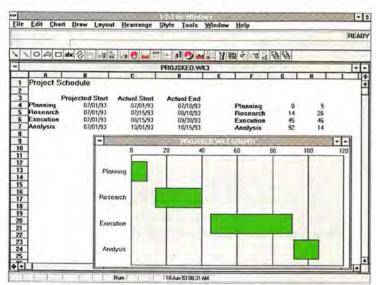
click *OK*. You now see a red and green colored horizontal "stacked" bar chart. Select *Chart•Options•Colors* and in the Data range colors section, click the *A* box. Choose *H* from the bottom of the color choices. Finally, click *OK* and your timeline is complete.

Excel

28

Keyboard Navigation

Drag-and-click operation has eased spreadsheet work, but all that mousing around takes time. Instead, hold down <Ctrl> when hitting a cursor key to jump the cell pointer from a non-empty cell to the cell just before the first empty cell in the cursor's direction or from an empty cell to the first non-empty cell in that direction. If your pointer is in a long column of entries, press <Ctrl>-<Down> to move it to the last entry. If the pointer is in an empty cell, hit <Ctrl>-<Left> to slide the pointer to the first filled cell.

Use the <Shift> key with <Ctrl>-*cursor* to select large swaths of a spreadsheet or a long list of entries. For example, to copy a row of headings, place the cell pointer in the leftmost cell of the row, then hold down

PLOT A TIMELINE using a 1-2-3 for Windows spreadsheet for efficient management of complex projects.
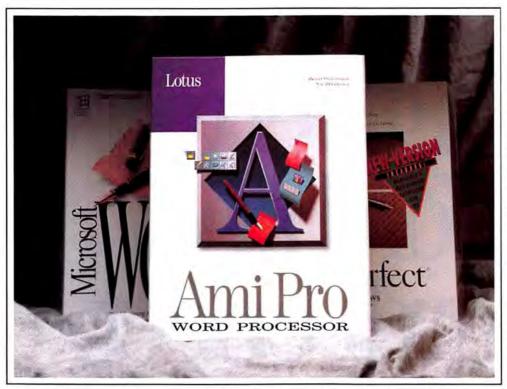
There's quite a battle raging between Word and WordPerfect.

For seco

Check the rankings.

Ami Pro 3.0 is ranked the #1 Advanced Word Processor for Windows™ by the National Software Testing Laboratories. (9/92)[†]

Recently, in an InfoWorld review, Ami Pro received the highest score ever given for a Windows word processor. (9/28/92)

Lotus Ami Pro captured the 1992 PC Computing MVP Award. (12/92) (Note: The MVP award also appears in the new WordPerfect ad. That's last year's award.)

PC Magazine recently named Ami Pro one of the Best Products of 1992. They said, "No other product can match…the sheer pleasure of using it." Microsoft Word received an Honorable Mention, with the comment "…it's a step behind Ami Pro." (1/93)

Now, perhaps the battle royale between Word and WordPerfect has been put into perspective.

And you probably wonder what it is that makes Ami Pro clearly better?

In the War of the Words, there's one clear winner. Ami Pro.

Word vs. WordPerfect. It's billed as the battle of the world's two greatest word processors. Hardly. According to most independent judges, Lotus® Ami Pro® 3.0 is the clear and convincing leader of the word processing pack. Word and WordPerfect are following its lead, scrapping it out for second and third.

nd place.

The battle of the features.

Simply put, Ami Pro is a faster, easier, friendlier word processor to use. It does so many things with so little effort, most people never even bother to open the manual.

To name a few, there's real, honest, no ifs-ands-or-buts WYSIWYG. There's Fast Format, for quick repetition of text formats. There are customizable, editable SmartIcons.™ Not to mention SmartClick, where the right mouse button will automatically shift you to the appropriate dialogue box to change fonts, styles or frame formats, based on what you're doing.

There's automatic renumbering of lists. Preview of Style Sheets. QuickStart on-line tutorial. Free 24 hour a day technical support.* And to ease your mind, a 60-day money back guarantee of your complete satisfaction.

And, if you're switching from WordPerfect for DOS, relax. Ami Pro makes it easy with a number of special features. Like seamless conversion of WordPerfect files. And a SwitchKit so that when you type in WordPerfect commands,

Ami Pro shows you how to perform the same functions using pull-down menus or one-click SmartIcons.

You call the winner.

So what drives hardened reviewers to use words like "love" and "pleasure" when describing Ami Pro? You can't tell from a list of features.

You've got to experience it. In your office. On your PC.

Call us for a free working model of Ami Pro and you'll see for yourself.

If you're like most people, once you actually sit down with Ami Pro, you'll definitely choose it. Over Word. Over WordPerfect. Over every other word processor out there.

Call Lotus today, at **1-800-872-3387, ext. 8760**, for your free working model or to upgrade from your current word processor for just $129.**

Ami Pro 3.0 Free Working Model

Lotus. Ami Pro 3.0
Word Processor for Windows

<Ctrl> and <Shift>, and press <Right>. The pointer ends up at the last filled cell prior to an empty cell, with all the intervening cells selected. If you have some empty cells along the row, continue to hold down <Ctrl>-<Shift> while you tap <Right> a couple more times.

29
Automatic Decimal Points

Save time and keystrokes during data entry by letting *Excel* do some work for you. When entering financial data, or anything requiring two digits after a decimal point, select *Options • Workspace* and check the Fixed Decimal checkbox (make sure the Places text box reads 2). Values are now entered with a decimal point. Now an entry of 54321 appears as 543.21. Note that the word FIX appears in the status line. To return to normal when you're finished, select *Options • Workspace* and deselect the Fixed Decimal checkbox.

30
Chart Templates
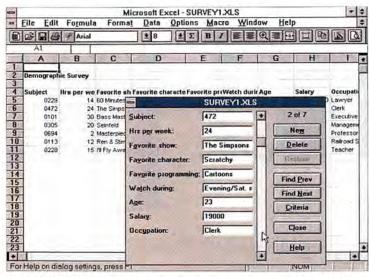
Let templates set up commonly used charts for you. Create the chart as you like, select *File • Save As* and in the Save File as

Type list box, select *Template*. *Excel* adds the XLT extension, but you need to supply an identifying name—for example, SALES-CHT.XLT. Then in the Drives and Directories list boxes, locate XLSTART, click *OK*, and restart *Excel*. Next time you want to create a similar chart, select your data and choose *File • New*; your template name will appear in the New list box. Double-click it and a ready-made chart will appear.

31
Cosmetic Surgery in Excel

Excel normally uses 10-point Sans Serif for cell entries and row and column headings. But you can change that. For a group presentation, for instance, you might want a larger point size or a different typeface. To change the default font to 20-point Arial, open the EXCEL4.INI file (found in your *Windows* directory) in any text editor and under the [Microsoft Excel] section of the file, enter the line FONT=Arial,20. If you want

to use a different font, toggle to *Excel*, select *Format • Font*, and look in the resulting list box for a list of your installed fonts. The new default font takes effect when you restart *Excel* (old files, however, retain the original default font).

32
An Easy Way to Change Names

If you've named a range and created formulas that use that name, you must live with that name forever, unless you want to edit every formula. Right? Wrong. Use the Changer add-in file to fix all name references when you change a range name. Select *File • Open* and locate the CHANG-ER.XLA file located in your EXCEL/LI-BRARY directory. Click *OK* to attach the add-in. You'll see a new command—*Change Name*—in the *Formula* menu. This command opens a dialog box that lets you select an existing range name and provide a new one. If you change names often, make the command permanent
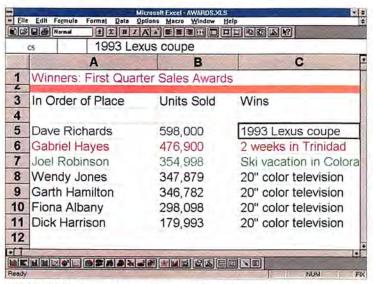
by choosing *Options • Add-ins • Add* and specify the CHANGER.XLA file.

33
Fast Data Entry

Facing a heavy-duty data entry chore in *Excel*? The *Data • Form* command can make life easier—even if your worksheet isn't going to be used as a database. This is especially handy for data entered in rows, such as survey responses and monthly expenditures.

First, set up your column labels, which act as field names for each record; fill the first column with data that identifies each record; and select the entire range, including the titles. Choose *Data • Set Database* to define the input area as a database. Select *Data • Form*. This command displays a data entry dialog box that makes it easy to enter data. The first field contains the record identifier. Press <Tab> to move to the next field, the title of which is the second column's label. Enter the data and press <Tab> to progress to the next field. When you've completed a record, press <Enter> to move to the next. You can correct mistakes afterward by pressing

EXCEL'S DATA FORM COMMAND makes data entry a snap—even if you're not creating a database.

CHANGE THE DEFAULT FONT IN EXCEL in order to change the look of your usual worksheet completely.

<Shift>-<Tab> to move to the previous field or <Shift>-<Enter> to move to the previous record.

34

How Many, Not How Much

If you want to know how many times a value or string occurs in an *Excel* spreadsheet without performing calculations, use an array formula. Arrays can replace several single-value formulas and, in effect, let you do several things at once. Say you want to know how often Anne has checked a book out of the office library. If each checkout is recorded on a separate row, with name, book title, checkout date, and return date in columns from left to right, type =SUM(IF(A3:A100 ="Anne",1)) in an out-of-the-way cell and then press <Ctrl>-<Shift>-<Enter> (if you accidentally press only <Enter>, press <F2> and then <Ctrl>-<Shift>-<Enter>). *Excel* puts braces ({}) around the entry to indicate an array formula. If Anne's name shows up 12 times in the column, '12' will appear in the array formula's cell.

35

Pulling Rank

Here's a simple formula that ranks data in a range. Say you want to rank semiconductor manufacturers by the volume of stock traded on a given day. For our example, we'll use a range named SHARES (D6:D15) in our figures. In B6, type =SUM(IF(D6>= SHARES,1)) and press <Ctrl>-<Shift>-<Enter>. *Excel* recognizes the entry as an array formula and places curly braces around it. Copy the formula to D7:D15, and the ranks will be calculated. Change a number in column D and watch the ranking change.

36

Avoid Long Names

At first glance, the 31-character limit for file names in a workbook is a welcome release from the 8-character cage imposed by DOS. But use all 31 characters, and you may soon regret it. Every formula that references a cell in a workbook's file includes the workbook's name and the file's name. Not only do long references make your formulas difficult to understand and edit, they can easily break the 255-character limit for a cell. Stick with shorter names, and you'll save your neck.

37

Free Your Chart of Zeros

Look at any annual report, and you'll find charts marked in millions or billions of dollars. Keep *Excel* charts free of unnecessary zeros with a custom number format that hides the last 3, 6, 9, or more digits. Use the format in your worksheets, and the charts you create from them will be much easier to

read. Don't forget to annotate your chart with something like "dollars in thousands."

To create a custom numeric format, select the cells to be formatted and choose *Format•Number*. Press <Tab> to highlight the current entry in the Code text box and type the code that describes the format you want, replacing what appears in the box. For example, #,##0, removes three digits, so 100,000,000 appears as 100,000 and #,##0,, removes six digits, so 100,000,000 appears as 100 (each trailing comma in the code indicates three digits are to be dropped).

Custom numeric formats are stored with a worksheet. To reuse one, select *Format•Number*, click *All*, and your custom format appears in the Format Codes section. Double-click the custom format you want.

38
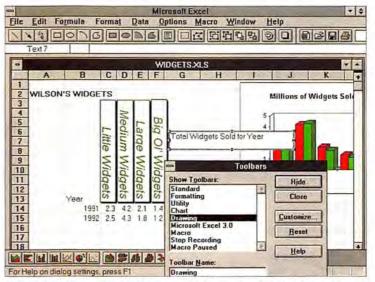
Turn a Phrase
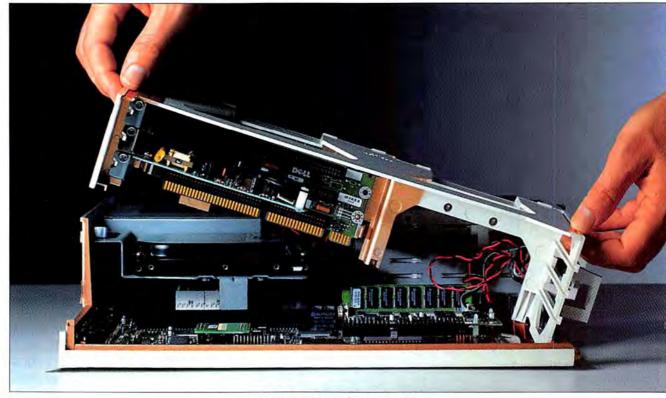
Excel lets you change the orientation of text or values in a cell with *Format•Alignment*. But vertical text automatically changes the row height to fit within the cell, leaving you with abnormally high rows. An alternative is to use *Excel*'s text tool to add a free-floating text box.

Open the Drawing tool bar by selecting *Options•Toolbars* and double clicking *Drawing* in the Show Toolbars list. Click the text tool icon (it looks like a page of text) and drag the mouse pointer in the worksheet to draw a box. Type your text into the box and right-click the box to evoke the shortcut menu. Select *Text* and click the desired orientation. Set the horizontal and vertical alignment and use the *Patterns* button to set border and fill options. Close

RANK INFORMATION AUTOMATICALLY with an array formula. Change the number of shares traded, and the rank changes.

ROTATE TEXT OR VALUES IN A CELL with the Text tool on Excel's Drawing tool bar without altering row heights.

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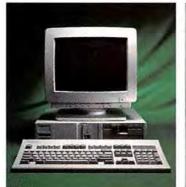
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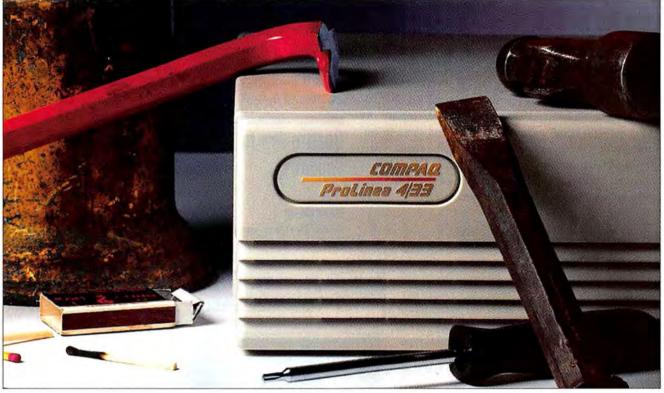
PRETTY UGLY.

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T15 Torx screwdriver. (No, your local grocer probably won't have one.) And to access the system board, should you decide to accept this mission, you may have to disconnect all of the cables, then remove the expansion cards, then replace the expansion cards, then reconnect all the cables.

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the dialog box and adjust the text position by dragging a side (not a handle) of the text box.

Quattro Pro for DOS

39

Add @Functions to Your Formula Bar

Avoid troublesome syntax errors and wasted keystrokes by pulling function statements from a list. **<Alt>-<F3>** brings up a scrollable list of @functions to select. Just highlight the function you want, press **<Enter>**, and it appears in the formula bar, ready to complete.

40

Stop Chasing Your Tail

Like an overexcited pup, *Quattro Pro* will chase its own computational tail if you create formulas that refer to each others' cells. For example, set cell B2 to equal the sum of cells B1 and B2, and you have a circular reference. While *Quattro Pro* helps you avoid meaningless calculations with a 'CIRC' warning at the bottom of the screen, what you really need is a way to know where the offending reference is. There is a way. In a blank cell, enter the formula **@CURVALUE("Audit" "Showcirc")**, and it will display the address of the circular reference.

41

Breaking Up Names

Why does it seem like data is never quite in the format you need? Say you have in column A a list of names (probably imported from a text file) that are in first name, last name format. Wouldn't it be more useful to have the first and last names in separate columns? Just plug in the formulas **@LEFT(A1,@IF(@ISERR(@FIND(" ",A1,@FIND(" ",A1, 0)+1)),@FIND(" ",A1,0),@FIND(" ",A1, @FIND(" ",A1,0)+1)))** into B1 and **@RIGHT(A1,@LENGTH(A1)−@IF(@ISERR(@FIND(" ",A1,@FIND(" ",A1,0)+**

1)),@FIND(" ",A1,0),@FIND(" ",A1, @FIND(" ",A1,0)+1))−1) into C1, then copy them down the length of your list. The first formula returns the first name, plus a middle name or initial (if present). The second formula returns the last name.

Want to sort by last name? In cell D1, enter **+C1&", "&B1**, copy it down the list, select *Database•Sort•Block*, specify A1 through the last name in column D and press **<Enter>**, select *1st Key*, specify D1 and press **<Enter>**, press A and **<Enter>**, and finally, select *Go*.

42

Down, Cursor!

For entering data in columns, a macro can make the <Enter> key move the pointer down after it enters your input. In cell A1, type **{?}{DOWN}{BRANCH A1}** and press **<Enter>**. The {?} waits for user input with the <Enter> key. {DOWN} moves the cell pointer down one cell. {BRANCH A1} makes the macro execution jump to cell A1, so the macro repeats itself (if you entered the macro in another cell, enter that cell name instead of A1).

Start the macro by selecting *Tools•Macro•Execute* while in the macro cell, and then press **<Enter>**. Now <Enter> moves the pointer down one cell after entering data. When you're finished, press **<Ctrl>-<Break>** to end the macro. <Enter> will now function normally.

43

Chartless Charting

If you use a text-only printer, you can still turn spreadsheet numbers into a graph. Enter your items in the left column

and your figures in the right (this works only with a one-series table). Select the value series and choose *Style•Numeric Format*, and select the +/- format. The numbers appear as + or − symbols; 4 becomes four plus signs, -3 becomes three minus signs. If you get a line of asterisks, you need to widen the column to fit the graph.

Quattro Pro for Windows

44

Hidden File List
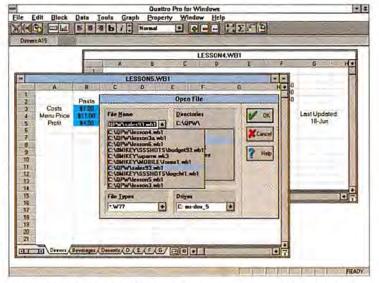
The *File•Open* command in *Quattro Pro for Windows* lists

FIND A HIDDEN LIST OF the files that were opened most recently in Quattro Pro for Windows.

the last ten files you opened. Click the down arrow on the right side of the File Name box or press the **<Down>** cursor key, and the list drops down. Click on the name of the file to open, and you're ready to work.

45

Name the Day

Want to know the day your birthday falls on this year? *Quattro Pro for Windows* obliges. To display the day of the week from a date, first select the cell or range where you will enter

the date(s) and right-click on the selected area. A dialog box pops up with the Numeric Format category preselected; select User Defined at the bottom of the radio button list in the second panel. Press **<Tab><Down>** or click the down arrow in the third panel to open the Formats defined list. Choose *TWeekday* and click *OK*. Now when you enter a date into those cells, *Quattro Pro for Windows* displays the day of the week that date falls on.

46

Sweeping Changes

The three-dimensional notebook metaphor is a winner, but changing certain spreadsheet properties—for example, the grid line display—is tedious if you have to change it for each page separately. To make changes to the entire notebook, select *Tools•Define Group*. Type a name for the group of pages in the Group Name box. Type **A** in the First Page box and **IV** in the Last Page box. Turn on Group mode by clicking the G icon at the bottom of the screen— you'll see a blue line appear beneath all the page tabs and the G icon. Right-click any

page tab to bring up the property inspector dialog box, select *Grid Lines*, and uncheck the Vertical and Horizontal checkboxes that appear.

47

Instant Radio Buttons

Creating your own dialog boxes when building spreadsheet applications is a snap. And if you need plenty of radio buttons in your box, here's a way to make them fast. Select *Tools•UI Builder* to open a blank dialog box. From the SpeedBar, choose the Group Box tool icon (move the mouse pointer over the SpeedBar to find out what each icon does) and draw a box in the blank dialog box by dragging the mouse pointer. To fill this box with radio buttons, hold down the <Ctrl> key as you drag a handle to resize the box. The box fills with as many radio buttons as space allows. To delete some of the buttons, select the unneeded items (after picking the first one, you can hold down <Shift> as you select to pick more) and press <Delete>.

48

The Sound of Dialog in a Box
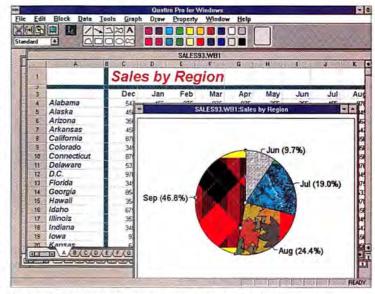
Want to make that custom dialog box sing—or rather, talk? To

insert an OLE object—say, a brief verbal message warning users to save their files—select *Edit•Insert Object* and choose the program that created your object. The program will launch. Open the file you want to embed and close the program. When asked if you want to update the embedded object, click *Yes*. Then right-click the object, select *Object Name*, enter a name for the object, and click *OK*. When you build your custom dialog box with *Tools•UI Builder*, add a button and select *Dialog• Links*. Click the *Add* button to insert a link, and specify the link command **ON Clicked DOMACRO {SelectFloat** *message*} **{OLE.Play}**. Substitute the name of the object for *message*. The only hitch is that the message must be located on the active page of the notebook—otherwise the program will not find it.

49

A Picture Is Worth a Thousand Bars

Charts can be boring. Fortunately, you can break out of old patterns by using graphic

USE ANY BIT MAP TO DRESS UP your charts in Quattro Pro for Windows.

images as chart elements. Create your graph as usual and right-click on a bar, pie slice, or marker to bring up the property inspector. Click on *Fill Style*, check the Bitmap radio button, and then click *Browse* to select a bit map file to use. Click *OK* when you have selected the file you want, then click *OK* again in the Properties dialog box. The selected chart element will be filled with pattern in the bit map file you selected.

50

Print Portions of Multiple Pages
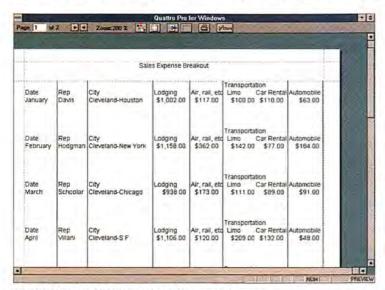
Say you have your monthly budget set up so that you have one month per page in a single *Quattro Pro for Windows* notebook. What if you want to print only what you spent each year on travel? If all the pages are set up the same way, it's easy.

Select the block of cells you want to print on the first page. Hold the <Shift> key and click on the tab for the last page you want to include. A black line will appear under all the page tabs. Select

File•Print Preview to see all 12 ranges, one after another.

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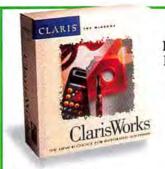
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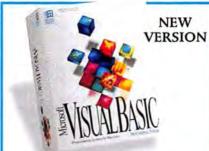
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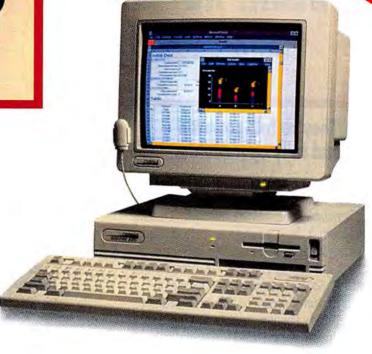
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Windows NT: The New DOS?

Microsoft's robust new operating system may put DOS out to pasture someday, but not in 1993.

BY NOW YOU MAY HAVE HEARD that Windows NT is either an overpriced and hardware-intensive boondoggle or the environment that *Windows*, DOS, OS/2, and even UNIX should have been all along. In truth, it's a little of both. Technically, NT's a wonderful operating system that combines the familiar *Windows* interface with a robustness and reliability that the rickety old DOS-*Windows* combination can't match. But NT requires a powerful computer to work properly, and some compatibility issues still need to be worked out. In other words, don't run out and upgrade without giving it some careful thought. **By Scott Spanbauer**

TOM CUSHWA

We described Windows NT's core features in depth last year (see "Windows NT: A DOS for the '90s," December 1992). NT's multitasking, we noted, is considerably more dependable than *Windows 3.1*'s, and applications can be more responsive. NT is both a network and workstation operating system, with many security features built in. File names need not be limited to eight plus three characters. And since NT doesn't have to sit on top of DOS, it's less prone to crashing and can address all of a computer's memory directly.

While most features remain unchanged in the March 1993 beta version we examined, Microsoft has added some modular functions, including TCP/IP protocols for connecting to UNIX networks, and a tool to let remote users dial in to, use, and even manage an NT network. As we went to press, Microsoft was predicting that NT would hit the streets before July and cost less than—gulp—$500.

Worth the Price?

Even if Windows NT debuts at a bargain price, will it be worth it? The program can take up as much as 70MB of hard disk space *before* you add applications and data, and it requires a bare minimum of 8MB of RAM. In addition, it may not adequately support your video, network, and other adapters and, more important, your key applications. Finally, how will Windows NT applications—when they appear—improve on *Windows 3.1* programs?
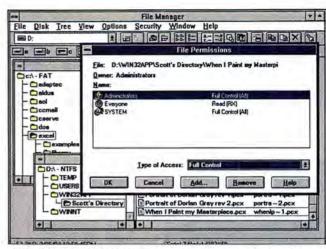
NT is a 32-bit operating system and requires a 32-bit processor, specifically a 386, a 486, Intel's new Pentium, or a MIPS R4000

or R4400 RISC chip. A version will also ship for the 64-bit DEC Alpha AXP. Microsoft says applications written to run in this 32-bit–memory nirvana will be faster because they'll perform calculations and access memory—up to 4 gigabytes of it—using one processor instruction instead of doing it piecemeal as DOS (and with it, *Windows 3.1*) does. The speedup could be as much as 20 percent over equivalent 16-bit processes, the company says, depending on the nature of the application. This remains to be seen, since no such applications are currently available for testing. It's important to note that you'll be able to run most forthcoming 32-bit *Windows* programs under *Windows 3.1* and that they may perform just as well there—although without NT's other advantages. Since Windows NT handles all the RAM in your system the same way, it offers at least one clear advantage: Unencumbered by DOS's 640K memory limit, you may never have to worry about extended, expanded, conventional, and upper memory again.

Windows' multitasking has always left a lot to be desired, but with NT those desires finally get fulfilled. Part of the reason is preemptive multitasking. In *Windows 3.1*'s nonpreemptive model, the program currently using the processor decides when to relinquish control. This scheme is usually fine for downloading a file or sorting a large database in the background, but it can break down under conditions that require the computer to respond to external events in a timely fashion—such as answering a fax-mo-
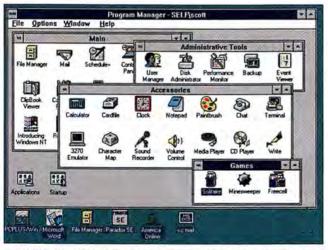
WINDOWS NT'S FILE MANAGER resembles the one in Windows for Workgroups but offers security controls and long file names.

dem or serving a network. With Windows NT's preemptive multitasking, the operating system decides when to allow access to the processor and can turn it over to higher-priority programs when they demand it. In *Windows 3.1*, applications that freeze up while in control of the processor bring the whole system to a halt until you remove them from memory (by pressing <Ctrl>-<Alt>-<Delete>). Theoretically, such a seizure will never occur in Windows NT.

Fine Threads

NT also boasts multithreading, in which an application performs its tasks in separate, concurrent "threads" rather than in one sequential queue. This capability can improve overall performance and provide a more responsive user interface. For example, a multithreaded word processor would allow you to continue working while it formats a 20-page report for the printer. By contrast, a single-threaded *Windows* program would not let you open a document while it is formatting another.

It may be a while, however, before multithreading appears in many commercial applications. Multithreaded programs are more difficult to design and write, so vendors will probably be slow to offer them. What's more, multithreading is not part of the Win32s API, the subset of NT programming instructions that allows 32-bit applications to run under *Windows 3.1*. Developers looking to build applications that run under both types of Windows may skip multithreading entirely.

Windows NT's user interface, identical in most ways to *Windows 3.1*'s, is a prime ex-

IT'S WINDOWS, RIGHT? Wrong. Windows NT looks like Windows 3.1, but note the computer and user names and other differences.

ample of multithreading's benefits. Under *Windows 3.1*, when you click on an icon to launch an application, you can't do anything else until the application has finished loading. By contrast, Windows NT allows you to click on other icons or switch to another application and continue working while the application loads.

For high-end systems that have more than one CPU, NT supports symmetric multiprocessing, which divvies up processing tasks among multiple CPUs, further boosting a system's responsiveness. A number of manufacturers, including Acer, ALR, AST, Compaq, Hauppauge, and NCR, have announced or already shipped multiprocessor systems tailored to Windows NT. The combination of preemptive multitasking, multithreading, and multiprocessing could make Windows NT a killer network or application server running, say, a multithreaded SQL database back end. Windows NT could compete with minicomputers for sensitive, transaction-intensive applications such as order entry and billing systems.

But back to the desktop. Until 32-bit applications come along, you'll be running your same old DOS and 16-bit *Windows* programs, as well as character-based OS/2 1.3 and POSIX-based UNIX applications. You can launch any of them from a Program Manager icon or from NT's command shell—a highly realistic rendition of the DOS prompt that provides new-and-improved versions of familiar DOS commands and a few badly needed new ones. There are commands for changing directories and then easily returning to the directory you left, and there's a much more powerful file searching program than the one that comes with DOS.

