

Southern California's Computer Magazine

Jan. 1, 1994 • #118

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The Seventh Annual MicroTimes

100

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In 1993

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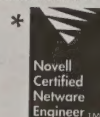
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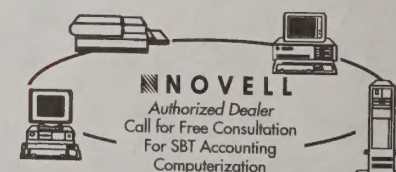
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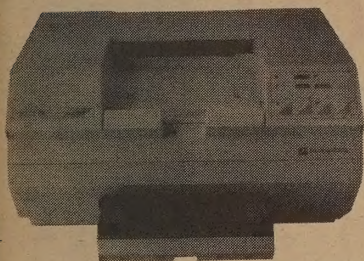
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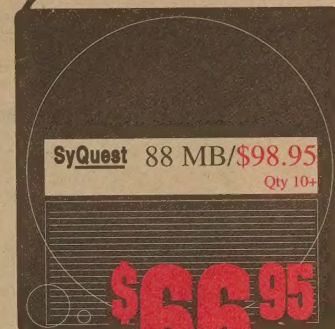
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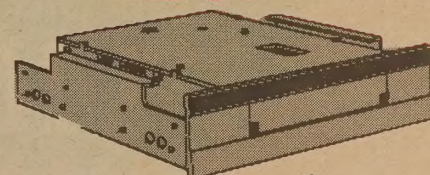


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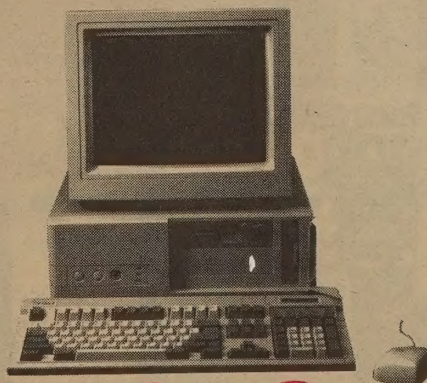
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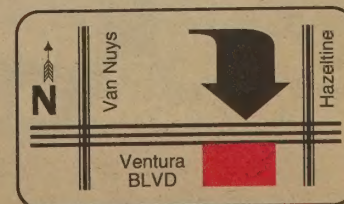
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A NOTE FROM THE EDITORS

As we enter the new year and look back on the old one, we're pleased to be able to bring you some perspectives from Alvin and Heidi Toffler, whose work over the last two decades has been a source of great insight as to where all this technology is taking us.

We're also pleased to bring you the perspective of our friend Rich Karlgaard, editor of *Forbes ASAP*, on a similar issue, and expect that it will provoke some interesting and perhaps heated response.

And of course, following in our time-honored tradition, we bring you this year's version of the *MicroTimes* 100 list, the denizens of which have, in one way or another, had a significant impact on the lives of all of us computer users during 1993.

Happy new year from all of us at *MicroTimes*!

—ME

COVER STORY

Surfing The Third Wave

Alvin And Heidi Toffler On Life And Work In The Information Age

By Mary Eisenhart

Cover Photo: Michael Jay

From *Future Shock* in 1970 to their recent work *War and Anti-War*, the Tofflers have provided insightful perspectives on the social and cultural impacts of technology. We recently had the opportunity to visit with the Tofflers and discuss the profound changes wrought by digital technology on the way we live and work.....44

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MICROTIMES
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MultiMedia & beyond

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 New release offers powerful modeling and animation features.

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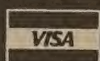
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CONTRIBUTORS

John C. Dvorak is a widely syndicated columnist and author who provides us with monthly updates on his bizarre travels and discoveries.

Paul Hoffman is an industry analyst who's been writing about microcomputer technology for over ten years, and is the author of several books on computer-related topics.

Ed Kahn is a writer and consultant based in the San Fernando Valley.

Rich Karlgaard, whose essay on NAFTA, Moore's Law, and related matters begins on page 20, is no stranger to the fine art of goring sacred oxen, as much of his past work at *Upside* and current work at *Forbes ASAP* attests. We rather expect this piece to generate heated controversy and invite responses; we also think he raises important issues that merit discussion.

We invite your responses to this and our other articles at our various addresses:

US Mail:

3470 Buskirk Avenue
Pleasant Hill, CA 94523

Electronic Mail:

Internet: microx@well.sf.ca.us

MCI: MicroTimes

America Online: MicroTimes

Douglas J. Nakakihara works a day job as a CPA and spends a lot of time looking for the latest cool Amiga stuff.

Richard Raucci is the former technical editor of an advanced workstation magazine. He lives in the Bay Area and contributes to several publications on a variety of subjects.

Jim Warren founded assorted time-honored institutions of the computer industry and serves on Autodesk's board of directors.

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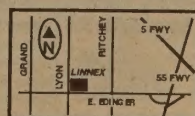
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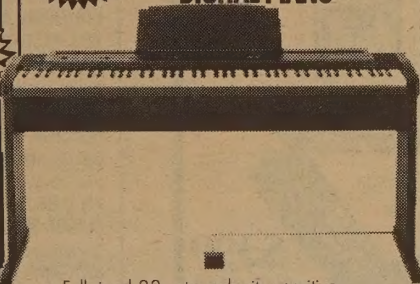
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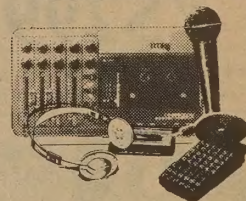
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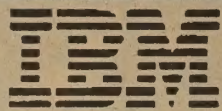


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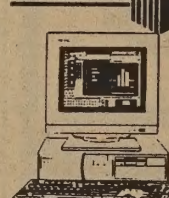
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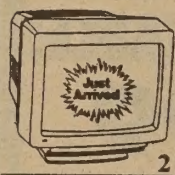
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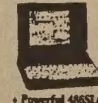
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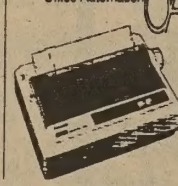


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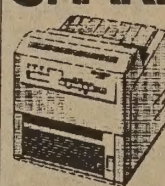


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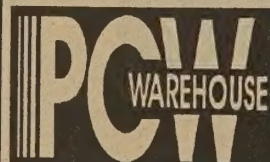


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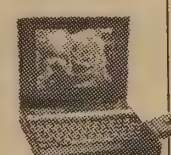


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INDUSTRY INSIGHT

Patents And PowerPC

Compton's Announces Patent on Almost All Multimedia—To Great Skepticism

**BY PAUL
HOFFMAN**

The US patent system has been widely criticized for the way it deals with software, and a recent announcement by Compton's New Media that they have received a patent for essentially all hypertext multimedia will certainly increase that criticism.

Compton's claims that the patent, issued in August, gives them the right to force any company creating searchable multimedia to pay royalties to Compton's. The immediate response from most of Compton's competitors has cast both Compton's and the entire patent process in an incredibly negative light.

The patent, 5,241,671, says that Compton's invented the process by which a program can search for information that interrelates text and graphics. When the patent was seen by people who had been in the field for years before Compton's released its Multimedia Encyclopedia in 1989, it was roundly criticized.

Many of the company's competitors are considering challenging the patent by showing that the concepts covered in the patent were known and discussed before Compton's released its software, and that they are completely obvious. Some claim that the same set of features claimed by Compton's had been available in commercial products for many years before Compton's applied for the patent.

Although it costs a great deal of money to write up, submit, and defend a patent during the application process, it's not so expensive to challenge a patent. The challenger can simply request a reexamination of the patent, giving information that the challenger believes would make the patent

invalid, such as publication of the ideas in the patent before it was applied for. All Compton's subsequent claims rest on the first, so anyone who can show that the parts of the first claim had been discussed or incorporated in other products could probably cause the entire patent to be revoked.

In fact, the main claim in the patent sounds suspiciously like many of the first HyperCard stacks that became available in 1987 and 1988. The claim, for "a computer search system for retrieving information" comprising ten parts, basically describes any one of a number of HyperCard stacks that let you retrieve pictures based on text descriptions and let you see the path of your search. In fact, all of the elements that the patent describes in the first claim were widely discussed in 1987 by journalists and Apple evangelists who were trying to explain what HyperCard was and why it was so exciting. The patent's other claims simply add bells and whistles to the first claim.

The uproar about the Compton's patent was immediate. Many companies, even those with good relations to Compton's, decried the chilling effect Compton's actions will have on the still-marginal multimedia market. Currently, millions of people have CD-ROM drives and multimedia-capable computers, but even the best CD-ROM titles are selling in thousands rather than hundreds of thousands. Compton's is demanding 1% of the standard list price of each title sold; that number will go up to 3% after June. Many companies object to the steep fees, which in some cases rival what outside authors get; they also object to having to report their

sales to a direct, and clearly belligerent, competitor. Some competitors were particularly bothered that Compton's was so out of touch with the market that its press release could make statements like "our royalty structure and distribution options will benefit our licensees."

Compton's defends its actions by saying that it wants the industry to grow, but also wants the public to recognize its contribution to the field. Although the Compton's Multimedia Encyclopedia was one of the first general education titles available on CD-ROM, it was quickly seen to be insufficient for anything other than a demonstration of interesting capabilities. As such, it was soon overtaken by entertainment CD-ROMs.

Around the same time, an unrelated company announced another software patent that covers a different part of the CD-ROM market. TestDrive Corp. says that its patent gives it exclusive rights to "try before you buy" technology, which lets software marketers sell fully enabled software on CD-ROMs and allows the buyer to try the software a few times without purchasing it. TestDrive also said that its patent covers a wide range of other delivery technologies and that they were looking at competitors' products for violations.

The claims in the Compton's patent brings up an issue that has been simmering in software development circles for years: patents that should never have been issued due to prior use of the claimed features. The most common reason for patents to be overturned is a challenger showing that the patent is based on "prior art" that was known in the industry before the patent



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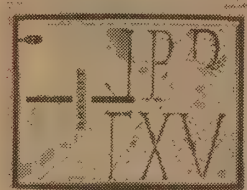
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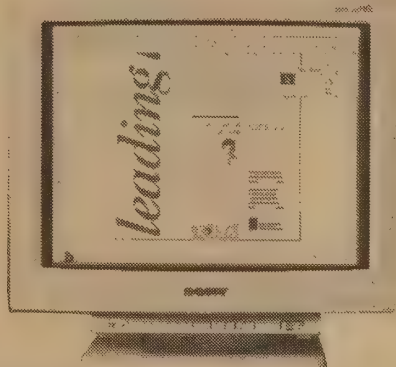
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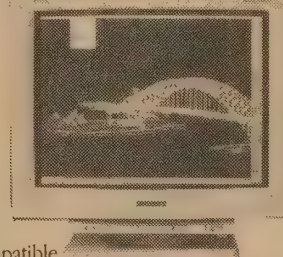
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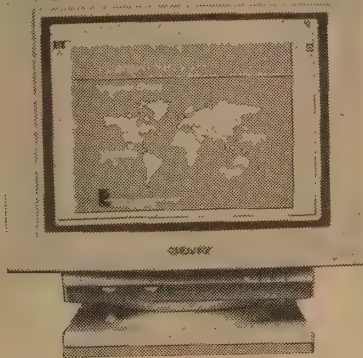
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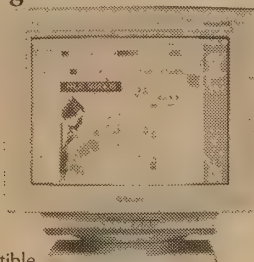


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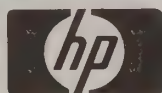
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Who's Buying Our Government?

Computerizing Campaign-Finance Disclosures

BY JIM WARREN

These columns concern what isn't, but could be—no technological breakthroughs needed. All it takes is time and effort.

HIDDEN IN PLAIN VIEW

For years, local, state, and federal political candidates and campaign organizations have been required to file detailed disclosures of their campaign finances and potential conflicts of interest. But these have been paper filings—implementing the “hide in plain sight” technique.

Example: typical financial disclosures for a single major candidate in a California gubernatorial race may be a stack of paper over four feet high. And it costs ten cents a

page to get a copy (and there's been a proposal to increase that to thirty cents per page!).

Even if you can afford a copy—just try to analyze it.

nets, without charge by the state. (The law took effect January 1, 1994.)

As with the legislation-online bill, I have agreed to provide a proposal explaining how—from a technical standpoint—computerized campaign filings and disclosures can be done for (I think) little or no increased expense for the receiving agency and, in most cases, no additional cost or hassle for “significant” campaign operations. In fact, it appears that there may be cost and time savings for both—and certainly improved utility for the public.

improved services for his own county operations. There are fifty-eight counties in California.)

At the state level, a coalition of the “usual suspects” is already coalescing to support the effort to mandate computerized campaign disclosures—public-interest and open-government advocates such as California Common Cause (916/443-1792), etc. It appears certain that the spectrum of supporters will include newspaper publishers, journalists, environmental groups, utilities watchdogs, educators, and numerous similar groups.

WIDESPREAD INTEREST

Two semi-announced candidates (Assembly Member Jackie Speier and Acting Secretary of State Tony Miller) for the open Secretary of State's office—which handles filings for state races—have had staff members contact me and are awaiting copies of the proposal.

Furthermore, a campaign disclosure reform bill is already partway through the legislative process, and the bill author's staff have also called and are awaiting copies of the proposal. If they like it, they are likely to amend appropriate components of it into the bill, SB758 by state Senator Tom Hayden.

In early December, at the invitation and guidance of the San Mateo County Clerk and Registrar of Voters, Warren Slocum, I outlined the proposal to ten county clerks and registrars—all we had time to button-hole in unplanned meetings during a Sacramento “new laws” conference. Most responses were actively positive; two were politely positive; none was even slightly opposed. (It probably helped that Slocum is a past president of the California Elected Officials Association and has actively pursued modernization and cost-effective

LOCAL IMPLEMENTATION ALREADY UNDERWAY

The City and County of San Francisco is even further along. In 1993, they passed an ordinance (#131-93, May 17th) mandating that local candidates and campaign organizations that collect \$5000 or more *must* file disclosures in computerized form—in addition to filing their already-required paper disclosures.

San Francisco's Registrar of Voters Germaine Wong, several of her key staff, and I had a lengthy working session in December addressing implementation details. It appears that they will implement their ordinance in a manner compatible with my then-tentative proposal, and I am certainly picking their brains for insights and ideas—a mutually productive sharing.

Wong mentioned that, as far as she knows, San Francisco appears to be the first jurisdiction in California to mandate computerized filings and have implementation already in process. (Some other counties are apparently scanning the paper filings and storing them as digitized images for computer retrieval. Better than paper, but all you can do is read 'em. No computer-assisted analysis.)

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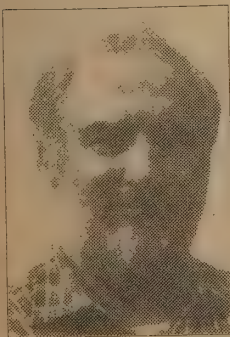
page to get a copy (and there's been a proposal to increase that to thirty cents per page!).

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COMPUTERIZED DATA IS ACCESSIBLE DATA

To make campaign disclosures *useful*, a project has recently begun to mandate that all state (and perhaps local) political campaign disclosure information that is “significant” be filed in digital form and made available upon request to anyone, on diskette and/or online. “Significant” might be defined as campaign receipts exceeding some dollar threshold.

This project is a logical follow-on to the successful 1993 effort that made comprehensive state legislative information and statutes available via the public computer



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NEWS & VIEWS

FOR A GOOD TIME . . .

This column will report ongoing details—though often too late to assist readers' most effective legislative participation.

To receive online updates and action alerts—which *do* arrive quickly enough to allow citizen input to the Legislature when it can have greatest impact, send your email address to jwarren@well.sf.ca.us—then, as I know more, you'll know more. (Once I have the implementation proposal completed, it'll be available online, and I will publish how to receive a copy by SASSE—self-addressed, stamped, snailmail envelope.)

Disclaimer: As with the legislation-online project, I have no business or financial interest in this—but I have a *great* civic interest in it. Anyway, it beats the hell outa hanging out at the local bar.

TECHNO-CIVIC QUICKIES

- Every federal congressional district in the nation purportedly has a library designated as the district's federal depository library—where copies of federal public records are made locally available. Many also serve as depositories for copies of state and/or local-government public records. Why not equip those depository libraries with ftp file-servers for often-local dial-up online access to computerized federal records? ("ftp" means "file transfer protocol," a standard mechanism for copying files between computers on the Internet.)

- You may not like the idea of "direct democracy"—with its potential for legislation by ill-informed masses manipulated by Madison

You may not like the idea of **"direct democracy"**—with its potential for legislation by **ill-informed masses** manipulated by Madison Avenue. But how about **voting by telephone?**

Avenue. But how about voting by telephone, instead of trudging off to wait in a line at some distant voting booth on election day? Interesting idea—with numerous complications ripe for technological solution. (Warren Slocum mentioned someone who has a proposal for how to implement it; more details later.) ■

THE HORSE'S MOUTH

Jim Warren will speak about "Modern (Electronic) Access to Government" before the Commonwealth Club in San Francisco, May 5th at 5 pm (415/597-6700).

He will discuss "Realworld Civic Networking" at a meeting of the IEEE Society on the Social Implications of Technology, Silicon Valley Chapter, Feb. 10th at 7:30 pm (415/948-9275 or dpauill@infoserv.com).

Warren founded InfoWorld, Wireless Digital, Initiative, Inc., and one of the nation's largest public microcomputer conventions. He was founding host of PBS's Computer Chronicles, founding editor of Dr. Dobb's Journal, and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center), and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991), was one of the first to receive the Electronic Frontier Foundation Pioneer Award (1992), and led the recent successful effort to make state legislation and statutes available via the public nets without state charge. He is also a member of Autodesk's board of directors.



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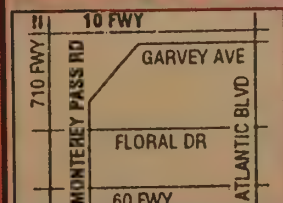
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NAFTA's Strange Bedfellows—It's Only The Beginning

BY RICH KARLGAARD

If its implications weren't so serious, the NAFTA debate would have been laughable for producing such odd bedfellows. Who would have imagined a dance card like this?

* FOR: *The New York Times* and the *Wall Street Journal*; Anthony Lewis and William F. Buckley; Al Gore and Empower America.

* AGAINST: Ross Perot and Jesse Jackson; Roger Milliken and Ralph Nader; Pat Buchanan and the Sierra Club.

What this shows is that the range of political opinion in the US is not always spread along a single axis of left to right. I believe there is another axis ascendant: authoritarian/libertarian.

Try this exercise. Draw a left-to-right line across a page. Then draw a vertical line from top to bottom, labeling it Authoritarian on top, Libertarian on bottom. You have just created a grid with four quadrants. Politically speaking, it should look like this:

* Upper left is left/authoritarian. Here dwell the Communist Party, AFL-CIO, NEA, parlor Maoists like Michael Lerner and European-style social democrats like Hillary Rodham Clinton.

* Upper right is right/authoritarian. Augusto Pinochet, Pat Buchanan and Ross Perot call it home.

* Lower left is left/libertarian. This quadrant is least represented in government today, even though many college-educated

baby boomers (particularly those without children) would place themselves here. Mavericks like Jerry Brown or Bob Kerrey often start here, then move out or drop out when they can't build a coalition—the

Here is the point: NAFTA was largely supported by libertarians and largely opposed by authoritarians. And NAFTA won't be the only example of this. As the world speeds ever faster into the information age, look for more skirmishes fought along the authoritarian/libertarian axis.

The source of the conflict is this: Authoritarians believe in the goodness of command-and-control. Politicians of this stripe—left and right—trust the state and its apparatus to mold human beings into better human beings. Force, implied, threatened or used, inevitably is necessary. Libertarians, by contrast, trust in the individual's ability to make his own best destiny.

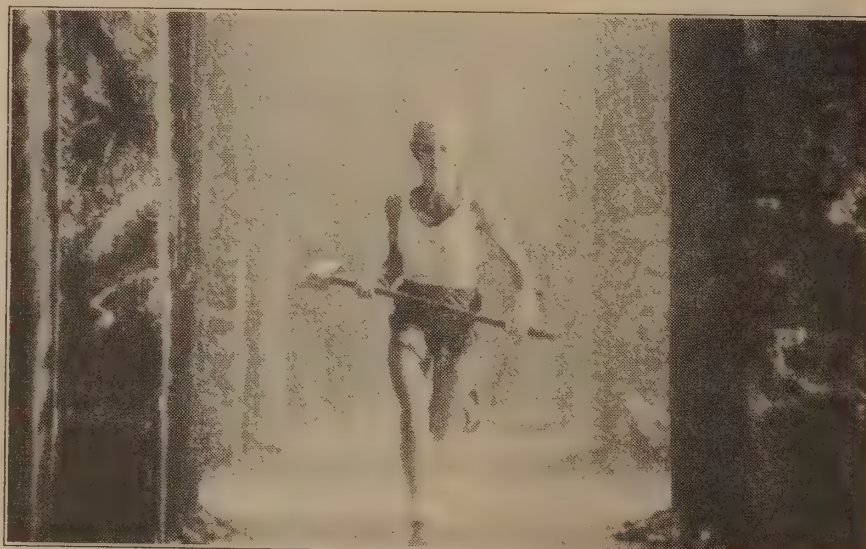
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Put this kind of expanding power in ordinary people's hands, and authoritarian regimes will topple, one by one.—Rich Karlgaard

Photo credit: Apple Computer, 1984 commercial introducing the Macintosh.

perennial problem of politicians in this quadrant. In the same quadrant are readers of *Rolling Stone* magazine and donors to the ACLU. Tellingly, most software designers I know would claim a home here.

* Lower right is right/libertarian. Most *Wall Street Journal* editorial page readers are comfortable here. Other neighbors include Ronald Reagan, *National Review*, *Forbes* and Empower America.

Where's Bill Clinton? Our young president has always been a leftist. His real problem is that he can't decide whether he is authoritarian, like his wife, or libertarian like the New Democrat he campaigned as for president. On NAFTA, Clinton was his old campaigning self. (Not so on much else, regrettably.)