At some point last year, Microsoft made the mistake of stating it would test the top 100 DOS and *Windows* applications to make sure they ran under NT. Now the company simply says that NT will run "hundreds" of applications without trouble and that it won't be publishing a specific list of compatible programs. In fact, the latest beta version of Windows NT ran every DOS and 16-bit *Windows* application I threw at it, with one exception: *WinFax Pro*, which could neither send nor receive a fax.

Microsoft says no existing 16-bit fax driver will work with Windows NT, and it suggested we contact the fax software manufacturer to find out when new drivers would

appear. Delrina Technology, maker of *Win-Fax Pro*, stated its intention to support Windows NT but couldn't say when a version would appear. If you rely on a fax-modem, this simple lack of a driver is enough to prevent you from adopting Windows NT, no matter how attractive its many other features are.

The bottom line is that NT won't allow applications to manipulate hardware direct-

A multithreaded word processor would allow you to continue working while it formats a 20-page report for the printer.

ly—they must use a virtual-device driver, which allows NT's security layer to confirm that the program isn't a virus, a hacker, or a politician. As a result, getting scanning software, for instance, to work under NT is an iffy prospect, and programs whose main purpose is to blatantly "touch" hardware, such as disk optimizers, are out.

Heavy Metal, Please

The hardware price for NT's power is steep. In addition to a fast 32-bit CPU, you'll need a minimum of 8MB of RAM. The beta version recommends 16MB, a number Microsoft says may shrink in the released product. You'll also need at least 70MB of free hard disk space to install the operating system. Add in more space for all your existing applications, and even a 200MB hard disk will fill up quickly.

Device drivers written for *Windows 3.1* won't work with NT, and that's a problem. Windows NT comes with drivers for quite a few video adapters, mostly newer ones. Older super-VGA boards, such as the Tseng ET3000-based Orchid Pro-Designer Plus, may be limited to 640 by 480 VGA mode until manufacturers decide it's worth the trouble to write NT-compatible drivers.

(Microsoft says NT will ship with drivers for most ET4000- and S3-based boards.)
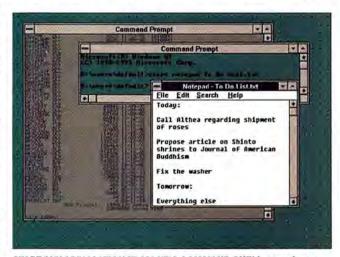
Microsoft can't or won't promise to support every piece of hardware under Windows NT and relies mostly on manufacturers to write their own drivers. A final list of supported hardware was unavailable as we went to press, but an NT product manager suggested that NT will come with drivers for most devices that *Windows 3.1* supports.

If NT is successful, of course, hardware manufacturers will scramble to rewrite drivers for all their video boards, network adapters, and other devices. In the meantime, though, users will have to struggle.

Getting It Going

Installing Windows NT from a CD ROM (like OS/2, it will also be available on a score or so of floppies) starts out much like a *Windows 3.1* installation. The first major difference comes when the system asks you to pick a file system: DOS's File Allocation Table (FAT) system, or the NT File System (NTFS), which allows long file names, provides sophisticated file security, and uses the hard disk more efficiently.

If you're installing NT over an existing DOS partition, you have the option of replacing the FAT system with NTFS without destroying existing files. You can also install a foolproof multiple-boot utility that lets you choose whether to run DOS or Windows NT at boot-up. And if you install Windows NT over *Windows 3.1*, NT's setup program will copy many of the settings in your *Windows* WIN.INI file to a separate

START ANY APPLICATION FROM NT'S COMMAND SHELL, or review a long directory listing with its handy scroll bars.

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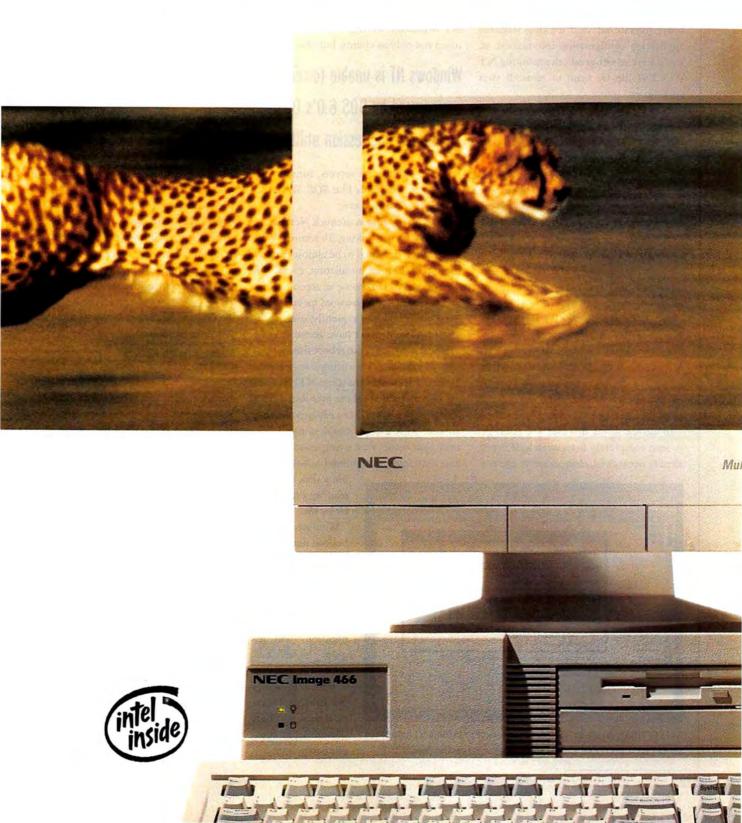
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Windows NT WIN.INI used when running 16-bit *Windows* programs.

Unfortunately, Windows NT is unable to read partitions compressed by DOS 6.0's DoubleSpace or any other compression utility (it can read compressed volumes across a network, of course). If you're currently keeping data on a compressed partition, you'll have to either decompress your files first or install NT somewhere else. Installing NT on a fresh partition means that it won't migrate all your existing *Windows* application configuration information, so you'll have to either edit the resulting NT WIN.INI file by hand or reinstall your applications.

Windows NT: The Network

Windows NT was built from the ground up to network. A special version, Windows NT Advanced Server, is a powerful network operating system intended to compete with Novell NetWare. But the plain, desktop-oriented Windows NT can handle small networks itself.

Go out and buy 20 486-33s, 20 network adapters with cabling, and 20 copies of Windows NT, and you have an instant network—all you have to do is name your work group. Like *Windows for Workgroups*, NT even bundles in *Microsoft Mail* and the *Schedule+* group calendar. If you believe Microsoft, individual users (assuming they're not computer impaired) will be able to install and configure Windows NT in a snap, then get right to work.

In the real world, however, you rarely get to start completely from scratch. If you're already networked, chances are you're running Novell NetWare, and few companies will scrap their corporatewide NetWare LANs on Friday, install Windows NT over the weekend, and pick up where they left off come Monday.

Fortunately, Windows NT systems will be able to hook up to other LANs. Microsoft is working with Novell and Banyan to create ways for NT to work with their LANs, and the necessary software is expected to come with the shipping version of NT. Windows NT will enable its systems to act not only as clients, but also as high-

Windows NT is unable to read partitions compressed by DOS 6.0's DoubleSpace or any other compression utility.

powered application servers, running client-server back ends like *SQL Server* on LANs other than its own.

If there's any reason to chuck NetWare in favor of NT's networking, it's security. Windows NT is designed to be almost entirely hackproof. During installation, every NT system asks you to choose an account name and password and a password for an administrator account. Subsequently, users without a password won't have access to your files, even if they try to reboot from a floppy—as long as you're using the NT File System. Likewise, networked NTFS drives are impenetrable to those prohibited from accessing the drive. The only gaps are that anyone with a copy could reinstall NT over your setup, destroying existing data, and extremely determined spooks could use a disk editor to read your hard disk bit by bit.

Windows NT's built-in networking should be fine for department-size networks, but companywide LANs that run critical applications will require more powerful tools, and that is where Windows NT Advanced Server comes in. This powerful but complicated system will

enable network administrators to manage multiple work groups, recover from disk errors on the fly, and add Macintoshes to the network.

The work-group management comes through the concept of domains, which shift responsibility for user names and passwords from individual workstations to centralized servers capable of communicating with each other and resolving naming conflicts. As a result, users can have faster access to systems across the network, and administrators needn't worry about maintaining unique user accounts. Windows NT Advanced Server's disk mirroring, drive duplexing, and drive array features allow a dedicated NT server to continue serving, without loss of data, should one of its hard disks fail. The Macintosh gateway will permit up to 256 Macs to access a Windows NT Advanced Server as they would any Mac server. Microsoft says Windows NT Advanced Server will cost less than $5000 for an unlimited number of users and that the upgrade policy for current *LAN Manager* sites will be competitive.
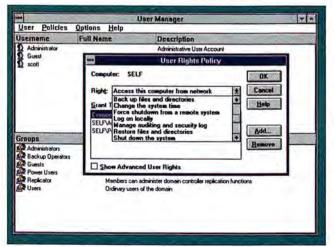
Join the NT Generation—Someday

So who is Windows NT really for? Individual users looking for the Rolex version of the current Timex *Windows?* Corporations hoping to avoid buying yet another expensive minicomputer? Is NT a reasonable replacement for the DOS-*Windows* combination? Or for OS/2? (We'll be conducting a Windows NT–OS/2 2.1 face-off in an upcoming issue.)

More important, is Windows NT for you? Do you own or plan to buy hardware that can handle it? Is your system free of software that addresses your hardware directly? And are you willing to use a relatively untried operating system? If so, the stability, robust multitasking, improved performance (which is still theoretical), multiprocessing, security, and advanced networking could prove to be substantial rewards. Otherwise, the DOS-based *Windows* will serve just fine for a bit longer. After all, they both come with Solitaire.

Scott Spanbauer is a contributing editor for PC World. *He can be reached as SCOOTSPAN on PC World Online (see page 10 for more information).*

SAFETY FIRST: Windows NT's pervasive security features let networked users pick and choose exactly who can access specific files.

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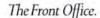
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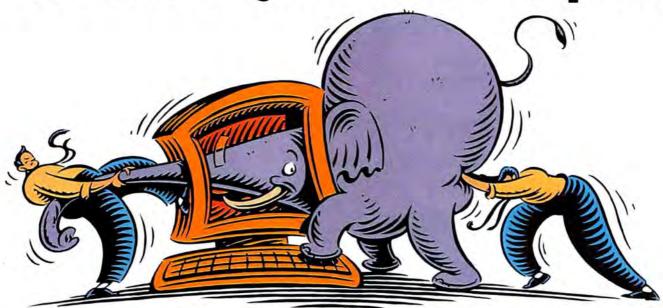
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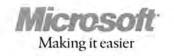
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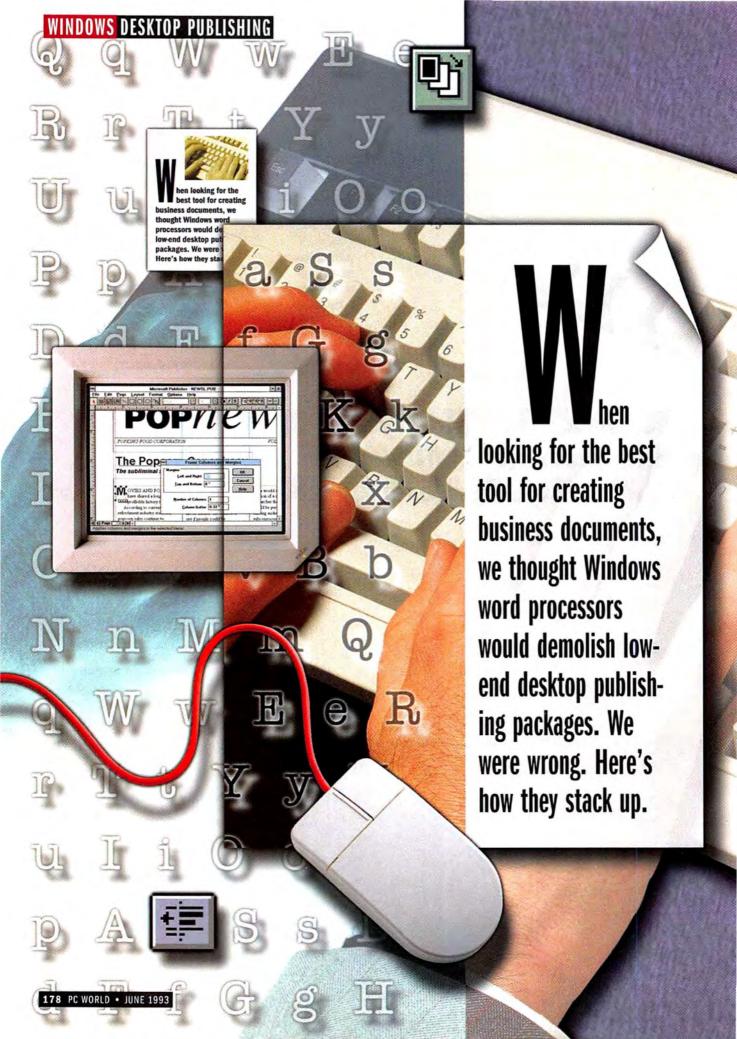
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When looking for the best tool for creating business documents, we thought Windows word processors would demolish low-end desktop publishing packages. We were wrong. Here's how they stack up.

WORD PROCESSOR

OR DESKTOP

PUBLISHER?

By William Harrel

If you're a *Windows* user, you already have a word processor—probably *Microsoft Word for Windows, Ami Pro,* or *WordPerfect for Windows.* These brawny $500 beasts can't be beat when it comes to writing basic documents and printing them on the office laser. But what if you want more? What if you're interested in cranking out slick-looking reports, newsletters, and other documents?

You could plunk down an additional $700 to $900 and get a high-end desktop publishing package such as *PageMaker, Ventura Publisher, QuarkXPress,* or *FrameMaker.* If you're in the publishing business, this is the only way to go. Most of us aren't, however; we're standard business users and our needs are simpler. Luckily we have two reasonable alternatives.

Option one is to pick up a low-cost desktop publishing package. While these DTP pro-grams can't match their high-powered cousins for sheer precision, long-document management, or color prepress tools, they're far easier to learn and use, and they require a fraction of the design talent. It doesn't hurt that they cost a mere $100 to $150 on the street, either.

But before you reach for your wallet, take a good look at option two: your *Windows* word processor. It might just have the page layout tools you need. Most graphical word crunchers let you create frames on each page and fill them with text and graphics, draw lines and boxes, add shading and even color—all in a WYSIWYG display for easy editing. With all that built-in design power, do you really need a desktop publishing program?

To answer that question, we pitted three best-selling low-end DTP packages against a trio of top-flight *Windows* word processors. In one corner, we put *Microsoft Publisher 1.0*, Timeworks' *Publish It for Windows 3.0*, and Power Up Software's *Express Publisher for Windows 1.0*. In the opposite corner sat the word processing heavyweights: Lotus's *Ami Pro 3.0*, *Microsoft Word for Windows 2.0*, and *WordPerfect 5.2 for Windows*.

The terms of our slugfest were simple. Pulling *Ventura Publisher 4.1* from our professional tool kit, we designed three of the most common desktop documents—a brochure, a newsletter, and a business proposal—for a fictional small business called PopKing Food Corporation. Then we tried to reproduce each document in all six test applications. Because we wanted to push these programs to their limits, our designs are a tad more sophisticated than the average user might create, incorporating such elements as shaded and rotated type, layered frames, and complex text wraps.

We were looking to answer three questions: Could the program complete the layout? How easy was it to do? And is one type of program better than the other for producing a particular kind of document?

Frankly, we thought the word processors would cream the DTPers, but the page layout programs proved surprisingly feisty. Of our three WP heavies, only *Ami Pro* was able to handle almost everything we threw at it. *WordPerfect* and *WinWord* performed most of the tasks, but only after a lot of work-arounds and hand-holding by support technicians. The DTP programs turned out to be friendlier hands-down—especially when creating short, relatively complex documents like the brochure and newsletter. The publishers hit the ropes, though, when we forced them to prepare the longer, text-intensive business proposal.

The bottom line: None of these applications are ideal for producing every type of document. You'll still need a word processor to create most of your text files, but a low-end DTP package will definitely make some layout chores easier. The key is knowing what kind of documents you need to produce—and how fancy you want to get. What follows is a blow-by-blow account of how our contestants fared, noting the highlights and limitations of each—good things to keep in mind when it's time to create your own designs.

BROCHURE

How They Rate

Word processors: Barring minor snags, all the contenders held their own. *WinWord* had trouble with our EPS graphics; *WordPerfect* couldn't rotate TrueType fonts; *Ami Pro* shone.

Ami Pro ★ ★ ★ ½
Microsoft Word for Windows ★ ★ ★
WordPerfect for Windows ★ ★ ½

DTP programs: *Express Publisher* couldn't perform irregular text wraps (though the next version should), and *Microsoft Publisher* balked at importing our EPS images, but mostly the low-end DTP programs proved to be ideal for this type of layout.

Publish It ★ ★ ★ ★
Express Publisher ★ ★ ★ ½
Microsoft Publisher ★ ★ ★
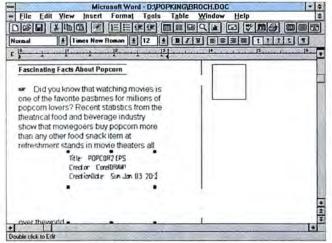
The Joy of Popcorn is a typical example of a marketing brochure. It's printed in landscape orientation on both sides of an 8½-by-11-inch page, then folded into thirds, so the

front panel becomes the cover and the back panel contains space for an address label. The other four panels contain text and high-quality EPS graphics—popcorn kernels, bags of popcorn, and the PopKing logo—created in *CorelDraw*. The brochure also employs two design elements that proved especially challenging to several programs: We used an irregular text wrap to flow the text along the edge of each graphic; we also placed the return address and logo inside a box on the back panel, then rotated them 90 degrees. We used True-Type Arial and Times New Roman fonts wherever possible. When a feature, such as *Publish It*'s PowerText, worked only with Type 1 fonts, we substituted Helvetica and Times and used *Adobe Type Manager*.

Low-cost page layout packages excel at brochures and other short, design-intensive documents, thanks to features like column guides, extensive drawing tools, and the capability to layer frames. While *Ami Pro* did a good job overall, the other two word processors came up short. Of the six contestants, only *Publish It* was able to easily flow text around irregularly shaped graphics. The other programs provided only blocky, squared-off text wraps. And three programs—*Word for Windows*, *WordPerfect for Windows*, and *Microsoft Publisher*—choked on some of our popcorn graphics. None of these three can accept *CorelDraw* EPS files that contain an image header (a bit-mapped version of the graphic that lets you see the image on screen). We had to export the files to an EPS format without image headers, which made placing and sizing the graphics on screen much tougher.

Ami Pro

Of the three word processors, *Ami Pro* gives you the most publishing power. It even provides column guides, which make it easy for you to draw frames with the mouse and line them up on the page, plus a column balance feature that aligns text frames at the top and bottom of the page automatically. The only thing that had us

WORD FOR WINDOWS, Microsoft Publisher, and WordPerfect for Windows all had problems digesting some of our EPS graphics.

stumped momentarily was figuring out how to rotate text—you need to use *Ami Pro's* drawing tool.

Microsoft Word for Windows

While *WinWord* lets you draw frames, it has no column guides. You're stuck lining up the frames using the ruler or specifying page coordinates inside a dialog box—which entails a lot of trial and error. Aside from *Word for Windows'* troubles with our EPS graphics, the layout went fairly smoothly. The only way to rotate the return address, however, was by using WordArt, a special effects utility that ships with *WinWord*. Since WordArt uses bit-mapped fonts instead of *Windows'* TrueType outlines, print quality was poor.

WordPerfect for Windows

Overall, *WordPerfect* did a respectable job with the brochure, but didn't make the job easy. Instead of frames, *WordPerfect* uses several different types of "boxes"—text boxes, graphics boxes, and so on—a holdover from its DOS forebear. There's no way to draw a box with your mouse; you have to type in the box's size and coordinates and, if you make a mistake, resize and place it with your mouse. But *WordPerfect* really fell on its face when it came to creating the return address on the brochure's back panel. When we tried to rotate the return address using TrueType fonts, the text refused to turn and printed outside of the box where we'd placed it. Adobe Type 1 fonts, on the other hand, rotated just fine.

Express Publisher

In this case, no news is good news. *Express Publisher* imported the EPS graphics cleanly and rotated the return address perfectly. Our trial turned up just one flaw: *Express* lacks an irregular text wrap feature. We should always have such problems.

Publish It for Windows

Publish It sailed through the brochure with ease—it's the only product here that lets you contour text easily around irregularly shaped graphics. The only snag showed itself when we tried to rotate the return address—you need the program's Power-Text add-on, which requires *Adobe Type Manager*. If you use only TrueType, you can't rotate type in *Publish It*.

Microsoft Publisher

Publisher did a fine job with most of the brochure. But because it uses the same file import filters as *WinWord*, it can't accept EPS files containing image headers, which

meant the only sure way to check graphics placement was by printing drafts. And, like *WinWord*, *Publisher* relies on WordArt for rotating text—not a workable alternative.

NEWSLETTER

How They Rate
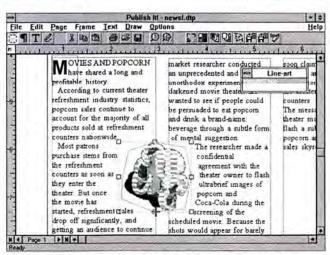
Word processors: Except for *Ami Pro*, the intricate layout features of our newsletter proved too taxing for the word processors. We weren't able to complete it in either *Word for Windows* or *WordPerfect for Windows*.

Ami Pro ★ ★ ★ ½
Microsoft Word for Windows ★ ★
WordPerfect for Windows ★ ½

DTP programs: While the DTP programs didn't include every feature we needed, their overall page layout orientation made creating the newsletter easier.

Microsoft Publisher ★ ★ ★ ½
Express Publisher ★ ★ ★
Publish It ★ ★ ★

TIMEWORKS' PUBLISH IT WRAPS TEXT AROUND GRAPHICS of any shape and lets you adjust the bounding box that surrounds the image.

Creating a newsletter is invariably harder than it looks, and this example was no exception. Of our three sample documents, the four-page *POPnews* features the most difficult collection of design elements. The front page contains a band of reversed type across the top and a banner with 127-point type. The letters "POP" in the banner are screened at 30 percent black, which makes them appear gray, and the space between the letters in "news" has been increased to spread them across the page. The first paragraph of each story begins with a 24-point letter inset into the text (a "drop cap"). Two EPS popcorn graphics and the PopKing logo are placed in the text with an irregular text wrap around them.

Other tricky design elements include a display quote near the bottom of the first column on page 1, a jumpline ("Continued on page 2") at the end of the third column, and a two-column sidebar in a shaded box in the bottom-right corner.

To complicate things further, the page features a hairline border. With most of the programs this required us to draw one large frame and lay several smaller text and graphics frames on top of it—a task that brought some applications to their knees. Another key newsletter feature we tested for is frame linking, or the ability to flow text between nonconsecutive pages, from, say, page 1 to page 4.

If you're creating a long or fairly sophisticated newsletter, save yourself some aggravation and buy a low-cost page layout program. All the desktop publishers here have one essential feature needed for newsletters—frame linking. Not one of the word processors does, which means the only way to jump text from one frame to another is by cutting and pasting—a major hassle if you need to select all the text in a specific story or make revisions. Except for its frame linking deficiency, *Ami* proved the most capable for laying out the newsletter, with *Microsoft Publisher* a close second.

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- 101-S keyboard

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Ami Pro

Ami is the only word processor with a page-border tool, making our chores much easier. Its Send to Back and Bring to Front commands allowed us to layer frames and then shuffle their order, which proved invaluable when creating the sidebar and placing the logo inside it. If only *Ami* could do irregular text wraps and link frames, we would have been thrilled.

Word for Windows

This newsletter proved a tad too complex for *WinWord*. The only way we were able to create the page border, for example, was to use an obscure macro and output to a Post-Script printer. To create the gray text in the *POPnews* banner, we had to specify it as a color, which *Windows'* printer drivers convert to a gray shade on black-and-white printers. In order to draw two columns in the sidebar frame, we had to call Microsoft technical support, who told us to create the columns first and then frame them. Even then, there was no easy way to wrap the sidebar text around the edge of the Pop-King logo. At that point we gave up.

WordPerfect for Windows

To lay out a document this sophisticated in *WordPerfect for Windows* you'll need an intimate knowledge of *WordPerfect*'s formatting codes and a large bottle of aspirin. For instance: The only foolproof way to create a page border is to define a page-size user box in a header—who would ever think of that? *WordPerfect* also falls short in its handling of text and graphics boxes. When we tried to layer a small box on top of a larger one, we couldn't use the mouse to select or move the small box. Instead, we had to leave the editing window and plod through cumbersome dialog boxes. The process got worse from there.

Express Publisher

Express Publisher gave us only minor hassles. The program allows only one column per frame, and each frame must have the same size rules on all four sides. Since the *POPnews* sidebar has multiple columns, a 6-point rule at the top, and a hairline rule on the left, we had to draw five frames. Graphics created with *Express Publisher*'s drawing tools require their own frame; if you draw a line under some text and then move the text, the line won't come along with it. Finally, the Undo command is limited to moving (or unmoving) objects. With a trial-and-error venture like page layout, you really need more.

Publish It for Windows

Publish It for Windows, on the other hand, has no Undo command at all. Still, laying out the newsletter was simple, with a few small exceptions. To tint the text in the banner requires PowerText, which uses only *ATM* fonts. And there is no way to select text across linked frames—Timeworks sorely needs to add a Select Entire Story command to *Publish It*.

Microsoft Publisher

Next to *Ami Pro*, *Microsoft Publisher* did the best job on our newsletter. We had the same problem with the EPS graphics as in the brochure, and we had to use WordArt to tint the headline text, but otherwise our document came together faster than it did with any other program.

How They Rate

Word processors: Overall, the word processors were much more adept at handling long documents than the low-end publishing programs.
WordPerfect for Windows ★ ★ ★ ★
Ami Pro ★ ★ ★ ½
Microsoft Word for Windows ★ ★ ★

DTP programs: As a rule, the low-end DTP programs lacked long-document prowess.
Express Publisher ★ ★ ½
Publish It ★ ★ ½
Microsoft Publisher ★ ★

The PopKing marketing proposal shown here tested each program's long-document handling capabilities, such as page numbering, headers and footers, and style sheets. It consists of a cover sheet and 11 two-column pages: a two-inch column on the left for headings and captions, and a four-inch column on the right for body text. Embedded throughout the body text are spreadsheet charts and graphs. In this type of document, figures and graphics can change often, and you'll need to be able to update them easily as the data changes. This put our programs' Object Linking and Embedding (OLE) capabilities to the test.

Compared to the newsletter, the proposal's design is simple: It doesn't contain any layered frames, EPS files, or text wraps, and it relies heavily on paragraph styles and the software's ability to anchor graphic frames to text. The short-and-sweet conclusion here is that it's easiest to produce this sort of document using a word processor—particularly *WordPerfect*. The paragraph style controls in our three word processors are far more sophisticated than those found in low-end

More on the Way

Technology never stands still. While we were preparing this article, Microsoft Corporation was working on upgrades to both *Word for Windows* and *Publisher* and WordPerfect Corporation was laying the groundwork for *WordPerfect for Windows 6.0*. According to Microsoft, *Publisher* will sport several new features addressing some of the more egregious problems we encountered. Apparently the next version will include style sheets, better all-around long-document handling, a table editor, improved irregular text wrap, and TrueType support for its WordArt miniapplication.

On the word processing front, WordPerfect should be releasing *WordPerfect for Windows 6.0* sometime in late 1993. And rumors of a release later this year of Microsoft's *Word for Windows* have also been circulating. Neither company is discussing potential features just yet, but we feel safe in predicting that *WordPerfect* will sport better frame handling and TrueType support. And since *Word for Windows* uses the same WordArt module as *Publisher*, the next version of *Word* will have better text rotation capabilities.

page layout programs, and all three let you create tables and set up OLE links. On the DTP side, only *Microsoft Publisher* supports tables and OLE, but its lack of style sheets makes it unsuitable for long documents. And none of the DTP packages can anchor frames to paragraphs: Every time we made a change or brought in a graphic, it made drastic changes to our layout.

Ami Pro

While *Ami Pro* had no real problems with the proposal, it didn't make the layout exceptionally easy either. As with the DTP programs, we poured body text into a column on the right, headings and captions into the frames on the left. *Ami Pro* let us anchor frames to paragraphs, which meant importing graphics and doing revisions didn't wreak havoc on our frame placement.

Microsoft Word for Windows

It took us several phone calls to Microsoft's tech support to figure out how to create this document in *WinWord*. At first, the frames seemed to move around by themselves, and text jumped out of frames when we applied paragraph styles to it. Microsoft told us to create a column for the body text on the right side of the page, to create frames for

headings and captions in the left margin, and to define the frames as part of the paragraph's style. That worked, but we would never have figured it out on our own.

WordPerfect for Windows
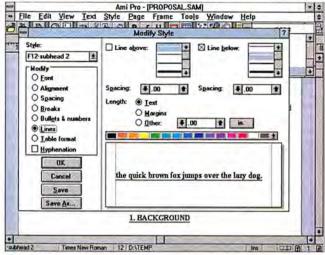
WordPerfect did the best job here. Using its parallel columns option, we were able to create headings and captions in one text column, body text in another—we didn't use frames at all. Parallel columns act like tables: No matter how we edited the body text, the headings moved appropriately. To format the document, all we did was apply styles on each page, type captions, and embed our charts and graphs.

Express Publisher

Express Publisher doesn't support OLE, but it does have a proprietary option for updating graphics and text files that works reasonably well. However, *Express*'s master page tool, which lets you specify design elements such as rules and headers that usually appear on every page of a document, will not let you hide certain elements for specific pages in the proposal. Because the report's cover sheet doesn't have a header or a page number, we had to

treat the cover as a separate document with its own master page—an awkward fix.

Publish It for Windows

Publish It also lacks support for OLE—but unlike *Express Publisher*, it provides no proprietary alternatives. Otherwise it does a reasonable job of laying out the report. We did uncover a small hitch, though: *Publish It* doesn't support small caps, which are capital letters set at the x-height of standard lowercase letters. Small caps appear in several places in the proposal.

Microsoft Publisher

Microsoft Publisher has some of the tools necessary for creating long documents, such as OLE and table support, but lacks one crucial feature: style sheets. Style sheets let you format big chunks of text at once—a necessity for long documents. *Publisher* forced us to format every paragraph manually, which made the process three or four times longer than it should have been.

William Harrel is a writer and desktop publisher based in Weaverville, California. He has written four books on desktop publishing, including one on Aldus PageMaker *and two on* Ventura Publisher.

AMI PRO LET US DEFINE THE LINES below the section headings as part of their paragraph styles, a feature none of the DTP programs support.

WORDPERFECT'S PARALLEL COLUMNS FEATURE made laying out the proposal a snap. Other programs required us to create separate frames for the headings and captions.

WHERE TO BUY

Ami Pro 3.0	**Microsoft Word for Windows 2.0**	**WordPerfect 5.2 for Windows**	**Express Publisher for Windows 1.0**	**Publish It for Windows 1.0**	**Microsoft Publisher 1.0**
List price: $495	List price: $495	List price: $495	List price: $149.95	List price: $149.95	List price: $199
Lotus Development Corp.	Microsoft Corp.	WordPerfect Corp.	Power Up Software	Timeworks	Microsoft Corp.
800/343-5414,	800/426-9400,	800/451-5151,	415/345-0551,	708/559-1300,	800/426-9400,
617/693-3899 (fax)	206/635-6100 (fax)	801/222-5077 (fax)	415/345-5575 (fax)	708/559-1399 (fax)	206/635-6100 (fax)
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DATABASES
Come to Windows

The claim of new Windows database programs: to make managing information a point-and-click affair. Do they succeed? We test seven packages—for novices and pros—to find out.

A t last—after years of drought in *Windows* database land, the software showers have started, and now a number of *Windows* database managers are on the market. This is great news for all *Windows* users and might finally tempt hard-core DOS fans to make the big switch. We jumped right in to evaluate these new programs and see if the wait was really worthwhile.

While these programs address a variety of database tasks, they all claim one common feature: ease of use. *FileMaker Pro* and *AceFile* provide simple database management. *DataEase Express* and *Approach* try to blend application development and high-level capabilities while avoiding programming. And the most sophisticated of these programs, *Superbase*, *Access*, and *Paradox for*

Windows, besides claiming simplicity for the end user, are fully featured and make programming easier than ever. To help you separate this spectrum of complexity, we've ordered the reviews in this roundup from simplest product to most complex.

We chose to look at software that had been released recently.

BY CELESTE ROBINSON

MICHAL VENERA

We didn't include *WindowBase* because its new version was not yet available and we felt it wouldn't be fair to compare it to the newer products here. We also didn't include three other products because they're primarily for developers: Two of them, Microsoft's *FoxPro for Windows* and Computer Associates' *dBFast*, have been available for some time, while Borland's *dBASE for Windows* has not yet shipped. We'll provide more information about these other *Windows* data managers in future issues.

Let's lay some groundwork: The products we tested represent a wide range of database capabilities. Nonrelational database managers allow easy management of simply structured data (for example, what you could put in a table) that's contained in a single file. Relational database managers allow you to create and store different categories of information in separate files and then link or relate information between the files. Nonprogrammable database managers let you build applications, but what these applications can do is limited. On the other hand, programmable database managers

(and to a lesser extent those in which you can write macros) allow you to create almost any kind of application.

To discover just how good each program is for its intended audience, we tested them using a battery of detailed tasks, from simple to complex, focusing on usability. We also had the PC World Test Center run some straightforward performance tests. But before we get into the results, let's take a look at what distinguishes these new data managers from their DOS-based ancestors.

Is a GUI Worth a Thousand Characters?

Some say appearance and style are everything. These new *Windows* database managers have both and manage to back them up with some real substance. Most notably, they help you easily create good-looking forms and reports. With a couple mouse clicks, you can change the style, font, size, and color of text and data and add graphic elements to your forms and reports. Most of the programs will also let you store sound or video objects in data files.

But the real question is whether the data handling is any good. Does the graphical interface of these new *Windows* products really make it easier to manage data than popular DOS programs like *Q&A* and *Paradox* do? And if so, how?

Chasing the Windows Database Grail

To find out which of these products deserved a Best Buy, we based our tests on a hypothetical work group trying to get its job done using information from a variety of sources. Customer and contact information might come from a local PC, while sales information could be stored as *dBASE* or SQL files on a server. We devised a

Best Buys

For simple, nonrelational databases, *FileMaker Pro* earns a Best Buy due to its ease of use and excellent performance. It doesn't support multiple file formats, and you can't use it to graph or cross-tabulate data as with *AceFile*, but for point-and-click simplicity it's a clear winner. *AceFile* did nearly as well overall, and you might want to check it out because of its low price and slightly larger feature set.

With the simplicity of its user interface, its capability to access data in several different file formats directly, and its good performance, *Approach* gets a Best Buy for uncomplicated relational database projects. *Approach* makes it easy to customize data entry. You don't have to write any code or use macros

as with most of the more powerful programs. You can point and click to join data files visually to create multitable forms and reports, and there are plenty of built-in macros. *Paradox for Windows* is also pretty good for straightforward, simple relational operations.

It's hard to pick a winner at the high end of this group. The programs are so complex and vary so much in capability that the choice depends on the situation.

We consider *Paradox for Windows* and *Access* to be the most useful when your project is complex—say, a database system for a large department—and you have only a couple weeks to get it up and running. For really complex database applications involving several linked departments, *Access*

BEST BUY APPROACH is the simplest and most straightforward relational database.

group of five database challenges of increasing complexity.

We started with the basic building blocks of any database. The first task was to create a table of customer information, add data checks such as making sure each customer ID was numbered sequentially, and test data entry using a plain-vanilla form. This task is straightforward, one that any program should handle. We focused here on ease of use. All the products earned passing grades, but *FileMaker Pro* and *Approach* did best.

The second task involved creating a table of contact/action information related to the customer table from the first task, then using it to make a follow-up report of incomplete action items. This task is more complex, but it's the basic work of a relational database manager. If a program didn't pass, you should consider it only for individual use—keeping track of simple lists and tables of information, such as contacts or an office inventory—and not for anything more complicated.

With the two nonrelational programs, *FileMaker Pro* and *AceFile*, we could create the follow-up report, but we had to settle for a makeshift solution. *FileMaker Pro* can be set up to include a fixed number of repeating fields to hold contact information in each customer record. But once you reach the number of repeating fields you've specified, you're stuck. *AceFile* actually has the capability to relate and join two tables to create a new table, so we were able to get all our customer and contact information into one table for reporting. However, you can suppress only one of the duplicated fields, so the final output included lots of repeated information.

For a more stringent test of the relational programs' power, our next task was to use five tables together for order entry and invoic-

ACCESS wins the Best Buy at the high end.

is best when you are short on time. But consider both *Paradox/Win* and *Access* when you have plenty of time, since the features of either in certain areas could outweigh other advantages. We feel obliged to make an overall call here, though, and *Access* just edges out the others for Best Buy, principally because of ease-of-use features like macros. But it's a close finish, and the choice of a high-end database is too important to make lightly. Consider the pros and cons of each program in relation to your needs.

To sum up the merits of the various contenders, *Access* and *DataEase Express for Windows* have the most ease-of-use features for dif-

ficult tasks, *Paradox for Windows* is easiest for creating data files and customizing data entry and easier to use on the basic building-block operations of database management, and *Superbase* is the most straightforward in approach and is now in its second *Windows* release. On the downside, *Access* reportedly has bugs (though we didn't see any) when dealing with very large data sets and has a steep learning curve, *DataEase Express* is lacking in high-end functionality and programmability, *Paradox/Win* has problems with some form and report functions, and *Superbase* is not as easy to use as the others.

FILEMAKER PRO is our Best Buy for flat-file data management.

standard activity, and it should be easy to set it up to execute with a mouse click. This task was enlightening, as we found that *FileMaker Pro* and *Approach*, two of the nonprogrammable products, let you set up these buttons with a few mouse clicks, while *Superbase* and *Paradox for Windows* required that you write code to attach to the buttons, or at the very least open a programming editor to drop in a canned routine.

The Right Database for You
In this type of roundup we ordinarily try to determine which products deserve a Best Buy based on ease of use, performance, price, and other factors. With these products, however, no one database can be recommended for all users. The best choice depends on the kind of information that you're working with and how sophisticated your data management needs are. The first step should be to figure out just how much database power you need. Here's a breakdown of the possible categories as we see them:

ing. We related tables of customer, sales rep, order, line item, and product information, putting together a multitable form for order entry, then creating a report that could be used to print invoices. If a program can't manage this tougher relational task, then it won't do for building applications designed to integrate and run your business. Neither *FileMaker Pro* nor *AceFile*, with their strictly limited relational capabilities, could complete this task or the next.

Our fourth task was to create a summary report of total sales by salesperson. We had to be able to summarize information across related tables. We could do this with all the relational products, but with varying difficulty. If your business requires different departments to work together, and they all need to provide high-quality reports on their day-to-day operations, the database you choose should be able to handle this fairly tough reporting task.

Each product's approach was unique. *Access*'s Report Wizard feature showed to nice advantage here. The report it created needed to be doctored a bit but required less work than the *Paradox for Windows* report, where the only way to add summary fields was to do it manually. The final result from *DataEase Express for Windows'* Query By Model (QBM) tool was nice, too, in that we could add the summary field by clicking on the right place in the dialog box, but it took some time to figure out which table to use as the master for the report.

Finally, we looked at what it would take to automate the printing of our reports. The idea here was to see how easy it was to create the custom action buttons that are one of the hot new features of these *Windows* databases. Printing a report, however complex, is a

If you need a database just to keep track of phone numbers or some other project where you can keep all your information in one file, an easy-to-use flat-file (nonrelational) program like *FileMaker Pro* or *AceFile* will work for you. If you're not sure a flat-file data manager is enough, look carefully at the unique features of *FileMaker Pro* and *AceFile* that stretch them beyond the typical nonrelational data manager. Also, *FileMaker Pro* has the advantage of working across both the *Windows* and Macintosh environments, while *AceFile* uses the common *dBASE* file format. Or you might consider a more powerful program, like *Approach* or *DataEase*

Does the graphical interface of these new Windows products really make it easier to manage data than popular DOS programs like Q&A and Paradox do? And if so, how?

Express, if you think you'll need its capability later or if you're planning to expand its use to other areas of your organization.

For projects like our order entry and invoicing task that definitely require the capability to handle more than one data file at a time, you'll need a relational database. *Approach, DataEase Express, Superbase, Access,* and *Paradox for Windows* all fall into this category. These programs can be divided into two groups: *Approach* and *DataEase Express*, which are not programmable, and *Superbase, Access,* and *Paradox for Windows,* which are.

Of the nonprogrammables, *Approach* is the easier to use for projects involving just a few related tables. A good example is if you're

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Point/Counterpoint

PC World asked our author, Celeste Robinson, and another database expert, Ellen Ullman, to offer a few personal comments on each of the programs in our review.

CR: For a project using a single file, I'd be torn between *AceFile* and *Approach*. For my taste, I didn't like *FileMaker Pro* as much.

EU: Yes, *FileMaker Pro* is a very low-end package, but I would recommend it if you need file portability between PCs and Macs.

CR: I found myself actually having fun using *AceFile*. It's nice that you can link the tables.

EU: I agree. *AceFile* was a complete surprise. If *AceFile* would add just one more feature—the option of attaching filters and joins to forms and reports—the package would become vastly more usable.

CR: *Approach* is several steps up from *AceFile*. It's a good choice if you need relational capabilities. It's easy to validate data entry.

EU: This might be a good time to introduce one of my criteria for judging these packages, which is what I call "database application widgets." These are the tasks you have to do over and over again. They include things like building a form or report based on multiple tables or verifying that some data element you've entered is valid by checking that it's in another table. A database application package shouldn't just be able to do these things with macro and function calls; it should make these widgets explicit operations you can enact with a click on an icon or dialog box.

CR: And you should be able to find the operations easily. You shouldn't have to write special expressions. The widget set is one big thing lacking in the high-end packages like *Superbase* and *Paradox for Windows*.

EU: Exactly. The high-end packages should take a lesson from *Approach*. Higher-end packages get all involved in complications like forms with embedded subforms.

CR: Moving up in capabilities, I have to say that I didn't like *DataEase Express for Windows* very much. The box is beautiful, but it

was difficult to find information in the documentation. It was hard to build a form with one-to-many relationships or accomplish referential integrity.

EU: At first I thought I would love *DataEase Express*. But I'm afraid it will please neither

The high-end packages should take a lesson from *Approach*. — Ellen Ullman

end user nor developer. It's too complicated for simple tasks, and, since it's not programmable, it's not powerful enough for many real-world applications.

CR: As for the high-end packages, I would say that they're not for the novice or the person who needs to work with just one file. However, for the intermediate user, these products should work very well without the need to hire a developer.

EU: *Paradox for Windows* gives you the ability to really see the visual relationships among tables, which shows that *Paradox* truly understands how database applications are built.

CR: Yes, *Paradox for Windows* is my favorite in putting together multitable documents automatically. You can look at the design layout and see exactly how it's going to work. You can go click-click and see it change. You can experiment, in contrast with *Access*. I tried the Form Wizards and still got lots of cryptic messages. *Access* has a good dialog box to set up searches, but

then the search dialog box obscures the data that you found.

EU: I had similar usability problems with *Access*. For example, if you get an error message while inputting data to try out a table definition, you can't suspend the input window and take a look at the table definition.

CR: *Access* does have one very hot feature. When you're querying a huge amount of data, the package will present the *dynaset*, or answer set, on the screen before the entire search is completed. You can start working with the information right away.

EU: I think querying is the strong point of *Access*. I give it high praise for letting you switch back and forth between visual query writing and SQL. Just as *Approach* is my model for how a tool should accomplish one-to-many forms, *Access* is my model for the scalable visual-to-SQL query tool.

Superbase was the real sleeper in the high-end group. It's not flashy, its widget set is small, but I found it straightforward. And *Superbase* has the advantage of being a 2.0 release. *Access* and *Paradox* may have been rushed to market for competitive reasons.

CR: The issue is, which package makes it easiest to manage your data. Once you strip those graphical features off the menus and tool bars, what are you left with? From the business user's point of view, it's easy to lose sight of the real issue: managing your data.

EU: My ideal database would have the application focus of *DataEase Express* and the great, easy widget set of *Approach*. It would have the query capabilities of *Access*. And it would have the visual data modeling of *Paradox* and *Superbase*.

CR: My ideal database would have the form widgets of *Approach*, the data modeling of *Paradox*—and the fun of *AceFile*.

Ellen Ullman was a principal engineer for the client-side tools for *Sybase SQL Server*. She is currently a consultant with Ideation, a San Francisco–based new-products consulting firm.

For a project using a single file, I'd be torn between AceFile and Approach. — Celeste Robinson

trying to integrate data from two or three departments but not your whole organization. The program lets you gather information from a variety of sources, including *Paradox*, *dBASE*, and various SQL formats, and quickly design good-looking reports and forms for a few related tables with little effort. However, when you get into more complicated situations, the timesaving dividend of *Approach*'s simple user interface starts to disappear. *DataEase Express*, with its Query By Model tool that essentially combines the process of querying and reporting on data, offers more functionality than *Approach* but also takes more effort to master.

If you're a power user with some fairly sophisticated relational databases to manage, but you don't want to get into programming if you can help it, *Approach*, *DataEase Express*, *Paradox for Windows*, or *Access* would probably work best for you. You could use *Superbase* as well, but it doesn't have as many end-user conveniences. The weaknesses of these products show up in different areas, so choose carefully to make sure the Achilles' heel of the one you pick doesn't ruin your project.

For application developers who feel that forms with macro-driven action buttons can't do enough, there's *Superbase*, *Access*, and *Paradox for Windows*. Each of these database managers includes its own programming language. The capability to program a database application gives you much more flexibility for those times when menu commands just aren't enough. However, it also requires a consider-

able time investment to become familiar enough with a programming language. The languages of these three are fairly equivalent in power and can call routines written in other languages.

Any of the three programs could be used to build a database system for a large organization with many disparate groups and data requirements. *Superbase* is the most straightforward but has the fewest features. *Paradox for Windows* would be great for anyone

For projects like our order entry and invoicing task that definitely require the capability to handle more than one data file at a time, you'll need a relational database.

moving over from the DOS version of *Paradox*—despite a completely new programming language—because the querying model remains the same. *Access* is probably the hardest to learn initially, but, with its features, it's easiest to use in the long run.

Celeste Robinson is a contributing editor for PC World *and the author of* The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992). She can be reached as CELESTEROB on PC World Online (see page 10 for more information).*

For more information about all products in this article, circle reader service no. 900.

Database Performance: No Clear Winners

	Find on record key	Find on name	Simple query	Joined query	Customer report
FileMaker Pro for Windows 2.0*	1	1	5	*	*
AceFile 2.0	1	50	25	1093	1091
Approach for Windows 2.0*	1	1	3	2984	599
DataEase Express for Windows 1.0	1	4	3	940	1340
Superbase 2.0 for Windows	1	26	58	1884	1214
Microsoft Access 1.0*	1	21	7	43	2258
Paradox for Windows 1.0	1	8	7	81	2733

***Best Buy**

Time in seconds.

*Couldn't complete test.

Methodology Performance tests are different from the application tasks used to evaluate database functionality. These tests evaluate performance on basic database operations.

We tested the *Windows* database programs on a Compaq Deskpro 386/25i configured with 8MB of memory and a 110MB hard drive. Before installing each of the applications, we set up the hard drive with Compaq DOS 5.0 and *Windows* 3.1 running at 640-by-480-pixel resolution with 16 colors (standard VGA). To build the test files, we imported our order entry database into the product's

native format (or the default format if no native one exists). We used four tables in our tests: a list of employees (1000 records), a list of additional information about those employees who are sales representatives (50 records), a list of customers (5000 records), and a list of orders (about 33,000 records). We indexed each table on a unique field.
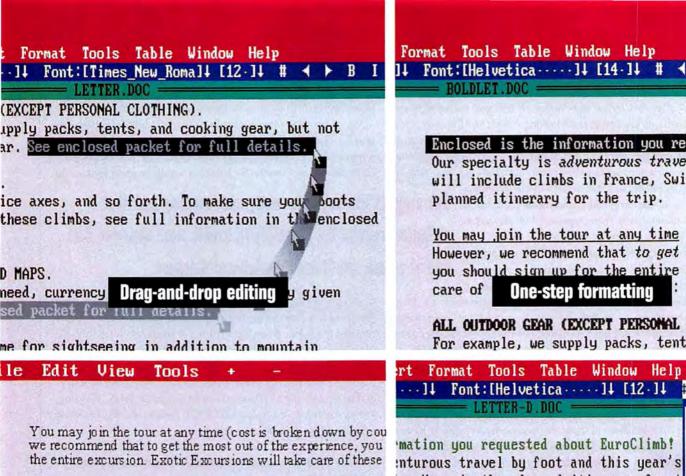
Find on record key We measure the time required to find a customer's record based on its customer key.

Find on name We search for the same customer record based on a subset of the company's name (this particular record is located about two-thirds of the way through the data file). We did not index this field.

Simple query We use the product's query-by-example or record filter tool to view 1511 of the customer records selected by a ZIP code range.

Joined query This test and the next cull records from several joined tables. We ask the program to display a list of all orders generated by salespeople earning more than $55,000.

Customer report We measure how long the program takes to generate a report file listing each customer grouped by sales representative.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

Panel 1 (top left)

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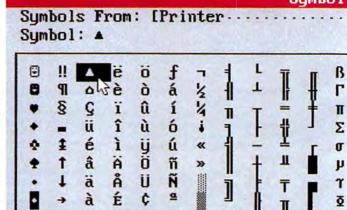
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Panel 3 (middle left)

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   rain gear. See enclosed packet for full details.

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...ly. Here is the planned itinerary for t

DATES	COST (U.
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AUGUST 15-SEPTEMBER 3	2126
SEPTEMBER 4-	**Automatic tables**
SEPTEMBER 24	473

4 × 6

Panel 5 (bottom left)

AUGUST

SUNDAY	MONDAY	TUESDAY	WEDNESDA
		1 Leave New York for Paris	2 Rest one da... at L'Hotel d... Roi
6 Preparation	**Lines and borders**		9 Climb
13	14	15	16

Panel 6 (bottom right)

Symbols From: [Printer············
Symbol: ▲

Special symbols

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Microsoft

Making it easier

FileMaker Pro for Windows 2.0

PROS: Simple, clean, Macintosh compatibility
CONS: Lacking in high-end features

The slick *FileMaker Pro* was a hit with Macintosh database users, and Claris is now promoting it for *Windows* as well. Like a contender for the heavyweight title, it has a lot of show and some real punch. *FileMaker Pro* is a flat-file database that will let you look up and fill in data from one file to another—but that's the extent of its relational capabilities. It passed our first test easily, but we ran into problems on the more advanced scenarios, which involved working with multiple files.

Notably, the program runs in both the *Windows* and Macintosh environments and shares files across these platforms. A fairly extensive set of security features lets you set up passwords and groups of users with access privileges that define the kinds of activities a user can perform with a file.
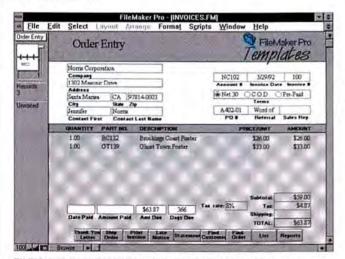
Another of *FileMaker Pro*'s unique features is its variable-length text fields. These simplify the process of creating a data file but come with a few inconveniences. For example, when you design a new layout, you may have to spend some time resizing field objects because the length of the defaults may be quite different from the size of the values you'll be storing in the fields.

An interesting feature that deserves special mention is *FileMaker Pro*'s repeating fields. When you define fields for a file, you can specify that one or more fields be repeated a fixed number of times. This allows you to create repeating sets of data like those you would see on an invoice with multiple detail items.

The templates that come with *FileMaker Pro* are easy to figure out and to adapt to your needs. Also worth noting is *FileMaker Pro*'s ScriptMaker feature. You can quickly pick actions from a macro list and associate them with buttons you place on your forms to automate many database tasks with a few mouse clicks. If you don't need relational capabilities, can live with the fixed number limit of the repeating fields feature, or need Macintosh compatibility, Best Buy *FileMaker Pro* is a winner by decision.

List price: $399. Contact: Claris, 408/727-8227.

Reader service no. 607

FILEMAKER PRO INCLUDES A GREAT SET OF TEMPLATES that you can customize for your own work.

ACEFILE LETS YOU JOIN TWO TABLES to create a new data file or define relationships to simulate linked table views.

AceFile 2.0

PROS: Simple, graphs, cross-tabs, inexpensive
CONS: Forces use of macros too often, lacking in high-end features

Like a small runabout car, *AceFile* is easy to get familiar with and fun to use. It's slower than *FileMaker Pro* and requires a little more work to customize data entry. Unlike *FileMaker Pro*, *AceFile* lets you create graphs and cross-tabs and includes a telephone dialer.

Two features push *AceFile* to the upper edge of what's possible with a flat-file program: the Relate and Join commands. With the Relate command, you can define, using common fields, several levels of relationships between data files. Then, when you select a record in your top-level table, *AceFile* automatically highlights the first associated record in any related tables.

AceFile's Join feature lets you link two tables to create a new table. You can report on the resulting table, effectively getting around *AceFile*'s limit of reporting from only one table. But you can suppress only one field of repeating information in a report, leading to unnecessary copies of the other fields.
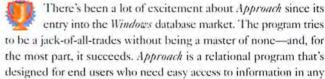
To its detriment, *AceFile* requires macros to set up lookups, pick lists, and incrementing fields, and it lacks a security system. For simple database projects that require a minimal amount of file linking, *AceFile* should handle your work well, if you don't mind writing macros to get custom features.
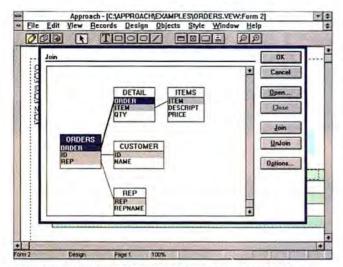
List price: $199. Contact: Ace Software, 408/451-0100.

Reader service no. 608

Approach for Windows 2.0

PROS: Simple design tools, great point-and-click interface
CONS: Lacks programmability and some high-end tools

There's been a lot of excitement about *Approach* since its entry into the *Windows* database market. The program tries to be a jack-of-all-trades without being a master of none—and, for the most part, it succeeds. *Approach* is a relational program that's designed for end users who need easy access to information in any

WITH APPROACH, YOU CAN JOIN TABLES for a form or report by just dragging your mouse to link the tables.

of several formats, including *dBASE*, *Paradox*, *FoxPro*, *Oracle SQL*, and *Microsoft SQL Server*. It lacks the application development tools of *Superbase*, *Access*, and *Paradox for Windows* but includes enough point-and-click tools to make it a good candidate for fairly simple relational database projects.

One of the best features of the program is its simple process for defining relationships between tables. You don't have to worry about setting up indexes for your tables before you relate them, as you do with some of the other relational programs. *Approach* sets them up automatically and keeps track of them for you. The process of creating a two-table form for our follow-up report was as easy as ordering lunch—and took about as long. But we discovered some potential pitfalls while using five related tables for our order entry/invoicing task. If you don't highlight the right master table when you add tables to either the main part of a form or a repeating panel, you can have trouble entering data later. This problem should be clearly documented so that you don't make a mistake, or the program should use a different method.

Approach includes abundant options for customizing data entry by just pointing and clicking. You can add lookups, incrementing fields, default values, pick lists, field formatting, and other checks without writing any macros or *expressions* (a code word meaning that you need to know the proper syntax for entering what you want). And although *Approach* doesn't include style sheets in the manner of *DataEase Express*, you can easily set your preferred defaults for screen elements like field and label styles and fonts and for treatment of pictures.

There are places where the user interface could be improved. In the case of creating multitable forms or reports, you can have problems if the proper table name isn't highlighted when you close the Create dialog box. This pitfall wouldn't be a big deal except that you can't change the tables used in a document once it's created—unlike in other relational programs, you have to design a new form or report from scratch. *Approach* completed the fourth task, summarizing sales by salesperson, with greater difficulty because of its complexity. The program's ease of use in some areas balanced its limitations with larger numbers of files, so it took about the same amount of time to complete the tasks as the other programs over-

all. Best Buy *Approach* probably has all the tools you need to manage your information, especially if you can do without the programmability of more high-powered databases such as *Paradox for Windows* and *Access*. Because it handles moderately difficult tasks well, it could also replace a flat-file database, should you decide you may need more capabilities in the future.

List price: $399. Contact: Approach Software, 415/306-7890.
Reader service no. 609

DataEase Express for Windows 1.0

PROS: Good range of features, Query By Model tool
CONS: Spotty user interface and documentation

Somewhere at the core of *DataEase Express for Windows* are two conflicting directions struggling for dominance. *DataEase Express* is marketed as a tool for end users rather than programmers. Yet it's oriented to application design. This conflict in character limits the extent to which we can recommend it for novice database users.

We were able to review only version 1.0 of *DataEase Express*, but version 1.1 will be available by the time you read this. The new version supports more import/export options and lets you access data in *dBASE*, *Paradox*, several popular SQL, and other formats.
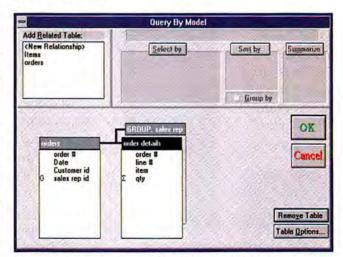
DataEase Express has a wonderful variety of field types, such as Choice for creating pick lists, which simplify the process of putting data entry checks in a table. But for a few other tasks, you have to create "derivation formulas" or "validation formulas" to get custom data entry features.

One of the most powerful tools in *DataEase Express* is Query By Model, which lets you choose the tables, relationships, fields, and record selection criteria for a report all from one dialog box. You can even add summaries and sorts to the report or group data within it by clicking in the right places.

DataEase's complexity derives from the relational capabilities it provides. It already has some of the ease-of-use features it needs, but with clearer documentation and better signposts in the user interface, it could hit the mark precisely for its intended audience.

List price: $395. Contact: DataEase Int'l, 800/243-5123.
Reader service no. 610

DATAEASE'S QUERY BY MODEL TOOL lets you relate tables and sort, group, and summarize data for a report all from one dialog box.