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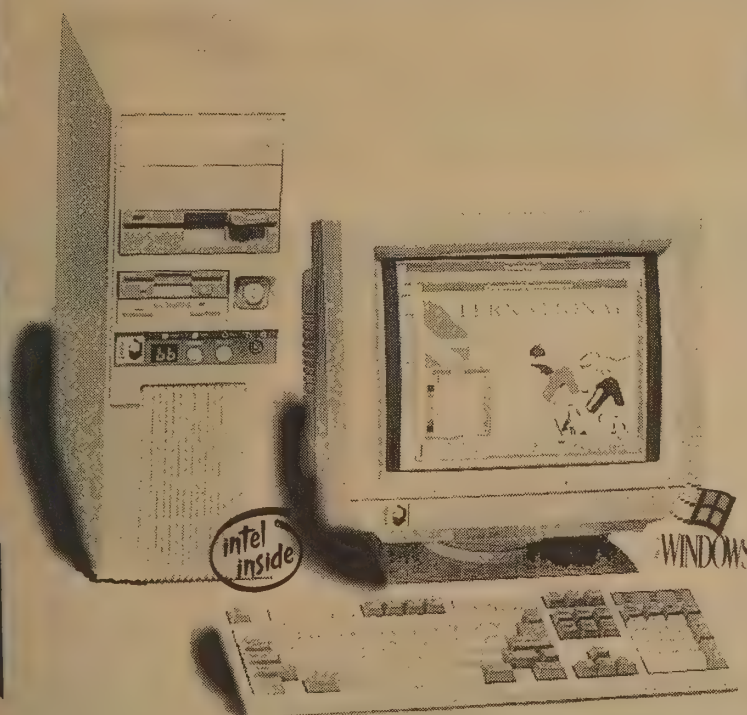
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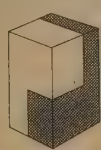
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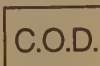
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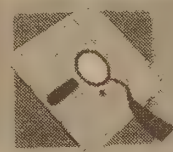
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of computing power sat collectively on the world's desktop (and laptop) computers. Moore's Law laid waste to command-and-control data processing centers inside of corporations.

Moore's Law (named after Gordon Moore, the Intel cofounder who predicted that chips would double in performance every eighteen months) will rout every authoritarian regime it encounters. Yes, every one: from mainframe computers, to monopolies and cartels, to the tin pot Napoleons in government, trade unions and academe.

By 1996 Moore's Law will have the power of 1993's top mainframe contained in a desktop box for \$3000. By decade's end, that power will be in your set-top box (once known as your television)

NAFTA was largely

supported by **libertarians**

and largely opposed by

authoritarians. As the

world **speeds ever**

faster into the information

age, look for more

skirmishes fought along the

authoritarian/libertarian axis.

and telephone. Communications bandwidth will grow at a rate even faster than Moore's Law. Fiber optics has an almost infinite capacity, assuming the development of such enabling technologies as photon amplifiers and frequency tuners. But while we're waiting for that, advances in digital signal compression (again, thank Moore's Law) will turn coaxial cable and even copper into six-lane interstate highways of data. Wireless may hold the greatest promise of all. Each year, Moore's Law—literally in the form of digital signal processors, analogously in a grid of microcells—will ensure that higher and higher frequencies in electromagnetic spectrum can be turned into ocean-wide channels of data.

Put this kind of expanding power in ordinary people's hands, and authoritarian regimes will topple, one by one. Before the decade's end, home and private schooling on computers will rout the NEA. Lightning fast library searches on massively parallel servers fed by fiber optic pipes will trash the cost structures of many professional cartels, including law and perhaps even medicine. And corporate organizations that are based on hierarchies, job descriptions and credentialism will be left gasping when passed by nimbler rivals harnessing workgroup software, teams of virtual experts and just-in-time learning.

In the age of information, those who cling to authoritarian command-and-control structures are destined to lose. But beware, in the meantime, they'll try their best to make us miserable. ■

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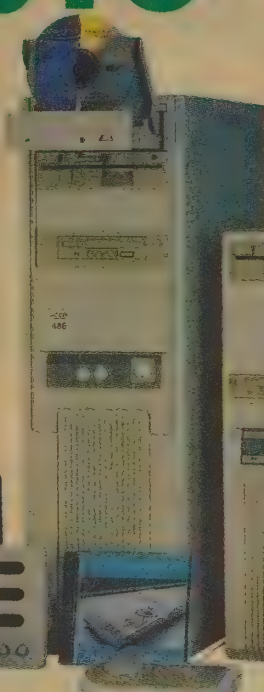
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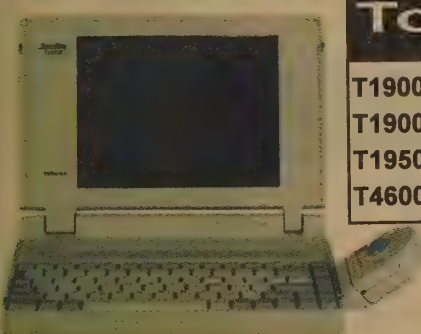
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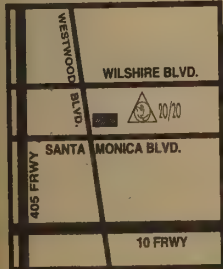
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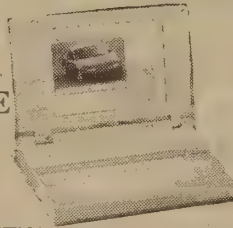


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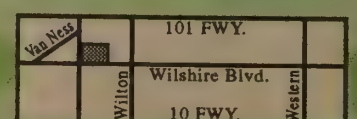
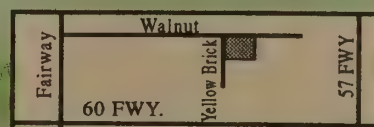
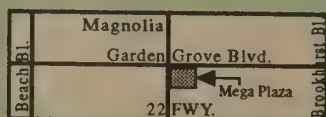
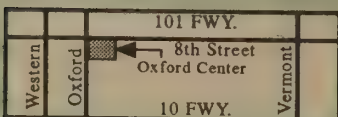
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continued from page 12

application. The situation is serious enough that many large companies have banded together to form the Software Patent Institute in Ann Arbor, Michigan, to help educate the US Patent Office about what prior art exists, to prevent the issuing of patents that are publicized but later overturned. The Compton's patent will certainly shine a brighter light on the whole

issue of software patents and patent owners who threaten maturing markets with claims for royalties.

APPLE BANKING ON POWERPC SYSTEMS FOR 1994

You can tell when major Apple announcements are about three months away: the

corporate leaks turn into gushes. In the case of its upcoming PowerPC-based systems, Apple is telegraphing its punches by taking out full-page ads in national magazines describing the wonders of systems that it has not yet announced. It is widely expected that Apple's first RISC-based systems will be shipped in March or April, with price tags comparable to its current line of computers.

The main reason that the PowerPC systems are so important is that many people expect the PowerPC processor to become one of the most popular CPUs in a very short amount of time. Backed by the two largest PC companies, IBM and Apple, the PowerPC chip could even take over the number one spot (currently held by the Sparc CPUs found in Sun computers) within a year or two. Early reports from software and hardware developers who have prototypes of Apple's upcoming systems say that they are already extremely reliable and run essentially all current Macintosh software quickly.

Apple's strategy for releasing its PowerPC computers may succeed where others have failed. Instead of replacing only its top-of-the-line Macintoshes with PowerPC systems, Apple is also replacing its mid-range systems as well. This is in distinct contrast to other companies' RISC strategies which have restricted RISC CPUs to running Windows NT as department-level servers, something that high-end 66 MHz 486 systems do just fine for half the cost. By bringing PowerPC into the mainstream (something that IBM may not even do for over a year), Apple is positioning itself as a technology leader with very fast systems.

The plan is likely to work for many reasons. The PC-compatible market is still basically a commodity market with little differentiation. Windows NT has made this worse by confusing people about whether they want to switch to a faster RISC processor that can only run one operating system. While Intel has competitors on its low- and mid-range CPUs, it is pretty much alone near the top of the speed range. Although many people thought that RISC chips could threaten these high-end processors, that will only happen when Windows NT takes off; now, there is little chance of that happening.

Even Microsoft admits that most people are waiting instead for the next release of Windows, due in mid-1994. Humorously, Windows NT will probably run on PowerPC-based systems at that time.

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NEWS & VIEWS

another-Windows-NT system, Apple's new PowerPC systems will look like real performers. There won't be a question of how well they run current Macintosh software: almost every company that makes Mac software says that its software works on PowerPC today, often at least twice as fast as top-of-the-line Macintoshes. The transition to PowerPC-based systems will be almost painless, particularly if the user is already running under System 7.1.

Apple's reliance on PowerPC is also becoming clear when you look at its near-abandonment of Bedrock, the programming environment that was supposed to help developers create both Mac and Windows programs at the same time. This lofty goal, long sought by many companies, seems to be getting further from the reach of many developers.

Apple has downgraded its firm support of Bedrock, which still hasn't even shipped in full beta. It appears that Apple is abdicating

MANY of the company's competitors are considering challenging the patent by showing that the concepts covered in the patent were known and discussed before Compton's released its software.

the cross-platform market, stranding many companies that tied their hopes to Bedrock after Apple made such a firm commitment more than a year ago. It is likely that Apple feels that its money is best spent on getting developers to convert their 68000-based code to native PowerPC code so that its programs run even faster.

This is not to say that Apple is supporting its

developers with tools for the PowerPC: it isn't. In fact, only a few have gotten very far with their ports to native PowerPC code. There are many reasons that developers are slow to port their software to PowerPC: they don't need to do the port, given how well even early PowerPC systems will run their software; they are busy adding a host of new "strategic features" that Apple has been touting for six months, such as OpenDoc (Apple's answer to Microsoft's OLE), standardized drag-and-drop, QuickDraw GX (an extended graphics library), AppleScript, and so on; they are trying to convert their software to Microsoft Windows so that they can have access to a much larger market. Apple's lateness with delivering Bedrock has certainly made this harder for everyone.

Even without native PowerPC applications, Apple is assured of a fair amount of success with the new systems this year, just as Microsoft was assured of early success with Windows NT. The difference is that Apple is committed to manufacturing PowerPC systems exclusively within a few years, while Microsoft will continue to develop MS-DOS and non-NT Windows. ■

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L A P T O P S

I can remember the time before I had a tape backup on my desktop computer. Backups were sporadic and time consuming. The net result was that I was not practicing safe computing. It was a big relief when I got my first tape backup unit! Finally, because of the scheduling feature that automates backups if you leave your computer on, I was able to do weekly backups of my entire hard drive and daily backups on all files that had been modified.

When it came to my laptop, however, it was a different story. I generally had copies of my portable files on my desktop machine, so I did not feel pressed to do systematic backups of the files on the laptop. But what about users who do not have a desktop computer? Even if they wanted to back up their portable system, it was very cum-

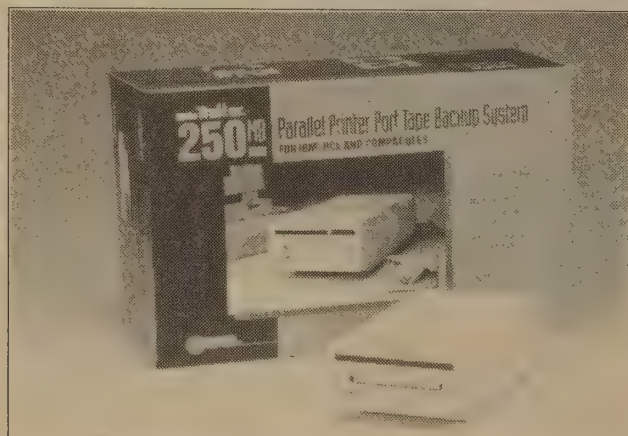
bersome—they needed a large stack of floppies and a great deal of time. Along with the increased size of portable hard disks has been the increasing discomfort associated with backing up onto floppies. While, increasingly, tape backup systems were being built into desktop computers, this is a virtual impossibility on portables. Relief is here. For some time, I have seen announcements of portable tape backups, but I shied away from them. Recently, Colorado Memory Systems, a major player in the backup market, introduced its Trakker line of portable backups. The Trakker comes in both 120MB (\$348) and 250MB (\$548) configurations. Both units look the same. I used the 250MB model. Although the list prices are high, the drives offer a lot. They come with DOS software as well as an abbreviated Windows package. The Windows version does not allow you to do automatic scheduling of backups; the DOS version lets you do everything. Colorado Backup for Windows (\$59), an accessory package, allows you to run the entire package from Windows, including automatic scheduling. Connecting through the parallel port, these systems work perfectly on portable computers. When you use the parallel port for the tape

drive, you can still use your printer, plugging it into the back of the tape drive. You cannot print while you are either backing up or restoring—an unlikely need in any case.

A portable tape backup system offers many advantages over built-in systems. First, you can use the system on more than one computer. Simply install the software on all of your systems and then move the Trakker from machine to machine. Second, whether traveling or in your primary work location, this system works to perfection. Also, if you use both a portable and a desktop system, you might consider purchasing the Trakker because of its versatility. The Trakker measures 4.6" x 2.65" x 9.5" and weighs only 5lbs. It requires plug-in power, but there is really no need to be backing up on the airplane. If you are going to be doing a lot of traveling with the unit, a carrying case (\$49) is available to hold the tape drive, its power supply, the cable to connect to the parallel port, and several backup tapes.

The included software is a joy to use. You can do either full, partial, or modified backups. Modified backups make copies of only those files that have changed since the last backup. It is easy to direct the software to back up individual files, subdirectories, whole directories, or just about any kind of selective backup you can imagine. Likewise, restoration is equally simple. You can just as easily restore a whole disk as a single file. Colorado Memory Systems has improved the software interface considerably since its early versions. It is simple, yet powerful, and pretty obvious even without reading the manual.

The 120MB drive uses standard QIC-40 tape while the larger drive takes QIC-80 tape. Transfer speeds depend upon a number of variables including the speed of your computer, the amount of RAM, and the presence of extended or expanded memory. Transfer speeds for the Trakker 120 may reach as high as 4.5MB/minute. The 250 achieves speeds as high as 8MB/minute. It is unlikely, however, that such high speeds will be realized in most configurations. Colorado Memory offers a full one-year warranty on these units and provides detailed documentation as well as simple instructions for getting started immediately. I highly recommend the Trakker to anyone who is not currently backing up their hard drive. Except for price, I can see no reason to buy an internal tape backup these days. The Trakker compromises nothing, even if you never move this system from a single location.

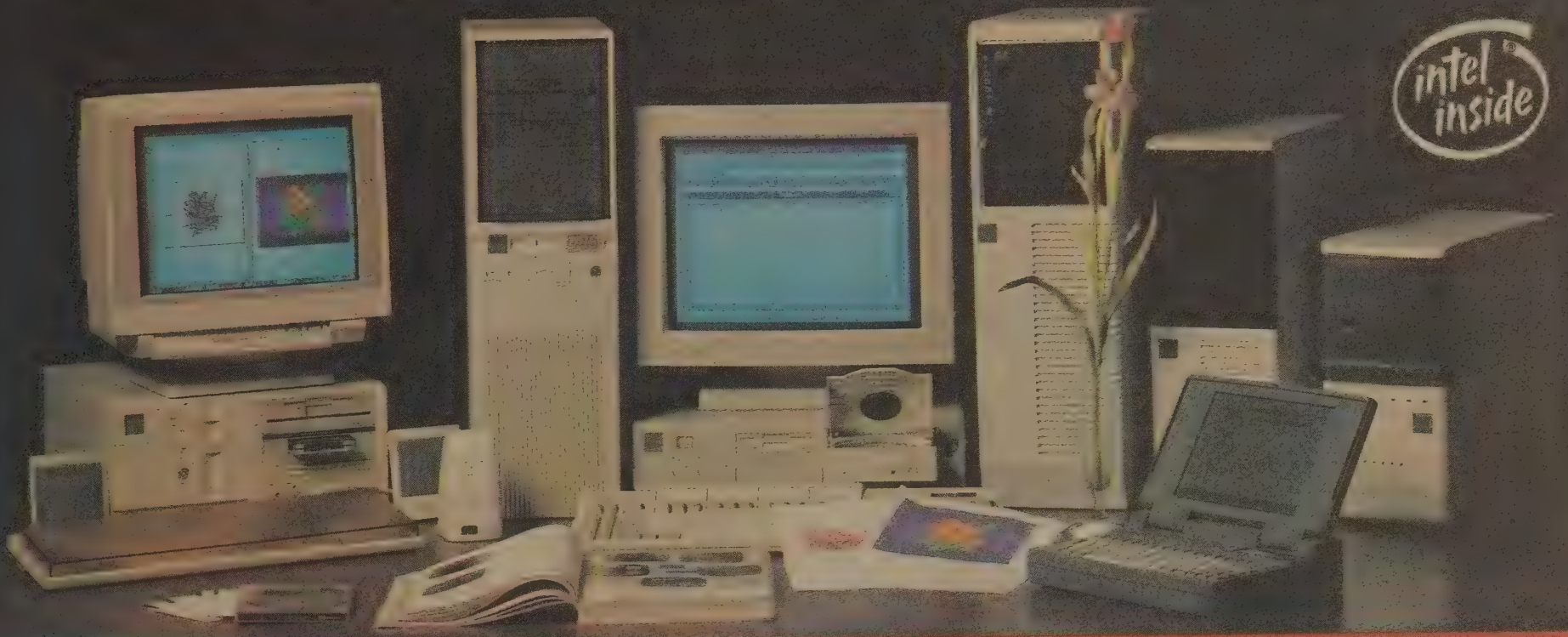


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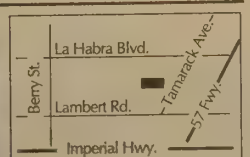
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IMAGE 486SLC-66

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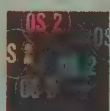
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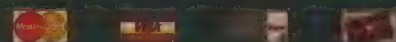
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BUSINESS SOLUTION

LAPTOPS

COMPUTER OF THE MONTH:

Gateway 2000 ColorBook

Color portables have arrived! Yes, I know that is old news, but what I mean is that color portables have now descended in price and ascended in quality and design to the point that they are worthwhile and practical for the rest of us, not just the power guys with big bucks. Gateway 2000 sells its entry-level notebook computer for \$1995.

The Gateway 2000 ColorBook 486SX-25 has everything you will need for smooth color operation within a Windows environment. The machine is powered by a 486 chip running at 25MHz. It comes with 4MB of RAM, expandable to either 8MB or 20MB. Memory prices seem to vary like pork bellies, so you have to get a quote from the Gateway 2000 people at the time you want to add memory.

The standard system comes with an 80MB hard drive as well as a high-density floppy drive. The hard drive is removable, so if you need a larger drive it is as simple as unplugging the smaller drive and replacing it with a larger one from Gateway 2000. This computer is also available in more powerful models with larger hard drives and faster processors for prices going as high as \$2795. The larger hard drive options are 170MB and 260MB.

The computer measures 11.7" x 8.5" x 1.77" and weighs 5.7lbs. with the battery installed. It has all of the usual, necessary ports on the back and also includes two PCMCIA Type II slots that will hold a fax/modem (\$319 for a 14,400bps model or \$199 for a 2400/9600bps model) or network cards (\$189). These slots are designed so that the two spaces will accommodate a single Type III card as an alternative. Overall, this laptop features sophisticated design.

There are a number of features that make this computer special. The display is a passive matrix color LCD, which offers excellent quality. Not too long ago, I would not have recommended that anyone purchase a passive matrix display, but in the last year this has changed. Now, most users will be pleased by the quality these inexpensive displays offer. It is the breakthrough in passive

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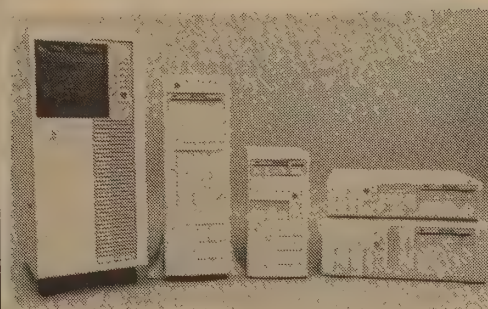
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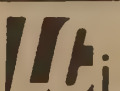
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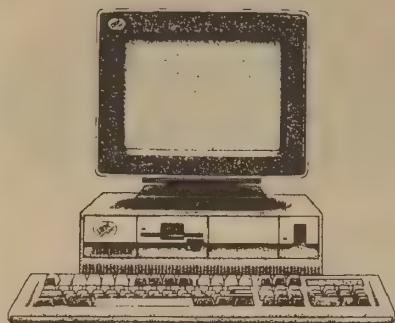
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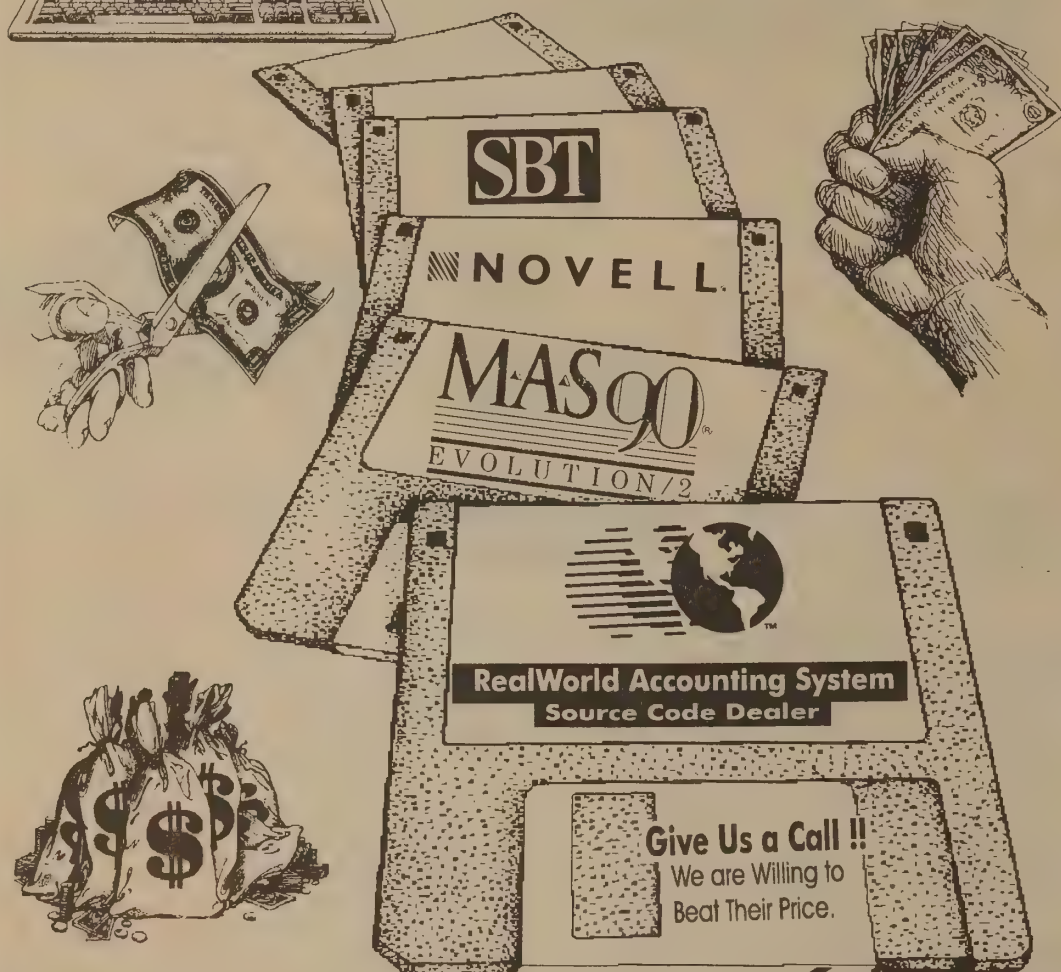
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BUSINESS SOLUTION

RESOURCES:

Gateway 2000
ColorBook, \$1995
Gateway 2000, Inc.
610 Gateway Dr.
N. Sioux City, SD
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1-800-846-2000

matrix technology that makes color portables affordable. The display on this system measures 9.4" diagonally and has VGA resolution. If you use an

external monitor, you can get Super VGA resolution. A sophisticated setup program lets you choose between viewing only the LCD screen, only an external monitor, or both.