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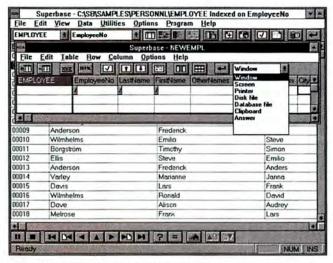
Superbase 2.0 for Windows

PROS: Powerful, straightforward
CONS: Few design tools, no built-in macros

Superbase is the granddaddy of *Windows* databases. It's the only high-end program here in its second major version, and the experience of the first lifetime shows. It was straightforward work to sit down with *Superbase* and its excellent documentation and figure out how to complete our first four tasks. Unlike some of the other relational programs, *Superbase* didn't present too many quirks; we didn't have to try a job several times before getting it right.

One noticeably weak area is *Superbase*'s default forms and reports, which are pretty plain. Also, the program lacks an easy way to switch back and forth between design mode and the mode in which you see forms or reports containing your data. This deficiency hampers the process of modifying documents or setting up a new design. A point in *Superbase*'s favor: It was quite simple, after a

SUPERBASE LETS YOU USE QUERY BY EXAMPLE to ask questions about your information or to update data files.

FEATURES COMPARISON

Windows Databases: The Details Matter

● Yes
○ No
n/a = not applicable

	FileMaker Pro for Windows 2.0 (BEST BUY)	AceFile 2.0	Approach for Windows 2.0 (BEST BUY)	DataEase Express for Windows 1.0	Superbase 2.0 for Windows (BEST BUY)	Microsoft Access 1.0	Paradox for Windows 1.0
List price	$399[1]	$199	$399	$395	$795	$495	$795
File formats directly supported							
Popular PC formats	FileMaker Pro	dBASE	dBASE, Paradox, FoxPro	DataEase, Paradox, dBASE[2]	Superbase, dBASE	Paradox 3.x, dBASE, Btrieve, Access	Paradox, dBASE
SQL access	○	○	●	●[3]	●[4]	●	●[3]
Export/import formats							
Popular PC formats	D, 1, E, T[5]	D, 1, T[5]	D, 1, E, P, T[5]	D, 1, P, T[3, 5]	D, 1, E, P, T[5]	D, 1, E, T[5]	1, E, Q, T[5]
Relational capabilities							
Number of tables that can be linked	lookups only	10 for table views	10	100	6	32,768	6
Link tables in forms and reports	○	○	●	●	●	●	●
Database-level referential integrity	○	○	●	○	●	●	●
Form-level referential integrity	○	○	●	●	●	●	●
Point-and-click data checks							
Lookups, pick lists	●	●[7]	●	●	●[8]	○	●
Incrementing fields	●	●[7]	●	●	●[8]	●	○
Data presentation							
Style sheets or preference setting for objects	○	○	●	●	●	●	●
Avery label layouts included	●	●	●	●	○	●	○
Cross-tabs	○	●	○	○	○	●	●
Graphs	○	●	○	○	○	●	●
Automatic linking of data files	n/a	n/a	○	●	●	●	●
Point-and-click multitable layout design	n/a	n/a	●	●	●	●	●
Experts, Wizards, or other guides	○	○	○	●	○	●	●
Attach filters to documents	○	●	●[7]	●	●	●	●

quick look in the documentation, to link tables and use them in multitable forms. And once these forms were completed, there were no hassles during data entry.

Though the user interface has problems in places, *Superbase* includes several niceties, such as an easy-to-manipulate table view, messages that can be turned on and off as desired, well-indexed documentation, and hot keys listed on the menus. The Query by Example facility works similarly to the QBE made popular by *Paradox* for DOS, and the program includes communications software.

Superbase hasn't done well in previous *PC World* reviews. However, this latest revision has improved the program dramatically. Overall, even with its programming capabilities, *Superbase* is fairly user-friendly. In comparison to *Access* and *Paradox for Windows*, it may seem a little plain, and it definitely lacks razzle-dazzle features like direct edit of query results. But for a relational program that really manages data, *Superbase* can hold its own.

List price: $795. Contact: Software Publishing, 408/988-7518.

Reader service no. 613

Microsoft Access 1.0

PROS: Powerful, good design tools, macros
CONS: Difficult to learn, idiosyncratic

Access has created a huge stir in the *Windows* database market, in part because of the initial offer to sell it for $99 (it's now $495). Another reason is the report of serious bugs when the program is used with very large sets of data. These bugs should be fixed by the time you read this.

Access's treasure trove of neat features really makes some complex tasks a snap. However, unless you're already a power database user, don't expect to just fire up the program and start whipping out forms and reports. Even though *Access* is marketed as user-friendly, you need to be willing to put in some time to discover how it does things.

Access's relatively steep learning curve becomes apparent as soon as you try to work with data from multiple tables in the same form or report. Unlike other programs we looked at, where tables don't

	FileMaker Pro for Windows 2.0 (BEST BUY)	AceFile 2.0	Approach for Windows 2.0 (BEST BUY)	DataEase Express for Windows 1.0	Superbase for Windows 2.0	Microsoft Access 1.0 (BEST BUY)	Paradox for Windows 1.0
Queries							
QBE, QBF	●	○	●	●	●	●	●
Experts, Wizards, or other guides	○	○	○	●	○[9]	●	●
Embed SQL requests	○	○	●	○	●	●	●
Edit query results directly to update original	●	●	●	●	○	●	○
Create from form or report	●	n/a	○	●	○	●	●
Security							
Group or application level	●	○	○	●	○	●	●
Table level	●	○	●	●	●	●	●
Field level	●	○	●	●	●	●	●
Data types supported							
Text, numeric, date, binary	●	●	●	●	●	●	●
Time	●	○	●	●	●	●	○
Memos	●	●	●	●	○	●	●
Currency	●	●	●	●	●[10]	●	●
Counter	○	○	○	●	●[10]	●	○
Logical	●	●	●	●	●[10]	●	○
Application development							
DDE and OLE	○	●	●	●	●	●	●
Point-and-click action-button definition	●	●[7]	●	●	○	●	●
Programming language	○	○	○	○	SBL	Access Basic	ObjectPAL
Run time	○	○	○	○	●	○	●
Supports calls to DLLs	n/a	n/a	n/a	●	●	●	●

[1] $99 for Q&A users, including translator, before June 30, 1993.
[2] DataEase currently supported; all other formats to be supported in forthcoming version.
[3] In forthcoming release.
[4] Requires SQL Library add-on.
[5] D = dBASE, 1 = 1-2-3, E = Excel. P = Paradox, Q = Quattro Pro, T = text.
[6] Limited by disk space.
[7] Requires macro.
[8] Requires expression.
[9] Through programming.
[10] With data formatting.

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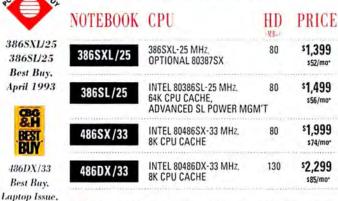
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486DX/33	INTEL 80486DX-33 MHz, 8K CPU CACHE	130	**$2,299** $85/mo*

386SXL/25
386SL/25
Best Buy,
April 1993

CBG&H BEST BUY

486DX/33
Best Buy,
Laptop Issue,
Sept. 1992

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Circle 14 on reader service card

ACCESS'S FORM WIZARD prompts you through creating a form, even for multiple related tables, as in our order entry task.

need to be keyed before being joined, *Access* enforces stringent rules regarding joins. And keying tables is not an intuitive task.

Yet if you make it past the initial hump of keying and relating tables, being able to use the Form and Report Wizards for related tables makes the effort worthwhile. The Wizards prompt you through the process of designing forms and reports, leaving you with document layouts you can then customize to your heart's content. The Wizards provide enough capability that we were able to use them to create all the forms and reports for our tasks. But the documentation for the Wizards is incredibly short, considering what they can do.

Other *Access* strong points include querying and its macro language. But again, you'll probably have to acquaint yourself with these functions through the documentation or the Cue Cards, an innovative extension of the program's on-line help system.

Overall, Best Buy *Access* is a powerful tool that has most of the features that any power user or application developer could need, plus a few extras. It has a rich set of macros that can be attached to buttons, and its own programming language, Access Basic. But if you're a beginning database user, be prepared to hit the books or the Cue Cards to deal with the program's idiosyncrasies.

List price: $495. Contact: Microsoft, 800/426-9400.

Reader service no. 612

Paradox for Windows 1.0

PROS: Powerful, good query tools, good programming language
CONS: Difficult to summarize calculated fields

Like *Access*, and like an octopus, *Paradox for Windows* reaches out in all directions. It includes many features that appear to be designed for the end user, yet at the other end of the spectrum, it also has its own programming language, ObjectPAL. The result is a database manager that can jump through all the hoops but is short on the end-user conveniences found in some of the less-powerful products.

Paradox for Windows quickly accomplished our first test task with no problems. You can assign various data entry checks (including lookups), define indexes, set passwords, and even define referential

integrity all in the same dialog box—a nice capability. With Speedbar buttons for Quick Forms and Reports (even Quick Cross-tabs and Graphs), simple forms and reports are a snap.

For both of our multitable forms, *Paradox for Windows'* Data Model, the dialog box you use to specify the tables and relationships for a document, made short work of naming and relating the tables. With the proper keys in place, *Paradox/Win* was able to correctly guess how the tables should be linked for the two-table form.

Although it was extremely easy to get decent default form and report layouts, even with several related tables, we ran into problems trying to add the summary information to our order entry form and invoice report. Unbelievably, *Paradox for Windows* will not allow you to summarize a calculated field either on a form or in a report easily—an incredible oversight, especially since *Paradox* for DOS can do it. Sure, you can do the calculation in a query and then report on the results for an invoice, but for a form you need to enter the calculation's result manually or use some trick to store the data in a real field for summarizing. In either case, you shouldn't have to work so hard to accomplish such a common task.
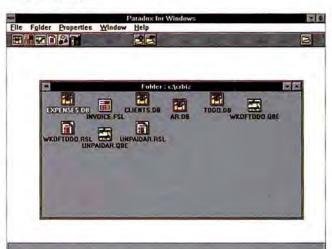
Paradox for Windows retains the easy-to-use Query by Example facility first popularized in its DOS version. One great new feature lets you base a query on a form or report. If the form or report you specify includes linked tables, *Paradox/Win* automatically joins the tables for you in the query window.

Defining action buttons for forms is not easy. You have to write "methods" in ObjectPAL and attach them to buttons. There are no predefined macros to choose from, unless you want to hunt through the sample code that comes with the program. Also, *Paradox* for DOS users should note that programs written in PAL (Paradox Application Language) will not run under *Paradox for Windows*.

Paradox for Windows is very much like *Access* in its range of capabilities. It provides good relational tools, has an extensible programming language, and offers lots of extras, such as graphing and its Object Inspector, which lets you quickly change the properties of almost any object you see on screen. The program is not for casual users, though. To make the best use of *Paradox for Windows*, you must be willing to spend some time discovering how it works.

List price: $795. Contact: Borland Int'l, 800/331-0877.
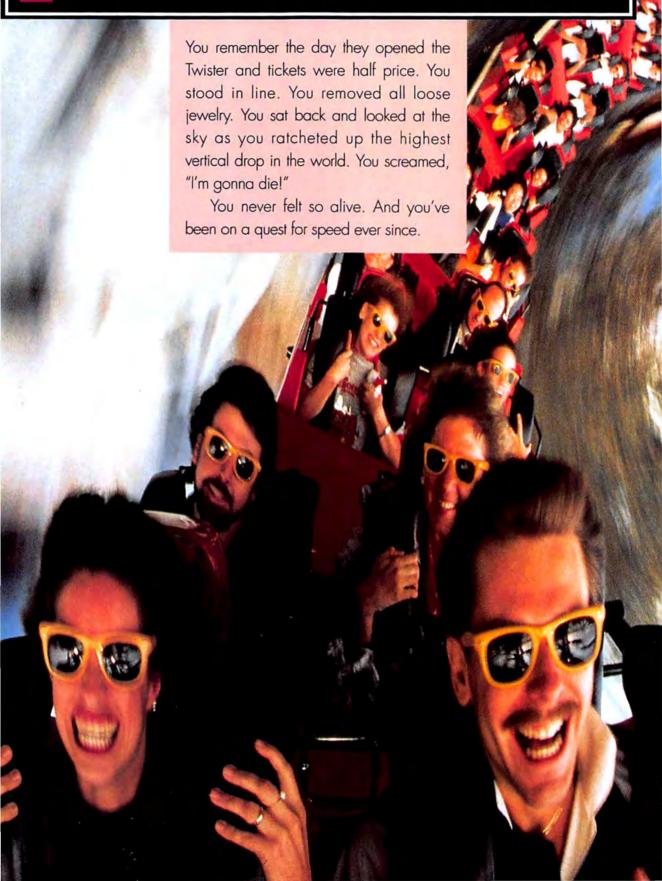
Reader service no. 611

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CACHES PAY OFF

BY TJ BYERS AND REX FARRANCE If your system's straining under the load of Windows and other disk-intensive applications, here's how hardware and software caches can help.
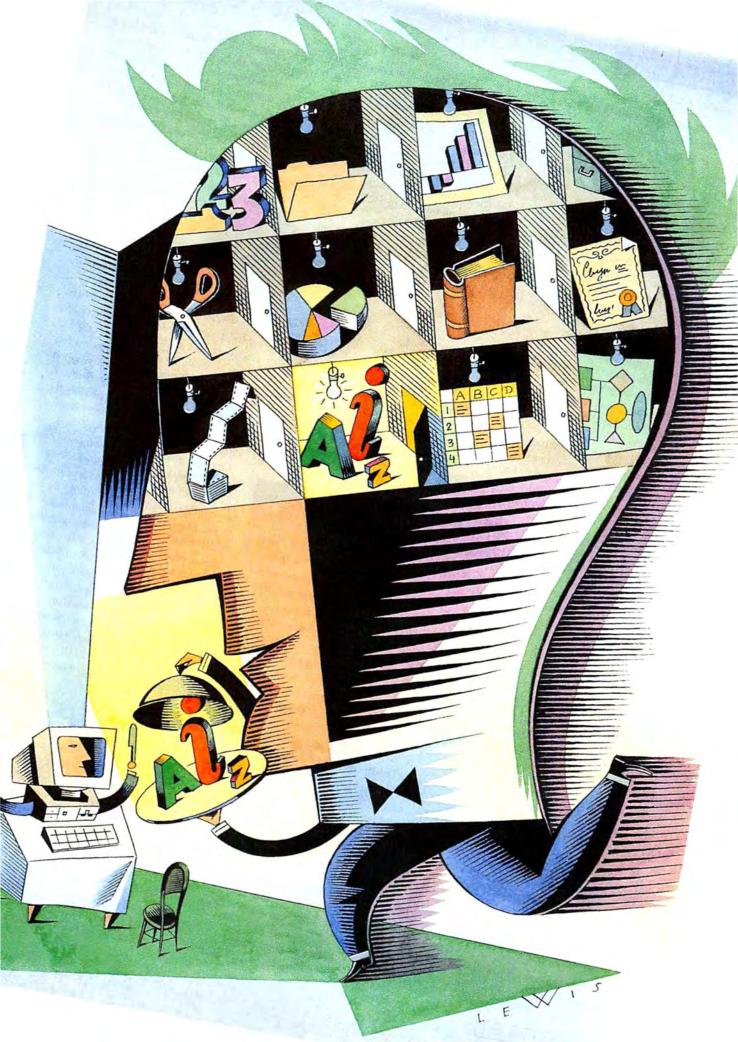
With today's weighty workloads and power-hungry applications, you're undoubtedly searching for anything that can help you work faster. And chances are, overspending your budget for new PCs is not on your list of options. So how do you get the speed you need without shelling out thousands of dollars? You may find the key to next-level speed stored on the hard disk of your current PC.

Disk caching can make a huge difference in the speed of today's applications, regardless of your hard disk's age. And you don't have to use a database program to benefit; *Windows,* with its heavy use of virtual memory, makes big hard disk demands. Any system—even the hottest desktop iron—can benefit from disk caching. By reading more data than an application requests, the data the app subsequently requests is often already in the cache. Because getting the data from the cache is far faster than getting it from the disk, system and application performance improves.

But what's the best cache choice on the desktop: hardware or software? Is a costly caching IDE disk controller—which you have to install in an expansion slot in your PC—worth the investment? Or will a less expensive, easier-to-install software cache, such as *Super PC-Kwik,* do the job just as well? And what about SmartDrive 4.0, the caching utility that's free with *Windows 3.1* and DOS 6.0? How does it stack up against its hardware and software competition?

The Cost of Cache

To suit your needs, you have to find just the right fit in three important areas: cost, speed, and usability. Cost is self-explanatory. The whole idea in using disk caching products is to get maximum

bang for the buck—and the fewer bucks you need to spend, the better.

If you're looking for the lowest price you can find, The Aldridge Company's *Cache86* and HyperWare's shareware *HyperDisk* are priced at a mere $50. Microsoft includes SmartDrive 4.0 with *Windows 3.1*, so you may already have it; you can get Smart-Drive 4.1 for the cost of a DOS 6.0 upgrade. The most expensive software products here are Central Point's PC Cache (included in *PC Tools*) and Symantec's NCache (included in *The Norton Utilities*). Both have list prices of $179, but they also come with data protection, data recovery, file management, system information, and bench-marking utilities that provide their underlying appeal. *PC Tools* throws in other extras, such as excellent antivirus and backup utilities, and a remote computing program.

Naturally you'll pay considerably higher prices for the hardware caching products. List prices run as high as $595 for Percep-

tive Solutions' WinStore controller with its starting capability to cache 1MB of data, and as low as $220 for UltraStor's Ultra 15C in its basic 512K configuration.

You should be able to find all these products discounted. For example, you can buy *The Norton Utilities* or *PC Tools* through mail-order software and hardware houses for around $115 to $125.

> For a 4MB Windows PC, boosting system RAM to 8MB may provide more of a speedup than adding a 4MB caching controller.

Searching for Fast Cache

While costs vary considerably, the PC World Test Center detected minimal overall speed differences between hardware and software caches. Intriguingly, the software caches took a slim 4 percent edge. Why? For one thing, software caches use system

RAM instead of dedicated cache RAM plugged into an expansion slot, so cached information doesn't have to cross the I/O bus.

The difference in the speed of the products was similarly small, between 5 and 10 percent—which means it wouldn't be noticeable in everyday work. We tested IDE controllers because IDE drives are the current desktop drives of choice, but control tests indicate that their results are consistent with those for ESDI and SCSI caching disk controllers.

It's important to note that our tests employed standard desktop applications. If you're using a non-DOS, non-*Windows* application such as Novell NetWare, a software disk cache may not work. For example, while all these software caches work on Novell client nodes, none support the Novell server. But many hardware caching disk controllers do, including the Alpha Research Model S4251 and UltraStor Ultra 15C listed here.

Our technicians used default installations on our 25-MHz 386DX Compaq Deskpro 3/25i for all the software products, on the assumption that most users would do the same. Our test system was equipped with 8MB of RAM. Hardware caching controllers were tested with 2.5MB to 4.5MB of cache, and with software from 256K to 7MB. We found that most of the benefit came with the first cache increments; each larger increment, while beneficial, offered an increasingly diminished performance benefit. For example, the speed difference between the same controllers using 2MB to 4MB of cache was a negligible 1 to 4 percent.

Cache Decisions

Remember that all caches use some kind of RAM. Hardware caches provide dedicated memory stores, and software caches borrow from system RAM. Generally speaking, a caching IDE controller will cost from $150 to $300 for the controller itself. Unless you have an older system or a system that requires proprietary RAM, these caching disk controllers and your system both use the same standard single in-line memory modules (SIMMs). So you'll pay a street price of $30 to $40 per megabyte to add RAM to either. And if you want to achieve an optimum performance boost, you'll probably need to add

Playing It Safe With Delayed Writes

Both hardware and software caches always cache reads on cached disks. But they don't always cache their writes. In the write-through mode—the safer of the two—data is written to the disk immediately. The second mode, called delayed write, staged write, or write-back, postpones writing to the disk until there's no impending hard disk or CPU activity. Use of this mode can improve data throughput at the time of the write by as much as 30 percent, depending on the application.

Timing the Writes

Some caches, such as DOS's SmartDrive, constantly monitor system activity and write to the disk whenever an opportunity occurs. Others, like *Fast*, simply wait a pre-determined time—five seconds, for example—in the hope that system activity will have subsided by the time the write is forced. Other products, such as Aldridge's *Cache86*, accomplish both of those tasks.

The danger in using delayed writes is that data has to reside in RAM during the wait, even though the cache has given the CPU

the message that the data has been written. So the data is susceptible to loss should power fail. You can also lose information if the system is turned off or rebooted before the data is written to disk.

Most software caches attempt to avoid data loss by trapping the <Ctrl>-<Alt>-<Delete> keystroke sequence and flushing the buffers before a reboot. Some give you a hot-key option, and you can flush your cache with a keystroke combination—if you remember to use it. However, these features don't help you with a power failure or an accidental flick of the reset switch. And in a case where you have set up your hardware caching controller to use delayed writes, you don't even have a hot-key option for flushing the cache.

Caching software and hardware vendors argue that delayed writes actually lessen the amount of time your data is in jeopardy by speeding up your system overall. Whether or not you buy that argument, there's no question that if your data has not been written to disk and you lose power, you'll lose the data as well.

some RAM—especially if you have a system with only 2MB or so of RAM.

It's important to decide where the added RAM will do the most good. If you have a system with 4MB of RAM and you're a *Windows* user who runs multiple applications and does a lot of task switching and background processing, boosting system RAM to 8MB will provide much more of a speedup than adding a 4MB caching disk controller. And you won't have to pay an extra $200 or more for the controller card. It is important to note, however, that older, slower machines will benefit much more from hardware than software caching for two reasons: The CPU is slower, and in PC-XT class and earlier systems specifically, your total RAM is too limited to leave enough space to cache in. Of course, with many of these older systems, the cost of a hardware caching controller may exceed the value of the PC.

Cache Usability

Usability is essential with any product, and it starts with an easy installation and setup, which an installation program should facilitate. Everyday usability features are even more important. Many software caches offer hot-key options that let you enable and disable the cache with a keystroke, switch performance-enhancing delayed writes on or off, or flush out the cache to make sure all the data is written to disk before shutting down. The latter can be important if you're using a cache with delayed writes enabled. (For more details see the sidebar, "Playing It Safe With Delayed Writes.")

Installing a caching disk controller requires some work. For starters, you have to open the PC's cover and plug the card into an expansion slot on the system board. Usually you have to run the computer's setup program to disable the PC's built-in IDE connector. Then you have to select the correct drive type to correspond to your controller. You attach the drive cables, set a jumper or two, and away you go. It's not really difficult, but the process can be intimidating for the less technically inclined.

Software installations are a snap. Usually all you have to do is run an installation program, which transfers the program from floppies to the hard disk. Ideally, the program should allow you to adjust your CONFIG.SYS and AUTOEXEC.BAT start-up files. If your program doesn't complete the whole job, you will have to use an ASCII editor and make the final adjustments yourself. This isn't terribly challenging, but it can be an annoyance. The best installation utilities are menu-driven, giving you the opportunity to set caching parameters during installation.
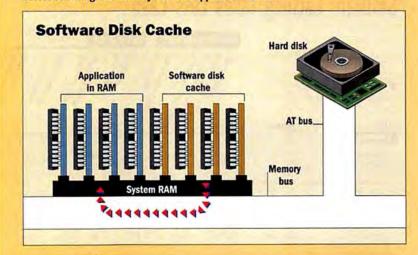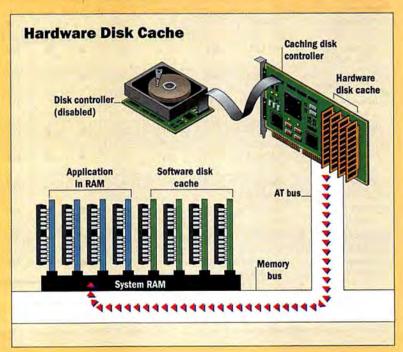
The easiest program to install is Lucid's *Lightning for Windows*. It has an accessible menu interface, and it's smart enough to default to the right choices in most cases. The only thing it doesn't do by itself is adjust the number of DOS buffers. All the software caches advise you to reduce the number of DOS buffers in the CONFIG.SYS file to ten or less, but only two, *Flash* from Software Matters and Golden

Software and Hardware Cache Hits

The software disk cache (top) uses system RAM for caching. When requested data is in the cache (a hit), it traverses only the memory bus to get to application RAM. The hardware cache (bottom) has its own dedicated cache RAM, but delivering a cache hit takes a bit longer because the data must travel on the slower AT bus before reaching the memory bus and application RAM.

Software Disk Cache

Hard disk

Application in RAM

Software disk cache

AT bus

Memory bus

System RAM

Hardware Disk Cache

Caching disk controller

Hardware disk cache

Disk controller (disabled)

Application in RAM

Software disk cache

AT bus

Memory bus

System RAM

Bow's *Vcache*, actually do it. The others force you to edit the file manually.

Unfortunately, neither *Flash* nor *Vcache* deletes existing software caches; having two running at the same time noticeably reduces system speed, and if you've installed *Windows*, you probably already have SmartDrive running. An advantage of caching disk controllers is that they do not need to delete software caches.

The most difficult software cache to install is The Aldridge Company's *Cache86*. It's the only one we found that lacks an installation program. Besides having to install the cache manually, you need complete firsthand knowledge of the system's environment, as there are no defaults.

Cache Considerations

As you can see, each class of products provides benefits and drawbacks. Software caches are a hair faster, a lot cheaper, and can cache more drives. Hardware caches are generally better behaved and support more applications and operating systems.

What's more, hardware caches don't eat up conventional RAM; the Alpha Research and Corporate Systems Center cards require just 1K; the Perceptive Solutions and UltraStor products use none. The IDE disk controller cards we looked at plug into 16-bit ISA expansion slots and use standard SIMMs to provide most of their cache capacity, although the two Perceptive Solutions controllers also have 512K of cache RAM soldered on.

Most of the software products can cache a variety of drive types in addition to ESDI, IDE, MFM, RLL, and SCSI Winchester drives. They will cache floppy drives and a range of SCSI removable-media drives, including those of hard disks, magneto-optical hard disks, and CD ROM drives. Software products cache instructions and data in extended RAM above 1MB but often

Software Caching Takes Less Cash

● = Yes ○ = No n/a = not applicable

Vendor	Product	Price	Cache size (installed hardware or software default with 8MB system RAM)[1]	Maximum cache size (MB)	Installation program	Removes existing software cache	Conventional RAM required?	Conventional RAM size	Recognizes system RAM type	Recognizes system	Enables/disables cache	Toggles write-through/write delay	Flushes cache	Maximum number of drives
HARDWARE														
Alpha Research 512/836-0709	Model S425I	$289	none[2]	16	●	n/a		1K	n/a	n/a	○	●	○	4
Corporate Systems Center 408/737-7312	FastCache 64	$149	1MB	64	●	n/a		1K	n/a	n/a	○	○	○	6
Perceptive Solutions 800/486-3278	QuickCache	$395	512K	8.5	●	n/a		none	n/a	n/a	○	○	○	4
	WinStore	$595[6]	512K[7]	8.5[7]	●	n/a		none	n/a	n/a	○	○	○	4
UltraStor 714/581-4100	Ultra 15C	$220	512K	8	●	n/a		none	n/a	n/a	○	○	○	4
SOFTWARE														
The Aldridge Co. 800/548-5019	Cache86	$50	none	8[8]	○	○		13K	○	○	●	●	●	24
Bloc Publishing 305/445-0903	Fast 4.13	$80	25% of RAM	8[8]	●	●		26K	○	○	●	●	●	24
Central Point Software 800/445-4208	PC Tools 8.0 PC Cache	$179	256K	32	●	○		17K	●	●	○	○	●	26
Golden Bow Systems 800/284-3269	Vcache 6.00	$70	avail. ext. or exp. RAM	8	●	○		37K	●	○	●	●	○	16
HyperWare 415/882-1740	HyperDisk 4.50	$50	avail. ext. or exp. RAM	63	●	●		29K	●	●	●	●	●	20[9]
Lucid 800/967-5550	Lightning for Windows	$130	3MB	8	●	●		90K	●	●	●	●	●	26
Microsoft 206/882-8080	Windows 3.1 SmartDrive 4.0[10]	$130	2MB	32	●	○		26K	●	●	○	○	○	26
PC-Kwik 503/644-5644	Super PC-Kwik 5.01	$80	avail. ext. or exp. RAM	16	●	●		48K	●	●	○	●	○	26
Software Matters 317/253-8088	Flash 9.0	$70	avail. ext. or exp. RAM	32	●	●		4K	●	●	●	●	●	26
Symantec 800/441-7230	Norton Utilities 6.01 NCache	$179	avail. ext. or exp. RAM	23	●	●		33K	●	●	○	○	○	26

[1] Software conventional RAM requirements vary with cache size.

[2] Sold without memory; needs 1MB to function.

[3] Controller support only, not cached.

[4] Can select inactive CPU or time-delayed write at setup.

[5] When Hot-Fix feature is enabled.

[6] Includes Stac hardware real-time data compression (approximately doubles size of hard drive and cache space). Software version available for $100 less.

[7] Caches twice as much compressed data.

[8] 8MB maximum for extended memory, 4MB maximum for expanded memory.

[9] Supports 10 hard and 10 floppy drives.

require conventional RAM in their default configurations. Lucid's *Lightning for Windows* takes a hefty 90K. You can usually load the drivers in upper memory, but if you also have network or CD ROM drive drivers to contend with, you may be out of upper memory. In that case, the bite will come from your 640K of conventional RAM. That adds up to problems executing RAM-hungry applications.

It's also important to realize that software caches don't always work with every application. For example, many software cache vendors warn against use with Quarterdeck's *QEMM-386* memory manager in its popular Stealth mode. And certain caches, such as Aldridge's *Cache86*, Bloc's *Fast*, and *The Norton Utilities 6.01*'s NCache, warn against use with AddStor's real-time disk compression utility *SuperStor*. (*Norton Utilities 7.0*'s cache, which will be available by the time you read this, is compatible with *SuperStor*, Stac Electronics' *Stacker*, and DOS 6.0's DoubleSpace data compression program.)

Hardware caching controllers, on the other hand, rarely conflict with software programs. One IDE caching controller, WinStore from Perceptive Solutions, even comes with Stac's hardware data compression integrated on the controller.

Picking Your Winner

For most desktop users, a software cache is the best choice, primarily because of the price advantage and easy installation. SmartDrive comes free with DOS and *Windows*, it's fast, and if you're like most users, it's all you'll ever need. But its installation does leave something to be desired: *Windows* and DOS 6.0 install it automatically but don't offer guidance on choosing a configuration. (A rough rule of thumb for users with 4MB of RAM is to set up a 1MB cache; if you have 8MB, SmartDrive 4.0's default 2MB cache should be fine.) *Windows* users with high memory to spare will like *Lightning for Windows*. It's easy to install and has an excellent toolbox of incidental *Windows* utilities. *Super PC-Kwik 5.01* is a tried-and-true program with a devoted following, a reputation for compatibility, and an easy installation. You can also buy it with *Super PC-Kwik Power Pak 3.0* for a nominal additional fee and get a number of extra utilities, such as keyboard and DOS screen accelerators and a print spooler.

Any of the caching disk controllers here can make a good alternative, especially if you have to run applications that need lots of RAM and your system is burdened with device drivers. If you're using a utility that software caches can't handle, a hardware solution may be your only disk-caching choice. The CSC Fastcache 64 is the least expensive of the lot. The Alpha Research S425I and UltraStor Ultra 15C are the only ones that will run on a Novell NetWare file server. If price isn't a big concern, Perceptive Solutions' WinStore board provides efficient disk caching and can nearly double your storage and disk cache capacity with its hardware real-time data compression.

While there is no universal answer, disk caching can pay off for almost every desktop user. Apart from exceptions dictated by occasional compatibility problems and unusually RAM-hungry applications, software caches are the most attractive solution. Bottom line? You probably already have one of the best disk caches you can get your hands on—SmartDrive. Just make sure you have it installed and configured properly.

TJ Byers is a contributing editor and Rex Farrance an associate editor for PC World. *They can be reached as TJBYERS and REXFARRANCE on PC World Online (see page 10 for more information).*

	INCLUDED UTILITIES						DELAYED WRITES				
Floppy	Selective drive caching	Keyboard accelerator	Screen accelerator	Screen saver	Data recovery library	Time delay	Writes when CPU Is Inactive	Warm boot protection	Verify	Reader service number
○³	○	○	○	○	○	●	●⁴	○	●⁵	625
●	○	○	○	○	○	○	○	○	○	626
●	●	○	○	○	○	○	●	○	○	627
●	●	○	○	○	○	○	●	○	○	627
●	●	○	○	○	○	○	●	○	○	628
○	○	○	○	○	○	●	●	●	○	629
○	○	○	○	○	○	●	●	●	○	630
●	●	●	●	●	●	●	●	●	○	631
●	●	●	●	○	○	●	●	●	○	632
●	●	●	●	●	○	●	●	●	●	633
●	●	○	○	●	○	●	●	●	○	634
●	●	○	○	○	○	○	●	●	○	635
●	●	○	○	○	○	●	○	●	○	636
●	●	●	●	○	○	●	●	●	●	637
●	●	●	○	○	●	●	●	●	○	638

¹⁰ DOS 6.0 includes a later version of SmartDrive.

For more information about all products in this table, circle reader service no. 901.

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HELP LINE Q & A

TIP OF THE MONTH

TERMINAL AUTO-DIALING: *Windows* can use your modem to dial the phone for you. Select Program Manager's StartUp group. Press `<Alt>-FN<Enter><Tab>`, type `PROGMAN-.EXE`, enter an unused shortcut key (we'll use `Z`), and press `<Enter>`. In Accessories, click on Terminal, press `<Alt>-<Enter>`, enter `T` for the shortcut key, and press `<Enter>`. Run Terminal. Select *Settings • Communications*, your modem's COM port, its baud rate, and *OK*. Select *Settings • Modem Commands*, and after ATDT, add the number, if any, for an outside line and a comma. Save the file as `Dial`, and exit. Highlight a phone number in an app. Run Accessories' Recorder, and select *Macro • Record*. Type `Autodial`, press `<Tab>D`, and ensure only Ctrl is checked. From the Playback To list, select *Any Application* and ensure only Enable Shortcut Keys is checked. From the Record Mouse list, select *Ignore Mouse*. Select *Start*. Switch back to the app. Press `<Alt>EC<Ctrl>-<Alt>-Z<Ctrl>-<Alt>-T<Alt>FODial <Enter><Alt>SN<Ctrl>-V<Enter><Alt>PD`. Click *Cancel*. Switch to Recorder. Save the macro. In Recorder, select *Macro • Record*, type `Hang up`, press `<Tab>H`, and select *Start*. In Terminal, press `<Esc><Alt>FXN`. In Recorder, save the macro. In Recorder, save the macro file as `DIAL.REC`. Now, whenever DIAL.REC is open, you can highlight a number in a *Windows* app and press `<Ctrl>-D` to dial it. When your party's phone rings, pick up your phone and press `<Ctrl>-H`.

Shane Rau, assistant technical editor

Print Screen Problem

Q I have to press <Print Screen> three times before my HP LaserJet prints. Then it prints two-and-a-half screens, and I have to take it off line to clear it. Is there some way to make <Print Screen> print on the first press?
Gerard L. Caron, Lynn, Massachusetts

A When you press <Print Screen>, it dumps what's on the screen to your LaserJet's memory. However, since the screen dump is only 25 lines long, and the Print Screen ROM routine doesn't send an "eject page" command, the LaserJet assumes there's more text on the way. When you press <Print Screen> again, the LaserJet still doesn't have a full page in memory, so it still doesn't print. When you press <Print Screen> the third time, the LaserJet prints out what will fit on one page, leaving part of the third screen in memory to be printed on the next page.

To avoid this problem, you can press <Print Screen> once, then eject the page manually: Press the On Line but-ton to take the printer off line, press the Form Feed button to eject the page, and press the On Line button again to put the printer back on line.

Another solution is the shareware utility *LJVGA*. This utility eliminates fiddling with the printer's buttons; you just press <Print Screen> once, and the LaserJet prints whatever is on screen. *LJVGA* can even produce super-VGA graphics at 300-dpi resolution (DOS's GRAPHICS utility prints 150 dpi) and works with DOS programs running under *Windows*. You can download *LJVGA* from PC World Online or order it by phone from the distributor.

- **LJVGA** $24 ($14 registration only); Ares Technologies; 800/242-4775, 713/524-6394, 713/524-6398 (fax)
  Reader service no. 620

Which On-line Service?

Q I am considering joining an on-line service but am confused about the options. You refer to America Online throughout the magazine, but you sometimes mention CompuServe as well. I also have a trial membership in Prodigy. Which service will give me the best access to *PC World?*
Martin P. Feinberg, Pittsford, New York

A Currently, your broadest access to the magazine is through the PC World Online area of America Online. There, you can ask questions of Here's How columnists, report subscription problems, and submit your comments to the *Letters* column. Though you can often download the shareware and freeware files mentioned in *PC World* articles from other on-line services or local BBS's, the easiest place to find the files is in each issue's Featured in folder on PC World Online. One other on-line service with a major *PC World* presence is MCI Mail, where most editors have personal E-mail accounts.

XCOPY from A: to A:?

Q My new 486 came with a single 3½-inch floppy drive. Because many of my clients still use 5¼-inch disks, I installed a 5¼-inch B: drive. The new

drive works great, but I can no longer XCOPY directly from one 3½-inch floppy to another. Is there some way I can get that capability back?
Elizabeth Edwards,
Brattleboro, Vermont

A DOS's DRIVER.SYS lets you assign multiple drive letters to floppy drives. Add the line **DEVICE=C:\DOS\ DRIVER.SYS /D:0 /F:7** to your CONFIG-.SYS and reboot.

The /D:0 switch indicates drive A:, and /F:7 tells DOS it's a 1.44MB drive. (If you have a 2.88MB drive, use /F:9 instead.) DOS will assign the drive both A: and the next available drive letter—if you have only two floppies and a C: drive, your phantom 3½-inch floppy will be drive D:.

If you have more than one hard drive, have partitioned your drive into multiple logical volumes, or have installed CD ROM or other drives that use their own CONFIG.SYS drivers, watch the display when DRIVER.SYS is loaded to see which additional drive letter it assigns to the floppy drive. (The message is 'Loaded External Disk Driver for Drive *x*'.)

Now XCOPY A:\ D:\ will work the way XCOPY A:\ B:\ did before you installed the second floppy drive. If you'd like to have the same capability with the 5¼-inch drive, also add the line DE-VICE=C:\DOS\DRIVER.SYS /D:1 /F:1 to CONFIG.SYS. The /D:1 indicates drive B:, and /F:1 tells DOS it's a 1.2MB drive. Assuming the first floppy's double was D:, this one's will be E:.

Overlapping Commands

Q After I log into my lab's network, I can no longer access DOS's on-line help display—entering HELP brings up NetWare's interactive help system instead. How do I get DOS help while running NetWare?
S. Chandrasekaran, via Internet

A If you need to get help on a specific command, you can always use the /? switch. For example, typing

UNDELETE /? displays help for the UNDELETE command.

More generally, when you have two or more commands with the same name in various directories, you can specify the one you want by typing its complete path. For example, if your DOS directory is C:\DOS, enter C:\DOS\HELP and you'll get the familiar list of DOS commands rather than NetWare's on-line help.

You can also use batch files to provide unique names for commands with conflicting names. For example, if you put the command @C:\DOS\HELP %1 in a text file and save it as C:\DOS\ DOSHELP.BAT, you'll be able to invoke DOS's HELP command using the command DOSHELP.

Easing Network RAM-Cram

Q I currently run DOS 5.0 with *Windows 3.1*, and my system is connected to a NetWare LAN and a minicomputer simultaneously. Even though I put everything I can into upper memory, by the time I load all the drivers I need, I have only 430K of memory left—not enough to load some of my apps. Is there a way to load some drivers into extended or high memory?
Glenn Gardner, via Internet

A Unfortunately, your drivers have to be loaded in conventional (base) or upper memory (UMA). One possible exception is NetWare's EMSNETX-.EXE driver, a NETX.EXE replacement that loads most of its code in expanded memory (EMS). However, if you don't need EMS for other purposes, switching to EMSNETX will be a net loss, because configuring DOS to emulate expanded memory on a 386 or 486 uses 64K of upper memory, the same memory EMM386.EXE uses to load drivers high.

If you don't use EMS, add the parameter **NOEMS** to the end of the CON-FIG.SYS entry for EMM386 (and remove the parameter RAM, if it's there), and you'll have 64K more upper memory for drivers and TSRs.

A NOTEBOOK FOR EVERY PRINTER: The point of having a notebook is taking it from place to place, but it's unlikely that the printers at your home, office, and client site are compatible.

You'll save some formatting headaches if you keep several printer drivers, both for *Windows* and your DOS applications, installed on your notebook. You'll obviously want drivers for your office and home printers, but drivers for Post-Script, a PCL printer such as the HP LaserJet Series II, and a dot matrix printer such as the Epson FX-80 will also come in handy if you'll be printing from a variety of locations.

Dan Hanson
Greater Cleveland PC Users Group

Novell's XMSNETX.EXE, which loads itself into the high memory area (HMA, the first 64K of extended memory), won't do you any good. You'll save more base memory by loading DOS into the HMA instead, if you add the line **DOS=HIGH,UMB** to your CONFIG .SYS file.

You may be able to load more drivers high (into upper memory blocks) by configuring EMM386 to provide more upper memory. To see if that's possible, exit *Windows*, enter **MSD** at the DOS prompt, and select *Memory*. Take a look at **FIGURE 1**. The "before" display on the left side is MSD's display of my UMA when CONFIG.SYS contains the line 'DEVICE=C:\WINDOWS\EMM386 .EXE RAM 128'.

Since MSD indicated the 64K range E000-EFFF was 'possibly available', I modified my EMM386 line to DE-VICE=C:\WINDOWS\EMM386.EX E /NOHI RAM 128 I=E000-EFFF and rebooted. (By default, EMM386 uses addresses from segment C800 to DFFF only; you must use the I= parameter to make EMM386 use other addresses.) As you can see in the "after" display on Figure 1's right side, that change gave me another 64K of usable upper memory. Note that although MSD doesn't display it, you can often make another 32K of upper memory available by adding I=B000-B7FF as well. However,

some super-VGA boards (like my Orchid ProDesigner IIs) use part or all of that range, so check your video board manual before making the change.

/NOHI forces EMM386 to load itself entirely into conventional memory, freeing the 4K identified as 'RAM' in the "before" display and making room for a 16K program where only 12K would have fit before. This has no practical benefit in my system, but in your situation it might let you load one more driver high. And don't forget, if you don't need EMS, replacing the parameter RAM with NOEMS will turn all blocks marked 'EMS Page Frame' into 'Free UMBs'.

If MSD still shows 'Free UMBs' after you load all your drivers and TSRs, try experimenting with loading them in different orders. If after all this fiddling you still don't have enough free conventional memory to run your applications, get out your checkbook and buy a copy of *386Max* or *QEMM-386*. These third-party memory managers use various software tricks to grab more upper memory and squeeze more stuff into it than DOS can.

- **386Max** $99.95; Qualitas, Inc.: 800/733-1377, 301/907-6700, 301/907-0905 (fax)
Reader service no. 622

- **QEMM-386** $99.95; Quarterdeck Office Systems Inc.; 800/354-3222, 310/392-9851, 310/399-3802 (fax)
Reader service no. 623

XMS = Extended?

Q When I run the DOS command MEM, it says I have 7340032 bytes of extended memory but zero bytes of *available* extended memory. Instead of available extended memory, MEM says I've 4972544 bytes of available *XMS* memory. What's the difference?
Chris Pauling, via fax

A The display of DOS 5.0's MEM command is a bit confusing. 'Total contiguous extended memory' shows how much extended memory DOS detects in your system—usually the total amount of physical RAM, minus 1MB. (In some systems, DOS may not recognize memory beyond 16MB, and the total can also be affected by RAM shadowing and other system-specific memory features.) 'Available contiguous extended memory' shows how much of that extended memory is available to programs that are written to manipulate it directly using DOS's interrupt 15h interface.

When DOS's extended memory manager, HIMEM.SYS, is activated (via the line DEVICE=HIMEM.SYS in your CONFIG.SYS file), it takes over all extended memory, so the amount of 'available contiguous extended memory' drops to zero. That memory is still available to your programs—the only difference is that they have to request it from HIMEM.SYS instead of directly from DOS.

MEM's 'available XMS memory' display shows how much of the extended memory HIMEM is managing remains available for use by other programs. These days, most programs access extended memory through XMS rather than interrupt 15h, so 'available XMS memory' is the only figure most people need to worry about.

If you upgrade to DOS 6.0, you'll leave this confusion behind. The upgrade's new MEM display is a big improvement—even though it gives you more information, it's much easier to read and understand.

By Robert Lauriston

Robert Lauriston is a freelance writer and a regular contributor to PC World.

Mail your questions to Help Line, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the* Help Line *forum on* PC World Online; *CompuServe 74055,412; MCI Mail 179-3813; Internet 1793813-@mcimail.com; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

Legend: Available " " RAM " " ROM " " Possibly Available " "
EMS Page Frame "PP" Used UMBs "UU" Free UMBs "FF"

	before		before	after		after
1024K	FC00	FFFF	1024K	FC00		FFFF
	F800	FBFF		F800		FBFF
	F400	F7FF		F400		F7FF
960K	F000	F3FF	960K	F000		F3FF
	EC00	EFFF		EC00	FFFFFFFFFFFFFFFF	EFFF
	E800	EBFF		E800	FFFFFFFFFFFFFFFF	EBFF
	E400	E7FF		E400	FFFFFFFFFFFFFFFF	E7FF
896K	E000	E3FF	896K	E000	UUUUUUUUUFFFFFFF	E3FF
	DC00	DFFF		DC00		DFFF
	D800	PPPPPPPPPPPPPPPP	DBFF	D800	PPPPPPPPPPPPPPPP	DBFF
	D400	PPPPPPPPPPPPPPPP	D7FF	D400	PPPPPPPPPPPPPPPP	D7FF
832K	D000	PPPPPPPPPPPPPPPP	D3FF	832K D000	PPPPPPPPPPPPPPPP	D3FF
	CC00	PPPPPPPPPPPPPPPP	CFFF	CC00	PPPPPPPPPPPPPPPP	CFFF
	C800	UFFFFFFFFFFFFFF	CBFF	C800	FFFFFFFFFFFFFFFF	CBFF
	C400	C7FF		C400		C7FF
768K	C000	C3FF	768K	C000		C3FF

FIGURE 1: MODIFYING YOUR CONFIG.SYS'S EMM386 command can make more upper memory available for use by DEVICEHIGH and LOADHIGH. This "before" (left) and "after" (right) composite of two MSD upper memory displays shows the effect of adding the parameters /NOHI and I=E000-EFFF.

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Here's How

Roll Over, Quattro

Q I use *Quattro Pro* to manage the inventory for my shade-tree nursery. I've set up a database worksheet where I record the year each variety of tree was planted, the size of the trees, and other facts. In a separate worksheet, I have a sizable table of database statistical functions that summarize the data by variety. Now I'm ready to roll the worksheet over to the next year, so I'd like to set up a new database sheet. The trouble is, I have more than 800 database functions that all refer to the original worksheet; if I switch the database, I have to edit each one of those formulas to make them refer to the new file. Do you know any shortcuts?
Timothy Power, Hastings, Minnesota

A The quick-and-dirty answer is, use Edit•Search & Replace. The longer but cleaner answer is, set up a what-if table, which will eliminate most of the formulas and greatly simplify the rollover procedure. Incidentally, this longer procedure will work in any spreadsheet product once you've made the appropriate command and formula modifications.

I took the liberty of reconstructing the worksheet you sent me, severely abbreviating its style (**FIGURE 1**). The database worksheet, which I've named VARIET92.WQ1, is shown on the left, with just 6 records (your original had about 240 rows). The report worksheet, VARIREPO.WQ1, is on the right.

The database statistical function formulas in cells B5..D7 calculate the subtotals by variety from the database sheet. For example, the formula in cell B5 is @DSUM([VARIET92]A3..E10,2, A1..A2). It looks in the database range A3..E10 of the file VARIET92 for the records that satisfy the criterion range in A1..A2 in the report worksheet, that is, for all records of the trees of the variety 'ACDEBORAH'. It sums the values in column number 2 of only those records of the database (that's column C in the database worksheet; column A is counted as number 0). The other summary formulas in B5..D7 all refer to the same database range, [VARIET92]A3..E10, but they vary the column number and the criterion range as necessary.

Now, let's say you've just set up your new database sheet for 1993, entered the new values for the varieties, and saved it as VARIET93.WQ1. You're ready to run the report. To change all the formulas to refer to the new worksheet, put the cell pointer in VARIREPO.WQ1 and select /Edit•Search & Replace•Block. Highlight B5..D7 and press **<Enter>**. Select *Search String*, type **VARIET92**, and then press **<Enter>**. Select *Replace String*, type **VARIET93**, and press **<Enter>**. Note that the Look In option reads 'Formula'. Select *Next*, then *All*. In a flash, you've made all the database references refer to the new file instead of the old file.

Your database functions give you the answers you want, but it will take a really long time to recalculate more than 800 of them. And because every variety of tree needs its own criterion range, setting up and maintaining the report will be a hassle. When the number of records is as large as yours, a what-if table (like the one shown at the lower right of Figure 1 at A12..D16) is a faster way to get the answers, and it requires only one criterion range.

A what-if table (known in *1-2-3* and *Excel* as a data table) uses a small set of "seed" formulas to generate a larger table of results. In this case, the seed formulas in B13..D13 are database functions similar to those discussed previously. The one for small trees in B13 is @DSUM([VARIET92]A3..E10,2, A10..A11); those in C13 and D13 differ only in column number. The values shown in B13..D13 reflect the total number of trees of each size, because cell A11 in the criterion range is empty and thus all records are selected. To generate the table, select /Tools•What-If•1 Variable, highlight A13..D16, press **<Enter>**, select A11 as the Input Cell, and press **<Enter>** again. Select *Quit*.

The command works like this: It takes one value at a time from the left-hand column of the table (A14..A16), enters it into the input cell (A11), recalculates the formulas in the top row of the table (B13..D13), and enters the result into the corresponding row of the table. Since the table does not consist of formulas, you must refresh the table by pressing <F8>. When you add a new variety of tree, insert it into the list in A14..A16.

Finally, when you need to roll your worksheet over to the next year, you can still use Edit•Search & Replace, but you need to change the formulas in B13..D13.

Restricting the Screen in Excel
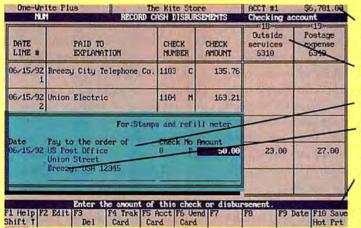
Q I've just switched from *Symphony* to *Excel*. Unfortunately, I can't seem to duplicate one of *Symphony's* nicest features: the capability to restrict the view and cursor movements to a portion of a large worksheet (it's the command

FIGURE 1: ORGANIZE A QUATTRO DATABASE by putting the data (shown at left) and reports in separate worksheets. The database statistical functions on the right summarize the database records.

<F9>•Window•Settings•Restrict• Range). How do I do this in *Excel?*
Garrett Cross, Albuquerque, New Mexico

A You can combine a couple of *Excel's* features to make quick and elegant work of restricting the worksheet.

First, in the column immediately to the right of the range you want to show, click on the column letter to select the entire column. Hold down <Shift> and press <End><Right> to select all the columns to the right of the range. Select *Format•Column Width*, and click *Hide* in the resulting dialog box. Similarly, hide all columns to the left of the area you're not restricting. Now click the row number of the first row just below the range you want to show, hold down <Shift>, press <End><Down>, and use *Format•Row Height•Hide* to hide the row

Spreadsheet Toolbox

You're the training manager for a company with 500 employees, and *1-2-3* is one of the basic tools of the trade. You arrange the classroom training for the staff, but it's expensive, so placing an advanced user in an introductory class, or vice versa, is a real waste of time and money. It would be great to know about the spreadsheet skills of a prospective new hire. Isn't there an efficient way to objectively measure people's knowledge of *1-2-3*?

Yes, indeed. *The Judd Test: Lotus 1-2-3* is an almost ideal solution. When you run the test, it launches *1-2-3* on your system (a special "restricted use" edition of *1-2-3* is included, just in case you need it). A series of pop-up windows explains the test procedures and then poses a graded series of tasks. Tasks run the gamut of basic *1-2-3* operations, including simple graphs, macros, sorting, and database procedures. The examinee can use any of the resources of *1-2-3*, including the help system, to complete a task. When finished with a task, the user types an exclamation point to go on to the next. *The Judd Test* scores the test and writes the results to a file.

It's the details that make *The Judd Test* a superior product. The examiner can configure the test to include or exclude various tasks and can identify examinees by name, social security number, code number, and so on. Scoring is sophisticated—it indexes both the user's accuracy and efficiency. And reports are available at various levels of detail, right down to a record of the individual keystrokes! Created by a Stanford Ph.D., the test is based on sound psychometric principles, and the documentation is exemplary. A test for *Excel* is in the works.

I give *The Judd Test* an A!

The Judd Test: Lotus 1-2-3 $495; Mentrix Corp.; 800/767-5833

Reader service no. 606

below the unrestricted area. Finally, hide any rows above it.

Cell pointer movement is now limited to the visible range, and you'll be able to use split panes within the area. To keep other users from disturbing the arrangement, select *Options•Protect Document* and enter a password.

Create a view to store the current screen arrangement so you can easily reproduce it later. Select *Window•View*, click *Add*, type a name for your new screen arrangement, for example **Restricted**, and click *OK*. When you want to apply this restricted view to the worksheet, select *Window•View*, select your named view, and click *Show*.

If you don't have a View choice under the Window menu, you need to install View Manager using your *Excel* installation disks. During the installation procedure, in the Excel Setup Options dialog box, check the Microsoft Excel check box, click on the *Excel* button, check the View Manager check box in the resulting dialog box, and click *OK*. Then click *Setup; Excel* will prompt you for the disk it needs.

Lost in Excel Macro Land

Q I'm an experienced spreadsheet user struggling to get started with *Excel* macros. I'm finding them to be very different from *1-2-3's* keystroke macros. How can I go about learning the basic concepts? Once I figure out how to think about *Excel* macros, I can probably do the rest on my own.
Pam Campbell, Centralia, Illinois

A I'm going to recommend $75 worth of books, but trust me—they're worth every penny. First, get Reed

Jacobson's *Excel Trade Secrets for Windows*, published by Que (ISBN 1-56529-055-0, $39.95). Carefully study the material in Chapter 2 about range names and Chapters 14 and 15 on macro concepts. Then hock your toaster oven and buy *Microsoft Excel Macros Step by Step* by Steve Wexler and Julianne Sharer (Microsoft Press, ISBN 1-55615-496-8, $34.95). Start at the beginning, skim through until it starts getting challenging, and then work your way right on through to the end.

When you're done with your reading, you'll want to take a careful look at a professionally prepared example. Crank up *Excel*, select *File•Open*, and double-click on the \LIBRARY directory underneath your *Excel* program directory in the Directories: list box. Find AUDIT.XLA, the add-in macro sheet that helps diagnose problem worksheets. (It will be there if you did a standard installation of *Excel;* if it's not, use the SETUP program to install it.) Hold down <Shift> and click *OK* to open the add-in as a standard macro sheet.
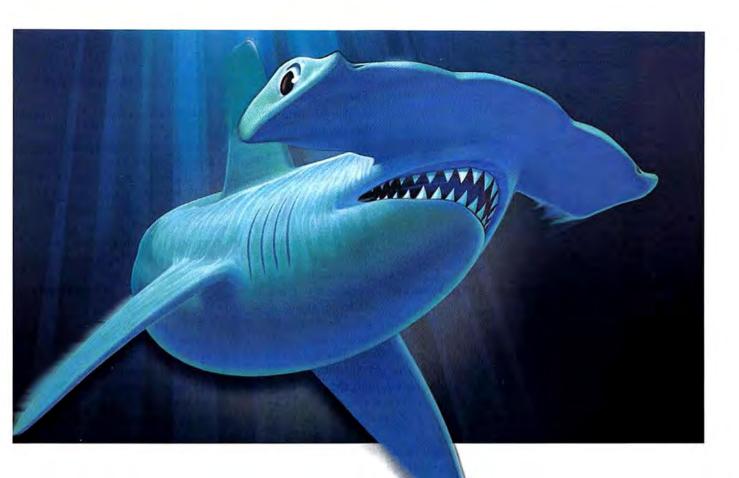
In AUDIT.XLA, notice the physical layout of the macro statements, dialog box tables, and menus. Note the documentation, including the names and comments columns. And pay attention to the range names. If you run the macro a few times and analyze the statements one cell at a time, you'll learn loads about how to build structured *Excel* macros using *Excel* guru Will Tompkins's EDJ methodology, which is fast becoming the industry standard.

Handy Lookups in 1-2-3?

Q I'm using *1-2-3* release 3.1 to manage my kids' soccer league teams. I'm entering everyone's birth date, and I want a way to group them by age. For example, if a kid was born between August 1, 1981, and July 31, 1982, he or she would go into the U-11 ("11 or under") group. What's the best way to do this?
Cliff Karten, Johnston, Rhode Island

A A quick way is to use a lookup table and a set of lookup functions. To set it up, start with a blank worksheet and select */Worksheet•Global•Format•*

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	A	B	C	D	E
1	Birth Date	Team		Lookup Table	
2	08/01/82	U-10		0	Over 13
3	03/16/78	Over 13		08/01/79	U-13
4	06/25/82	U-11		08/01/80	U-12
5	08/25/83	U-9		08/01/81	U-11
6	03/28/80	U-13		08/01/82	U-10
7	03/27/80	U-13		08/01/83	U-9
8	03/26/81	U-12		08/01/84	U-8
9	11/13/84	U-8			
10		NA			

FIGURE 2: CONSTRUCT A LOOKUP TABLE IN 1-2-3 for a quick way to group individuals by age group.

Other•Automatic to allow *1-2-3* to format the birth dates properly. Enter all the dates and labels as shown in **FIGURE 2** in A1..A9, B1, and D1..D8. In B2, enter the formula **@IF(@CELL("type",A2..A2)="b","NA",@VLOOKUP(A2,D2..E8,1))**, and use */Copy* to copy it into the range B3..B10.

The heart of the formula is the function @VLOOKUP(A2,D2..E8,1). This formula takes the number from column A and looks for a match in the leftmost column of the table at D2..E8. When it finds a date equal to or less than the date in column A, it skips one column to the right and returns the label from column E. Remember that spreadsheet dates are numbers denominated in days, where day 1 is January 1, 1900, so the smaller the birth date number, the older the kid. The 0 in the table's top row (row 2) handles everyone older than the maximum age group.

The rest of the formula is decorative: @CELL("type",A2..A2)="b" is true when A2 is blank, thus causing the @IF function to display 'NA' when there's no birth date in column A (like in B10).