The keyboard has an excellent layout and a good feel. You also have the option of using an external, standard PS/2 keyboard. This computer is designed to work with Windows and offers a built-in trackball that pulls out from the front edge of the computer, positioned just in front of the keyboard. I found the trackball to be usable but not optimal—larger balls make for better control. Certainly, however, this device works fine on the go. If you like, you can attach a PS/2 mouse through the port on the back. If, like me, you would want to use both an external key-

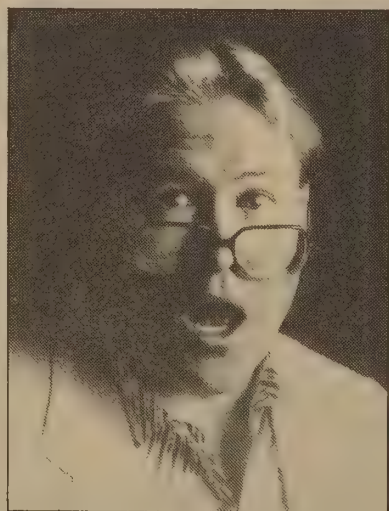
LAPTOPS

This laptop is one of the first I have seen that is truly set up for the user who will not be using it primarily as an on-the-go system.

board and a conventional rodent, then you could buy Gateway 2000's Anykey keyboard as a \$60 upgrade and attach a serial mouse through the serial port.

Gateway 2000 has gone to great lengths to build versatility into this computer. A wonderful setup program lets you make many choices about how you want to configure the system. Power management is accessed as either a part of this program or separately. I like the power management module in this unit better than what I have found in other portables. Specifically, I like that you can choose to conserve power when using the built-in nickel metal hydride rechargeable battery pack or to skip the powerdowns when using the included AC adapter. This really makes the machine feel like a desktop unit. While I appreciate having hard disks and displays go to sleep after a few minutes of inactivity when I am running on battery power,

continued on page 62



DVORAK!!!!!!

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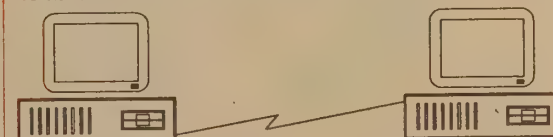
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The Tale Of The Two Margarets

Or

Smarter UNIX Mail With MIME

BY BENNETT FALK

"I was dialed into a UNIX system, trying to send email. While I was typing the message the whole system suddenly just froze. I couldn't do anything! I pressed every key I could think of, but nothing worked. None of the characters I typed showed up on the screen. Whenever I pressed a key, my terminal just beeped. Convinced that I had either crashed the system, or broken my modem, I finally just turned the modem off."

When, over a three-week time period, two very intelligent people named Margaret independently reported this problem (using almost identical language), it was evident that something was up. If your name is Margaret, or if you know someone named Margaret, the next couple of paragraphs may save you some grief.

The mail programs that come with UNIX are notoriously terse. When you give a command like

mail rosebody@well.com

the mail program will put whatever you type next into the body of the message. There is no prompt that tells you that what you're doing is entering the text of your message. Some mailers will prompt for a subject, but after that, you'll drop into the formless void of message entry.

Upon encountering this formless void many people assume it is something like a word processor, and this is the heart of the problem. UNIX mail is *not* a word processor: it contains virtually no editing features other than the ability to backspace over characters within a line. Consequently, it doesn't automatically break lines for you. If you don't do something (like press RETURN) to break lines in your message, everything you type will be on one line. Eventually that line will be as wide as your screen, and if you keep typing without

pressing RETURN, the very long line will simply get longer. (Appearances can be deceptive here: a line that is wider than your screen will be folded at the edge of the screen and continued on the next line of the display. The mailer program is blissfully ignorant about the size of your screen, it judges line breaks exclusively by the presence of an end-of-line character that is inserted into your message only when you press RETURN.)

None of this would amount to a hill of

UNIX mail is not a word processor: it contains virtually no editing features other than the ability to backspace over characters within a line.

beans if it weren't for the fact that UNIX mailers typically can't tolerate lines longer than 256 characters. When you attempt to enter the 257th character on a line, the mailer will simply beep at you. And this is exactly what happened to the two Margarets.

(Actually, there are two things that can be done when you've typed a 256-character line in a mail message: abort the message by typing control-C or backspace over characters to shorten the line.)

MAIL AND ITS LIMITS

The 256-character line length limit is the kind of thing that drives some people nuts.

Increasing the limit would reduce the frequency with which people encounter it, perhaps shifting the burden from Margarets to Algernons. However, the new limit would be no less arbitrary than the old one. The real problem is not line length, but that the sender of a mail message has to be concerned with lines at all.

There are good reasons for the mail program to be conscious of lines and their lengths: electronic mail is a "store and forward" service: the mail you send is likely to be routed through several computers on its way to the recipient. You can't control the routing and you don't know what the capabilities of the intervening machines are. The safe thing is to send messages in a format that virtually any mail-sending daemon can handle: 7-bit ASCII with relatively short lines and relatively short messages.

The use of 7-bit ASCII text is not just a quirk of the UNIX world. It was adopted long ago as the standard for mail messages on the Internet. It's worth knowing that the document specifying the format of mail messages that can be safely transferred through the Internet is Request For Comment 822 (RFC 822). The RFC 822 format specifies 7-bit ASCII and a maximum line length of one thousand characters.

Much of the data that people want to share via email does not occur naturally in RFC 822 format. Consequently, a number of utilities have been developed to get data into and out of formats that can be transferred safely through email. Uuencode/uudecode are widely used by UNIX and PC users; BinHex is widely used by Macintosh users. These utilities generally work very well. However, they aren't well integrated with the programs people use to send and receive mail. Coding and decoding files for email is usually done manually, and this requires both time and know-how.

continued on page 43

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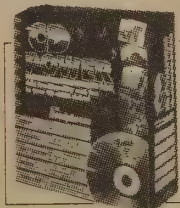
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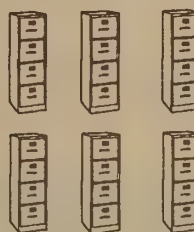


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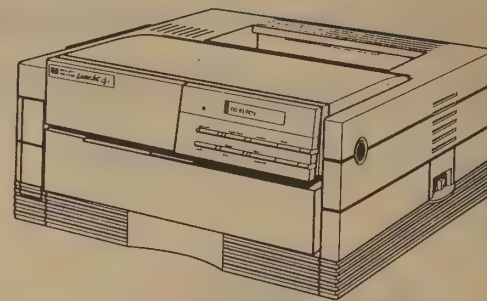
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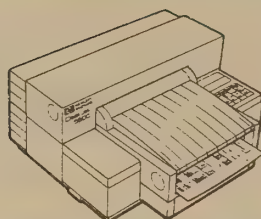
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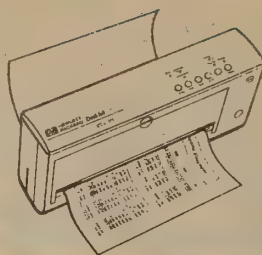
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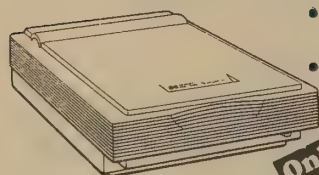
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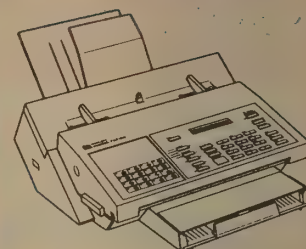
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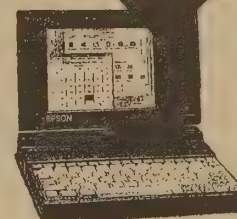
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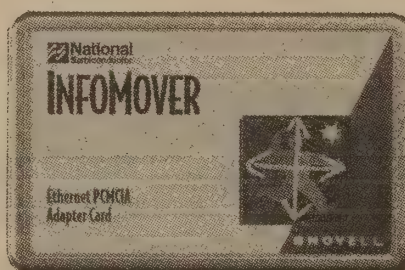
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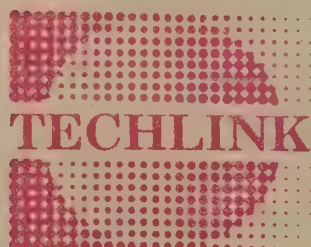
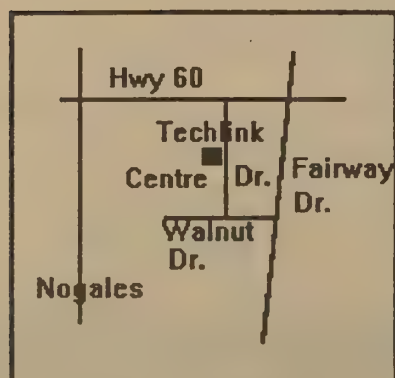
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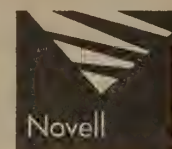
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continued from page 38

Imagine how much less USENET traffic there would be if no one needed to ask or answer questions about uuencode.

ENTER A MIME

The problem of making electronic mail more versatile (at least for Internet users) is addressed by the Multipurpose Internet Mail Extensions (MIME). MIME is not a piece of software. It's a standard for assembling, encoding, and decoding complex messages for transfer through email on the Internet. The evolution of MIME can be traced through a number of Internet RFCs, but RFC 1521 is the definitive document.

The importance of having a standard for this is that mail programs written according to the standard can free the user from having to compose messages exclusively in RFC 822 format. The MIME standard provides a way of including many different data formats (binary word processor formats, graphics, sound, non-ASCII character sets, or application-specific data) in mail messages. Of course, the transfer of mail messages still happens in a 7-bit ASCII format, but MIME provides an interface that mail programs can use to shelter the user from the business of converting data into and out of 7-bit ASCII. The literature about MIME refers to the programs used to compose and send mail as "user agents" or "mail user agents" (MUA).

Note that MIME is not a standard for playing sounds or displaying graphics. MIME makes possible easy delivery of almost any kind of data via email, but using that data once you've received it will almost certainly require some additional capabilities that aren't part of MIME at all. For example, if you receive email containing graphics in GIF format, you'll need a GIF viewer to display them. Of course, there is a lot of incentive for people building MIME-compliant mail programs to bundle in other features (like image viewing or, shudder, word processing).

MIME works by providing three things: a set of categories for classifying the contents of mail messages; standard means of encoding data to be transferred through mail protocols that require 7-bit ASCII messages; and a mechanism for packaging the classification and

information in the message header, and sending this information with the message to allow the mail program that receives the message to respond to it in a sensible way.

Under the MIME standard, the body of a mail message is assigned a type and a subtype that describe the message's contents. MIME defines seven content-types (text, multipart, message, application, image, audio, and video), and there are canonical subtypes for each type. (Image, for example, has subtypes that specify jpeg and GIF formats.)

The seven content-types are supposed to be all anyone will ever need to classify mail message contents, but the types are also indefinitely extensible. Any type beginning with "x-" is assumed to be user defined.

The MIME standard supports two strategies for encoding these message types for transfer via electronic mail. Both these strategies produce messages in an RFC 822 compatible format. The BASE64 scheme is more appropriate for binary data, while the QUOTED-PRINTABLE scheme works well for messages that are mostly text with

some unprintable characters.

Finally, MIME provides for the content-type and transfer encoding information to be recorded in the mail message header. Bundling this information into the message header gives the mailer enough information to decode incoming messages and invoke the appropriate application for the data received.

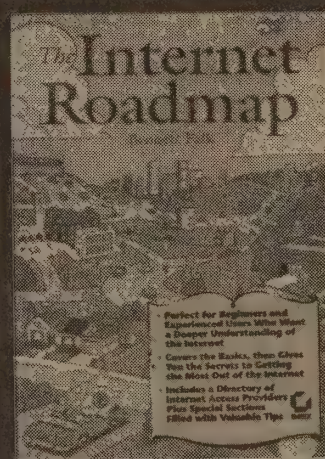
The MIME standard has sparked a great deal of activity in the already burgeoning field of alternative mail programs. There are MIME-aware versions of established mailers (elm and MH, for example), as well as relatively new products like Eudora by Qualcomm.

User reports and MIME-compliant product development news can be found in the USENET newsgroup comp.mail.mime. A compilation of frequently asked questions in comp.mail.mime is published as the mime-faq in netnews.answers. For details on the standard itself, see RFC 1521, available by FTP from many Internet sites.

Someday soon, Margarets and others will be able to compose a mail message of any length without having to press RETURN. ■

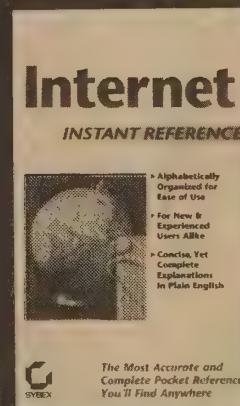
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The background of the cover features a series of horizontal, wavy lines in various colors: pink, green, blue, and orange. These lines are arranged in a way that creates a sense of movement and depth, resembling stylized waves or a topographical map. The colors are vibrant and contrast sharply with the light beige background.

Surfing The Third Wave

Alvin And Heidi Toffler On Life And Work In The Information Age

By Mary Eisenhart
Photo: Michael Jay

For almost three decades, Alvin and Heidi Toffler have been thinking and writing about the impact of technology on people and culture. In several books, notably *Future Shock*, *The Third Wave*, and *Powershift*, they've considered events around the world and their implications for social change; their findings are widely studied by governments, businesses, and ordinary citizens trying to make sense of an increasingly chaotic world.

Their current book, *War and Anti-War*, analyzes the parallels between business and military organizations in the information age—as with business, the military is evolving away from traditional command-and-control structures and becoming increasingly dependent on smaller, smarter, more efficient groups of people using ever-more-complex technology.

Since the Tofflers' views are integral to such recent phenomena as “downsizing” and “just-in-time manufacturing,” to say nothing of the very existence of the personal computer industry, we were glad to have the opportunity for a conversation with them during a recent visit to San Francisco.

A lot of our readers probably weren't born when *Future Shock* came out, so could you do a brief summary of the previous books and where *War and Anti-War* fits in?

Alvin Toffler: In *Future Shock*, Heidi and I wrote about the acceleration of change, driven to a considerable degree by technology, but not entirely. We wrote that book in the late '60s, and it was published in 1970.

In that era, in that distant epoch, nobody yet appreciated that things were speeding up. We had to fight to make the case that the pace of life was becoming more rapid, that technological and social changes were more and more rapid, and so on. The book made that case, and it also argued that there's an upper limit to the capability of any system, whether it's a computer system or a human biological system, to cope with change; that below a certain level human beings are understimulated, and above a certain level of change, a certain rapidity or complexity of the changes they face, they are subject to maladaptation or difficulty.

We call that “future shock”—when too much change hits too fast for people to absorb, they then began to show signs of either deteriorated decision-making capability or disorientation; indeed, in some cases, stress and illness and so forth.

What was happening at the time that suggested this to you?

We wrote an article in 1965 for a magazine called *Horizon* called, “The Future as a Way of Life.” In that article, we argued this case: that things were accelerat-

ing, that long-range planning or long-range thinking was going to be necessary, and that there would be difficulty in adapting to the speed of change. We coined the word “future shock” in that article in 1965.

I can remember when the term occurred. I was interviewing a friend, a psychologist, on the telephone, about culture shock—the disorienting effects of suddenly being thrust into a completely alien world. In the course of that conversation, as she described the symptoms or the consequences of that, it occurred to me that you could be plunged into an alien culture in your own society if an alien future arrived more rapidly than you were prepared for.

So we said that future shock is the consequence of the premature arrival of the future. And that book, which we thought would have a modest success, turned out to be a humongous bestseller all over the world. Indeed, it was the fourth- or fifth-best-selling nonfiction book in the entire decade of the '70s, and lent the term “future shock” to the language—it's in many dictionaries, it's in headlines every day of the week, and so on.

That, then, was followed by another major book in 1980 called *The Third Wave*, ten years after *Future Shock*. That book said that the changes around us are not entirely random, that you can see patterns, and that basically what was happening was a revolutionary upheaval on a par with, or even greater than, the industrial revolution—or indeed the agrarian revolution that came first. We used the terminology First Wave, Second Wave, Third Wave.

The first wave of change was ticked off by the agriculture revolution, when some prehistoric Einstein, probably a woman, planted the first seed. That was the invention of agriculture, and it spread slowly, until now virtually the entire world is capable of agriculture, except for a few remaining tribal or nomadic populations. Basically the whole world has learned the game of how you make nature grow things.

Then came the industrial revolution of two or three hundred years ago, which launched what we call the second great transformatory wave in history, and gave rise to an industrial civilization. That industrial civilization had multiple forms. It had capitalists and communists; it had Japanese, Korean, Swedish, or American versions; but all of the industrial countries, by definition, were based on mass production, mass distribution, mass consumption, mass education, mass media, mass entertainment. Sociologists referred to it as the mass society.

The old scenarios, the scenarios of Orwell and Huxley and hundreds, if not thousands, of science fiction writers, saw the continual advance of technology as necessarily increasing the industrial character of society—making it more bureaucratic, more centralized, more impersonal, more robotoid, and so on. Both in *Future Shock* and then with much more detail in *The Third Wave*, we argued that in fact a turn was taking place; that the third wave, while it was technological, was not industrial, and that there's a distinction between these two; and that especially the rise of the computer, but also many other technologies linked together, were giving rise to a new kind of society, or civilization as we call it, that contrasts with the mass society produced by industrial civilization.

It is what we call a demassified society. It is heterogeneous; it has much more room for diversity. And the computers, rather than suppressing diversity, have in fact made possible and fostered a high degree of diversity, particularly as we shifted from the mainframe to the PC. So you now move from mass production to demassified production of customized products—small-run production.

In parallel, you move toward demassified micro-markets—boutiques, targeted catalog shopping, etc., as examples. You move toward a more diverse family structure—not everybody's in the nuclear family any more. In fact the working father, stay-at-home mother, with two kids under eighteen probably

represents under 5% of the American population today. Instead of nuclear, we have a wide variety of family forms.

We sometimes summarize the changes in terms of a biological analogy: that society is going through cellular differentiation and a speedup of metabolism at the same time.

Then came *Powershift*, which we published ten years later in 1990. *Powershift* focused more directly on the implications, particularly the economic implications, but more generally the power implications, of a society in which knowledge has become the central economic resource. It focused a lot on the economy, on business; talked some about the future of the nation-state and of politics; and did a very quick rough sketch of some of the global implications but didn't focus closely on them.

This new book, *War and Anti-War*, takes as its premise that knowledge stands in a new relationship to economic production. The book looks at the implications of this for both economic power and military power. Knowledge now becomes central to both kinds of power on the planet. Now, what does that mean in terms of conflict, war, peacekeeping, and the global system?

We don't regard this book as part of the trilogy that was formed by *Future Shock*, *Third Wave*, and *Powershift*, but it clearly comes out of the same brains and applies some of the same kind of thinking, this time to a special problem. Rather than to how civilization is changing as a whole, it looks at the process of conflict.

My understanding is that you see the military world experiencing more or less the same kind of change the industrial world is experiencing. As we have just-in-time factories, we are now moving to a just-in-time military?

That's right. That's right. Absolutely parallel. For one thing, the role of information is growing in importance in both the economy and in war.

The military is undergoing a set of changes that directly parallel the changes taking place in business. One example, of course, is demassification. Because of computer controls and numerical controls and information technology, we now are capable of producing short runs of products economically, instead of the traditional industrial-style assembly-line long runs of mass production; if we're capable of demassified production, precision targeted weapons are the parallel to that—that is, demassified destruction.

If companies are downsizing, not just because of the recession but because they're restructuring into smaller work units, the military is doing precisely the same. We're moving into a military situation in which a brigade can do what a division used to be able to do, given information-intensive technology.

Heidi Toffler: Therefore we don't need thousands of tanks produced assembly-line fashion in the future; and, since the military is smaller and more information-dependent, and you can upgrade the electronics in a tank, you don't need factories mass-producing. So that weakens the military-industrial complex.

AT: It weakens the *second-wave* military-industrial complex. In the third wave, the military-industrial complex disappears. It melts into a civilian-military complex, with the emergence of dual-use, or multiple-use, technologies.

More and more weaponry is going to come off the shelf, or more complexly, be configured out of pieces of different technologies off different shelves, assembled into weapon packages. What we've been saying to people, trying to make them wake up about this, is that someday a company like Revlon is going to produce some nice innocent cosmetic which just happens to be a precursor to somebody else's chemical weapon.

HT: People think that the recent budget cuts are what have fueled the de-scaling, but I think big companies like Hughes and General Dynamics have known this for years.

AT: Corporate America is, on the one hand, driven by the recession to lay off people. But it is also restructuring, so that they're not going to put those people back on. Work is taking place in smaller groups, and the same thing is true in the military. Fighting is taking place, or will be taking place, in smaller groups.

Similarly, we're going to be moving toward increasing robotization, driven by hypercompetition in the global market. The military is going to be moving toward robotization. In *War and Anti-War* we discuss the philosophical debate over the degree of autonomy that robots ought to be permitted.

What if they're too smart and they take over?

AT: Yes, exactly.

HT: The truth is, the smarter the machine is, or the smarter the programming

in it, the less smart you have to be.

AT: But the more smart you have to be to control the system.

So there are these many parallel changes. Systems integration. We now know that companies are engaged in very, very complex interactions. They have lots of subsidiaries and profit centers, and they're dealing with large numbers of customers, and they've got custom-made relationships between the customers and themselves. And they need computer systems and information systems to keep track of their tens of thousands or even more products.

They can't do that without the computer. If you do that with a computer system, and then you link into the network that connects you to the supplier on the one side and the distributor or retailer on the other side, you have to have systems integration.

It's exactly the same for the military. There are many problems, but the military has the problem that when an air tasking order is created for the Gulf War, there are permutations of literally tens of thousands of factors that have to be fed into the computer in order to "deconflict the skies." So there is a heavy requirement for systems integration. Systems integration in turn requires a heavy electronic infrastructure. And therefore more networks, and therefore more technologies for data transfer, and so forth.

So everything that is happening in the civilian economy is paralleled in war. Everything we're doing for *production* is paralleled in what we're doing for *destruction*.

You've said that second-wave entities are predicated on hierarchical structures where the people at the top know everything the people on the bottom need to do, whereas in third-wave structures the person on the bottom is the one who's dealing with the situation in real time, and so they're the ones who have to know this stuff.

HT: There has to be feedback. The top can't continue to function unless it gets feedback from the bottom, and from all the levels.

AT: But the key hidden fact that no one talks about in traditional hierarchical bureaucracies, is the assumption made by the people on top that they know what the people down below need to know. That's just not tenable any more.

HT: They didn't even have to *ask* the people on the bottom. They *knew*.

AT: They said, "You're going to handle this job, and in order to do that, you get this information and report to this line. You're going to handle that job..."

Well, the reality is that it's so complex now, and shifting so rapidly, that people on top are the last ones to find out what's going on, and that's why this whole discussion of "empowerment" is not a result of altruism or New Age feelie stuff—it's that you can't make a profit, you can't make a product, the old way. You *have* to empower to a certain degree the people who are actually doing that work. Because now they're the ones who know, and they can tell you what you cannot tell them.

You've said on occasion that you used to work in a factory.

HT: This was when we were very young. When we graduated from the university in 1949 there was a recession in this country, quite a severe one. I remember the best job I could get, and you needed a college degree for that, was an airline reservation clerk. That was my first job after I graduated.

Heidi Toffler:

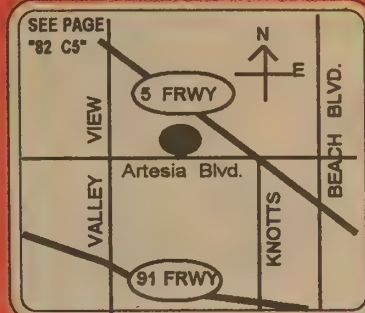
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It was on a swing shift—two weeks from 8 am to 4 pm, two weeks 4 to midnight, and two weeks midnight to 8 am.

So you always had jet lag.

HT: *Aaah*. It was unbelievable.

AT: On the ground!

HT: I could not do that job more than six months, because when you change every two weeks, it takes about two weeks to get adjusted. It was just an impossible job, but it was the only job I could get, and it paid 40 or 45 dollars a week. And you had to be a college graduate.

So we both left New York about then and went to the Midwest. My first job there was in a library, also for 45 dollars a week. But the factories were paying better—about \$1.85 an hour.

AT: I never got that. I got \$1.49 and then \$1.53.

HT: So I made more money in a factory than I did in the library or at Eastern Airlines reservations. And I did not have to work that horrible swing shift every two weeks.

My first job was for General Electric, and I did not tell them on the application that I had a college degree because I knew that would disqualify me. I would have been “overqualified.”

So I neglected to put that down, I put down high school diploma, and I got the job. I made light bulbs at a machine for a year. The job was mindless, it was boring. I asked many times—they were very small light bulbs—what these light bulbs were for. And no one would tell me.

AT: Or nobody knew.

HT: No! I'm sure somebody knew! *[laughter]* But why in the world would I need to know what the light bulbs were being used for?

Did they ever tell you you weren't being paid to think? I always used to love that one when I was working in retail...

AT: Yes! All the time! All the time!

HT: Yes!

I've given this illustration many times: I knew my machine fairly well. It was simple. I had filaments in one hand and a tweezer in the other, and with the tweezer I put the filaments into the gas jet slots as they went by. The machine moved every second or so and a new gas jet came in front of me—it was a circular machine. And then at one point the glass came down over it, and at another point the fire came out and melted the glass. Then at another point it went down the chute to the machine below me.

When my machine broke down, I knew why it was broken. I could not call the maintenance foreman and say, “Call somebody to fix the machine, this is what's wrong with it.” I had to call *my* foreman.

My foreman would come over. He'd go “Hm?” I wasn't supposed to tell him what was wrong, because I wasn't supposed to know, because I was too stupid. So then he would call upstairs, where the white-shirted people were who came to visit on the shop floor about once a month. He would call one of them. One of them would call the maintenance foreman. The maintenance foreman would then call my foreman. They would decide that they would send a mechanic to the machine. The mechanic would come. I would tell the mechanic what was wrong and how I thought he should fix it, and he fixed it.

In the meantime the machine was down for two hours. I could have called the mechanic in the first place and told him what was wrong—and it would have been fixed in ten minutes.

Now, we travel around corporate America today, and I sometimes find these old-time CEOs who try to tell me how efficient the factories were in the old days. They were not efficient *at all*. They were *inefficient*. But we devastated Europe and Japan during World War II. So we had no competition afterwards and we could make a profit even if our companies were inefficient.

AT: It didn't matter if we were inefficient.

HT: So talking about the wonderful productive capacity and the worker productivity—this is all a fantasy in the minds of these old managers. It's much more efficient now in smaller workgroups.

Very frequently we ran out of glass or some other thing—

They hadn't found out about just-in-time ordering...

HT: No. They were inefficient, but they thought they were efficient.

I think that illustrates many components of second-wave style factory management. The same was true when I worked in the aluminum foundry—there, I was an elected UAW shop steward, and I was always getting in trouble. At

Alvin Toffler:

“We need a better economic system. We cannot just throw millions of people out of work without doing something about that—but the solution is not to go back to that old system. We have to go to a smarter, not a dumber, production system, which in turn requires smarter, not dumber people.”

least the management would talk to me then, but if I got too obstreperous I was sent to a room which was off in the corner...

AT: Siberia!

HT: ...that broke up the sand cores and took the grommets out and put them on a belt. They were punishing me, keeping me away from my workers. I mean, this is what you do to children in school, you don't do this to adults.

And they also visited the factory floor about once a month.

I *believe* we made airplane engines. I again asked—now, I was a union rep. I was still considered too stupid to know what we were making.

And I think all of the workers were exceedingly smart. They knew—when the time-study men came in the front door of the factory, the word went around very quickly, “Slow down today.” These were games that were played. But the management really thought we were too stupid.

Of course they wouldn't have brought time-study men in if they didn't.

AT: It was the epoch of Taylorism. This was the time when Taylorism was in flower.

And apparently Taylor was deeply chagrined at what use his work was put to, because he thought the workers would get the payoff from all this increased efficiency...

AT: *[laughs]* And they didn't!

HT: They just retimed the jobs so you had to produce more if you were doing piecework jobs. I was a core paster, and this was piecework. But they also took none of the human factors into account, that in the morning you're more awake, you feel better, you're producing more; in the afternoon you get tired, so you work slower. I mean, this was the machine model of the human being also.

AT: So what we resent today are people who continually glorify that kind of labor, and say that's what we need. The fact is that it's dehumanizing, brutalizing labor.

We need a better economic system. We cannot just throw millions of people out of work without doing something about that—but the solution is not to go back to that old system. We have to go to a smarter, not a dumber, production system, which in turn requires smarter, not dumber people.

The question is how to do that, and it's extremely difficult. It's difficult because in the old system, because it was low-skill, work was essentially interchangeable. If we got laid off, or we fell ill, they could replace us in five minutes because they didn't have to teach anybody anything.

Now, of course, the high skill levels require that you either get people that have the skills, or there's an investment of time in teaching. Not only mechanical skills, but teaching culture, in the sense of learning how to get along with the other members of that team. You're no longer a machine, you're a person.

HT: You can't take a manager out of a foundry that operates the way it did in 1940 or 1950 and put him into a high-tech company in Silicon Valley.

AT: It's not just the workers, it's the managers too.

The basic change is we're moving from interchangeable labor. As the Industrial Revolution gave rise to interchangeable parts and interchangeable labor, we're now moving to noninterchangeable parts because they can be custom-made and individualized as the job requires, and to noninterchangeable people.

Alvin Toffler:

"Corporate America is, on the one hand, driven by the recession to lay off people. But it is also restructuring, so that they're not going to put those people back on. Work is taking place in smaller groups, and the same thing is true in the military. Fighting is taking place, or will be taking place, in smaller groups."

That has a phenomenal effect on economics and social life, in the sense that in the old system, if you had X numbers of workers unemployed, you could stimulate the economy, create X number of jobs, and you'd solve your unemployment problem. Today you could have X number of people unemployed, you could create 5X jobs, but those workers could not do the jobs. Which means that the unemployment problem is directly related to skill requirements, and is much more complex than where you have interchangeable labor. It is also doubly difficult because of the rate of change—the skill requirements are changing constantly. So that even if you train people for a job, by the time they're trained the skill requirements may have changed again.

So that creates a truly intractable problem of unemployment that's not going to go away.

HT: But most of the unemployment is among the people who sell muscle power. People who worked in the construction industries, and there's very little construction going on. People who worked in auto factories.

AT: Second-wave work is drying up. That creates a monumental social problem for us, and I don't think that even this administration, which talks a lot about it, understands how profound this crisis is.

HT: And neither does the AFL-CIO.

AT: Well, it depends on which union, because some of them are organizing knowledge workers. But the old mainstream unions.

HT: I'm disappointed in the CWA. They give lip service to understanding, but I don't believe they really do.

The unions tend to be violently opposed to telecommuting, for instance.

AT: Yes! The unions see that as an attack, whereas it may be liberating for many workers.

Both management and the unions just seem to be interested in imposing this hierarchical adversarial boilerplate on people and making them conform to it rather than giving work a more human structure.

AT: Exactly.

So this is what we've been writing about for our lives, basically, and what is sad for us is to know that we, and others as well, have written some of this stuff twenty-five and thirty years ago, but America wasn't prepared to do anything about it.

HT: I don't think it was as clear then—it wasn't as clear then that it was really happening. Then, when we published *The Third Wave* in 1980, the *New York Times* blasted us and said that the idea of people working at home was ridiculous.

AT: "The Tofflers are visionary."

HT: "Ridiculous. People would never work at home." They asked the question, "Why would anybody want to work at home?"

AT: [laughs] And one of the great joys of the last few months was to see an article in the *New York Times*, in the same position as that first article I described, on page one, saying, "Guess what? People are working at home!" [laughter]

HT: Reporting on this as if they had always known that this was the case!

Tell us the story of your run-in with Don Regan...

HT: That was a White House lunch. We were invited to have lunch with President Reagan, then-Vice President Bush, I think Meese was at that lunch, and it was Regan's first day in the White House as chief of staff. And of course he was invited to the lunch also. I think there were eight futurists and eight White House people.

It was in the family dining room in the White House, and it was just an open discussion. The president was asking us questions.

AT: I opened by saying that futurists don't all see the world in the same way...

HT: And we don't. We disagree violently.

AT: But we all agree that something very big is happening, and it's not just more of the same. And Regan jumped in...

HT: After Al gave the introduction and said we don't all agree, Regan jumped up. "Aaah, you futurists," he said, "you all think we're going to run around cutting each other's hair and flipping each other's hamburgers. It's going to be a service society," he said, "and America's not going to be a great manufacturing nation anymore."

The men are all talking, but they're not addressing his question, and I sat there for about ten minutes waiting for one of these men to answer him, and they didn't. And it's very difficult when you're in a room with all these men to get a word in edgewise, because they don't pause long enough to take a breath for anybody to jump in. So after about ten minutes of waiting for somebody to answer him, and they're all talking from their egos and their own agendas...

AT: Most of us don't have egos.... [laughs]

HT: ... I couldn't stand it any more, and as soon as one of the gentlemen took a slight breath, I said, "I would like to answer your question, Mr. Regan. No, that's not what we're saying at all. We're not saying that America is not going to be a great manufacturing country. We certainly are. But we're going to have fewer people in the factories doing the manufacturing. We're going to have more automation. We're going to be more productive."

At that time, it must have been 1985, the example that was current then was the new Macintosh factory as opposed to the old Apple factory. They produced many more computers with fewer numbers of people in the factory. I had the figures.

AT: You were also talking about agriculture.

HT: I said, "Because we have less than 3% of our population in agriculture today, does that mean that we're not a great agricultural country?"

AT: In fact, the fewer people we had in agriculture, the larger the output has been. Why could that not similarly be the case with manufacturing?

HT: And I think I might as well have spoken to the wall. He never responded. And I don't think he understood the answer.

AT: Indeed, we wrote him afterwards and gave him some figures, for that and some other questions, and never got a reply from Don Regan. But Regan has not gone down in history as the nicest, most intelligent chief of staff we've ever had.

True. But suppose that somebody like him comes along now, and they're trying to get a clue but they're fixated on the wrong thing—how do you explain to such a person the difference between a knowledge worker and a burger-flipper?

HT: Hm...

The value-added component of a product used to be in the physical labor that went into it. The value-added component of a product today is the information.

AT: The problem is the manufacturers, the traditional second-wave blue-collar smokestack industries, have an ideology. An ideology is a self-justifying rationale. Their ideology, which they've managed to peddle to a great many intellectuals in this country and to a large part of the political establishment as well, is that manufacturing is the key to an economy, and that services are necessarily unproductive and a waste, basically.

Now, first of all, the tools we use to measure service and information productivity were designed to measure hardware, not software. We're lousy at measuring the productivity of services. So the answer is when we see statistics saying in the service sector group, productivity went down, they're meaningless, essentially. But they are useful as informational propaganda in defense of the old sectors.

HT: And in Marxist economics, the white-collar worker lived off the surplus of



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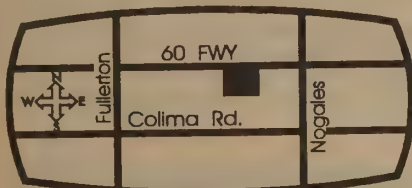
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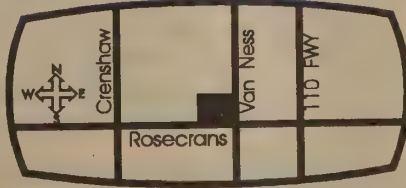
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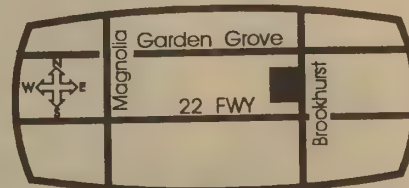
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the manufacturer—the manual worker.

AT: And that's basically not different from the classical capitalist economist, either. Classical economists also tended to look at mental labor as wasteful and nonproductive.

Different windows on the same thing.

AT: The knowledge worker is one who processes information data, ideas, symbols, images, and other forms of knowledge, as part of the task of creating wealth. This is done at many different levels of complexity, some very simple, some very complex, some more abstract, some less abstract. You can clearly see that an increasing number of jobs, both in manufacturing and in services (if that distinction still has any usefulness), are based on knowledge manipulation.

HT: Give the example of the seeds that caused a riot in India.

AT: I like that example to suggest the conflicts that are inherent in all of this. The process of moving from one form of production to another is not necessarily a peaceful process, so there are winners and there are losers in that process. And that's true, not just domestically.

In India, in July, there was a riot—angry farmers attacked an American agribusiness firm. Now, why did they do that? They said that the firm was selling them seeds at too high a price, considering the fact that that variety of seeds had originated in India in the first place. The company, of course, had taken the seeds and genetically enhanced them, which was, in fact, radically improving their productivity in India, by in effect injecting more information into those seeds.

But the information is invisible. It took millions of dollars of research and development to do that, but the Indian farmers cannot see that. They cannot see or touch the knowledge, the information. They can touch the high productivity, but that's not now, that's after the crop comes in.

So they in fact went on the rampage, even though it started out as a peaceful demonstration.

HT: Now the value added is the information.

AT: We believe that that is going to be true for almost all products. Information is being injected into hardware, and of course is the basis of software. So that we're truly going to an economic system in which knowledge, as we have argued, is the central resource.

In *Powershift* we made the point, as we've made repeatedly on other occasions, that the reason that knowledge is the central resource today is that with appropriate knowledge, we can reduce all the other resources needed.

HT: You can substitute knowledge for labor.

AT: Knowledge for labor, knowledge for energy, knowledge for space in the warehouse, knowledge for capital, knowledge for all the inputs of production. Knowledge can reduce the requirements. It therefore is what in *Powershift* we called the "ultimate substitute" for the other factors of production.

I'm kind of curious—take those smart workers back in the factory who weren't allowed to be smart. Does this do anything for them, or are they just getting crushed in a different machine than the one they were getting crushed in thirty years ago? Institutions mutate; what happens to people?

AT: Millions of people get caught in the crush. And one way of thinking about that is to look back at how the Industrial Revolution made its way onto the

stage of history. There was massive dislocation. There were wars and civil wars and unemployment and just horrible conditions for many, many people.

And yet, and yet—over the course of history, populations have migrated from the countryside to the slums of the city, because the slums of the city, as bad as they were, were better than the countryside. That's still happening all over the world. So the people who are attacking the terrible conditions today may be telling the truth, but it's not set in adequate historical perspective.

The reality is all those peasants who are pouring into Mexico City or into Bangkok or into wherever are not stupid. They're smart also. They're not educated, they're not economically skilled at high-productivity work, but they're not stupid, and they know that even digging garbage in Manila is better than living out in the countryside and starving to death like an animal.

HT: If those workers stayed in the auto plant doing the interchangeable jobs they're not better off. If they left the factory and—

AT: If they got some skills that were not outmoded by the time they got them—

That's a problem. I was talking to some teachers in a high-school job-training program recently, and they're trying to come to grips with the fact that any skill they teach those kids will be worthless in five years. So what do you do? What do you teach?

HT: You teach them to *think*.

AT: Yes. You have to teach meta-skills of some kind, and it's easy to say, but it's not so easy to do. You've got to teach skills about skills. And that is not something we know very much about doing. Nobody knows very much about doing that.

We think that it would be helpful for them to understand things like how to model. Because if I understand what a model is, I can model lots of things. Even if a model is inaccurate, it's better to have a model of a situation than to be confused by an assortment of unorganized, or random data. If a model is inadequate, you can fix it or replace it.

HT: I'd teach kids how to plug in and out of Internet. Or get into six hundred databases. How do you know that you're getting good medical care? By reading all the relevant papers that have been written. You can get access to them.

We have a friend who has a business. He's distilled vodka that is free of impurities.

AT: Give him a plug, honey! Tell her the name of the product! *[laughs]*

HT: Oh yes. SKYY vodka. It's sold here in San Francisco.

He was thinking of bottling it in small airline bottles, and he went to look at the machinery needed to do this.

AT: He said they wanted fifty or one hundred thousand dollars for the machinery, but as an engineer, he said, "I could make that for \$15,000."

HT: He said, "You know, the patents are probably all expired."

He was talking to his assistant about this, and the assistant said, "Don't worry." He hooked up his computer, and in fifteen minutes he had a printout of all the relevant patents.

Our friend said, "In the past I'd have to go to a patent attorney, I'd have to pay for a patent search, and this kid had it for me in fifteen minutes."

That, to me, is an example of somebody who doesn't just have rote and repetitive computer skills. He thought about it. He thought about where the databases were. He accessed them, he got the information, he had it printed out...

He is invaluable to his employer.

AT: He made his boss very, very happy that day. And saved him loads of money. That translates into productivity, if you measure productivity the way economists do, to include alcohol as productive! *[laughs]*

One thing keeps occurring to me—what about filtration? As you get more and more information-dependent, you also have a much bigger garbage-in, garbage-out problem. The consequences of disinformation, or bad information, or propaganda are all the more serious.

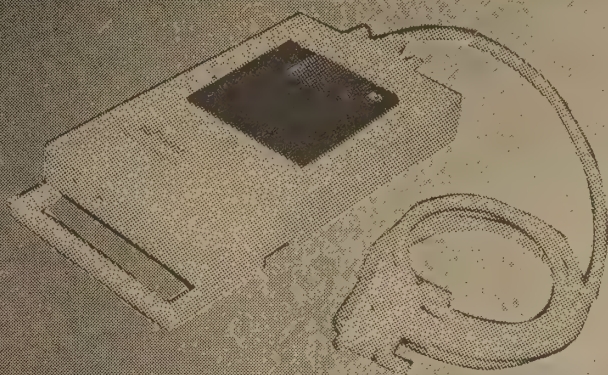
HT: In *Future Shock* in 1970 we talked about information overload. I think if you're bombarded with too much information about anything, you get overloaded and you can't function.

We were at Fort Knox recently looking at the programmers working in the simulations for the M1A1 tanks, they were trying to create programs that took unnecessary data off the screen so the tank driver was not bombarded with all of this irrelevant information. It seems to me that's the job of metaprogrammers—how do you get the information that's relevant at the time?

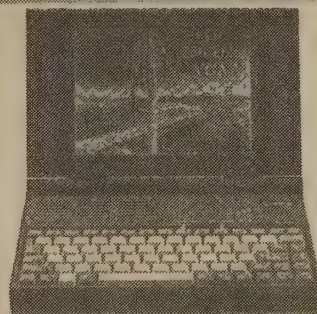
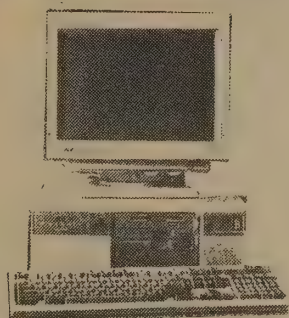
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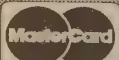
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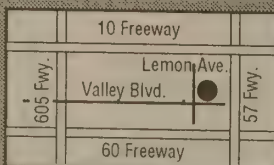
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Alvin Toffler:

"People on top are the last ones to find out what's going on, and that's why this whole discussion of 'empowerment' is not a result of altruism or New Age feelie stuff—it's that you can't make a profit, you can't make a product, the old way. You *have* to empower to a certain degree the people who are actually doing that work. Because now they're the ones who know, and they can tell you what you cannot tell them."

And how do you avoid being manipulated by somebody who's trying to feed you information to make you do what they want?

AT: You do that by understanding that all information is manipulated.

HT: But you as the operator still have the option of getting additional information.

AT: We're not only manipulated deliberately, but we're also victims of looking at a map and believing it is the same as the territory. Korzybski says no. Korzybski was the father of general semantics, and he had a slogan: "The map is not the territory." The map is not the territory.

HT: The word is not the thing.

AT: The word is not the thing. And I know that from personal experience.

As a correspondent in Washington—I spent a few years there—I remember coming home from a very complex set of congressional hearings. All day long, seven hours of detailed testimony about disarmament. And it had to do with throw weights and warheads and just really, really complicated stuff.

HT: And he had to boil all that down to five hundred words.

AT: And suddenly I had to write the story, which would appear on page one of my paper, and I had to do it by a certain hour. I wrote it, and I said, "You know, that doesn't really capture the complexity of what went on in that room."

So I wrote it again, and again, and again, and again, and again. I kept throwing the versions away trying to encapsulate the complex reality that occurred in that room, and finally the deadline was upon me, and that was the version that was going to get printed.

Now as I filed that story, it suddenly occurred to me that there were going to be nine other stories around it on page one, written by nine other journalists, some of whom might be more or less intelligent than I, more or less capable than I, more or less responsible.

And the consequence of that is that what we read is essentially a fiction. It may be the best fiction we can get. It's as close to the reality, perhaps, as we can make it, but it ain't the reality. So as far as information is concerned, we're also at the mercy of deliberate manipulators, and that's true of all politicians and all bureaucrats and so forth...