Constant Subtraction Is Getting Me Down

Q I would like to subtract a constant value, say 1.25, from a column of numbers in an *Excel* worksheet without having to subtract it from each number separately. How do I do this?
Steve Skahill, Dubuque, Iowa

A There's a very easy way to do this using Edit•Paste Special. Let's say your numbers are in A1:A20. Pick a cell, say, B1, and enter **1.25**. With the pointer on cell B1, select *Edit•Copy*. Select range A1:A20, select *Edit•Paste Special*, and click the Subtract radio button in the Paste Special box. Click *OK*, and you've subtracted 1.25 from each number in A1:A20.

By Richard Scoville

Richard Scoville is a contributing editor for PC World *and a software training consultant based in Chapel Hill, North Carolina.*

Mail your spreadsheet questions to Spreadsheets, PC World, 501 Second St. #600, San Francisco, CA 94107; *or send them electronically to the Spreadsheets forum on PC World Online; CompuServe, 72341,2727; MCI Mail 357-4517; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

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Here's How

WordPerfect 5.1 Base Font Switchers

Q I often need to change the base font in *WordPerfect 5.1*, but it's a pain to press <Ctrl>-<F8>F and scroll through the list of fonts each time I do it. Is there an easier way?
Steven Kayser, Wantag, New York

A Making your base font changes is a perfect job for a set of easy-to-record <Alt>-*key* macros. Start *WordPerfect* with a blank screen. Press <Ctrl>-<F8>F and make a note of the fonts you want to make available in your macros, then press <F1> to return to the editing screen. Follow the steps below for each font you want to assign to a macro.

1. Press <Ctrl>-<F10> to start the macro recorder.
2. Hold down <Alt> and type an easy-to-remember key for a particular font. For example, try <Alt>-T for Times Roman. Type a description for the macro, then press <Enter>.
3. Press <Ctrl>-<F8>F, then use the cursor keys to select the base font you want assigned to the macro. Press **S** to select the new base font, then type in the point size and press <Enter>.
4. Press <Ctrl>-<F10> to complete the recording.

Repeat this process for each font you'll use frequently, giving each a different hot key. Whenever you're using *WordPerfect 5.1*, you can switch base fonts by pressing the <Alt>-*key* combination you've assigned to your favorites.

Disk Full Error in WordPerfect for Windows

Q When I was working on a large *WordPerfect 5.1 for Windows* document containing a lot of graphics, I got a 'Disk Full' error when I tried to save. I was surprised because my hard disk has over 18MB of free space. I found a directory, WP}WP{TD.1, on my disk that contained two files, WP}WP{.GF1 and WP}WP{.GF2, which totaled almost 18MB in size. I couldn't find any reference to these files in the manual and lost all my edits. What's going on?
Nick Williams, Walnut Creek, California

A When you import a graphic image into a *WordPerfect for Windows* document, *WordPerfect* converts it into a format it can use and then stores the image in a temporary file. The more graphics, the bigger the file. That file stays in place as long as the document is open and is deleted when you close it or exit *WordPerfect for Windows*. As you discovered, in a long, graphics-laden document, the temporary files can get unmanageably huge, especially if you're using scanned TIFF color images. And you can't save your document because the disk is full. It's a catch-22.

The solution is to break your document into smaller segments and work on each part separately. When you have finished editing, you can close one section and work on another. Temporary files won't become so monstrous, and you'll be able to save your document. If you *must* work on the entire document at once, you'll have to free up enough hard disk space to accommodate the temporary files.

From WordPerfect to Ami Pro

Q I recently switched from *WordPerfect 5.1* for DOS to *Ami Pro 3.0*. Is there a way I can convert my old *WordPerfect* documents into the new *Ami Pro* format for editing?
Ketan Patel, Roselle Park, New Jersey

A Easily. When you import your old *WordPerfect* documents into *Ami Professional 3.0*, you'll retain almost all the formatting, including tables and multiple columns from the old documents. You may have to change some fonts manually, however. Here's the process:

After starting *Ami Pro*, select *File•Open*. In the List files of type list box, choose *WordPerfect 5.0 & 5.1*. Next, select the appropriate drive and path to find your existing *WordPerfect* documents; choose the file you want to open in the Files list box, and click *OK*. Now select *OK* in the Import Options dialog box (the default *Convert Styles* option works best in most cases).
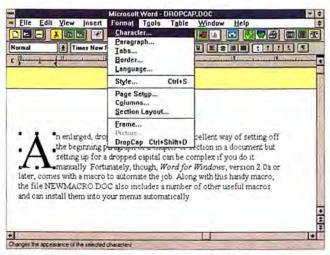
Once the import is complete, you'll see the document on the *Ami Pro* screen. If your *Windows* environment doesn't include the same fonts as your old *WordPerfect* printer drivers, you may have to alter the document's fonts. Make any other changes and select *File•Save*. Type in a new file name, then select *OK* to save the file in *Ami Pro* format.

Ami Pro will automatically store the new file in its normal document directory. If you need to convert more files, repeat the process. *Ami Pro* will remember the directory where your *WordPerfect* documents are stored.

Dropped Caps in WinWord

Q I need to create dropped capital letters in *Word for Windows 2.0*. I've tried doing it simply by changing the font size for the first character of a paragraph, but the character extends above the paragraph. That's not the effect I want. Is there an easier way to do this?
Sunny Singh, Queens, New York

CREATE A DROPPED CAPITAL LETTER in Word for Windows with the DropCap macro found in the NEWMACRO.DOC file.

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Circle 252 on reader service card

A *Word for Windows* versions 2.0a and later come with a file, NEWMACRO.DOC, which you should find in your main *WinWord* directory. It contains a macro that automates this task. To install the macro, first select *File•Open*, choose NEWMACRO.DOC, and click *OK*. You'll see a list of available macros. Choose *DropCap*, then click on *Install*. In the next dialog box, choose a Template (NORMAL is the default), choose the Menu to hold the new entry (*Format* is ideal), enter a shortcut key if you wish, then select *OK*. You'll again see the previous dialog box; select *Cancel*, then select *File•Close* to unload the NEWMACRO.DOC file. To make your new menu entry permanent, select *File•Save All*.

Any time you want a dropped capital letter at the beginning of an existing paragraph, position the cursor anywhere in that paragraph and select *Format•DropCap*, the new menu command. If you're not already in Layout View mode, *WinWord* will automatically switch to that mode, then place the first character in a frame in a larger size. Once the dropped capital is in place, you can modify the font size of the character or resize the frame using normal *WinWord* commands. To return to the Normal editing mode, select *View•Normal*.

A New Start for Word 5.0

Q Is there a way I can force *Microsoft Word 5.0* to automatically show me a list of documents at start-up?
Harold Ennor, King City, Oregon

A *Word 5.0* will automatically run a macro with the name AUTOEXEC every time it starts. If you want to customize this macro, start *Word*, then complete the following steps:

1. Press **<Shift>-<F3>** to start macro recording.
2. Press **<Ctrl>-<F7>** to display a list of files.
3. Press **<Shift>-<F3>** to finish recording, then type **AUTOEXEC** and press **<Enter>**.
4. Press **<Esc>TGS** to save the macro and make it permanent.

Now, each time you start *Word 5.0*, you'll see a list of DOC files in the current document directory.

POWER TIP no. 285

Protecting WordPerfect Merges

If you have multiple-line fields in a *WordPerfect* secondary (data) file, blocks of information in your merged documents may end up split between pages. To avoid this, block-protect the merge codes in your primary document: In the primary file, place your cursor at the beginning of the merge codes and press either **<F12>** or **<Alt>-<F4>** (Block). Move your cursor to the end of the merge codes and press **<Shift>-<F8>**. Press **Y** at the Protect Block prompt. When you merge your primary and secondary files, your merged data will be block-protected.

Marilyn G. Butler
Gadsden, Alabama

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WORD PROCESSING Q & A

Changing WinWord Directories

Q I like *Word for Windows*, but wish it didn't automatically store all my documents in the default *Word for Windows* directory. I prefer to store my documents in a separate directory, and would like *WinWord* to use that directory for its default. Is there a way to do this?
Tony Gelphman, Sacramento, California

A You bet, as long as you have version 2.0b or later. Start *WinWord* and select *Tools•Options*. Scroll the Category window until you see the WIN.INI icon and select it. In the Startup Options list, select the item that reads 'DOC-path='. In the Setting field, change the current path to your document directory, select *Set*, then select *Close*. From then on, when you run *WinWord*, it'll know where to find your documents.

If you're still using an earlier version of *WinWord*, you can change the default directory in Program Manager. Click once on the *WinWord* icon, then select *File•Properties*, and change the drive and path in the Working Directory box. There's one caveat with this approach; *WinWord* may occasionally miss some of its own files. A better solution is to call Microsoft and ask for an upgrade.

By George Campbell

George Campbell is a contributing editor for PC World.

Mail your word processing questions to Word Processing, PC World, 501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Word Processing forum on PC World Online; CompuServe, 71571,222; MCI Mail, GCAMPBELL; or 415/442-1891 (fax). PC World pays $50 for published questions. Sorry, we can't acknowledge unpublished materials.

POWER TIP no. 286

Unattached Excel
In *Excel 3.0* and higher, two cells don't have to be next to each other to be part of a selected range. If you hold down <Ctrl> while you click on cells, you will select the cells you click on but not those in between.

Yaron Shapira
Bethesda, Maryland

Once I started managing my information with PageKeeper, I realized I could get back to being a manager.

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For Your Information.

Circle 17 on reader service card

Here's How

Enter the Drag-and-Drop

Q On my PC at work, I can drag a file from File Manager onto a mini-mized *Word for Windows* icon to open the file. This doesn't seem to work on my home PC. I'm running *Windows 3.1* on both machines. What's wrong?
Marianne Marchant, Laie, Hawaii

A *Windows 3.1* enables the wonders of drag-and-drop, but only for applica-tions that employ this technology. *Word for Windows 2.0* and *2.0a* don't have this feature, but versions *2.0b* and *2.0c* both do. If you're a licensed user, you can get the upgrade free by calling Microsoft's *Word for Windows* technical support at 206/462-9673.

Windows Toolbox

A computer program that prompts you to exercise might sound like a joke, but muscle strains—and resultant repetitive strain injuries such as carpal tunnel syndrome—are no laughing mat-ter. The icon for *Stress Free 1.1* sits quietly on your desktop for a user-specified interval and then pops up to guide you through an exercise routine featuring written instructions, animated pic-tures, and a timer that steps you through each exercise. You can choose up to ten sets of exercises, including Relaxation, Quick full body, Circulation, and routines for specific muscle groups. *Stress Free* is shareware with a registration fee of $39.95. It's available in PC World Online's Featured in June folder (STRESS11.ZIP) and on other on-line services, or from LifeTime Software, P.O. Box 87522, Houston, TX 77287-7522; 800/947-2178, 713/474-2076 (fax). Reader service no. 639

Once you've upgraded, by the way, you can also open files by dragging them from File Manager and dropping them on *Word for Windows'* title bar or on the blank *WinWord* background (vis-ible only if no documents are open or if you've cascaded or otherwise arranged document windows accordingly).

Making File Manager Mind

Q I routinely use Recorder to con-struct macros within *Windows'* File Manager. Unfortunately, I keep tripping over the same problem when I try to navigate to files within a macro. De-pending on whether the current selec-tion highlight is on a disk drive, in the directory window, or in the file list, Recorder behaves dif-ferently. Can you sug-gest a command or key-stroke that will always put the selection high-light in the same place?
Rick Cattell,
Los Altos, California

A Sure thing. When you start your re-cording, simply press **<Ctrl>** plus the drive let-ter of your choice to move the selection to the drive icon. For ex-ample, press **<Ctrl>-C** to switch to drive C:, **<Ctrl>-D** for drive D:, and so on. From that point, **<Tab>** to the tree or file list in order to fin-ish your macro.

Clearing Off the Norton Desktop

Q My new 50-MHz 486 computer came with *Windows 3.1*, DOS 5.0, and *Norton Desktop 2.0 for Windows* in-stalled. I don't have any need for *Norton Desk-top*. How can I remove

this program from my computer and be certain that I have removed all of its files and changes to my system?
Marion F. Smith, San Diego

A The solution to your problem is real-ly very simple. Just locate and dou-ble-click the Norton Desktop Uninstall icon. If for some reason you aren't able to find the icon, choose *File•Run* in *Norton Desktop*, Program Manager, or File Manager. Then type **c:\ndw\install /u** (substituting a different drive letter or path if necessary), and click *OK*. Fol-low the on-screen prompts to remove all traces of *Norton Desktop*.

Managing PostScript Font Downloading
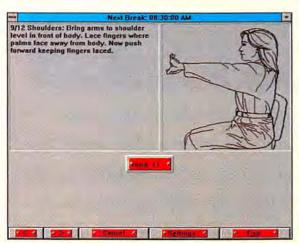
Q I recently installed several Post-Script fonts via *Adobe Type Manager 2.5*'s control panel. When I print on my HP LaserJet III using a Pacific Page PE PostScript Cartridge, all the new fonts default to Courier. When I remove the cartridge and use the PCL language, I change the printer driver, and all the *ATM* fonts print fine. How can I get all my fonts to print correctly with my PostScript cartridge?
May Johnson, New Orleans

A When you installed the fonts, you apparently unchecked the 'Install as autodownload fonts for the PostScript driver' check box. Checking this box when installing fonts adds information to your WIN.INI file that tells your computer to download each font to your PostScript printer for each page that requires it. After the page is printed, the font is cleared from the printer's RAM. This process is known as automatic downloading. Because you did not check this option, your fonts will not print in your printer's PostScript mode until they are manually downloaded—a process that requires a special utility to send the fonts to the printer's memory.

To switch your fonts to automatic downloading, launch the *ATM* Control Panel, and in the Installed ATM Fonts list box, select the fonts that are giving

BY ADDING AND REMOVING A FONT with Adobe Type Manager 2.5, you can control whether a font downloads manually or automatically.

you trouble. (To select more than one font at a time, hold down the <Ctrl> key while clicking.) Then click *Remove*, and accept any prompts to remove the fonts. Don't worry; the fonts will stay on your hard disk—they're inactivated only temporarily.

Next click *Add*, and select the directory where you keep your font metrics files (usually it's \PSFONTS\PFM). When the list of fonts appears, select the ones you just removed. This time, be sure to check the box next to 'Install as autodownload fonts for the Post-Script driver'. Then click *Add*. Since you're using the latest version of *ATM*, most applications won't require you to restart *Windows* for the changes to take effect (consult the README.TXT on your *ATM* disk for details).

Of course, Adobe gives you this option for a reason. Sometimes you can print faster if you download the fonts manually—if you're printing many pages that use the same fonts, for example. That's because auto-downloading flushes each font from your printer's RAM after the page is printed. Manually downloaded fonts stay in your printer's memory until you shut the printer off—handy for repeating the same font page after page.

On the negative side, manual downloading requires special downloading software and makes you download the fonts each time the printer is turned on. Moreover, if you download too many fonts, you'll use up so much of the printer's RAM that the printer won't have enough to print your pages. If you have a choice, it's best to use manual downloading for a few frequently used fonts (such as text faces) but to call on automatic downloading for seldom-used fonts (such as display faces for headlines or advertisements).

To change automatically downloaded fonts to manually downloaded fonts, simply remove the fonts in question, click *Add*, then deselect the 'Install as autodownload fonts' box and add the fonts again. Then the only thing left for you to do is manually download the fonts that you need.

Most Adobe PostScript font packages come with a pair of DOS utilities that you can use for manual downloading: PSDOWN.EXE (a menu-driven program for use with serial ports) and PCSEND.EXE (a command-line program that works with parallel ports). The latter is handy for creating font-downloading batch files that can even be run from your AUTOEXEC.BAT file. If you don't have either of these programs but you do have *Windows* software from Micrografx, you can download the fonts from the dialog box for the PostScript driver that comes with most Micrografx products.

Old Files, New Error Messages

Q When I'm working in *Windows*, I sometimes receive an error message that says, 'Call to Undefined Dynalink'. Can you tell me what's going on?
Thom Drayton,
Albuquerque, New Mexico

A This message usually signals the presence of an out-of-date DLL (dynamic link library) file in the directory in which you installed *Windows*. Likely culprits: TOOLHELP.DLL, SHELL.DLL, COMMDLG.DLL, OLECLI.DLL, and OLESVR.DLL.

The correct version of these files should be located in the WINDOWS\SYSTEM directory and should have the date 3/10/92. (If you're running *Windows for Workgroups*, the date will be 10/1/92.) Check these file dates and their locations.

If you aren't able to find the proper (updated) file on your hard drive, look on your *Windows 3.1* disk (you should expect that the extension's last character will be replaced with an underscore). To decompress one of these files to your hard drive, go to the DOS prompt, switch to your *Windows* directory, and then type **EXPAND**, the location of the original file, and the location where you want the file to end up.

For example, if you wanted to restore the TOOLHELP.DLL file from your A: drive, you would type **EXPAND A:\TOOLHELP.DL_ C:\WINDOWS\SYSTEM\TOOLHELP.DLL**.
By Scott Dunn

Scott Dunn is a contributing editor for PC World *and coauthor of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1992).*

Mail your questions to Windows, PC World, 501 Second St. #600, San Francisco, CA 94107; *or send them electronically to the Windows forum on PC World Online; CompuServe, 74055,412; MCI Mail, 179-3813; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.*

POWER TIP no. 287

Auto-Load Calendar File
You can program *Windows 3.1's* Calendar to load the same calendar file automatically every time you launch it. Select, but don't open, Calendar's icon in Program Manager, press <Alt>-<Enter>, type the file's name (we'll call it JEFF'S-.CAL) in the Command Line text box, and click OK.

Jeff Guillet
South San Francisco, California

Here's How

Marking dBASE Records After Printing

Q I use *dBASE III Plus* to print cata-log labels for new prospects. Each day I enter names and addresses into a data file called MAILING. This file includes a date type field called Sent, which I leave blank. About once a week, I use the REPORT command to print labels for all records with a blank Sent field, then I add a date to Sent for all the new records.

The whole process works fine, except that I hate having to go back and mark the records in the Sent field so that peo-ple don't get catalogs twice. Is there an easier way to do this?
Ann Tompkins, Chicago

A You have a good procedure set up. By running a short program like the one in **FIGURE 1** to do a mailing, you can make the process even better. You can create this program in any text editor; to use the one that comes with *dBASE*, type **MODIFY COMM** at the dot prompt. As you enter the lines, substitute the name of your report form for the word *Labels* in the third line (the second line is a comment that you can omit). Save your

```
USE Mailing
* Use your own report name for Labels
REPORT FORM Labels FOR ;
  Sent = CTOD("")
GO TOP
REPLACE ALL Sent WITH DATE() ;
  FOR Sent = CTOD("")
```

FIGURE 1: PRINT LABELS AND UPDATE DATA with this short dBASE III Plus program.

program as **LETTERS.PRG**. When you want to print your labels, enter **DO LETTERS** at the dot prompt.

Saving Deleted dBASE Records

Q In the June 1992 issue, the *Data Basics* column showed how to determine which *dBASE III* or *dBASE IV* records have been marked for dele-tion. In my particular application, it

would be useful to copy these deleted records to another file. Could you tell me how to do this?
Joe Marciniuk,
Edmonton, Alberta, Canada

A You can easily save the information in *dBASE* records that are flagged for deletion, before reusing or zapping them, with the COPY command. At the dot prompt, with the file you want to copy from open, simply enter the com-mand **COPY TO oldrecs FOR DELETED()**. *dBASE* will create a new data file named OLDRECS containing the flagged records. You don't, of course, have to name the file OLDRECS.

Since COPY creates a *new* file, you'll need another technique if you want to append "deleted" files to an existing OLDRECS file. In this situation, enter the command **COPY TO temp FOR DELETED()**. Then **USE OLDRECS** and run the com-mand **APPEND FROM temp**.

Counting With Paradox Queries

Q Using *Paradox*, I'm trying to count the number of records in my ORDERS table for each customer, and I'm obviously doing something wrong. I do an Ask query on ORDERS, check-ing only the Customer # field and typ-ing in the calculation Calc Count. But when I press <F2> to Do_It!, I get a count of 1 for each customer number, even though some customers have ordered more than once. How do I get *Paradox* to give me the right answer?
David Newman, Honolulu

A Easy. All you do is add the keyword **All** after Calc Count. This tells *Para-dox* to include all records in the count for each customer. As long as you have just the Customer # checked, you should get the answer you want.

Drawing Lines in Paradox Reports

Q I'd like to include boxes around some of the data in my *Paradox 4.0* reports. Right now, I'm using dashes or the underline character to "draw" lines,

Memos and Memory in dBASE IV

When editing or browsing *dBASE IV* or *FoxPro*, you can discover if a Memo field contains data by look-ing at the word *memo*. If it's capi-talized, that means there is text.
Bob Coppedge
Greater Cleveland PC Users Group

but they don't look very good. Can I get real boxes with corners, intersecting lines, and so on?
Randy Dillon, Santa Clara, California
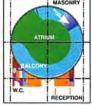
A You can put good-looking boxes in your *Paradox* reports, but it takes a little time (well, maybe a lot). First, open your PAL Reference manual to the ASCII character table in Appendix H—any ASCII table will do. Look toward the end of the chart and you'll see the box- and line-drawing charac-ters. For example, character 179 is a sin-gle vertical line, and 196 is a single hor-izontal line. There are also characters for box corners, middle-of-the-line intersections, and combinations of sin-gle and double lines. Keep this chart handy while you work.

Unfortunately, your printer might not use the same extended ASCII charac-ters as does character-based DOS (and *Paradox*). Some printers, including the HP LaserJets, offer these characters as an option, but not the default. To use this option, enter report design mode and select *Setting•Setup•Custom* and your printer port. Type the control code for changing your printer's symbol set (just add it to the end of the string if there's already one present). For a LaserJet, the code is **\027(10U**. Then enter a reset string to return to your printer's default (**\027(8U** for a LaserJet). Now you're ready to draw your lines.

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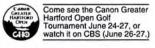
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For a single character, move the cursor to the place you want the line and hold down the `<Alt>` key while entering the character's number code on your keyboard's numeric keypad. When you lift `<Alt>`, the character will appear.

If you're creating a long line, that can get monotonous. Luckily, you can use mini-scripts to automate the process. To create a single horizontal line, press `<Alt>-<F10>`, choose *Miniscript*, and enter `FOR x FROM 1 TO` *n* `TYPEIN CHR(196) ENDFOR`, where *n* is the length of the line in characters. For a single vertical line, change the miniscript to `FOR x FROM 1 TO` *n* `TYPEIN CHR(179) DOWN LEFT ENDFOR`. You'll still have to put in the corners and intersections individually.

Preferences for Access Reports

Q I don't care for many of Microsoft's formatting defaults in *Access* reports, and I'm always changing things like text size and fonts. Can you tell me how I can create my own defaults that will come up every time I start a new report?
Mark O'Connell, San Francisco

A Yes, I can tell you how. First, define the properties you want as the default in a single report. For example, to change a report's default font for fields, bring up that report in the designer, select a field, and change its font. With the field still selected, choose *Layout•Change Default*. This sets the default for that particular report.

You must assign those default properties, and any others you've changed, to all new blank reports. Choose *View•Options•Form and Report Design*. Go to the Report Template option in the Items list, type the name of the report you just changed, then press *OK*. Your new defaults will be in place.

Customizing Data Entry With Approach

Q I've been using *Approach* to create reports for my *dBASE* databases. I suspect it would be simpler to forget about *dBASE* and enter and edit the data directly in *Approach*. But I don't know how to put today's date in a field automatically. Can I do this and other database modifications easily with *Approach?*
Tom Wagner, Los Angeles

A *Approach* has a Data Entry Options dialog box that lets you control data entry. To use this feature, open your data entry form (if you open a *dBASE* file, *Approach* will create a default form) and select *View•Design*. Double-click on the field you want to customize. When the Field Style dialog is shown, click on *Field Definition* and then on *Options*. The resulting Data Entry Options dialog box will give you plenty of choices, including one to insert the creation date in a new record.

By Celeste Robinson

Celeste Robinson is the author of The Paradox 4.0 Handbook *(Bantam Computer Books, New York, 1992) and a contributing editor for* PC World.

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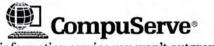
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Here's How

Colorful Backgrounds in Harvard Graphics

Q I just bought a copy of *Harvard Graphics 3.0* to create charts, but I don't like the canned backgrounds. How do I create my own backgrounds? *Lynn Walterick, Bartlesville, Oklahoma*

A The fastest way is to edit the chart palette, then blend two colors to create a shaded background. Load your chart, press **<F6>** to reach the main menu, and select *Setup•Color palette* to open the color palette screen. You'll see the background color in the preview box that appears in the upper-right corner. The small box on the left side of the preview box is the starting color box for shaded backgrounds, and the small box on the right side is the ending color box. The three boxes below the preview box let you pick the shading direction (side to side or top to bottom) or choose a solid background color.

To create a shaded background, follow these steps:

1. Move the cursor to the starting color box and press **<Enter>**, or if you are using a mouse, click the box; you'll see a white frame appear around it. Then move the cursor to the chart colors palette on the left side of the screen and press **<Enter>**, or click on the color you want to select it. You can also choose colors from the custom colors palette (below the chart colors palette) if you like.

2. Move the cursor back to the side-to-side or top-to-bottom box (on the upper-right part of the screen) and press **<Enter>**, or click one of them to select a direction for the shaded background.

3. Move the cursor to the ending color box and press **<Enter>**, or click the box. Then move the cursor back to one of the color palettes (on the left of the screen) and pick out the other color you want to use.

4. Finally, press **<F6>** (File) and select *Save palette* to save the chart palette using a new name and, if you like, a description. Press **<Enter>** to finish saving the file.

You'll see the new blended colors in the background preview box. To see a preview of your current chart with the new background, press **<F9>** (Edit Palette) and select *Redraw chart*, or press **<F2>** (Show chart) for a full-screen view. Now just press **<F6>-E** to exit and return to the main menu. (If you chose the full-screen view, hit **<Esc>** first to return to the color palette.)

To use the same shaded background behind every chart, follow these steps:

1. Select *Presentation•Edit Presentation* from the opening menu and load your presentation file.

2. In the Edit Presentation screen, press **<F8>** (Options) and select *Presentation appearance*.

3. Press the space bar to set 'Use presentation chart palette' to Yes and press **<Enter>**.

4. Press **<F3>** to view the list of files in *Harvard*'s Palette directory. Now, move the cursor to highlight the palette you want, and then press **<Enter>** to set the *Presentation chart palette* option.

5. Press **<F10>** twice.

select *Presentation•Save presentation*, type the file name and the description (if desired), and press **<Enter> <Enter>**.

From now on, *Harvard* will apply the same color palette and background to each chart in the presentation. To view the entire presentation, press **<F2>** (Preview) from the Edit Presentation screen and press **<Enter>** to display each chart.

Proper Fractions in PageMaker

Q Is there a painless way to create fractions in *PageMaker*? *N. Weisel, New York*
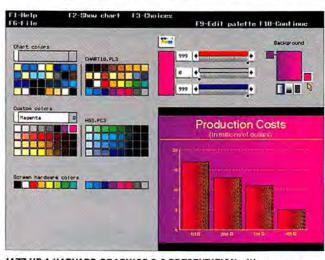
A Yes, if the only fractions you need are ¼, ½, and ¾. Most standard text fonts, such as *Windows 3.1*'s Times New Roman and Arial, provide those three common fractions as alternate (or extended) characters, which you can easily insert into your text by holding down the **<Alt>** key and typing **0188** on the numeric keypad to get ¼, **0189** to get ½, or **0190** to get ¾.

Creating other fractions takes a little more doing. Here are the steps:

1. Select the text tool and select *Type•Type specs* or press **<Ctrl>-T** to open the Type specifications dialog box. Choose the font you want and click *OK*.

2. Insert the text cursor in your document and type the fraction—for example, ⅝ or ¹³⁄₁₆—using a slash (/) between the numerator and the denominator. Then select the entire fraction.

3. Select *Type•Type specs•Options* or press **<Ctrl>-T** and **<Alt>-O** to open the Type options dialog box.

4. Now you can adjust the position of the numerator and denominator by changing two of the Type options default settings: Type **60** for the super/subscript size and type **0** for the subscript position setting. Click *OK* twice to save the new settings and return to your fraction.

5. Select the numerator and press **<Ctrl>-<Shift>-** to make it superscript. Select the denominator and press **<Ctrl>-** to make it subscript.

The fraction is now formatted and

JAZZ UP A HARVARD GRAPHICS 3.0 PRESENTATION with your own shaded color background. You can select a side-to-side or top-to-bottom blended background using any two colors you want.

the baseline of the denominator should be aligned with the baseline of normal text. If you'd like to make further adjustments, repeat step 4, using increments as small as ⅒ of 1 percent to fine-tune the super/subscript size and subscript position.

You can also create fractions faster by using keyboard shortcuts—<Ctrl>-<Shift>-\ for superscript and <Ctrl>-\ for subscript—to format each numerator and denominator along the way *before* you type them. Follow these steps just before you type each fraction:

1. With the text tool selected, press <Ctrl>-<Shift>-\, type the numerator, and then press <Ctrl>-<Shift>-\ again.

2. Type a forward slash for the fraction bar.

3. Press <Ctrl>-\, type the denominator, and then press <Ctrl>-\ again.

Service Bureau Miniguide

Q I've created a presentation using *Corel-Draw 3.0* and want to print the files as color transparencies, but I don't have a color printer. I've heard that there are commercial companies that can produce the color transparencies for me. Can you tell me

how I can locate them and what they do?
Chris Darner,
San Juan Capistrano, California

A You're looking for a service bureau—a business center where you can rent PCs by the hour, as well as print your documents. Some shops have high-resolution imagesetting machines that can print your pages on camera-ready (specially coated) reproduction paper or film negatives, which a commercial print shop can then use for small press runs. Some of them also provide scanning and color slide-making services.