And all marketing departments...

AT: And all marketing departments.

HT: And all governments.

AT: All of that.

In *Powershift* there are two chapters of which I'm more proud than Heidi—they've never been favorites of hers, but I think they're quite useful. They outline the tactics that are used to manipulate information, whether you're talking about political systems or individual corporate bureaucracies and so forth.

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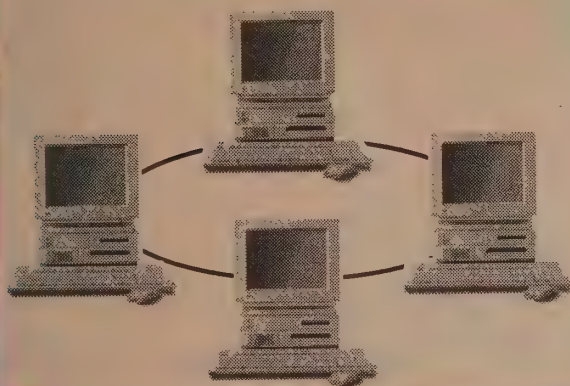
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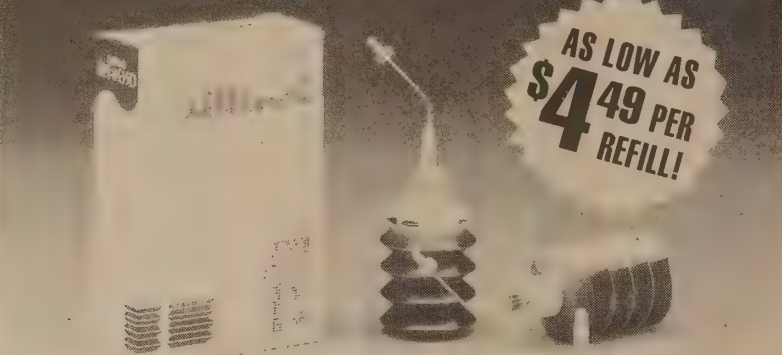


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And now that it's digital, it's even easier! You can put flying saucers in that picture...

AT: Exactly! So the first of those chapters deals with conventional information tactics, and the second chapter in that series deals with what we call metatactics as a result of the arrival of the computer. So there you have many more options of how to manipulate.

HT: You can build models and put in some variables and leave out others.

AT: You could weight them differently.

You could get something purporting to be the objective facts which is carefully filtered to one point of view or another. My experience is that most people aren't even aware of what goes into this—"Oh, I saw it on TV so it must be true!"

HT: We have a friend who's an eminent psychopharmacologist and statistical mathematician, and he says, "Always look at the research design. And then look at the basic statistics. And if they don't make sense, don't just accept them."

AT: It struck me as interesting some years ago when Bush was still in—Sununu, who was a computernik, was chief of staff, and he got into a big battle with Gore over the model for global warming.

What was interesting to me was not the substance of their positions, but the fact that the argument took place over the adequacy of The model. That's pretty sophisticated. Sununu was arguing that we don't have enough points of information, enough data coming in, the model is inadequate, why should we base major social or economic policies on this? Gore's position was: the model is adequate, the information is adequate for us to do something.

Now that's a step removed from the argument over what you should do. That is a meta-battle going on.

It's an agenda-driven meta-battle.

AT: Of course! Everything's agenda-driven in Washington.

HT: The people in the White House who write the option papers boil this all down and give the President three options.

AT: High, low, medium.

It's like those multiple-choice tests where you want to check None of the Above.

AT: That's right. Drop the nuke, do nothing, or continue doing what you have been doing.

HT: There may be eighteen other options.

AT: And indeed the option writers lead the decision-maker by the hand. I've spent some time looking at options, potential options, as a literary form, and have looked at this and talked to the people doing this, in Tokyo, in Moscow, and in Washington.

And I discovered, for example, in Washington, that you can say, "Here's a problem, Mr. President. Here are three options. Tick one off." Or you can say, much more cleverly, "Here is a problem, Mr. President. Here is what you've said about it before. Here are several options. Choose one." [laughs]

So all information emanating from any large institution is regarded by the people in the institution as essentially ammunition. Words are info-bullets. All agenda-driven. Sometimes the people are not even aware of their agenda, but that's a different story. That's another level of complexity.

HT: I think you have to assume that you're being manipulated. But it's good to ask the question of how are you being manipulated, and by whom.

And why.

AT: You may want to lend yourself to some manipulations, because you may agree with the agenda.

I'm sure we've been used unbeknownst to us in defense of all kinds of things that we would not necessarily agree with. And if we are, you can be sure that you are and everybody else is. ■



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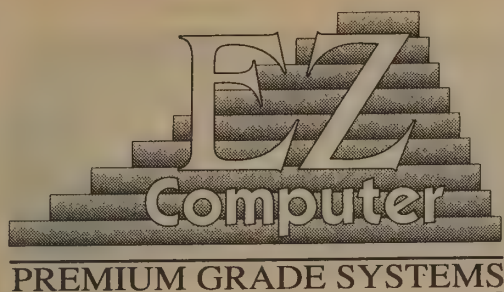
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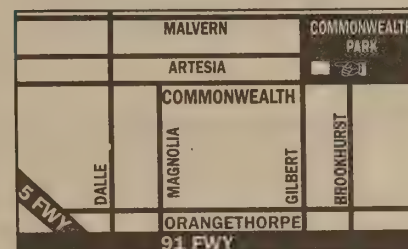
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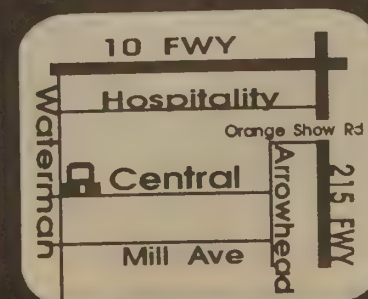
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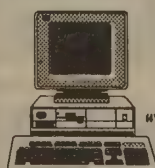


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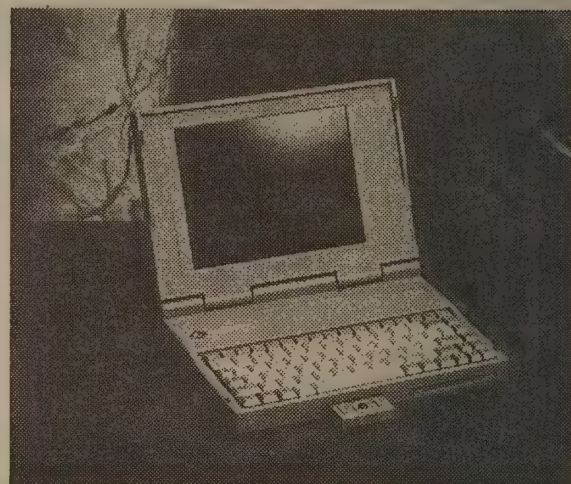
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continued from page 36



Gateway 2000

when connected to a power supply, I find it annoying to have to wait for the hard disk to come up to speed before I can save or retrieve information. When you do use the battery, you can expect between two and four hours of use before you need to recharge. Recharges take two hours, but only happen when the computer is off or in stand-by mode. Extra battery packs (\$89) are available.

This laptop is one of the first I have seen that is truly set up for the user who will not be using it primarily as an on-the-go system. That, I suspect, is most of us—typically using the machine most of the time at a desk and occasionally on the road. In any case, you can set up this machine to accommodate either use. For instance, if you attach an external monitor and keyboard, you can set up the machine so it will not turn off the computer when you close the lid. Normally, when you close the lid, the computer goes into suspend mode. This is a great convenience when you want it.

These units come with MS-DOS 6.0, Windows

LAPTOPS

3.1, and a bunch of utilities prein-

stalled. They also come with an uninstalled copy of Microsoft Works for Windows, the best integrated software package for the beginner. Works includes a word processor, database, spreadsheet, and a generous collection of useful utilities including address book, amortization schedules, and others too numerous to name.

If you have decided to take the plunge and go for color, check out the Gateway 2000 machines. They carry a one-year warranty. For an extra \$100, you can buy an add-on warranty that guarantees that you will be shipped a replacement notebook within 24 hours if you have a breakdown during the warranty period. While I am leery of mail order units, I have no hesitancy about buying a computer from these folks, as they have done everything to make mail order a safe and sensible option. Their telephone line often puts you on hold, but they give you an 800 number so it is your time, but not your money. They sell all of their machines with a 30-day money-back guarantee. ■

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32Mb 8x36		1975	1735
64Mb 16x36			4890

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8087-1	82
80287	59
80387DX-16	49
80387DX-20	49
387SL/Mobile	84
80387DX(all speeds)	79
387SX(all speeds)	78
387SX/16	49
387SX/20	49

Cyrix	ULSI Coproc.
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387SX (all)	69
79387SX/25	60
387SX/33	65
387DX/33	65
387DX/40	70

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Advantage 386SX/20, 25,

Advantage Pro SX/25, Bravo3/33	2Mb 500962-001	148	8Mb 500962-002	438
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Advantage Pro 486DX/33; SX/25,

Bravo LC 4/25s; 33, 33s; 50d; 4/66d	2Mb 500987-001	119	4Mb 500987-002	228
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Premium 386/25;33;33T,

Premium II 386SX/16;20;25	1Mb 500780-003	68	4Mb 500780-004	229
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Advantage 486/25;33;33p;SX20,

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Premium ServerPower Premium 3/33;

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Premium 386/33TE, 486/25; E; 25E; 33; 33E; 33TE

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Advantage486/25;33;33p;SX20, Bravo4/33;

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DeskPro 386-33, 486-33, SystemPro

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Prolinea 3/25s, 325zs

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Prolinea 4/25s, 4/33, 4/50

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Vectra 486PC; 25T; 33T, 486s/20,

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Hurdia 386, Sprinta 386(all)	2Mb N/A	118	8Mb N/A	419
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PS/1 286, 386SX

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Essential Consultant, Expert Models x43,x44	4Mb 96F9290	298	16Mb 96F9291	825
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PS/1 Consultant, Essential, Expert x76

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2Mb Kit 30F5360	08
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Xstation,ValuePoint Cxx series, adapter	4Mb 34F2933 or 87F9977	228
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PS/2 35SX;LS,40SX,ValuePoint Cxx series

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Consultant,Essential,Expert Mod. x11,X13,x14,	2Mb 6450608	128
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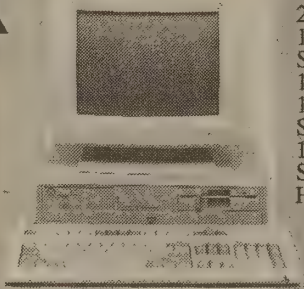
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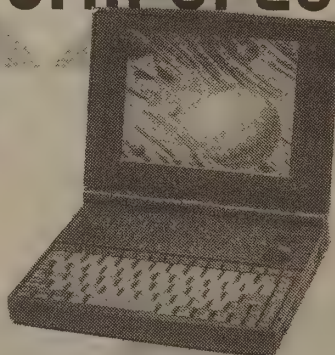
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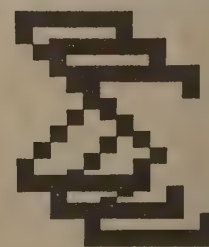
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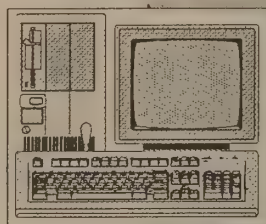
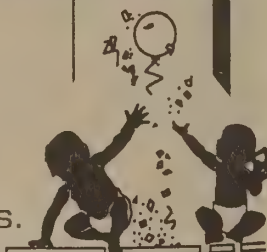
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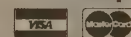
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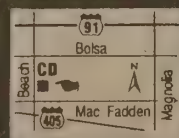
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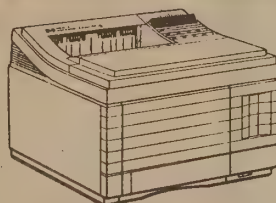
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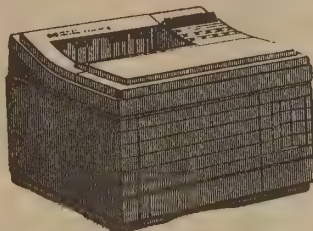


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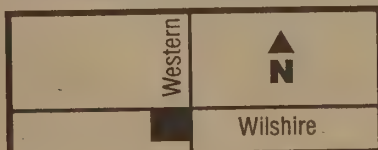
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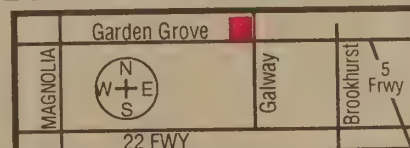
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Arthur's Teacher Trouble, The 7th Guest, Speaker

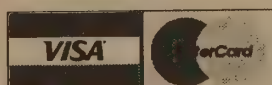
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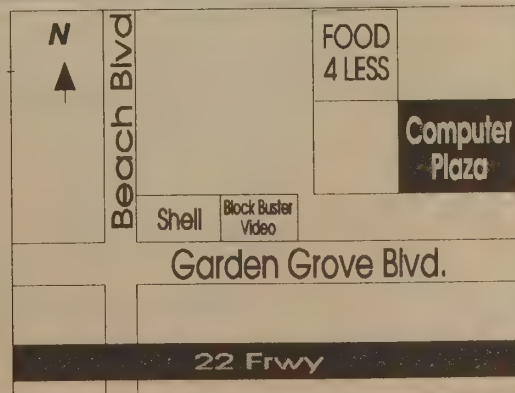
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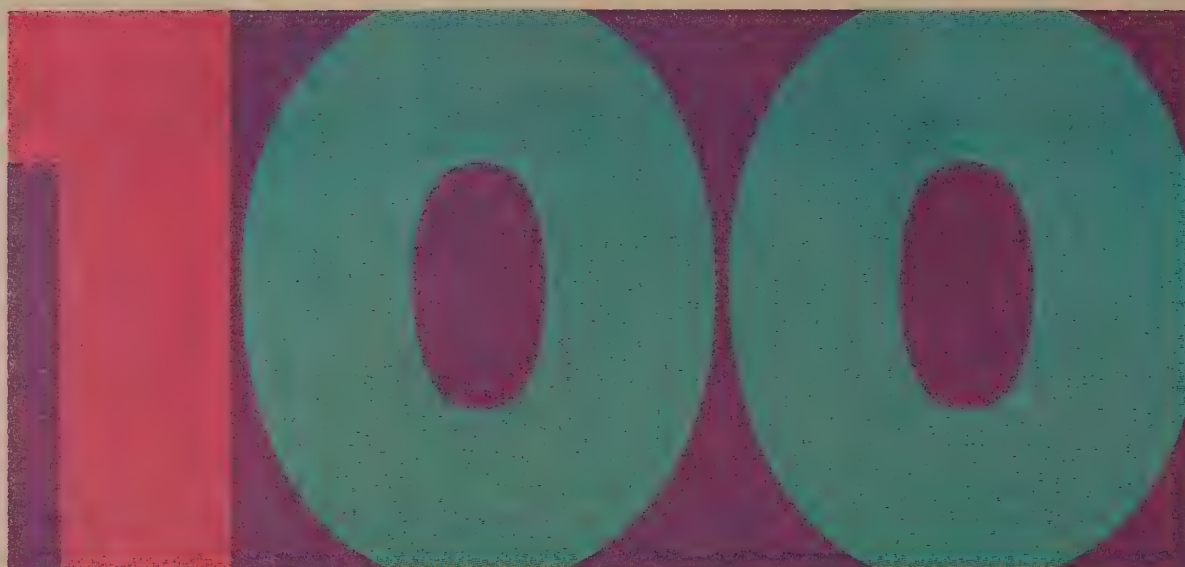
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INDUSTRY LEADERS, LUMINARIES, AND UNSUNG HEROES OF 1993

Interval Research head David Liddle, who years ago at Xerox PARC helped create technology that went on to enable the personal computer revolution, has been heard to remark of late that in the not-too-distant future, the computer is going to disappear. It's not that we won't be using them; it's just that the machines and applications will be essentially transparent, and the important thing will be what you can do with them—play, work, learn, and interact in ways we're only beginning to imagine.

This year's list reflects an industry moving in that direction. Hardware and applications are rapidly becoming commodity products, though ever-faster and more feature-laden ones. The growth is in the information, from corporate data to networked games to movies-on-demand, that's being created and consumed by their users. Consequently you'll see a lot of people from the multimedia world, both tools and content providers. You'll see a large number of people from the networking world as global highway construction increases at a nearly incomprehensible rate. You'll find quite a few who wrote books to help people visualize and make sense of it all. And, as always, you'll encounter a few virtually unknown souls who just went out and did something good.

We hope you enjoy this year's list, and that you're not shy about telling us who should be on next year's.

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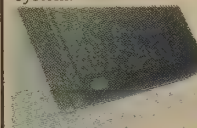
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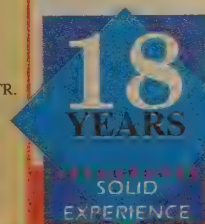


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The entire computer world comes to COMDEX to announce products, check out what's new, and schmooze with its peers, and Adelson keeps giving it more and better COMDEXes, embarking on further global efforts with shows in Europe and the Far East.

Regrettably, he hasn't found the solution for COMDEX-related gridlock in Vegas, however.

PAUL ALLEN

CHAIRMAN

DAVID LIDDLE

PRESIDENT AND CEO

INTERVAL RESEARCH CORPORATION

Xerox PARC pioneer Liddle and Microsoft cofounder Allen started Interval in 1992 to perform research and advanced development on information systems, communications, and computer science. As Allen said at the time, "We share the view that the larger potential of computing is not being realized, and the major problems to be solved require a more exploratory approach than can be taken when developing competitive products for an existing market."

In the interim they've kept a tight lid on information emanating from Interval, while attracting some stellar personnel. Toward the end of 1993, Liddle, while still pretty reticent about the actual projects going on, has spoken about the company's overall vision of computing in the next century—a key component of which is that the "computer" itself will essentially disappear and will become a transparent tool for letting people interact with information, their surroundings, and each other.

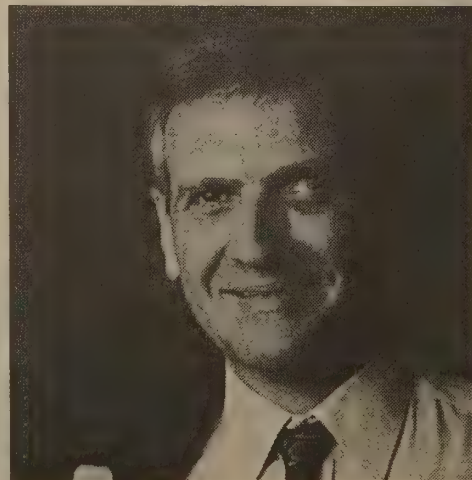
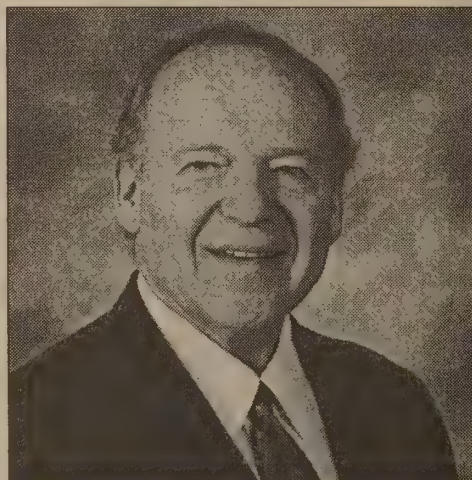
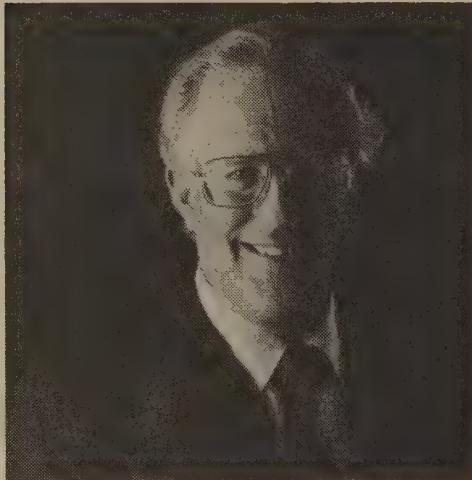
ROBERT ALLEN

CHAIRMAN AND CEO

ROBERT KAVNER

EXECUTIVE VICE PRESIDENT; CEO, MULTIMEDIA
PRODUCTS AND SERVICES GROUP
AT&T

There was a time in the recent past when AT&T was regarded as a stodgy corporation lagging behind the times, but Allen and Kavner are aggressively moving the company into technological areas far beyond Plain Old Telephone Service. With strategic deals such as 1993's acquisition of McCaw Cellular and EO, and divergent investments such as General Magic (whose TeleScript offers unprecedented simplicity in moving diverse content over the phone or wireless networks), entertainment innovators 3DO and Spectrum HoloByte, and the Sierra Online gaming network, they've positioned AT&T as a leading architect of digital highways and provider of some of their more interesting destinations.



Top to bottom: Alan Ashton, Robert Allen, Sheldon Adelson, Enzo Torresi.

CARLTON AMDAHL

CHAIRMAN AND CHIEF TECHNICAL OFFICER

ENZO TORRESI

PRESIDENT AND CEO

NETFRAME

Torresi and Amdahl cofounded NetFRAME a few years ago to develop and market Amdahl's innovative and sophisticated network server technology. Today the company's "superservers," which combine several Intel CPUs and offer performance that compares favorably with minis and mainframes, are finding wide acceptance with customers that include Alcoa, Shell Oil, Microsoft, Citibank, and the US Holocaust Memorial Museum, in applications from single-location to geographically widespread networks.

ALAN ASHTON

PRESIDENT AND CEO

WORDPERFECT

For many CEOs, a crucial issue in an evolving industry is adapting to the times. In recent years, WordPerfect has often been cited as a company at risk because of its apparently complacent dependence on its flagship product, the industry-standard WordPerfect word processor, and a general slowness to adapt to industry trends.

In response to changing markets, founder Ashton has led the company through a remarkable period of self-reinvention, with a new emphasis on strategic alliances and cooperation with other vendors, including Novell and IBM. WordPerfect Office, the company's integrated email and scheduling package, is gaining market share over its competitors from Lotus and Microsoft, and is making inroads in the mobile computing arena thanks to agreements with such vendors as Motorola and RAM Mobile Data.

The word processor's still doing fine, though. WP 6.0 for Windows recently won PC/Computing's MVP Award, and the DOS version is at the top of the charts.

What's next? Well, the company recently launched a consumer software line and is looking into edutainment...

JOHN PERRY BARLOW

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Occasionally dubbed "the Odd Couple of Cyberspace," Kapor and Barlow have created some strong alliances in the quest to implement what Kapor calls a Jeffersonian vision of the info infrastructure—one in which individuals are info-producers as well as info-controllers, where the owners of the highway provide access to all prospective travelers. They've also been instrumental in forming a strong consortium to inform the government

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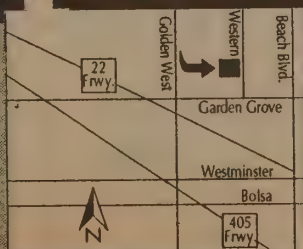
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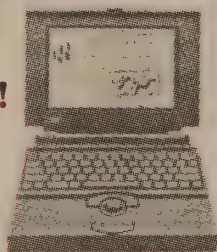
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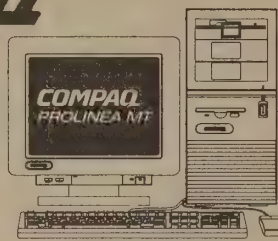
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of the communication industry's need for strong data privacy protection, and with their various writings and presentations they've kept an extremely diverse audience aware of the evolving issues relating to digital civil liberties.

CAROL BARTZ

PRESIDENT, CEO, AND CHAIRMAN
AUTODESK

Since coming to Autodesk from Sun in 1992, Bartz has provided strong, effective leadership for the world's sixth-largest software company, increasing the company's profitability and maintaining a steady stream of product releases and updates, including an excellent Macintosh version of AutoCAD and an exceptionally well received version of 3D Studio. She also provided input on the Clinton administration's technology policy, speaking at then-President-Elect Clinton's Economic Summit in Little Rock.

She did a good deal of this while waging a successful fight against breast cancer, and now serves on the board of the National Breast Cancer Research Foundation and speaks frequently on women's health issues.

ERIC BENHAMOU

PRESIDENT AND CEO
3COM

Taking 3Com considerably beyond its Ethernet origins, Benhamou has not only achieved stellar success in the booming LAN market but made the company a world leader in complex global network systems. He's pleased customers and shareholders alike with leading-edge technologies, custom solutions, and ever-increasing sales and profits.

DANIEL BEN-HORIN

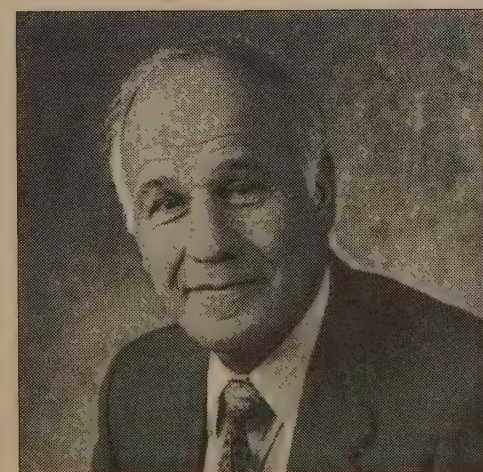
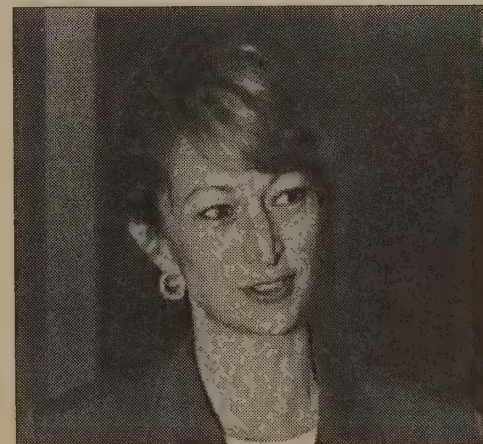
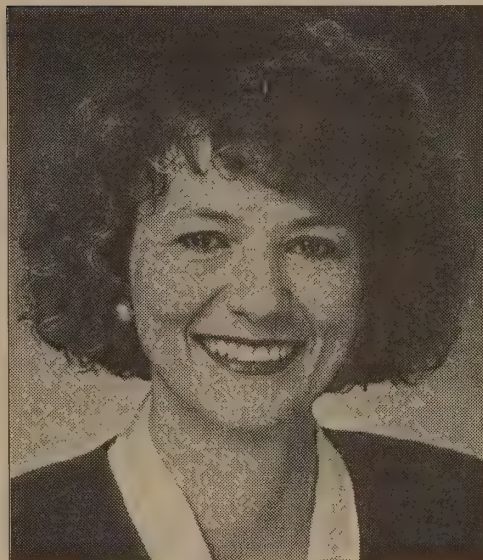
DIRECTOR
COMPUMENTOR

Continuing to match computer-skilled volunteers with nonprofits in need, Ben-Horin's expanded the scope of CompuMentor to specialized training in Internet access for community organizations. He's also looking at ways of bringing computer training into cash-strapped and under-resourced local schools, and generally discovering new and useful ways for the computer industry to make a positive difference in the surrounding community.

JIM BIDZOS

PRESIDENT
RSA DATA SECURITY

Encryption technology was a hot topic in 1993 as individuals became worried about protecting their private information, software companies their intellectual property, and businesses their trade secrets in an increasingly vulnerable world of electronic communications. Bidzos, whose company markets superior encryption technology based on



Top to bottom: Carol Bartz, Eric Benhamou, Debra Bowen, Sheldon Breiner.

the RSA algorithm and the public-key principle, has been a tireless speaker on the conference circuit during 1993, increasing awareness of the technical and business aspects of the privacy issue. He's also been highly successful at winning acceptance for RSA technology in other vendors' products—it's been a key component of Lotus Notes from the beginning, for instance, and was incorporated in Apple's System 7 Pro.

Asked recently about whether the government-proposed Clipper standard, announced last spring to general derision from the technical community, posed a threat to RSA's business, Bidzos appeared to regard the scheme as essentially a dead issue, pointing out that with over two million copies of RSA out there in the world, its users were unlikely to sit still for an expensive switch to a more vulnerable technology.

STEVEN BLANK

PRESIDENT AND CEO
ROCKET SCIENCE

While SuperMac veteran Blank's startup is some distance away from shipping its first product, that didn't stop it from garnering headlines in 1993 as one of the most interesting attempts to bridge the gap between the computer and entertainment industries. Launched in July, the company has scored technical coups like recruiting most of Apple's core QuickTime team and key animators from Industrial Light and Magic, not to mention luring writers and artists responsible for such blockbusters as *Jurassic Park*, *Terminator II*, and *The Hunt for Red October*.

The company has announced that its first interactive entertainment releases will ship on CD-ROM. However, Blank remarked recently, the company's long-term future is based on the scenario of its products going direct to the user via the emerging plethora of set-top cable boxes.

BMUG

Expanding ever further into cyberspace with its Planet BMUG BBS, the intrepid BMUGers continued to broaden their horizons across platforms, across nets, across continents. In addition to assisting hordes of users with technical support issues and providing tons of software, the BMUGers entertained the industry with their unique trade show presence and their genial rivalry with the Boston Computer Society.

DEBRA BOWEN

CALIFORNIA STATE ASSEMBLY MEMBER
AUTHOR, AB1624

Bowen performed a great public service to the citizens of California and struck a major blow for government accountability with this bill, now law, which mandates that all proposed bills in the California legislature be made available to the public in digital form. As the business world is using

technology to operate more efficiently and eliminate layers of bureaucracy, Bowen's bill permits citizens more direct and hassle-free involvement in the doings of their elected representatives.

SHELDON BREINER

PRESIDENT

QUORUM SOFTWARE SYSTEMS

Breiner and his fledgling company have weathered a few legal salvos from Apple and found wide acceptance in the workstation world for their software products: Quorum Equal, a user-level program that allows the use of Macintosh programs in native format on various workstations, and Quorum Latitude, which allows developers to quickly port their Mac applications to the UNIX environment. In 1993, Equal began shipping Word and Excel on its CD-ROM under a licensing agreement with Microsoft, which had historically cited the fragmentary nature of the UNIX marketplace as a reason not to port its applications; it also astonished observers accustomed to the performance hit of emulators by running a Quadra-level speed on SGI's Indy. Latitude was also a key component as Mac application developers moved their software into the workstation world; Adobe announced that it was using Latitude to port Photoshop to the Sun and Silicon Graphics environments.

DAVID BROWN

CHAIRMAN/ACTING CEO

VISIONEER

Providing a sterling proof that major productivity enhancers don't have to be huge and expensive, Brown's little Menlo Park startup markets a novel hardware-software package called PaperMax. Realizing that businesses often need to share documents over the network or the phone lines, and that 95% of the documents they need to share are on paper, they combine their Mac and Windows software (including free and widely distributed reader software) with a compact desktop scanner which instantaneously puts a paper document on the screen in PaperMax form, for sharing, markup, faxing, storage, etc. A simple idea that stands to make life easier for a lot of people.

JIM CANNAVINO

SENIOR VICE PRESIDENT, STRATEGY & DEVELOPMENT

IBM

While IBM as a whole isn't necessarily out of the woods in its perilous transition from unwieldy monolith to a lean, mean, just-in-time organization, Cannavino has achieved a remarkable turnaround with the IBM PC company, which has garnered critical acclaim and record-breaking sales with products from the state-of-the-art ThinkPads to the affordable ValuePoints. With the PowerPC waiting in the wings and OS/2 getting ever-better



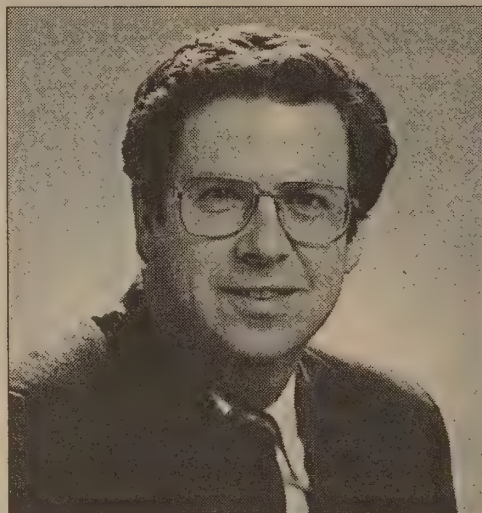
market share, the future's looking bright for this part of the Blue empire.

DOUG CARLSTON

CHAIRMAN AND CEO

BRØDERBUND SOFTWARE

A rare long-term success story in the consumer software business, Carlston has kept the company interesting and its products attuned to users' changing sense of the neat and useful. Brøderbund entered the CD-ROM game world in 1993 with the much-acclaimed Myst, introduced new and updated products from preschool to Print Shop, and kept the wily Carmen Sandiego one step ahead of the law for further adventures.



DENISE CARUSO

EDITOR

DIGITAL MEDIA

One of the leading analysts in the multimedia field, Caruso studies the converging players and technologies for the benefit of readers trying to achieve commercial success in a perilous industry. For those attempting to figure out where it's all going, Caruso's articles provide an invaluable road map and survival kit through the hype.

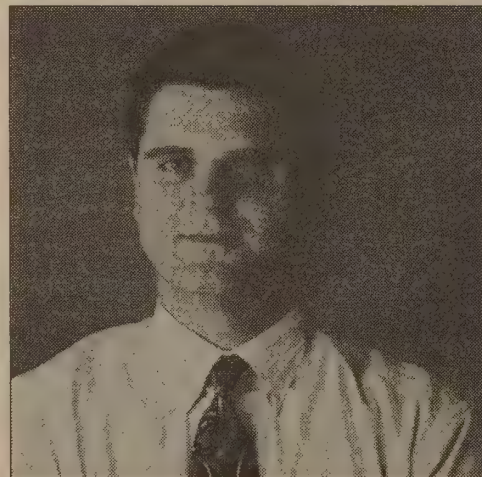
STEVE CASE

PRESIDENT AND CEO

AMERICA ONLINE

In contrast to most of his competitors over the last year, Case actually lowered access charges on AOL. He also hit the road with a traveling AOL team that hosted parties for members in Hard Rock Cafes all across the country, and generally engaged in aggressive and successful recruitment of new members. To say nothing of new platforms, as AOL moved into the PDA arena on the Zoomer, Sharp, and Newton.

All of which seemed at year's end to have the system hardware somewhat bogged down by the hordes of users, something that seems to be an ongoing problem with successful systems.

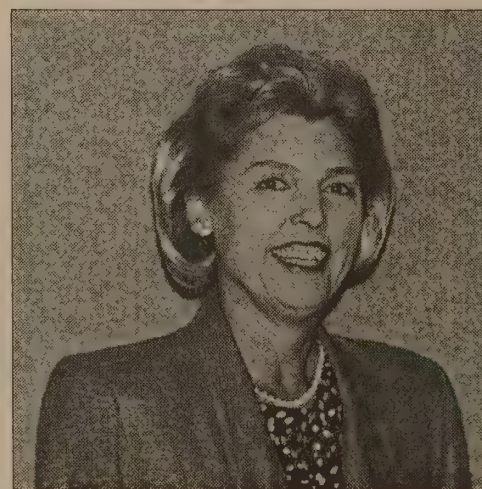


BARBARA CASS

EXECUTIVE DIRECTOR

SOFTWARE ENTREPRENEURS FORUM

Offering unparalleled support, information, and professional networking opportunities for new and experienced software developers, SEF is one of the industry's most vital resources. It celebrated its tenth year of service to the development community in 1993, a testimonial not only to the Valley's entrepreneurial spirit but to Cass's ability to keep an increasingly complex organization healthy and growing.



CASEY CASS

CEO AND FOUNDER

TITAL SYSTEMS INC.

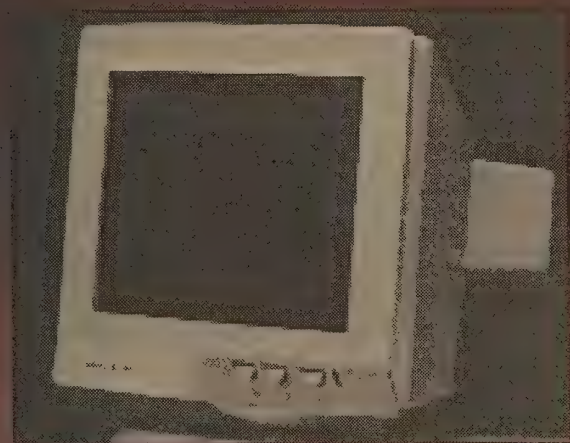
Cass's enthusiastic employees brought him to our attention, citing the success of the company he

Top to bottom: Jim Cannavino, Doug Carlston, Steve Case, Barbara Cass.

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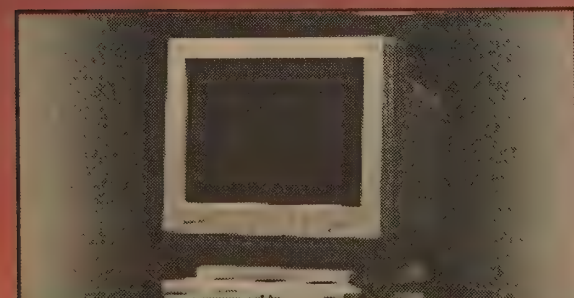
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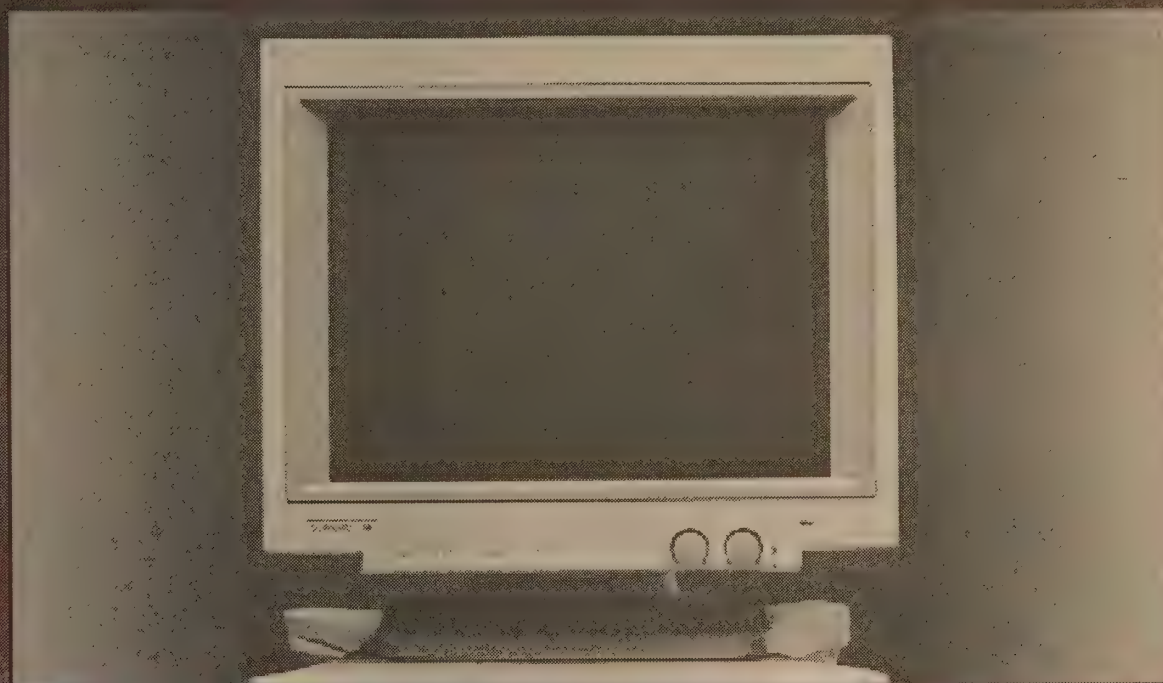
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started with \$500 in an unfurnished apartment in San Francisco three years ago. Believing that computer buyers were faced with a hopeless task in dealing with retail sales personnel who often knew nothing about the products they were selling, Cass set out to run his business differently. Among the service-oriented policies at Tital (which has now expanded to an all-in-one retail, training, and manufacturing facility that employs thirty-six people): every employee will receive a minimum of one hour's product and service training per day; employees receive training from manufacturers' representatives at least once a week; no voicemail during business hours; customer calls requiring research will be returned within thirty minutes. We are pleased to join with Cass's employees in saluting these exemplary policies and achievements.

RONALD CHWANG

PRESIDENT

ACER AMERICA

Strategies like just-in-time manufacturing and a diverse distribution channel from VARs to catalogs have helped Chwang keep Acer growing at far greater than the industry norm in recent months. Acer America accounts for about a fourth of the Taiwanese parent company's revenues and manufactures nearly all its products locally for best response to the changing marketplace. While the majority of the company's business is based on the well-entrenched Intel standard, the company is also exploring other platforms, experimenting with MIPS-based parallel-processing machines to take advantage of the emerging Windows NT server market.

JIM CLARK

CHAIRMAN

ED McCracken

PRESIDENT AND CEO

SILICON GRAPHICS

Clark and McCracken seemed to be generating news on an ongoing basis all year—hosting the Clinton/Gore road show, forming alliances with cable companies for set-top box design and video-to-the-home projects, shipping more powerful hardware at the high end and the revolutionary Indy at the low. Wherever the digital highway winds up taking us, Silicon Graphics is getting heavily into the transportation business.

BILL CLINTON

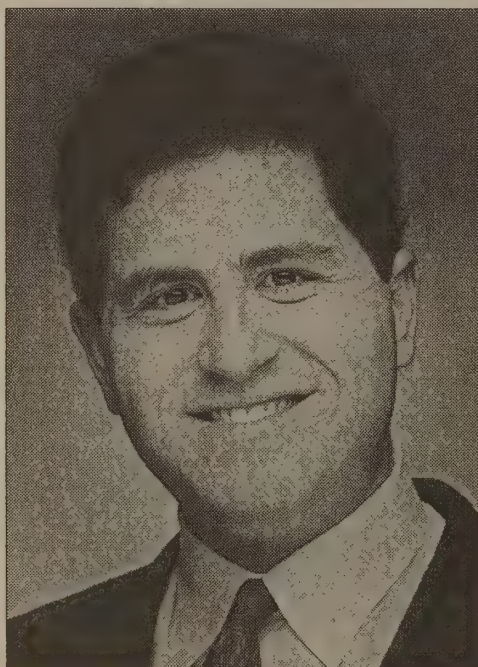
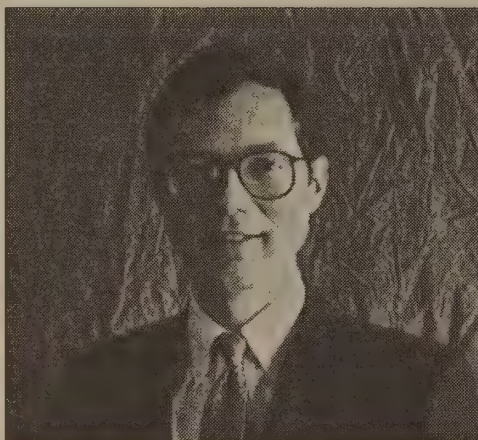
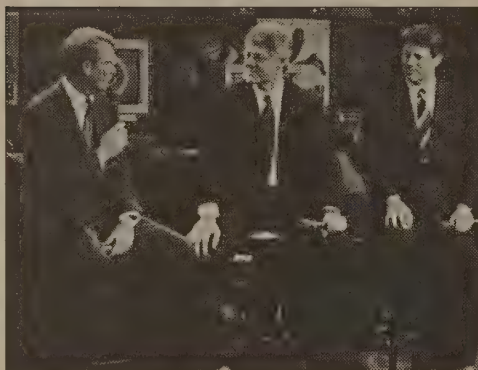
PRESIDENT

AL GORE

VICE PRESIDENT

UNITED STATES OF AMERICA

Whatever you might think of these guys on the political front, there is no doubt that they are far more aware of the importance of technology than any of their predecessors. They played a major role in making the Internet a household word, and made the



Top to bottom: (l-r) Ed McCracken, Bill Clinton, Al Gore; Scott Cook; Michael Dell; Brian Dougherty.

White House accessible via email for the first time in history. Many industry leaders have pinned their hopes for the future to this administration; others warn of dire perils. Time will tell, but an administration committed to building an information highway is certainly a step in the right direction.

SCOTT COOK

CHAIRMAN, PRESIDENT, AND CEO

INTUIT

Cook further strengthened his company's eminence in money management, both in the business and personal finance areas. His flagship product Quicken continues to gain market share as consumer computing grows explosively and the software gets more features, and a Pocket version for the Tandy/Casio Zoomer came out to help the mobile professional track finances on the go.

JAN DAVIDSON

PRESIDENT AND FOUNDER

ROBERT DAVIDSON

CHAIRMAN AND CEO

DAVIDSON AND ASSOCIATES

Founded by Jan Davidson in 1982 to market some speed-reading software she'd created, Davidson and Associates went public in 1993 and expanded its leadership role in the fast-growing education marketplace. The Davidsons play complementary roles in the company, Jan in charge of the technical side and Robert of the business aspects.

In addition to the shipment of such hit packages as Kid CAD and Math Blaster: The Search for Spot, 1993 saw such milestones as strategic alliances with textbook vendors for multimedia curriculum development and the company's selection as one of the "best small companies in the world" by *Forbes*.