Many service bureaus accept your files on disk or via modem and produce your documents for you. Some shops even provide overnight turnaround. You can find service bureaus, photocopy shops, and instant-printing centers listed in the phone book.

To print your *CorelDraw* files as color transparencies, look for service bureaus with color PostScript laser printers, such as a Tektronix Phaser or QMS ColorScript series printer, that are capable of producing full-color transparencies. Prices can run from $5

to $15 per transparency so shop around for the best bargain. Finally, make sure the service bureau has *CorelDraw 3.0* installed so you can simply send or take in your files on disk. If you can't, you'll need to save your *Corel* files as PostScript print files (using *Corel*'s own Print to File option for color PostScript printers), then at the shop, copy them to the printer.

By Richard Jantz

Contributing Editor Richard Jantz is an electronic publishing and presentation consultant in Berkeley, California.

Mail your publishing and presentations questions to Publishing & Presentations, Q&A, PC World, 501 Second St. #600, San Francisco, CA 94107; *or send them electronically to the Publishing & Presentations forum on PC World Online; MCI Mail RJANTZ; or 415/442-1891 (fax). Send make-over candidates, preferably clean and unfolded, to* Publishing & Presentations, Make-Overs, *at the above address.* PC World *pays $50 for published questions or make-overs. Sorry, we cannot acknowledge unpublished materials.* ■

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PC WORLD

Here's How

Hitchhiking on the Internet

Q I use America Online, Compu-Serve, GEnie, and a few bulletin boards. But all the business people I deal with seem to have Internet addresses. Can you tell me how to join?
Robert Stewart, Larkspur, California

A What confuses people about Internet is, it's not an on-line service in the conventional sense. You can't subscribe to it by mailing in a card torn from a magazine. Originally a Department of Defense network, it's now a vast web linking universities, businesses, and some commercial on-line services around the globe. A true anarchy, it has no central governing body.

Internet offers a cosmos of data, software, and services. But its main advantage is, through it you can send E-mail to anyone in the world.

The easiest way to get access is to work for an Internet-linked school or business, but you can connect to it by other means. CompuServe, MCI Mail, GEnie, and America Online offer cheap E-mail links to Internet. But they don't carry the raucous Internet discussion conferences (Usenet) that are so popular. Nor do they provide access to more sophisticated features like FTP, which lets you download software and files, or Telnet, which actually lets you log on to other Internet computers.

If you want to participate in Usenet discussions, there may be a BBS in your area that carries it. Many big ones do, especially FidoNet BBS's. (FidoNet, by the way, is now linked to Internet, so you can also send and receive Internet mail via local Fido boards.) Check out the file NIXPUB.ZIP on PC World Online for a list of some BBS's that carry Usenet. Two commercial on-line services, Portal (408/973-9111, voice) and The WELL (415/332-4335, voice), also offer Usenet.

Many small commercial on-line services that provide Telnet and FTP access as well as E-mail and Usenet are springing up around the country. One is HoloNet (510/704-0160, voice; 800/638-4656, fax or modem), which offers off-peak access through local numbers in most major cities for $2 per hour. a2i Communications offers Internet access for $12 per month (408/293-9010 and 408/293-9020, both modem; type "guest" when you log on).

Performance Systems International, of Reston, Virginia, sells Internet access in a variety of packages. The company also provides users with front-end software that tames the beastly Internet interface. For $29 per month and a $19 sign-up fee, PSILink Basic service provides E-mail, Usenet, FTP, and menu-driven software to navigate Internet. PSI can also link your company's network into Internet, with all Internet functions, for $175 to $300 per month (800/827-7482, voice; 703/620-4586, fax).

There are several files floating around BBS's and on-line services that give you more information on Internet: "The Hitchhiker's Guide to Internet" (HHG.ZIP), "Zen and the Art of Internet" (ZEN.ZIP), and "The Inter-Networking Guide" (INETMA.ZIP). You can download them individually, or in a big parcel with several other applicable files as INTERNET.ZIP from the Featured in June section of PC World Online.

And there's finally a book that helps. *The Whole Internet User's Guide and Catalog*, by Ed Krol, is a superb guide to Internet services written by the guy who wrote the original *Hitchhiker's Guide to Internet*. It's $24.95 from O'Reilly & Associates (800/998-9938).

When Hanging Up Is Hard to Do

Q I'm using *Procomm Plus for Windows* with a Zoom Telephonics modem, but I can't get *Procomm* to hang up the modem when I click on the telephone icon. Can you help?!
Wayne Liquorman,
Redondo Beach, California

A First, insert the modem command **&D2** into the software's initialization string (right after 'AT' at the beginning of the string), then reinitialize the modem. This command forces the modem to pay attention to the data terminal ready signal (DTR) coming from the PC and hang up when the PC turns the DTR signal off. This is true no matter what software or modem you're using.

> **Internet is a vast web linking universities, businesses, and some commercial on-line services around the globe.**

To find the initialization string in *Procomm Plus for Windows*, select *Window•Setup* or press **<Alt>-S** to bring up the Setup window. Click on the *Connection* button (it turns red), and choose *Advanced* from the menu at the top of the window. Click on the *Modem Setup* button. The initialization string is at the top. Insert the **&D2**, click *OK* twice, and then reinitialize the modem by selecting *Communication•Initialize Modem* from the main menu or pressing **<Alt>-J**.

In addition, you should make sure that *Procomm Plus for Windows* drops the DTR signal between calls. Click on the open book icon at the top left of the screen to get to the dialing directory, then select *Dial•Options*. You'll find a check box called Drop DTR Between Calls—make sure it's checked.

By Judy Heim

Judy Heim is a contributing editor for PC World.

Mail your communications questions to Communications Q&A, PC World, 501 Second St. #600, San Francisco, CA 94107, or send them electronically to the Communications forum on PC World Online; CompuServe, 75300,713; MCI Mail, 312-7737; GEnie, JUDY.HEIM; Internet, 3127737@mcimail.com; or 415/442-1891 (fax). PC World pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.

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Here's How

IDE Hard Disk Upgrade

Q I plan to upgrade to a 170MB IDE hard disk. Do I need to buy a controller to go with the drive? My system already has an IDE controller built into the motherboard.
Tom Nguyen, Carbondale, Illinois

A Actually, your motherboard has an IDE *interface*, not controller. IDE drive manufacturers build all the required controlling electronics onto the drive itself, so you don't need a separate controller. You can hook up any IDE drive to any IDE interface, whether the interface resides on the motherboard or (less likely) on an expansion board. Just mount the drive in a free bay, connect it to the interface using the supplied ribbon cable, and plug in the power connector. The connectors on both the ribbon cable and the power cable can be plugged in only in one direction. As you'll read below, however, the physical connection may be the easiest part.

Third-Party Hard Disks

Q I was going to buy a replacement hard drive from the company that sold my system, but I can get a better deal at a superstore. Both the drive and the system are the standard IDE type. If I go to a third party, am I taking a risk the drive won't be compatible?
Mike Landis, Highland Park, Illinois

A Not likely, though you may have to work a little harder to get drive and system to talk to each other. Before you start, you'll need the following information about the new drive: the number of cylinders, the number of heads, the preformatted capacity, the number of sectors per track, the landing zone, and the starting cylinder for write precompensation. You don't need to know what these specs means—just crib them from the drive's documentation. If they're not there, extract the parameters from the drive vendor's technical support.

Next, run your system's setup routine. It's probably built into the system

BIOS, which means that you can call it up with a key combination—usually <Ctrl>-<Alt>-<Esc>, <Ctrl>-<Alt>-S, or <Ctrl>-<Alt>-<Insert>. (You can also press <Esc> or one of the above <Ctrl>-<Alt> combinations while your system does its power-on self test). Systems that don't have setup in the BIOS come with a setup routine on a floppy disk. If you can't access the BIOS setup or find the floppy, contact your system vendor's tech support.

Look for 'Fixed Disk 1' and 'Fixed Disk 2' (or similar wordings) on the setup menu. Each will be followed by a drive type number (or 'none'). You're replacing your sole hard drive, so select *Fixed Disk 1*. A table should pop up listing around 45 alternate drive types, detailing the number of cylinders, heads, and so on. Beware! Drive type numbers are not standard, so don't try matching the type number on your drive with the type number in your system's drive table. Check your new drive's specs item by item against the ones listed for each drive type in the drive table. When you find a match, enter that drive type.

If you opt for a third-party drive, you probably won't find a match. Fortunately, most setup routines let you pick an unused drive type (usually Type 0, Type 47, or Type 99) and enter your drive's exact parameters. If you can't do this, select a drive type that comes closest to matching your drive's specs, provided the number of heads, cylinders, and sectors per track do not exceed those of your drive.

Unfortunately, this means wasting some of your drive's capacity. Many of today's IDE drives feature *automatic translation*, which enables a drive to keep wasted capacity to a minimum, even if the specs for the drive table entry don't match those of the drive. But watch out! Pre-1990 system BIOS's often don't support IDE drives over

100MB or even 80MB, so you could squander a huge amount of space even if the drive works properly. In such cases, get a BIOS upgrade from your system vendor before installation.

Alternatively, you can try *DrivePro* from Micro House (800/926-8299). This nifty $100 utility claims to match any IDE drive to any PC no matter what the system BIOS says. Moreover, you don't need to access your system setup software. Just install your drive, boot from a floppy, pop the *DrivePro* disk in a floppy drive, and run the program.

Many of today's IDE drives feature automatic translation, which enables a hard drive to keep wasted capacity to a minimum.

Anyway, I tried it on two test drives, and it worked.

Finally, you'll need to run DOS's FDISK (*DrivePro* includes a similar utility that works better) and decide whether you want a huge drive C: or several smaller partitions (D:, E:, and so on; see "Tips to Organize Your Hard Disk," March). The final step is to slip a DOS system disk in drive A: and format all the partitions (enter **FORMAT C:/S** to make C: the boot drive).

Sound like too much hassle? Consider a new preloaded drive, such as Conner's 170MB Sof-Stor, which comes with its own interface board. Its interface does the configuring, so you just hook up cables. The drive comes preformatted with DOS 5.0 and includes *Windows 3.1*, *Microsoft Works for Windows*, and *Central Point Anti-Virus for Windows*. Want it even easier? Try Quantum's 240MB Hardcard EZ, a hard disk upgrade on an expansion board. Both upgrades save time, though they cost more than ordinary drives.

Clock-Doubled 486s

Q A guy in my office says you can install those Intel clock doubler chips in 486DXs as well as in 486SXs.

That can't be true—those Intel "Vacancy" ads made it pretty clear that 486SXs were the ones designed to be upgradable. Otherwise, being a *Windows* user, I'd clock double my 25-MHz 486DX in a minute.
Edward Meyer, Kensington, Maryland

A I hope you didn't make a bet. Last fall Intel began selling clock doublers, officially known as OverDrive processors, as upgrades for 486DX machines. You simply pull out your old CPU, plug in the Over-Drive, and enjoy a 30 to 70 percent speed increase, depending on your application.

The catch is that OverDrives for DXs won't work in every 486DX machine. Fortunately, Intel has benchmarked hundreds of DX systems to determine which can accommodate OverDrives. To get the latest list of compatible systems, contact Intel's fax-back service at 800/525-3019. If your machine is on the list, the upgrade should work. If it doesn't, Intel either will make reasonable efforts to resolve the incompatibility or will refund your money. If your machine isn't on the list and you try the up-grade, you aren't covered by the warranty.

At this writing, OverDrives aren't cheap: The 25/50-MHz version retails for $549, the 20/40 MHz model is $399, and the 33/66-MHz version lists for $699 (SX and DX OverDrives cost the same). Since you're a *Windows* user, you might get more bang for your buck with a $150 graphics accelerator card, or maybe some more memory.

The Case of the Forgetful Configuration

Q When I turned on my system recently, I got the message 'System Configuration Error—Run Setup'. I ran the setup program and the thing started properly, so I didn't think it was worth fixing (the warranty had expired). The problem recurred. Is a visit to the repair shop in my future?
Brian Connolly, San Jose, California

A Probably not. Your system keeps forgetting its configuration because its battery is dying. In most systems, a lithium battery the size of a nickel maintains a smidgen of memory containing your system configuration when the power is off. Called CMOS (complementary metal-oxide semiconductor) RAM, this memory requires a tiny amount of power to stay afloat. But when your battery begins to fail, so does the chip's recollection of your system configuration.

Usually you'll find the lithium battery in a socket on the motherboard; replacements can be found at Radio Shack or at your nearest superstore. Some systems use a cluster of standard AA batteries instead, which you'll typically find in a plastic holder stuck to the inside wall of the chassis. If you still have your system manual, it should give you the battery's exact location.

By Eric Knorr

Eric Knorr is a contributing editor for PC World.

Mail your hardware questions to Hardware, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Hardware forum on PC World Online; MCI Mail, 459-7102; or 415/442-1891 (fax).* PC World *pays $50 for published questions. Sorry, we cannot acknowledge unpublished materials.* ■

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Here's How

Classic Lines in WordPerfect

When I use *WordPerfect 5.1* for DOS, in addition to the number of words in a document, I often need to know the exact number of lines. Doing a word count is simple enough with the spell-ing checker's Count option, but I had to write a macro [**FIGURE 1**] to get a line count.

To use TOTALINE, just position the cursor where you want counting to begin, press **<Alt>-<F10>**, type **TOTALINE**, and press **<Enter>**. *John Kirkpatrick, Tulsa*

Editor's note: This macro is a big time-saver. Note that it must be created us-ing the *WordPerfect* macro editor, invoked by pressing **<Home>** followed by **<Ctrl>-<F10>**. Type **TOTALINE** (or another name for the macro if you prefer), and press **<Enter>**. You may add a description if you wish.

In the macro editor, you must insert different types of commands in differ-ent ways. To insert a command shown here in **boldface**, press **<Ctrl>-<Page Up>**, select the command from the pop-up list in the upper right corner of the screen, and press **<Enter>**. For com-mands that are **boldface and under-lined**, press **<Ctrl>-V** and then the appro-priate key (for example, **<Ctrl>-V**, then **<Down>** for [Down]). Type plainly printed text as it appears. Press **<F7>** to exit the editor. The complete macro, named TOTALINE.WPM, is available in the Featured in June folder on PC World Online.

Duty-Free Imports

I import data into *1-2-3* from comma-delimited ASCII files—files where mul-tiple values (fields) on one line (a rec-ord) are separated by commas. But if there's too much data on a line, *1-2-3* returns the error message 'Input line too long (240 characters max)'.

I wrote a simple Qbasic program [**FIG-URE 2**] that solves this problem and takes only seconds to run. It prompts for the name of a file and allows you to choose between numeric or text input. The program reads a record's fields from the source file and then writes them se-quentially to the target file, each on its own line. This allows numbers or text

```
{FOR}lines~1~100000~1~
  {ASSIGN}numlines~{SYSTEM}10~~
  {Down}
  {IF}{VARIABLE}numlines~={SYSTEM}10~~
    {BREAK}
  {END IF}
{END FOR}
{PROMPT}Number of lines: {VARIABLE}lines~~
{WAIT}30~
```

FIGURE 1: COUNT THE LINES in your documents with this handy WordPerfect macro.

to be imported into a single worksheet column. *Debbie Leahy, Warrenville, Illinois*

Editor's note: This program takes advantage of a quirk of Qbasic and other Microsoft BASICs: Commas in the input stream are considered to sepa-rate the stream into distinct values. You can run this program by copying it to an ASCII text file called CONVERT.BAS and typing **QBASIC /RUN CONVERT.BAS** at the DOS prompt. CONVERT.BAS is available in PC World Online's Fea-tured in June folder.

Dialing Direct From DOS

Your modem makes a great, hands-free automatic telephone dialer, complete with a speaker that lets you monitor the progress of the call. Unfortunately, nei-ther DOS nor most modems come with a utility for dialing from the DOS com-mand line, a convenient place to do it. Here are two programs that will let you do just that.

The first utility, DTR.COM, controls the DTR (Data Terminal Ready) sig-nal—which must be turned on before your modem will accept commands. If your modem is attached to COM1:, DTR's syntax is a simple DTR ON or DTR OFF. If you're using another communications port, you must give the port address immediately after the program name, as in DTR COM2: OFF, for example.

After you've used DTR to turn on your modem, you can send a command

Disk-Efficient Batch Files

Every file on your hard disk takes a minimum of 2K to 8K, depending on your version of DOS and the size of your disk partition. Therefore, having lots of little batch files can waste a good deal of space. One solution is to create a single batch file that, given a parameter, can do the work of many. I call mine RUN.BAT, and I run it with commands like RUN 123 to launch *1-2-3*. Here's a sample:

```
@ECHO OFF
IF %1==X GOTO NOPROG
IF %1==123 GOTO LOTUS
IF %1==wp GOTO WP
IF %1==WP GOTO WP
ECHO NOT SET UP TO RUN %1
GOTO END

:NOPROG
ECHO PLEASE SPECIFY A PROGRAM
ECHO RUN [APPLICATION]
GOTO END

:LOTUS
C:\123\123
GOTO END

:WP
C:\WP51\WP
GOTO END

:END
```

Note that with most options, you must in-clude upper- and lowercase IF . . . GOTO com-mands (123 is an exception because it con-tains no letters). You'll need to put the batch file in a directory named in your AUTOEXEC-.BAT's PATH statement.

Alan Forro
Greater Cleveland PC Users Group

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TEXAS INSTRUMENTS

```
100 CLS
110 LINE INPUT " file: ", FILEIN$
120 LINE INPUT "OUTPUT: ", FILEOUT$
130 INPUT "(T)ext or (N)umber? ", I$
140 OPEN FILEIN$ FOR INPUT AS #1
150 OPEN FILEOUT$ FOR OUTPUT AS #2
160 IF UCASE$(I$) = "N" THEN
170   DO
180     INPUT #1, R
190     WRITE #2, R
200     LOOP UNTIL (EOF(1))
210   GOTO 270
220 ELSEIF UCASE$(I$) = "T" THEN
230   DO
240     INPUT #1, RECORD$
250     WRITE #2, RECORD$
260     LOOP UNTIL (EOF(1))
270     CLOSE 1
280     CLOSE 2
290   GOTO 900
300 END IF
310 PRINT "OOPS! Invalid choice!"
900 SYSTEM
```

FIGURE 2: BREAK UP FIELDS of a comma-delimited file with CONVERT.BAS.

to it with the second utility, AT.COM. The syntax is similar to DTR: AT *command string* if your modem is on COM1:, and AT COM*n*: *command string* if it's on another port. The command AT Z will reset your modem, while AT DT, followed by a phone number and a semicolon (;), will dial the number (the semicolon tells the modem to stay on the line until you tell it to hang up with an AT H command).

Omar Mody, Dallas

Editor's note: Mr. Mody's utilities are quite well designed, checking to make sure that the port you're accessing exists and, if you run them with a question mark as a parameter, reminding you of the correct command-line syntax. You can create a batch file to automate the dialing job even more:

```
@ECHO OFF
DTR ON
AT DT%1;
PAUSE
AT H
DTR OFF
```

To call a number, you simply pass it to DIAL as a parameter. The batch file will dial the number and then wait for you to

press a key before it shuts the modem off, turning control over to you and your phone.

To create the programs, copy **FIGURES 3** and **4** into two ASCII text files called DTR.SCR and AT.SCR, respectively. It's easy to make mistakes when entering this type of data, so check your work carefully; I recommend checking the code in vertical columns. Then, type the commands **DEBUG < DTR.SCR** and **DEBUG < AT.SCR** at the DOS prompt. DTR.COM and AT.COM will appear in the current directory; you can move them from there into a directory that's in your AUTOEXEC.BAT's PATH statement. Or you can avoid the whole process by downloading the two programs from the Featured in June folder on PC World Online.

If you have an older 1200- or 300-bps modem, you'll need to lower the baud rate with a command like MODE COM1: 1200,N,8,1.

Note that while AT-.COM sends strings to your modem, it can't receive them; you'll have to watch the modem's lights (or listen to its speaker) to tell that it's gotten your command. If your modem stays silent when it dials, use the command AT M1 to turn on the speaker before you issue your dialing command.

By Brett Glass

Brett Glass is a contributing editor for PC World.

Have a macro, batch file, short program, or general tip you're proud of? Mail your tips to Star-Dot-Star, PC World, *501 Second St. #600, San Francisco, CA 94107; or send them electronically to the Star-Dot-Star forum on* PC World Online; *CompuServe, 74055, 412; MCI Mail, PC World Editorial; Internet, rogue@well.sf.ca.us; or 415/442-1891 (fax). PC World pays $25 to $200 for each tip used. Sorry, we cannot acknowledge unpublished materials.*

```
Ndtr.com

E100 BE 82 00 FC AC 3C 20 74 FB 3C 3F 74 1D E8 8A 00
E110 3C 43 75 22 AC E8 82 00 3C 4F 75 1A AC E8 7A 00
E120 3C 4D 75 12 AD 80 FC 3A 74 14 BA A5 01 B4 09 CD
E130 21 B8 01 4C CD 21 BE 82 00 32 DB EB 09 90 2C 31
E140 3C 03 77 E6 8A D8 32 FF D0 E3 B8 40 00 8E C0 26
E150 8B 07 0B C0 75 05 BA E5 01 EB D2 8B D0 83 C2 04
E160 AC 3C 20 74 FB E8 32 00 3C 4F 75 BE AC E8 2A 00
E170 3C 4E 75 17 EC 0C 03 EE BB E2 01 B4 09 BA D2 01
E180 CD 21 8B D3 CD 21 B8 00 4C CD 21 3C 46 75 09 EC
E190 24 FC EE BB DE 01 EB E3 EB 90 3C 61 72 06 3C 7A
E1A0 77 02 2C 20 C3 55 73 61 67 65 3A 20 20 44 54 52
E1B0 20 5B 43 4F 4D 31 3A 7C 43 4F 4D 32 3A 7C 43 4F
E1C0 4D 33 3A 7C 43 4F 4D 34 3A 5D 20 4F 4E 7C 4F 46
E1D0 46 24 44 54 52 20 69 73 20 6E 6F 77 20 24 4F 46
E1E0 46 24 4F 4E 24 50 6F 72 74 20 6E 6F 74 20 66 6F
E1F0 75 6E 64 24
RCX
F4
W
Q
```

FIGURE 3: TURN YOUR MODEM ON AND OFF with the program that this DEBUG script creates.

```
Nat.com

E100 BE 82 00 FC AC 3C 20 74 FB 3C 3F 74 1D E8 A6 00
E110 3C 43 75 22 AC E8 9E 00 3C 4F 75 1A AC E8 96 00
E120 3C 4D 75 12 AD 80 FC 3A 74 14 BA 76 01 B4 09 CD
E130 21 B8 01 4C CD 21 BE 82 00 32 DB EB 09 90 2C 31
E140 3C 03 77 E6 8A D8 32 FF D0 E3 B8 40 00 8E C0 26
E150 8B 07 0B C0 75 05 BA A7 01 EB D2 8B D0 B0 41 E8
E160 5F 00 B0 54 E8 5A 00 AC E8 56 00 3C 0D 75 F8 B8
E170 00 4C CD 21 00 00 55 73 61 67 65 3A 20 41 54 20
E180 5B 43 4F 4D 31 3A 7C 43 4F 4D 32 3A 7C 43 4F 4D
E190 33 3A 7C 43 4F 4D 34 3A 5D 63 6F 6D 6D 61 6E 64
E1A0 73 74 72 69 6E 67 24 50 6F 72 74 20 6E 6F 74 20
E1B0 66 6F 75 6E 64 24 3C 61 72 06 3C 7A 77 02 2C 20
E1C0 C3 50 83 C2 05 EC 24 20 74 FB 58 83 EA 05 EE C3
RCX
D0
W
Q
```

FIGURE 4: THIS DEBUG SCRIPT creates a program that sends commands to your modem.

MICROSOFT DOS 6.0: UTILITIES

DOS 6.0 includes several utilities to optimize system resources and protect your data. Three of them—Backup, Anti-Virus, and Undelete—also come in *Windows* versions.

Note: Start each command within its respective utility unless otherwise noted. Keys to press are shown in **boldface**. Keys to press simultaneously are joined by a hyphen. A bullet (•) links menu, option, and button names in a series. This Instant Reference Card is the second of two on DOS 6.0; IRC #36 details the DOS 6.0 command line and the DOS Shell program.

OPTIMIZING YOUR SYSTEM

DoubleSpace creates a new logical drive that, by compressing files, nearly doubles the capacity of your hard disk. You must set up one or more compressed drives before the DoubleSpace program will run.

Note: DoubleSpace does not run in *Windows*.

Task	Command
Set up DoubleSpace drives or start DoubleSpace program	**DBLSPACE** at DOS prompt
Compress existing drive, creating new uncompressed drive	**Compress • Existing** Drive, select drive, **<Enter>**, set amount of free space and drive letter for new uncompressed drive, **C**

Task	Command
Create new compressed drive from free space of existing uncompressed drive	**Compress • Create** New Drive, select drive with free space, **<Enter>**, set amount of free space to leave free, set compression ratio and drive letter for new drive, **C**
Set compression ratio estimate for selected drive	**Drive • Change Ratio**, select ratio, **OK**
Change selected drive's size (if reducing, defragment drive first)	**Drive • Change Size**, set number of MB to leave free on uncompressed drive, **OK**
Mount selected drive	**Drive • Mount • OK**
Unmount selected drive	**Drive • Unmount • OK**
Format selected drive	**Drive • Format • OK**
Delete selected drive	**Drive • Delete • OK**
Defragment selected drive	**Tools • Defragment • Yes**
Check drive	**Tools • Chkdsk • Fix/Check**
Exit DoubleSpace	**Drive • Exit**

Defragmenter speeds up disk access by rearranging fragmented file parts (which are scattered about the disk) into consecutive locations.

Note: Defragmenter does not run in *Windows*.

Task	Command
Start Defragmenter	**DEFRAG** at DOS prompt
Select drive to defrag	Type or double-click drive letter
Use recommended method	Select drive, **Optimize**
Open Optimize menu	**<Esc>** or **Configure**
Change defrag method	Open Optimize menu, **Optimization** Method • **F**ull Optimization/**U**nfragment Files Only • **OK**
Order files in directories	Open Optimize menu, **File** sort, select criterion and order, **OK**
Begin optimization	Open Optimize menu, **Begin** Optimization
Exit Defragmenter	Open Optimize menu, **Exit**

OPTIMIZING YOUR SYSTEM (continued)

MemMaker optimizes the use of memory on 386 and 486 systems by making maximum upper area available and deriving the order for loading memory-resident programs and device drivers that leaves the most conventional memory free for DOS programs. MemMaker is very simple to use and has on-screen prompts; it can also run unattended. Use MemMaker after adding or removing a memory-resident program or device driver.

Note: MemMaker does not run in *Windows*.

Task	Command
Start MemMaker	**MEMMAKER** at DOS prompt
Run MemMaker unattended	**MEMMAKER /BATCH** at DOS prompt
Undo most recent MemMaker changes	**MEMMAKER /UNDO** at DOS prompt

PROTECTING FILES

Backup copies hard disk files so you can restore them if they're damaged or lost. There are three types of backup: *Full* copies selected files. *Incremental* copies selected files that changed since the last full or incremental backup. *Differential* copies selected files that changed since the last full backup.

Note: Where only one sequence of commands appears, it applies to both DOS and *Windows* versions.

Task	DOS	Windows
Start Backup program	**MSBACKUP**	Launch Backup from Tools group; or Tools • **Backup** in File Manager
Select type	**Backup • Backup** Type, select type	
Select target drive/format/directory	**Backup • Backup** To. Select drive/format, **OK**; or MS-**DOS** Drive • **OK**, type path	**Backup • Backup To**. Select drive/format; or MS-DOS Path, **<Tab>** to or click path box, type path
Print setup file	**File • Print • OK**	**File • Print**, select mode, **OK**
Select drive to select files from	**Backup. Backup** From, select drive; or click drive icon in Backup From box	
Select/unselect all files on drive	**Backup. Select** drive, **<Space>**; or double- or right-click drive icon in Backup From box	
Select/unselect directory's files	**Backup • Select** Files. Select directory, **<Space>**; or double- or right-click directory name (not folder), **OK**	
Select/unselect file(s)	**Backup • Select** Files, select directory, **<Tab>**, select file, **<Space>**; or double- or right-click file, **OK**	
Activate/deactivate verification	**Backup • Options • Verify** Backup Data • **OK**	
Use/don't use error correction	**Backup • Options • Use** Error Correction • **OK**	
Save file selection, backup type, target, and options	**File • Save Setup As**, type file name or double-click name in **Files** box, **Save**	**File • Save Setup As**. Type file name, **OK**; or double-click name in **Files** box. If prompted, confirm overwrite
Backup selected files	**Backup. Setup** File, select SET file; and/or select files, backup type, target, and options. **Start** Backup	
Activate/deactivate Restore's verification	**Restore • Options • Verify** Restore Data • **OK**	**Restore • Options • Verify** Restored Files • **OK**
Compare/restore backup file(s)	**Compare/Restore**. Select backup set catalog, source, and target. Select Files, select file(s), **OK • Start** Compare/Restore	

MICROSOFT DOS 6.0: UTILITIES

PROTECTING FILES (continued)

Undelete restores deleted files. It has three levels of protection: *Standard*, the default level, can undelete a file until the space it occupied is reused (which can happen when you save new files, install programs, run *Windows*, or open a file in *Windows*). The intermediate *Delete Tracker* stores and reserves the locations of deleted files in a hidden file. *Delete Sentry*, the highest level, stores deleted files in a hidden directory to ensure recovery. The memory-resident Delete Sentry and Delete Tracker use 13.5K of RAM each.