MICHAEL DELL

CHAIRMAN AND CEO

DELL COMPUTER

While somewhat scathed from his brasher attempts to do battle with Compaq, Dell has remained a major force in the industry, keeping his company on a fast growth track. He was among the pioneers of innovative service and support programs for customers who range from large corporate accounts to individuals and small business, and of making his products available to customers through their channels of choice. As Dell's annual report states, the company is committed to a strategy of "mass-produced technology, one customer at a time," and its founder has been generally successful at adapting to changes in the business that have undone many of his rivals.

BRIAN DOUGHERTY

CHAIRMAN AND CEO

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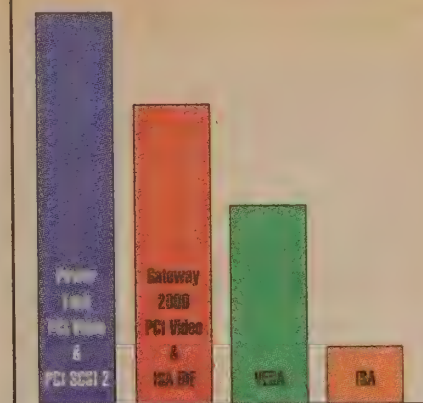
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tem, Dougherty expanded into significant new markets this year with the advent of PDAs. Casio and Tandy shipped Zoomers running GEOS, followed by the Sharp PT-9000. With a clear strategy of being a serious player in the mobile computing market, Dougherty formed alliances with Motorola, CompuServe, Novell, and others and held the first developers' conference to encourage ISVs to write applications for the GEOS environment.

KENNETH DOWLIN

DIRECTOR

SAN FRANCISCO PUBLIC LIBRARY

Amy Titus of Brisbane suggests that we include California's public libraries on this year's list because, as she says, "they have been leaders in information technology. Many people have their first computer contact at a public library. Librarians provide computer information to everyone, for free."

We are delighted to join with her in thanking the state's librarians for their vital work in ushering in the information age, and we think Dowlin deserves particular notice for his pioneering work in getting the San Francisco library system online. According to plan, during 1994 the library will implement a program to allow home, business, and classroom access to the system, as well as community Internet access, full text delivery of documents in other city institutions, and a switched multimedia network to all the local library branches. Actively involved with San Francisco's multimedia community, Dowlin has set a goal of providing switched multimedia access to the home by the year 2000.

ERIC DREXLER

RESEARCH FELLOW

INSTITUTE OF MOLECULAR MANUFACTURING

CHAIRMAN

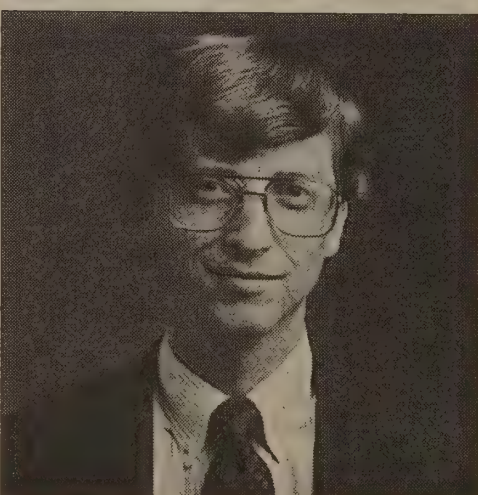
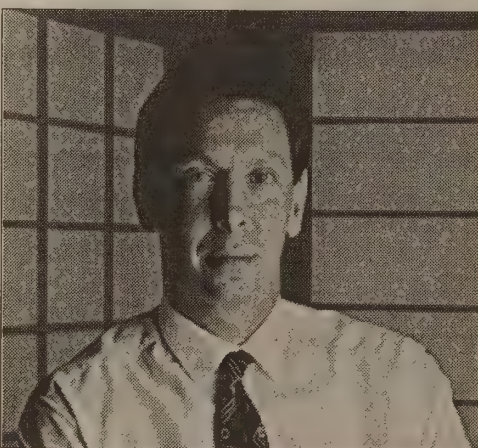
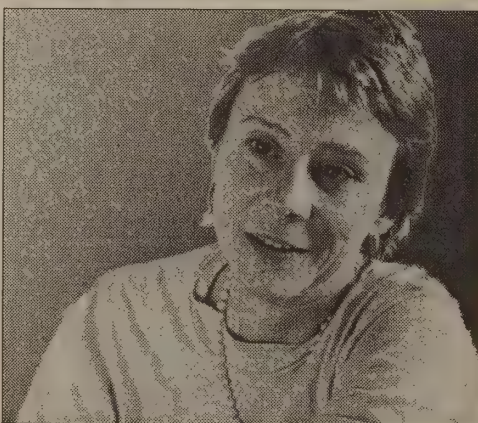
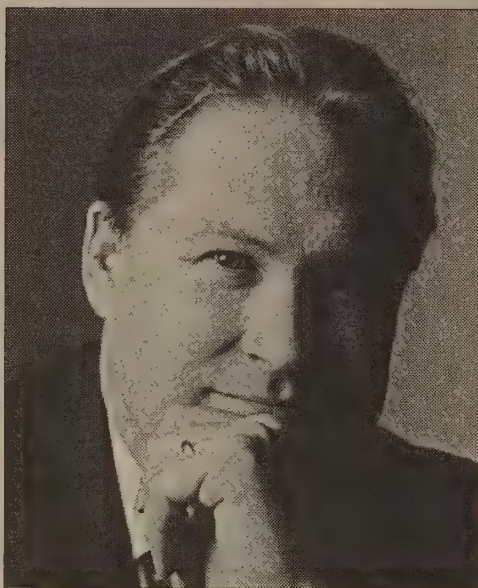
FORESIGHT INSTITUTE

While we're still waiting for the big breakthrough in nanotechnology, Drexler continues to do research and offer provocative suggestions as to which pieces of the technology might reasonably be implemented next, most notably at the recent Third Foresight Conference on Molecular Nanotechnology. His highly technical book *Nanosystems* has sold exceptionally well as such books go, having entered its second printing and sold over fifteen thousand copies so far, and was given the Award for Excellence in Professional and Scholarly Publishing in the computer science category by the Association of American Publishers. Drexler was also presented by industrialist Jack Kilby with the Kilby Young Innovator Award for his work on nanotechnology.

JOHN C. DVORAK

COLUMNIST

Dvorak continues to delight his readers and annoy his adversaries with columns, books, and advice.



Top to bottom: John Dvorak, Esther Dyson, Larry Ellison, Bill Gates.

Aside from his role as a significant information source, he's one of the primary forces likely to keep the industry from getting boring, what with his frequent trips to the future and other alternate realities that mysteriously resemble our own.

ESTHER DYSON

EDITOR

RELEASE 1.0, REL-EAST

Long a major influence on the industry with the *Release 1.0* newsletter and PC Forum conferences, Dyson has devoted much of her energy lately to building up entrepreneurial high-tech businesses in the former Eastern Bloc, where technical expertise is great and money is scarce. She's been instrumental in catalyzing some interesting alliances, for example connecting the Russian handwriting-recognition wizards at Paragraph with Apple, resulting in Paragraph's technology being incorporated into the Newton.

LARRY ELLISON

PRESIDENT AND CEO

ORACLE

Not that he's slacking off in his domination of the corporate data-processing world, but these days Larry Ellison has set his sights beyond the conventional notion of relational databases to an all-encompassing vision of digital commerce. He's invested significant amounts of his own and Oracle's resources in massively parallel computer technology, which he believes is the key to moving multi-terabyte content such as on-demand movies along the digital highway to come; the result is not only short-term advantage to the database giant whose software is among the relatively few to take advantage of massively parallel systems, but a tactical advantage for becoming the virtual warehouse for the infinite variety of information destined to be bought and sold on the global network.

MARK EPPLEY

CHAIRMAN AND CEO

TRAVELING SOFTWARE

PDAs were everywhere in 1993, and Traveling Software went right along with them. Among the key products in which Traveling Software's involved: the HP OmniBook 300 and 95LX, the Apple Newton, and a host of Sharp Wizards. Eppley's sense of emerging trends has enabled the company's technology, notably its line of LapLink products, to become an integral part of mobile computing.

ED ESBER

PRESIDENT AND CEO

CREATIVE LABS

Last seen on this list some years back as the CEO of Ashton-Tate, Esber has found new challenges and rewards in the PC multimedia market with this US branch of Singapore-based Creative Technology.

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Long an industry leader in the audio field with its Sound Blaster card, Creative is finding a lucrative new market in PC multimedia upgrade kits, both under its own name and with a list of OEM customers that includes IBM, Dell, and AST.

What's next? Well, like a lot of other vendors, Creative's going into the interactive CD-ROM business. They announced a consumer karaoke kit at COMDEX, and Esber said their goal is to become "the Rhino Records of karaoke."

DAVID, JOHN, AND RANDY FRY
FOUNDERS

CHARLIE YANDELL

DIRECTOR OF COMPUTER OPERATIONS
FRY'S ELECTRONICS

Something of a rarity in a hype-intensive industry, the Fry Bros. send out no press releases and avoid the spotlight. However, they keep right on opening stores, one in Campbell and one in Fountain Valley, providing the technical community with a unique one-stop source for all their needs from SIMMs and systems to magazines and Doritos, and an ever-growing repertoire of bizarre retail decorating schemes. Yandell keeps the day-to-day operations of this distinctive retail phenomenon on track.

BILL GATES

CHAIRMAN AND CEO
MICROSOFT

Despite celebrity status, a position as one of the world's richest men, the chairmanship of a company that bypassed General Motors some time ago, and a position in the operating system market that envious competitors discuss in terms reminiscent of nineteenth-century Standard Oil, Gates remains far from complacent in his ongoing battle to keep Microsoft on top.

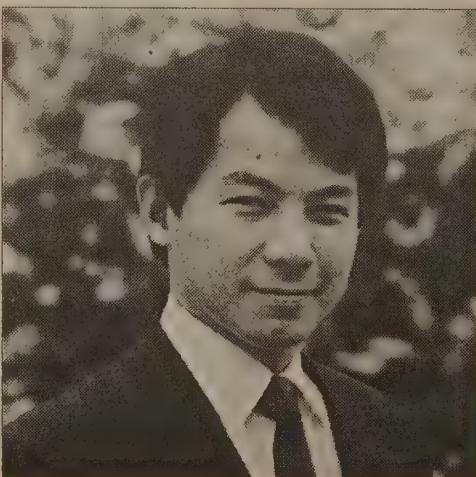
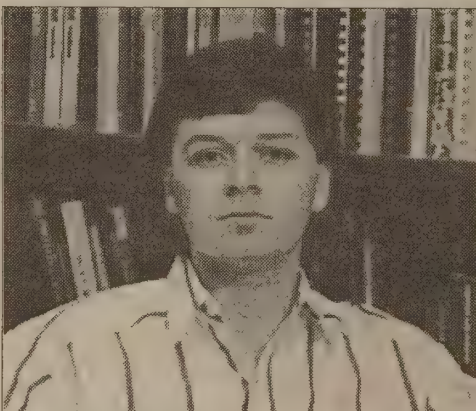
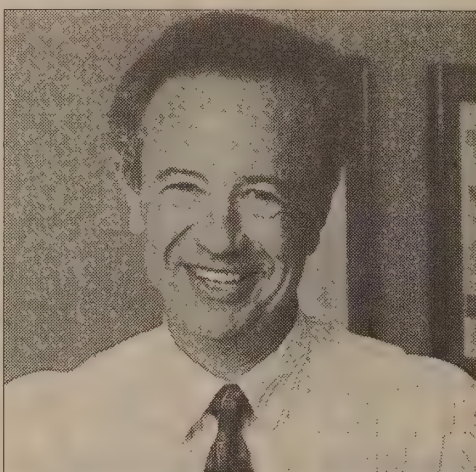
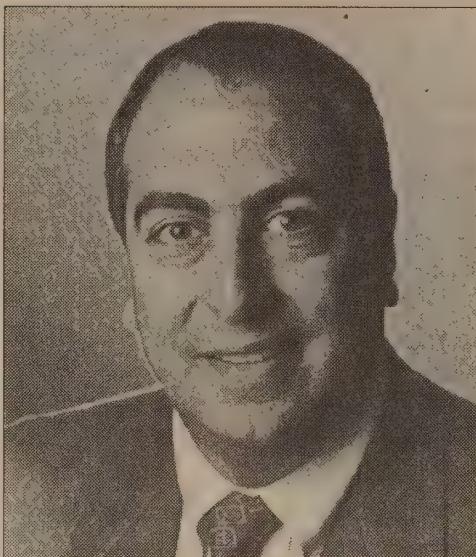
Still, with the advent of multiplatform Windows NT, Microsoft stands to enter new markets. Not content with expanding Windows to platforms from pen-based computers to client-server networks, it's making alliances in the entertainment and cable industries. All in all, despite the fond hopes of competitors, Gates appears unlikely to let down his guard any time soon.

MARK GRAHAM
PRESIDENT

MITRA

TECHNICAL DIRECTOR
PANDORA SYSTEMS

Both Graham and Mitra are longtime veterans of the online world: Graham previously cofounded the Institute for Global Communications and was the director of PeaceNet; Mitra was the founder and director of GreenNet in the UK and more recently worked on Internet applications such as Gopher and WAIS. At Pandora, they worked on a number of



Top to bottom: Edward Esber, Andrew Grove, Mark Graham, George Hara.

significant projects during 1993, notably the network service for WIRE, the women's online service, and the WAIS and Gopher gateways for America Online's Internet Center. They've also been working extensively to help develop the Internet in the former Soviet Union, providing a vital resource during a traumatic economic transition.

ANDREW GROVE
CEO

INTEL

Another good year for Intel, 1993 found the Pentium shipping to eager users, the 486 in its infinite varieties taking hold in machines from notebooks to superservers, and platoons of operating system vendors rushing to port their software to the Intel environment. While it's nice to be popular, the hard-driving Grove is not one to rest on his laurels, having seen all too many existence proofs that today's industry standard is tomorrow's archeological curiosity; he's leading Intel on an aggressive course in areas from embedded processors to multimedia to communications, and furthermore has no intention of letting the vaunted PowerPC erode Intel's empire.

GEORGE HARA
FOUNDER

ALLIANCE CONFERENCES

Having pioneered the concept of international high-tech startup some years ago, Hara is an effective promoter and facilitator of US/Japanese collaborations and joint ventures. The Alliance conferences, held yearly in Japan, bring high-level industry executives from both countries together with entrepreneurs for idea sharing and the formation of mutually beneficial alliances, and have been responsible for the creation of some noteworthy partnerships.

MARK HASS

EXECUTIVE DIRECTOR

COMPUTER RECYCLING CENTER

While others simply bemoan the widening gap between the info haves and have-nots, Mark Hass did something about it. Inspired by the desperate need of Bay Area schools for computers and the large number of perfectly good, if somewhat outdated, computers being discarded by upgrading businesses every week, the former robotics engineer founded the Computer Recycling Center, now housed in Mountain View. Each week the nonprofit Center takes dozens of cast-off computer systems, repairs them, and donates them to needy schools, along with software.

TRIP HAWKINS
PRESIDENT

3DO

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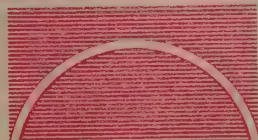
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which it remains to be seen whether its new, CD-ROM-based standard can make significant inroads against the cheaper and ubiquitous Sega and Nintendo. Initial offerings for the players based on the 3DO standard run toward graphically superior versions of the usual shoot-'em-ups, but Hawkins envisions the technology as a gateway to everything from home shopping to game-playing on the global network.

MARK HOFFMAN

CHAIRMAN, PRESIDENT, AND CEO

SYBASE

Hoffman has led Sybase from a tiny 1984 startup to its current status as a large public corporation rapidly approaching a half-billion dollars in annual revenues. A pioneer in client-server computing, Sybase has kept a technological lead in the online enterprise-wide computing arena and continues to gain market share, with its database and connectivity tools available on platforms from desktop to mainframe.

DAVE HUGHES

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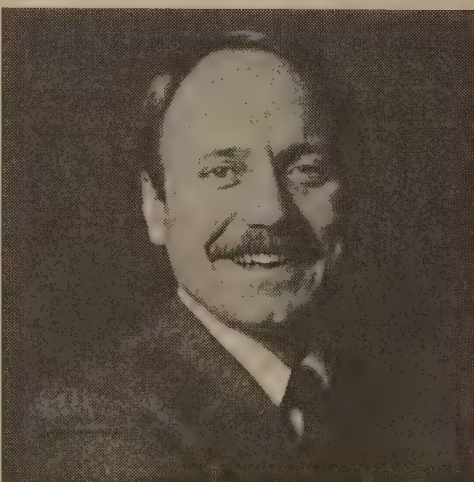
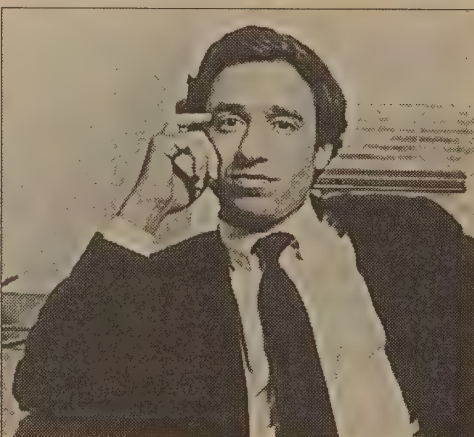
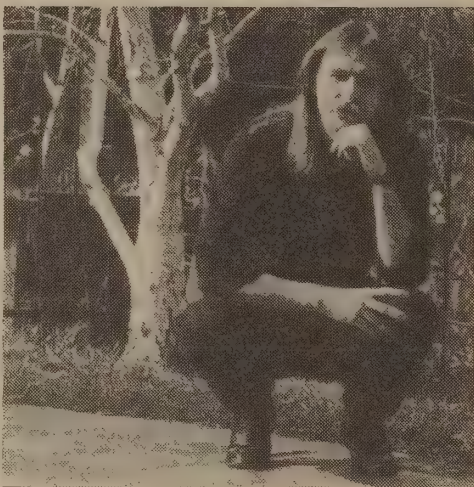
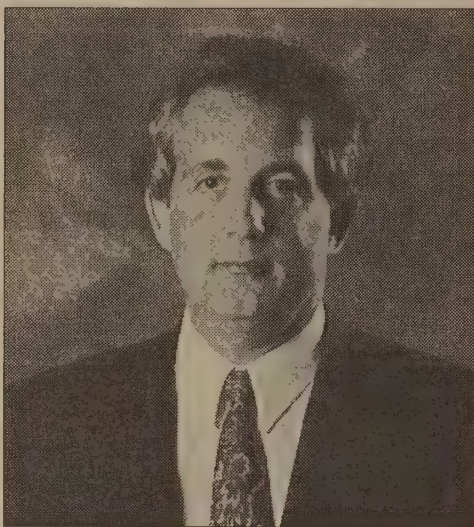
Telecommunications pioneer Hughes was on to further adventures last year—having campaigned at length to convince the modem-using populace that the NAPLPS standard was the great hope for moving graphics, animation, and non-Roman text over the global phone lines, he was constantly frustrated by the lack of good telecommunications software implementing the protocol. In 1993, his problem found an elegant solution and, for a very minimal expenditure of hard currency, he was able to enlist the services of Russian software wizards to write a program called Teledraw. The results were so good that Hughes is now plotting further collaborations with Andrey, Sasha, et al. to enable an ongoing process of phone access to everything from classroom whiteboards to Indian art.

STEVE JACKSON

PRESIDENT

STEVE JACKSON GAMES

Longtime readers will recall the 1990 incident in which Steve Jackson's business was nearly destroyed by overzealous Secret Service agents in ostensible search of the E911 document, who seized all his company's computer equipment, damaged most of it, and didn't return it for months, meanwhile reading private email stored on the company's BBS and generally engaging in egregious conduct. In a case with wide constitutional implications, Jackson and the EFF brought suit against the Secret Service, and in April 1993 federal district court Sam Sparks ruled in Jackson's favor, assessing the Secret Service \$50,000 in damages, plus Jackson's attorneys' fees. In scathing terms, Sparks made it clear not only that the Fourth Amendment's protections against unrea-



Top to bottom: Mitch Kapor, Kai Krause, Jim Manzi, Mark Hoffman.

sonable searches and seizures applied to computer owners, but that special legal protections of publications extend to the digital world, where the concept of "publishing" is undergoing rapid change.

PAUL JAIN

PRESIDENT AND CEO

MEDIA VISION

Jain and others cofounded Media Vision in 1990 to take advantage of the emerging multimedia market. Since then he's led the company to a position of industry prominence with retail and OEM products ranging from audio kits to interactive CD-ROM games and voice-activated daily planners. The company's growth has been explosive since it shipped its first product in 1991, and its rapid development cycles and distribution arrangements position it well for a significant role in the future.

TIM JENISON

PAUL MONTGOMERY

FOUNDERS

NEWTek

While Commodore continues to struggle for market share, one device, the NewTek Video Toaster, remains arguably the leading driver of Amiga sales. The founders' brainchild came out in a new release, the Video Toaster 4000, during 1993, and finds ever-wider acceptance in the video industry. Used by Foundation Imaging in its Emmy-winning effects for *Babylon 5*, the Toaster has become an indispensable tool for the budget-minded video professional and amateur alike, and its creators keep adding new capabilities.

STEVEN P. JOBS

CHAIRMAN

NeXT

On the occasion of the Macintosh's tenth birthday, it is only appropriate to note the profound change in the lives of millions of people as a result of Jobs' vision. Otherwise, while it cannot be said that 1993 was a banner year for NeXT—the company made a wrenching decision to get out of the hardware business entirely and focus on making its innovative software available on the Intel platform—it's also clear that the company may well have a strong future in the software business. Whether NeXTstep can prosper in the platform wars to come remains to be seen, but Jobs has been defying the odds to good effect for years.