Note: *d* indicates drive; if omitted, default is assumed.

Task	DOS command
Enable Delete Sentry	**UNDELETE /S**[*d*]
Enable Delete Tracker, optionally limit entries to 1 to 999	**UNDELETE /T**[*d*][*-nnn*]
Display drives' current protection level	**UNDELETE /STATUS**
List directory's deleted files, optionally specify recovery method	**UNDELETE /LIST** [/**DS** or /**DT** or /**DOS**]
Recover directory's files	**UNDELETE** [*d:path/filename.ext*]
Recover directory's files using Tracker if Sentry directory exists	**UNDELETE /DT**
Recover directory's files using DOS if Sentry directory or Tracker file exists	**UNDELETE /DOS**
Recover directory's files automatically	**UNDELETE /ALL** [/**DT** or /**DOS**]
Unload Sentry or Tracker TSR	**UNDELETE /UNLOAD**
Reload Sentry or Tracker TSR	**UNDELETE /LOAD**

Task	Windows command
Start Undelete	Launch Undelete from Tools group; or **File • Undelete** in File Manager
Enable Delete Sentry	**Options • Configure Delete Protection • Delete Sentry • OK**, set options, **Drives**, select drive(s), **OK • OK • OK**
Enable Delete Tracker	**Options • Configure Delete Protection • Delete Tracker • OK**, select drive(s), **OK • OK**
List a directory's deleted files	**Drive/Dir** or **File • Change Drive/Directory**
List deleted file(s) in current drive by name/content	**Find** or **File • Find Deleted File**, type name and/or contents, **OK**
Sort deleted files list	**Sort by** or **Options • Sort by**, select order criterion, **OK**
Get info on file surrounded by selection box	**Info** or **File • File Info**
Select/unselect file(s) in list	Click name; or cursor to name, **<Space>**
Select file(s) by name	**Options • Select by Name**
Unselect file(s) by name	**Options • Unselect by Name**
Print deleted files list	**Print** or **File • Print List**
Undelete selected file(s)	**Undelete** or **File • Undelete**
Undelete selected file(s) to other drive/directory and optionally rename	**Undelete** or **File • Undelete to**
Purge Delete Sentry file(s)	**File • Purge Delete Sentry File**
Exit Undelete	**<Alt>-<F4>** or **File • Exit**

PROTECTING FILES (continued)

Anti-Virus detects and removes more than 1000 viruses. VSafe, a memory-resident program, watches for and reports signs of virus activity.

Note: Do not run MS-DOS Setup or *Windows* Setup while VSafe is loaded.

Task	DOS	Windows
Start Anti-Virus	**MSAV**	Launch Anti-Virus from Tools group or **Tools • Antivirus** in File Manager
Select/unselect drive(s) to scan	**<F2>** or **Select new** drive, *drive letter*	In Drives list: click icon; or cursor to drive, **<Space>**
Scan memory, selected drives	**<F4>** or **Detect**	**Detect** or **Scan • Detect**
Scan and clean memory, selected drives	**<F5>** or **Detect & Clean**	**Detect and Clean** or **Scan • Clean**
Stop scanning current drive	**<F3>** or **<Esc>**, **Stop • OK**	**Pause • Stop • OK**
Get information about virus	**<F9>**, select virus, **Info**	**Scan • Virus List**. Select name, **Info**; or double-click name
Print virus list	**<F9> • Print**	**Scan • Virus List • Print**
Set Anti-Virus to scan memory and default (DOS only) or specified drive(s) automatically	**MSAV** [*d*: [*d:...*]] (add **/P** and/or **/L** to have Anti-Virus close when done; use **/P** for command line interface, **/L** to scan all local hard drives.)	Highlight Anti-Virus icon, **<Alt>-<Enter>**. For each drive to be scanned, add **<Space>***drive letter* **<Colon>** to Command Line. (Add **/P** to have Anti-Virus close when done.)
Delete Checklist files	**<F7> • Delete**	**Scan • Delete CHKLIST files**
Activate/deactivate stealth virus detection	**<F8>** or **Options, Anti-Stealth** (leave **Verify Integrity** checked), **OK**	**Options • Set Options • Anti-Stealth** (leave **Verify Integrity** checked), **OK**
Disable/enable alarm sound	**<F8>** or **Options, Disable Alarm Sound**	**Options • Set Options • Disable Alarm**
Save/lose settings on exit	**<F3>** or **Exit, Save Configuration • OK**	**Options • Save Setting on Exit**
Exit Anti-Virus	**<F3>** or **Exit, OK**	**<Alt>-<F4>** or **Scan • Exit Anti-Virus**
Load VSafe	**VSAFE** (to load TSR automatically when PC starts, add command to AUTOEXEC.BAT)	Load before *Windows* and add **MWAVTSR.EXE** to load= line in [windows] section of WIN.INI
Toggle VSafe option(s)	**<Alt>-V • ***number***• <Esc>**	**<Enter>** or Options button, select option(s), **OK**
Unload VSafe	**<Alt>-V • <Alt>-U**	**Options • Exit • OK**

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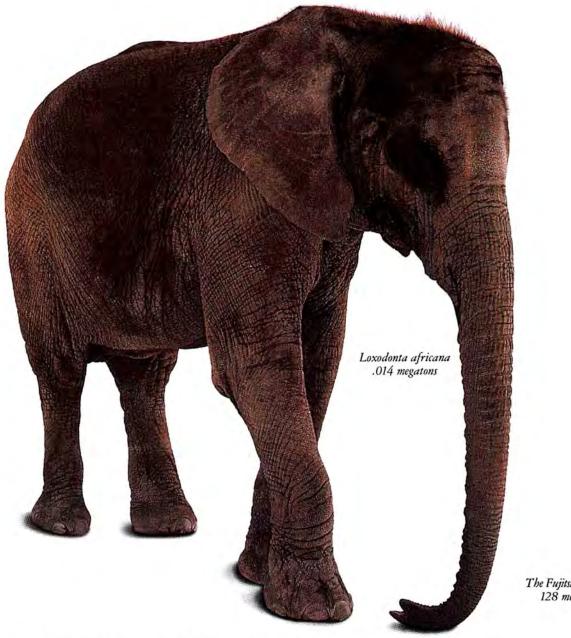
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Last name

Daytime phone number

1 2 3 4 5 6 7 8 9 0

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Sample	●	○	○	○	○	○	●
In This Issue (page 19)	○	○	○	○	○	○	○
Letters (page 23)	○	○	○	○	○	○	○
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Real Problems, Real Solutions (page 37)	○	○	○	○	○	○	○
Top of the News (pages 42–56)	○	○	○	○	○	○	○
1-2-3 4.0 for Windows (page 42)	○	○	○	○	○	○	○
News Monitor (page 43)	○	○	○	○	○	○	○
HP 100 LX (page 48)	○	○	○	○	○	○	○
HP LaserJet 4L (page 50)	○	○	○	○	○	○	○
cc:Mail 2.0 (page 54)	○	○	○	○	○	○	○
Protect Your PC Investment (page 56)	○	○	○	○	○	○	○
New Products (page 69)	○	○	○	○	○	○	○
Marketplace (page 93)	○	○	○	○	○	○	○
486s for $1250 (page 100)	○	○	○	○	○	○	○
50 Spreadsheet Tips (page 134)	○	○	○	○	○	○	○
Windows NT: The New DOS? (page 161)	○	○	○	○	○	○	○

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	All	Some	Least 1	2	3	4	Most 5
Word Processor or Desktop Publisher? (page 178)	○	○	○	○	○	○	○
Databases Come to Windows (page 188)	○	○	○	○	○	○	○
Caches Pay Off (page 212)	○	○	○	○	○	○	○
Help Line (page 220)	○	○	○	○	○	○	○
Spreadsheets (page 224)	○	○	○	○	○	○	○
Word Processing (page 230)	○	○	○	○	○	○	○
Windows (page 236)	○	○	○	○	○	○	○
Data Management (page 240)	○	○	○	○	○	○	○
Publishing & Presentations (page 244)	○	○	○	○	○	○	○
Communications (page 248)	○	○	○	○	○	○	○
Hardware (page 250)	○	○	○	○	○	○	○
Star-Dot-Star (page 254)	○	○	○	○	○	○	○
Reference: DOS 6.0 Utilities (page 259)	○	○	○	○	○	○	○
Business Fixtures (page 293)	○	○	○	○	○	○	○
Games: Break Time (page 297)	○	○	○	○	○	○	○
Home Office (page 300)	○	○	○	○	○	○	○
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○ Evaluate brands or models   ○ Have other purchase involvement

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For yourself
○ Yes   ○ No

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○ Yes   ○ No

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The Bottom Line: Keep It Simple, Smarty

An animated character in the dazzling tutorial for *Improv* says, "There's only one problem to solve. Calculating the bottom line." *Improv*, Lotus's ingenious reinvention of the spreadsheet, eliminates the complexities of spreadsheet life. *Guide Line*, Symantec's answer to the obscurities of project management software, is also easy to use. Autodesk's *Office Layout* package greatly simplifies the management of office space and furnishings. And the trackball on PC Brand's new Leader-Book Pro is simply *mahvelous!* (So's the color monitor.)

The bottom line? Each product promises to increase my productivity by making things less complicated.

Improv for Windows

Improv is so simple to use, it's surprising no one thought of it before. More than just a reinvention of the spreadsheet, *Improv* gives you a new way to handle and manipulate data. If you deal with numbers at all—especially if you've never used a spreadsheet program—you will want *Improv*.

Yes, there are still rows, columns, and cells in a ledger-sheet-like layout. But that's where the resemblance to your average spreadsheet ends. All cells are named in English, and you refer to the data they contain by the name of the cell or item. An item can be named "miles per gallon," and you can assign a formula to it, also in English—for example, "miles per gallon = miles/gallons" instead of "A1=B1/C1."

You can locate formula or logic errors by reading your own words, not obscure cell references. What's more, being able to track the links among your numbers with plain English means you're likely to think more logically about how your figures are laid out and how they should be calculated and interpreted. All the

By Thom Foulks

calculations used on a given worksheet are shown in a scrolling display at the bottom of your screen.

Improv will allow you to manipulate your worksheet in almost every conceivable way. It lets you drag items around the sheet wherever you want without losing the relationships among them. You can apply the same formula to multiple item locations with just a couple of mouse clicks: There's no retyping, no copying.
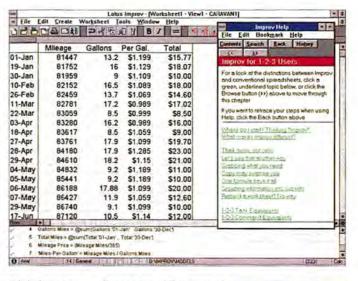
Learning to use *Improv* is a delight, thanks to the interactive tutorial that serves as an introduction to the program. *Improv*'s tutorial is the most impressive graphical demonstration I have seen on a PC.

Such software power, of course, must be matched with hardware: At minimum, *Improv* requires a 20-MHz 386 PC with 4MB RAM (Lotus recommends a 33-MHz 386 with 6MB RAM), a VGA monitor, and a mouse. If you haven't upgraded to this kind of horsepower yet, *Improv*'s simplicity and dynamic display powers will make you happy to do so. *Improv*'s list price is $495, but you should look for introductory offers. Most assuredly, *Improv* is a Foulks Favorite.

Guide Line and Guide Line Maker

A couple of years ago, when I attempted to use a project management program, I got stumped on one of the first questions: Did I want a Gantt chart or a PERT chart? I knew that either would let me see the entire project in chart form, but I didn't know which one I wanted, and the software wouldn't let me proceed until I chose. Talk about

frustrating. All I wanted was a schedule—I didn't want a college degree in scheduling.

Symantec is seeking to change that situation by introducing two new products that work as front ends to any of four popular project management packages: Symantec's *Time Line 1.0 for Windows*, *Time Line 5.0 for DOS*, *On Target*, and Microsoft's *Project for Windows*.

The $149.95 *Guide Line* is a package of 16 ready-to-use guides for common projects, such as putting together a marketing plan, setting up a network, or relocating an office. *Guide Line* can be purchased alone and is bundled with the $699 *Time Line for Windows*.

The $499 *Guide Line Maker* is a project development tool that helps you build other more specific guideline project models. When you use either product with a project management package, you can develop a full-blown project schedule that displays all the resources, time dependencies, and charts you need.

Using a LAN installation guideline, I developed a workable Gantt chart installation schedule for a ten-station local area network in about 15 minutes.

> **Foulks's Favorite is Improv, Lotus's brand-new approach to spreadsheets.**

The *Guide Line* template asks you questions—in this case, how many workstations, length of the cable, and so on—with predictable options to be checked if you want to include them. *Guide Line* then produces a template file. To build a complete schedule, you must feed the file into one of four project management packages *Guide Line* supports. You can also import an existing project management schedule and convert it to a template for distribution.

Office Layout

Using a CAD (computer-aided design) product to lay out an office floor plan isn't a new idea, but drawing a symbol for every stick of furniture is tedious. Autodesk makes this otherwise complicated project a lot easier with a specialized $149 version of its top-drawer *Generic CAD* program. *Office Layout* has a greatly simplified user interface, predrawn office equipment symbols, and an equipment inventory system.

You start by drawing your office walls, using a crossbar cursor to indicate their location, with a real-time display of your layout's dimensions. *Office Layout* knows how to draw doors and their swing paths—just point to a door's location and choose its width. Then you select from more than 200 office object symbols—chairs, desks, desktop equipment, and portable partitions—experimenting with their placement on screen. I've already begun looking at various redesigns of my office.

The inventory system is particularly useful and gives *Office Layout* an edge over regular draw programs in creating floor plans. As you choose and rearrange symbols in your office design, you also specify size, price, occupant, and so on, so that your plan holds the data for inventory summaries automatically. That data can be exported to *Improv* or any other spreadsheet program.

Although *Office Layout* gives you highly graphical representations with on-screen display measurements that go all the way down to ⅟₁₆ inch, it does not use the *Windows* interface. That, according to the Autodesk folks, means *Office Layout* can run on an XT equipped with a hard drive and a graphics card. (I looked at the product on my 33-MHz 386 machine with 8MB RAM, so screen response was impressively snappy and crisp, even on zooms to desk-drawer detail.)

486/SX Dual Scan Color LeaderBook Pro

Evaluation units of notebook computers have wandered in—and out—of my office for months, and all have lacked one critical

POWER TIP no. 288
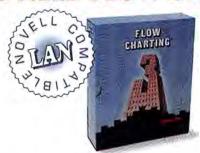
Creative Comments in WordPerfect for Windows

If you want multiple paragraphs in a *WordPerfect for Windows* comment, don't create the comment in the comment dialog box. Instead, type it in as normal text in the document area. When complete, block the comment and select Tools • Comment • Create. The highlighted text will become a comment, but one with hard returns.

George Salvador
Houston, Texas

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Circle 246 on reader service card

element: a functional pointing device. I've been desperate for something to use instead of a mouse, especially when I'm cruising at 35,000 feet or I'm in a cab that's stuck in traffic. My lean-and-mean mobile work style rules out any of those plug-in, cable-dangling, clamp-on units. So far, all the built-in pointing devices I've ever tried have been too small, with tendencies to jiggle and overspin.

Just when I was about to give up, enter
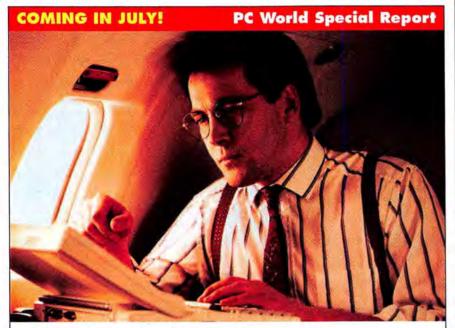
PC Brand with the 486/SX Dual Scan Color LeaderBook Pro. The 6.6-pound portable LeaderBook Pro has a solid, comfortable, centrally mounted trackball that can be manipulated by either hand, or both if you so desire. (Imitation remains the most sincere form of flattery: PC Brand freely admits that the broad platform that holds the trackball was "borrowed" from Apple Computer's highly successful PowerBook series of portables.)

Also lacking in many portables is a screen that doesn't strain your eyes. PC Brand's "dual scan" LCD scores again. Its passive-matrix design makes two simultaneous vertical sweeps across the 9.5-inch diagonal surface. The company says this produces a 20-to-1 contrast ratio rather than the 13-to-1 ratio common to most other passive-matrix designs: The result is a brighter picture. The colorful screen is indeed quite comfortable to view in room light, so you don't have to squint.

My unit, complete with 4MB RAM and a 120MB hard disk, carries a $2595 price tag. A 2400/9600-bps fax-modem is available for $199, and a proprietary 4MB RAM expansion module costs $300. (Monochrome models of the LeaderBook Pro series are priced as low as $1795.) I'd be happy to pay that just for the trackball.

- **Guide Line, Guide Line Maker** Symantec Corp.; 800/441-7234, 408/253-9600
  Reader service no. 712

- **Improv for Windows Release 2.0** Lotus Development Corp.; 617/577-8500
  Reader service no. 713

- **Office Layout 1.0** Autodesk Retail Products; 800/228-3601
  Reader service no. 714

- **486/SX Dual Scan Color LeaderBook Pro** PC Brand Inc.; 800/722-7263
  Reader service no. 715

Thom Foulks is a contributing editor for PC World.

POWER TIP no. 289

Faster Finds in Excel

Excel's Formula • Find feature helps you find a string in a worksheet. But if you're looking for the right instance of that string, calling up Formula • Find over and over, even with the <Shift>-<F5> hot key, can be a drag. In these cases, Formula • Replace is a lot quicker. Just type the string into the Find What box and click **Find Next**. If the first find isn't what you're looking for, click **Find Next** again. Just don't click Replace or Replace All. When you find the cell you want, click **Close**.

Rex Farrance
Associate Editor

Underground, in a Maze, and on the Green

The popular *Ultima* fantasy series has gone underground. No, you don't have to lurk around the bus station to buy the latest version. Adventurers continue to roam the highways and villages of Britannia in *Ultima VII—The Black Gate* (reviewed here in January). But would-be wizards and coffee-break sword fighters get an opportunity to explore the subterranean depths with *Underworld II—Labyrinth of Worlds*.

The plot? Okay, you've saved Britannia eight times already, but suddenly a huge black-rock gem encases the castle of Lord British, and the hapless deadbeats who live there need you to beat back the bad guys one more time. You find yourself exploring dark corridors, gathering spell-casting runes and magic potions, wielding medieval weaponry and armor, and enjoying stylized conversations with seers, sorceresses, and sidekicks. The scope of this adventure is astonishing. Each of the eight facets of the black-rock gem opens onto a different plane of reality: prison towers, ice caverns, distant cities, exotic worlds, and alien dimensions.

Underworld II employs a distinctly different graphical approach, too. Instead of the familiar spy-eye viewing angle where you float just over someone's head, you see *Underworld* from the hero's or heroine's point of view.

A well-designed, mouse-based interface lets you move through the dungeons as smoothly as if you were walking. Simply swing your cursor to the side to change directions, or raise it toward the top of the screen to run faster. And you can throw away that graph paper, courtesy of an auto-map that records your explorations automatically. Combat is equally intuitive. Aim your weapon with the mouse, hold down the right button to gather power, and release the button to thrust or parry.

By Michael Goodwin

On-screen icons allow you pick to up and manipulate objects, although these controls are awkward to use.

If you're looking for a radical reinvention of swords and sorcery fantasy, better look elsewhere: *Labyrinth of Worlds* is basically a retread of Dungeons and Dragons. But its size and splendor make for a rewarding adventure.

Egg-Zackly Right

At first *Contraption Zack* looks simple: It's your first day as a repairman at Gadgetco, but already you're in a world of trouble. There are major malfunctions everywhere, and your fellow workmen have "borrowed" your tools. Your job: Show 'em who's boss!

Zack is built around an elaborate six-level, 60-room maze, but getting through it requires much more than just drawing a map. The heart of *Contraption Zack* is a series of logical puzzles. None of the puzzles requires special equipment, but their very simplicity is what makes them so maddening—and so irresistible. You *know* there's a way to get through the doorway to the next room. If the blue button lowers the blue cones but raises the yellow cones, maybe you can pass the yellow cones first and then….The modular design is also appealing: Once you've beaten one puzzle, you can save the game and go to the next when you're ready.

Graphics are relatively crude—much like an arcade game—and the interface is a bit clunky. Cursor keys move Zack, but sometimes a horizontal key moves him diagonally—and vice versa. Not all the malfunctions are in Zack's puzzle world: The <Esc> key is supposed to display the main menu, but in my experience it didn't always work. Still,

an elegance to the game's underlying design makes up for flaws in its controls. *Contraption Zack* is highly appealing, particularly for short coffee breaks.

Straight Into the Trees

It must be the year for golf; quite a few PC golf simulations are reaching the stores. In addition to Fuji Golf (part of Microsoft's *Entertainment Pack 3*, reviewed last month), there's *David Leadbetter's Greens* from MicroProse and *Links 386 Pro* from Access.

Greens is supposed to help you improve your game with play-by-play advice from big-time golf instructor Leadbetter, who says cryptic things such as, "Remember—never up, never in" when you miss a putt. He also reminds you of the importance of proper stance, tee height, club selection, ball spin, and so on. To swing, you click your mouse three times—once to start your backswing, once to start your downswing, and once to choose the instant of contact with the ball. While I find it hard to believe that anything you do with a mouse and your PC will have the slightest effect on what you do with a golf

> Underworld II welcomes you to the chambers of Lord British. The icons on the lower right let you pick up objects and use them.

LINKS 386 PRO SHOWS UP TO FOUR VIEWS. Here, two right-hand frames depict the green and a spy-eye shot of the hole.

club on the fairway, I don't imagine this simulation will do your game any *harm*.

Once you manage to hit the ball, you're rewarded with an incredible array of real-time visuals that follow it as it flies toward the green—or, in my case, straight into the trees. The "camera" angles are marvelous. This part of *Greens* is major fun. You can choose to play against one or more comput-

er-generated opponents, on one of six courses, and in 11 different kinds of games. You can even play against another human being via modem, assuming that you both have copies of the software.

Links 386 Pro from Access shares some important features with *Greens:* You click your mouse to hit the ball, for example. But in most ways it takes a different approach. No on-screen pro gives you advice, and there's less attention to theoretical niceties of form. But the biggest distinction is graphical. *Links* shows you the golf course—including trees, grass, sky, and buildings—at virtually photographic resolution. Moreover, you can display four views at a time, including a high-angle overhead shot from which you can zoom in.

The downside to all of this photo-realism is that it's slow. *Links 386 Pro* can take as
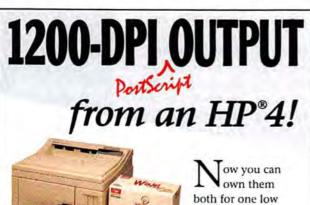
long as 30 seconds to repaint the screen after every shot. Nevertheless, when you tee off on *Links'* gorgeous super-VGA rendering of Hawaii's Mauna Kea course (sold separately), you may decide that its breath-taking beauty more than makes up for the slow-motion graphics. Anyway, golfers aren't supposed to be in a hurry.

- **Contraption Zack** $39.95; Mindscape; 800/845-8698
  Reader service no. 600
- **David Leadbetter's Greens** $59.95; MicroProse Software; 410/771-1151
  Reader service no. 601
- **Links 386 Pro** $69.95, Mauna Kea Championship Course $29.95; Access Software Inc.; 800/800-4880
  Reader service no. 602
- **Underworld II—Labyrinth of Worlds** $79.95; Origin; 800/245-4525
  Reader service no. 603

Michael Goodwin is a contributing editor for PC World. He can be reached as MGOOD-WIN on PC World Online (see page 10 for more information). ∎

Uninstallium Practicalus

Remember the good old days? Every DOS program came with a convenient, free, easy-to-use uninstall routine—DEL *.*. A really complicated operation might've involved removing a directory and deleting some lines from your AUTOEXEC or CONFIG files, but that was as difficult as it got.

Well, Bunky, if you've switched to *Windows*, you know those days are over. Many *Windows* applications install themselves into half a dozen new directories scattered across your hard disk, add a heap of new DLL files to your WINDOWS directory, and insert dozens of new lines into WIN.INI.

Hope, I'm glad to say, has sprung, in the form of some smart utilities that'll rid your computer of unwanted *Windows* programs—along with their bazillion unidentified support files. And as a fringe benefit, you'll get a better grasp on how *Windows* works.

The highest marks go to MicroHelp's *The UnInstaller*, a brilliant utility that cleans up after an application as it removes it. When you select a program, detailed analysis lets you know where the program and help files reside, if the program has its own INI file, and which Program Manager icons exist. The $79 *UnInstaller* also ferrets out DLLs and items added to WIN.INI. Then with just a click of the mouse, they're gone. *Adios. Hasta luego.*

Windows Without a Clue
Because I don't have a clue about half of those files in my *Windows* directory, I was reticent about using *The UnInstaller*; afraid I might unintentionally delete something I need. Not a chance—*The UnInstaller* has more safeguards than a monitor has pixels. For example, it has a reassuring "Confirm all Deletions" choice and it's smart enough to stop you from uninstalling

By Steve Bass

essential *Windows* programs like PIFEDIT or WINFILE. After it's done, *The UnInstaller* can report on what items it removed and what you didn't allow it to remove. Using *The UnInstaller*'s browse mode, I was able to get rid of more than 5MB of long-unused *Windows* programs that I'd forgotten I even owned. Now if the utility could only remove the excess DLLs left from applications I erased before I got *The UnInstaller*.

If you're looking for a bargain, and are willing to do more work to earn it, you can use *Uninstall for Windows*. You must run this program before and after you install a new *Windows* app, letting it take a snapshot of your entire system. The program can then compare the "old" system to the "new" so you'll know what's changed. *Uninstall for Windows*, available as UN4WIN.ZI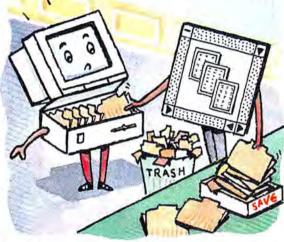P on PC World Online and other on-line services, isn't particularly elegant. But it's only $19, and it's try-before-you-buy shareware.

A Back Door to Windows
Using *The UnInstaller* had an unexpected advantage: It gave me a glimpse into the inner workings of *Windows*. I now know, for example, which DLLs are shared by multiple programs and how many programs create their own INI files. This sparked my curiosity. To learn more about *Windows* (and do some safe tinkering) I started playing with a pre-release copy of Windows User Group Network's *System Engineer*, an incredibly comprehensive utility that lets me snoop into—and modify—just about every part of *Windows*. Among other things, I was able to explore my *Windows* communications setup, tweak my 386 memory settings, and even set a log to record the last 100 changes to my system. Being a bit fainthearted, I was glad that *System Engineer* has an option to let me experiment without any

chance of doing harm.

If *System Engineer* had nothing but its help and tutorial files and its ability to troubleshoot a problem, it would still be worth the price. The Help system includes not only a comprehensive glossary and flowchart of *Windows* functions, but took me on an amazing tour of *System Engineer*'s own options. And as for troubleshooting, the WUGNET program easily helped me solve a problem I had been experiencing with the mouse when I was in windowed DOS programs.

It's June, time for garage sales and weeding the yard. With programs like these, you can clean your *Windows* too.

Contributing Editor Steve Bass is the president of the Pasadena IBM Users Group. He can be reached as PCW STEVE on PC World Online (see page 10 for more information).

WHERE TO BUY

Uninstall for Windows
$19, It's Your Money Inc.;
CIS 72621,2222; America
Online "IYM."
Reader service no. 722

The UnInstaller $79,
MicroHelp Inc.; 800/922-
3383, 404/516-0899,
404/516-1099 (fax).
Reader service no. 723

System Engineer $49.95
(free with WUGNET membership), Windows User Group
Network; 215/565-1861,
251/585-7016 (fax).
Reader service no. 724

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IBM	PS/2 Model 77 486DX2
COMPAQ	DeskPro 66M

0M   5M   10M   15M   20M

Performance measured by running WINBENCH version 3.1 at 640 x 480, 256 colors. Results measured in millions of WINMARKS. Results for IBM and Compaq as published by PC Magazine in issue dated January 26, 1993. Results for Dell 466/M and 466/ME provided by Dell Performance Measurement Lab, January 1993. DeskPro 66M configured with 8MB RAM, 210MB IDE HD, QVision 1024/E controller with 1MB VRAM. PS/2 model 77 486DX2 configured with 8MB RAM, 400MB SCSI HD, XGA-2 with 1MB VRAM and 256KB cache. 466/M and 466/ME both configured with 8MB RAM, 170MB IDE HD, local bus video with 1MB VRAM, and 128KB cache.

Our Dell 466/M and 466/ME with over 19 million WINMARKS, outran the Compaq DeskPro 66M with QVision and IBM PS/2 Model 77 486 DX2 with XGA-2. That means we're up to 57% faster than QVision and up to 174% faster than XGA-2. Thanks, of course, to our accelerated local bus video and fast drivers for Windows applications. Both help put the Dell® 466/M a little ahead of its time.

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