REESE JONES

CHAIRMAN AND CEO

FARALLON

Since the days when he spun Farallon off from BMUG, Jones has parlayed a keen sense of emerging markets and an ability to combine innovation and affordability into a product line far beyond PhoneNet. During 1993, the company launched a number of breakthrough offerings to address the

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Advantage! Pro 386SX/25, Bravo 3/33s	8MB Kit	500962-002	280
Advantage! 486/25,33,33p,486SX/20	2MB Kit	500780-005	96
Bravo 4/33 (Original), 486/25	8MB Kit	500780-001	348
Advantage! Plus 486DX/33,DX2/50,66	4MB Kit	500510-008	199
	8MB Kit	500824-001	399
Advantage! Pro 486DX/33,486SX/25	2MB Kit	500987-001	99
Bravo LG 4/25s,33,33s,4/50d,4/66d	4MB Module	500987-002	150
	8MB Kit	500987-003	299
	16MB Module	500987-004	599
	32MB Kit	500987-005	1,199
Power Premium 3/33,4/33,33s,50d,66d	0-32MB Board	500818-001	148
Premium 386/33TE, 486/25, 25E,25TE,334-32MB Board	8MB Kit	500780-004	330
486/33E,33TE		500780-001	348
Premium II 386/25,33,486/33,486SX/20			
Premia 4/33,33s,50d,66d	4MB Kit	501159-001	198
	8MB Kit	501159-002	368
	16MB Kit	501159-003	700
	32MB Kit	501159-004	1,300
	64MB Kit	501159-005	3,400
PowerExec EL	2MB Module	500984-004	105
	4MB Module	500984-001	175
	8MB Module	500984-002	495
	16MB Module	500984-003	750
Power Exec 4/25SL, Color,ColorPlus	4MB Module	501166-001	195

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HP DESKJET PLUS 500,500C	256K MODULE	N/A	\$40	KX-P4450I	2MB BOARD	N/A	\$115
CANON LBP 8II,8IIR,8IIT	2MB MODULE	33448	121	KX-P4420	4MB BOARD	N/A	196
	4MB MODULE	33445B	265	PANASONIC	1MB BOARD	N/A	76
HP LASERJET II, IID IIP,				4410/4430	2MB BOARD	N/A	117
IIP+,3,3D,3P	1MB MODULE	33474A/B	60		4MB BOARD	N/A	200
	2MB MODULE	33475A/B	99		1-4MB KIT	N/A	53
HP 4,M,SI,MX	4MB MODULE	N/A	184	TI MICROLASER	1MB MODULE	70014701	68
				OKIDATA	2MB MODULE	N/A	109
				LASER-400	1MB BOARD	N/A	90
				OKIDATA 410/810	2MB BOARD	N/A	131
					4MB BOARD	N/A	214
					1MB BOARD	540101	77
HP 4L	1MB CARD	C2024A	49		2 MB BOARD	540102	118
PAINTJET XL3000	0MB BOARD	C1650A	58		4MB BOARD	540104	200
CANON LBP 4,PLUS,4LIT	1MB BOARD	S63-2230	124		2MB MODULE	70016501	120
	2MB BOARD	N/A	164		1MB MODULE	N/A	53
LBP-4sx	1MB BOARD	R03-0010-00	86		2MB MODULE	N/A	92
	2MB BOARD	R03-0020-00	128		1MB MODULE	N/A	81
LBP-8sx	1MB BOARD	N/A	86		2.5MB MODULE	N/A	147
	2MB BOARD	N/A	124		4MB MODULE	N/A	230
EPSON ACTION	2MB BOARD	N/A	66				
LASER II	3MB BOARD	N/A	107				
	5MB BOARD	N/A	182				
PANASONIC	1MB BOARD	N/A	288				
			74				

COMPAQ

MODEL	MEMORY ADDED	LP PART#	SHECOM PRICE	MODEL	MEMORY ADDED	LP PART#	SHECOM PRICE
DeskPro 386/25M,33M 486/33M	2-64 MB Board	118689-001	\$345		4MB Module	141684-001	\$185
486DX2/50M,66M 486s/16M,25M	4-64MB Board	118690-001	430		8MB Module	141685-001	375
SystemPro/LT 386/25,33 486DX2/50,	8-64MB Board	128877-001	625	ProSignia PC Server 486/33,DX2/66	1MB Module	118688-001	49
486SX/25	1MB Module	118688-001	49	SystemPro LT/486/33 (1-8MB Only)	2MB Module	118689-001	89
	2MB Module	118689-001	89		4MB Module	118690-001	185
	4MB Module	118690-001	185		8MB Module	128877-001	375
	8MB Module	128877-001	359		16MB Module	149320-001	625
DeskPro 5/60M,66M	8MB Kit	149911-001	388		32MB Module	149147-001	1,595
	16MB Kit	149949-001	789	Contura 4/25,25CX,25c	4MB Module	146520-001	207
	32MB Kit	149912-001	1,700		8MB Module	146521-001	359
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	128MB Kit	149914-001	8,000		4MB Card	129769-002	248
ProLinea 3/25s,25zs	2MB Kit	141738-001	96		8MB Card	129769-003	399
	8MB Kit	141742-001	290	LTE Lite4/25,25C,25E,33C	4MB Card	142337-002	219
ProLinea 4/25s,33,50,66,CDS	1MB Module	141682-001	49		8MB Card	142337-003	419
	2MB Module	141683-001	89		16MB Card	142337-004	693

IBM

MODEL	MEMORY ADDED	IBM PART#	SHECOM PRICE
PS/1 Consultant 2133-G11,G13,	1MB Module	6450603	\$49
2155-G14,PS/1 Essential 2133-W11,	2MB Module	6450608	89
W13,2155-W14,PS/1 Expert	4MB Module	6450128	185
2133-S11,S13,2155-S14	8MB Module	6450130	359
PS/1 Consultant 2133-G43,2155-G44	4MB Kit	96F9290	199
PS/1 Essential 2133-W43,2155-W44	16MB Kit	96F9291	560
PS/1 Expert 2133-S43,2155-S44			
PS/ValuePoint 6384 System			
PS/2 95 XP 486 OMF,OMT	4MB Module	6451158	198
	8MB Module	6451159	418
PS/ValuePoint 6382 System	2MB Module	6450902	90
PS/ValuePoint 6384 System	4MB Module	6450128	185
PS/ValuePoint 6387 System	8MB Module	6450130	359
	16MB Module	60G1622	625
PS/2 Model CL57SX	4MB Module	07G1420	225
ThinkPad 700,C,720,C	8MB Module	07G1421	430

SUN MICROSYSTEMS

MODEL	MEMORY ADDED	PART#	SHECOM PRICE
SPARC Server, Station 330	32-64MB Board	X133B	\$1,825
	8-16MB Board	X106D	715
	8MB Kit	X106E	593
	32MB Kit	X134A	1,580
SPARC Station/Engine 10 Model 30,41	16MB Module	X116F	825
Model 52/54	64MB Module	X164F	4,300
SPARC Station ELC (4/25)	4MB Module	X104Q	210
	16MB Module	X116Q,U	725
SPARC Station IPX (4/50)	16MB Module	X116Q,U	725
SPARC Station SLC (4/20)	4MB Module	X134A	210

ZENITH

MODEL	MEMORY ADDED	ZENITH PART#	SHECOM PRICE
MasterSport 386SL,SLe	2MB Module	ZA-4-4	\$132
MasterSport 386SX	2MB Module	ZA-360-1	132
SuperSports 286,E	1MB Module	ZA-180-66	73
	2MB Module	ZA-180-64	158
	4MB Module	ZA-180-71	206
SuperSports SX	2MB Module (Alpha)	ZA-180-86	158
	2MB Module (Beta)	ZA-180-87	158
	2MB Module	ZA-180-64	158
Z-LITE 320L	2MB Module	ME1002	175
Z-Note 320L,320LB,325L,Lc,Lp	2MB Module	ZA-3250-5	105
	8MB Module	ZA-3250-4	315

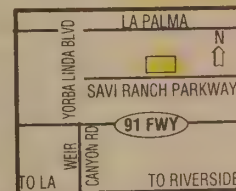
TOSHIBA

MODEL	MEMORY ADDED	TOSHIBA PART#	SHECOM PRICE
Toshiba T1800,T1850,C	2MB Card	PC-PA2000U	\$96
T1000, T2000, T2200	4MB Card	PC-PA2001U	199
	8MB Card	PC-PA2002U	380
Toshiba T4400,T6400,T6600 Series	2MB Card	PC-PA2003U	106
T1000, T2000, T2200	4MB Card	PC-PA2004U	190
	8MB Card	PC-PA2005U	360
	16MB Card	PC-PA2010U	675
Toshiba T4500,T4600,T1900	4MB Card	PC-PA2012U	229
Toshiba T1950 Series	8MB Card	PC-PA2013U	430
	16MB Card	PC-PA2014U	1,150

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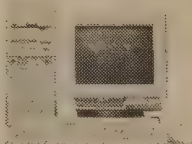
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Internal 96/24 Voice Fax	\$79

MICE

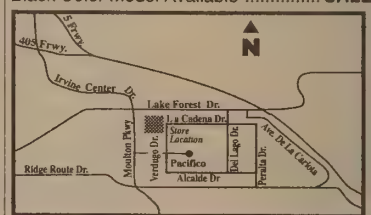
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changing needs of today's heterogeneous and often mobile networks, notably the EtherWave technology for easy connection of laptop computers to Ethernet networks. It also threw something of an obstacle in Adobe's plans to make its Acrobat technology a PostScript-like standard for document handling by marketing its Replica technology and giving away the reader software, a key differentiation over Adobe's pricier product.

BREWSTER KAHLE

PRESIDENT

WIDE AREA INFORMATION SERVERS, INC.

Inventor and architect of the WAIS electronic publishing software now in use across the Internet, Kahle started the commercial WAIS Inc. to exploit the many-to-many publishing opportunities of the Internet. Just as the free WAIS software on the Internet allows users to retrieve information from all over the world, WAIS Inc. seeks to provide an alternative to paper and other cumbersome distribution media for both public and commercial information providers. As the company literature states: "Electronic publishing does not mean a few, proprietary information providers. It means access to related information wherever it might reside, and the opportunity to publish for anyone with something to say." We await future developments with interest.

PHILIPPE KAHN

CHAIRMAN, PRESIDENT, AND CEO

BORLAND INTERNATIONAL

"As long as you delight your customers," said Kahn recently, "it's all right to get criticism from your peers."

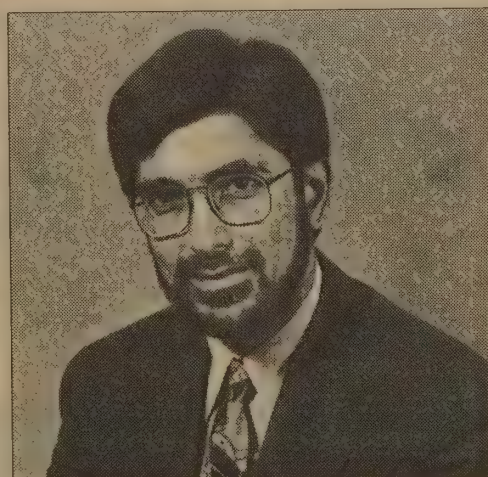
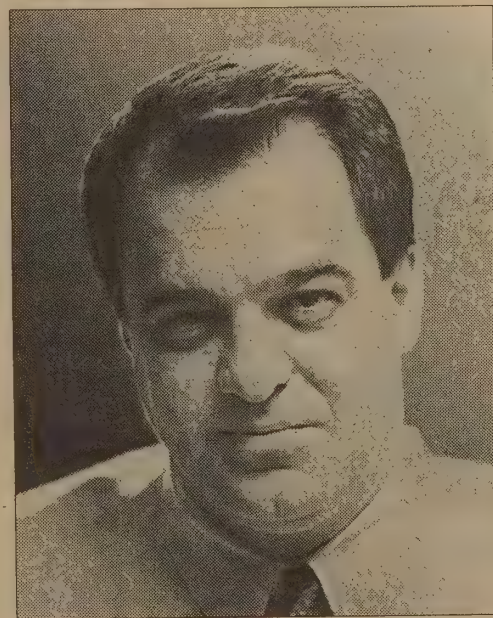
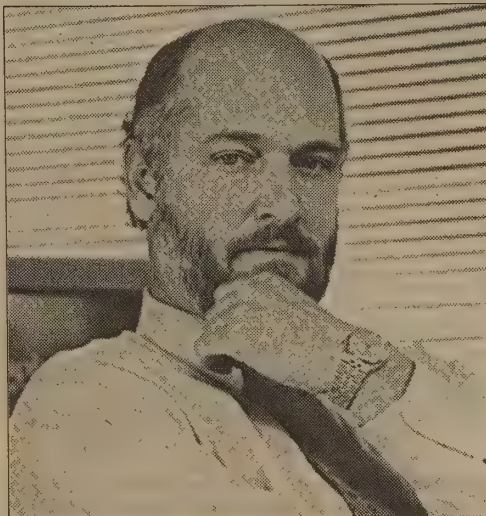
All in all, Borland customers seem to be a pretty happy and numerous lot these days, especially given Kahn's aggressive response to adversity and price wars. No sooner did the Lotus suit go against Borland and Judge Keeton order the recall of all copies of Quattro Pro than Borland shipped a new and noninfringing version. Then, in a quest to attain major market share, they dropped the price to an introductory \$49.95, selling half a million copies within six months.

Kahn's busy positioning his company for what he terms "upsizing"—moving from desktop PCs to networks and client-server environments. Two strong database products and the promising Interbase engine, object-oriented tools offering quicker development cycles, and technology and marketing agreements with leading hardware and software vendors stand to keep Borland a strong contender in new, more complex computing environments.

JUDGE ROBERT KEETON

US DISTRICT COURT

While the merits of his decision are likely to be hotly debated for generations to come, Keeton



Top to bottom: David Liddle, Therese Myers, Safi Qureshey.

ended years of speculation in 1993 by deciding in favor of Lotus and against Borland in the now-legendary look-and-feel lawsuit. The case's full implications will probably not be apparent for years; it may have raised as many questions as it answered, but it has certainly had a profound influence on the design of software with regard to competitors' products.

SAT TARA S. KHALSA

CHAIRMAN AND CEO

INFO NOW

We've probably got a few years to go before we attain the level of VR-based online shopping profiled in *Doonesbury*. Meanwhile, Khalsa is an early adopter of an intermediate approach, in which vendors and customers communicate directly, thanks to a CD-ROM catalog and an 800 number—what Khalsa calls a "virtual store." Currently bundled with PCs from a number of vendors including IBM, InfoNow's discs are a model of just-in-time-ness: they contain encrypted versions of dozens of applications, to which the customer gets the key upon ordering the application from InfoCorp. Khalsa maintains that this distribution approach stands to save corporate America significant expense—he says the processing cost of a purchase order is around \$75–\$100.

BRUCE KOBALL

CHAIRMAN

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In 1993 Chairman Koball put together another stellar event in the ongoing series of CFP conferences, at which law enforcement, civil libertarians, lawyers, hackers, cryptographers, and assorted interest groups weigh the conflicting issues and possible solutions as computer technology changes the way we live and work.

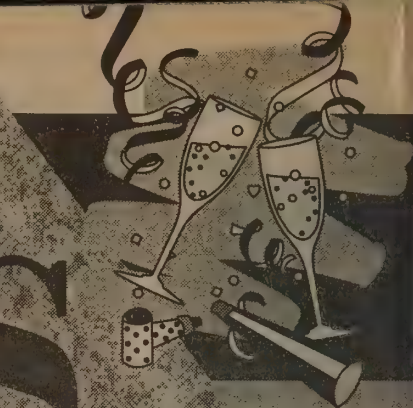
BARRY KORT

"MOULTON"

MICROMUSE

WELL conference czar Gail Williams, who knows a thing or two about online worlds, recommends Kort for this year's list in honor of his work on MicroMUSE, a computer-based universe that's home to a "place" called Cyberion City. A retired network planner with twenty years' experience for such organizations as Bell Labs, NASA, and MITRE, Kort decided to put his skills to work furthering education. As he told Howard Rheingold in *The Virtual Community*, "I knew that if we could create a suitable play space, children would learn at remarkable rates, and they would learn a wide range of skills and subject matter." Since he and collaborator Stan Lim set up MicroMUSE, over two thousand users (children and adults) have come along and studied science in a virtual museum, taken courses at an online university, and other-

MAGICTEK COMPUTERS



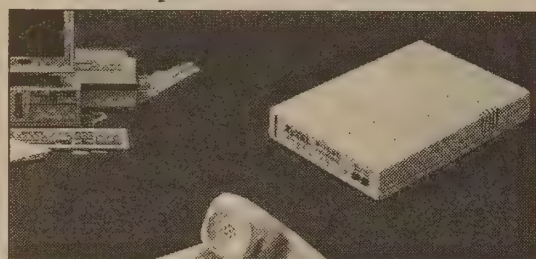
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HP Laser Printer All ModelsCALL

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Maxi-Switch\$32
Fujitsu 4700-601KB38
Focus 200134
BTC 53309SX19
Keytronic BE (Big enter)29
Focus 900059
Focus 7000+ w/Trackball49

CASES:

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Mid Tower w/Digital69
Big Tower w/Digital 230W105
Big Tower w/Digital (10 Spaces) 250UL135

COLORADO TAPE DRIVES:

120MB	.....\$125
250MB	.....170
DC 2120 Tape	.....18
Trakker 250MB	.....355

MOUSE:

Logitech	.....\$49
Microsoft	.....49
Portable Trackball	.....59
Serial Mouse	.....12
DEXXA Mouse	.....22

MEMORY CHIPS/MATH COPROCESSORS CALL

HARD DISK:

MaxtorCALL
ConnerCALL
Western DigitalCALL

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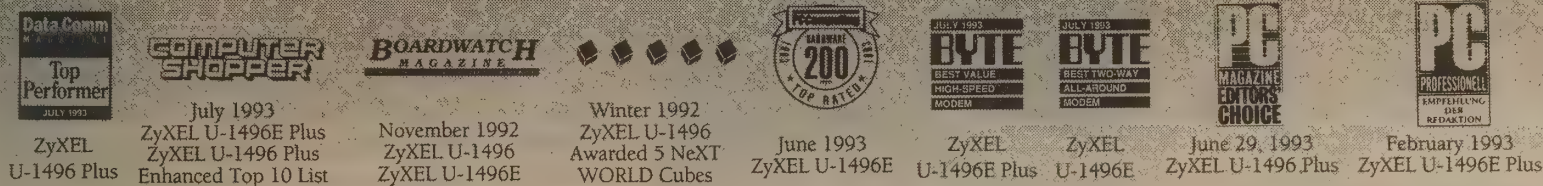
AT I/O w/16550 chip\$32
Adaptec SCSI 1542C195
V-L IDE w/Cache (512K Upgrade to 16.5MB)155
TEAC Floppy Drive (1.2M)	.....49
TEAC Floppy Drive (1.44M)	.....42
V-L IDE I/O Controller	.....29
TEAC 2-in-1	.....120
V-L SCSI Controller	.....165

1 Year Parts & Labor Warranty For Systems

BUSINESS HOURS: Monday-Friday: 9:30 A.M. - 7:00 P.M.
Saturday: 10:00 A.M. - 3:30 P.M.



Everyone's Talking About **ZyXEL**



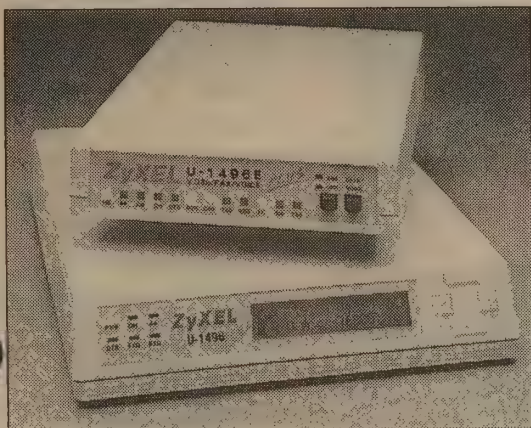
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- Remote Configuration
- All ZyXEL Standard & Intelligent Features

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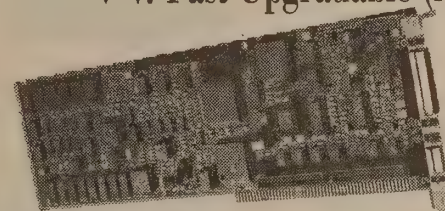
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- ♦ VoiceFax Software in DOS, Mac and Windows Versions
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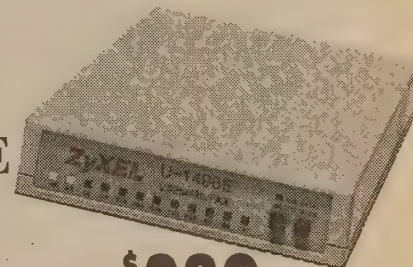
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16 Bit Arcnet/Bus/Coaxial	75
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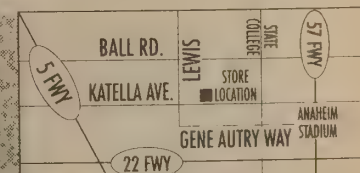
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wise built up everything from shopping malls to amusement parks.

KAI KRAUSE

EXECUTIVE VICE PRESIDENT
HSC SOFTWARE

Special effects expert Krause has become a leading force in the computer graphics world. Aside from unleashing the Kai's Power Tools set of Photoshop enhancements on an unsuspecting populace, he's the driving force behind HSC's pioneering role as an information provider on America Online; the company's forum serves as a vital resource to graphics professionals and eager beginners alike.

A frequent speaker at industry gatherings and a faculty member at the American Film Institute, Krause serves as a continuing impetus for innovation on the artistic side of technology.

ED KROHL

AUTHOR
THE WHOLE INTERNET USER'S GUIDE AND
CATALOG

The book against which all subsequent Internet guides are measured, Krohl's work has emerged as an indispensable reference to beginners and seasoned travelers alike as they venture out on the data highway.

JACKSON LAN

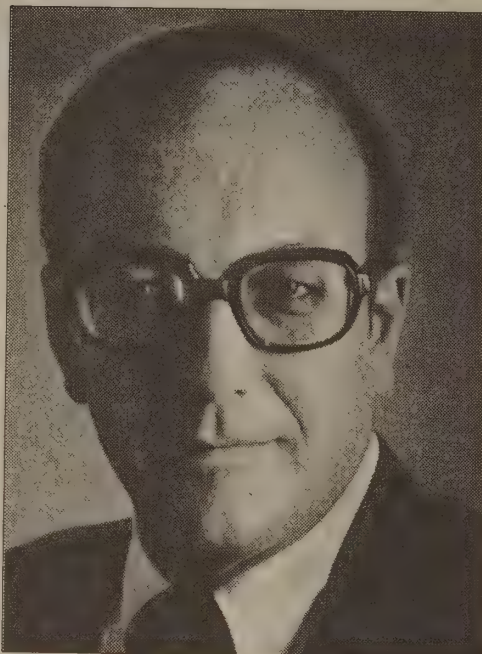
PRESIDENT
SOUTHERN CALIFORNIA CHINESE COMPUTER
ASSOCIATION

No vendor is a island in this industry; working together in mutually beneficial ways is the key to success in the '90s. Jackson, the 1993 president of SCCCA, helped members of the various constituencies in the local PC community, from OEMs and engineers to dealers and VARs, network and build a stronger industry.

GILMAN LOUIE

CHAIRMAN
SPECTRUM HOLOBYTE

Over the last few years Louie's brought his company through some perils worthy of the scarier multimedia dungeons, all the while keeping it at the leading edge in the gaming marketplace. In addition to its longtime bestsellers, the F-16 flight simulators and the Tetris series, Spectrum now goes where no software company has gone before, having entered an exclusive licensing agreement with Paramount Pictures to produce computer games based on *Star Trek: The Next Generation*. With investors ranging from VC firms to AT&T and Paramount, and its recent merger with MicroProse, its former chief rival in the flight simulator arena, Spectrum is well positioned for the coming convergence of technology and entertainment.



JIM MANZI

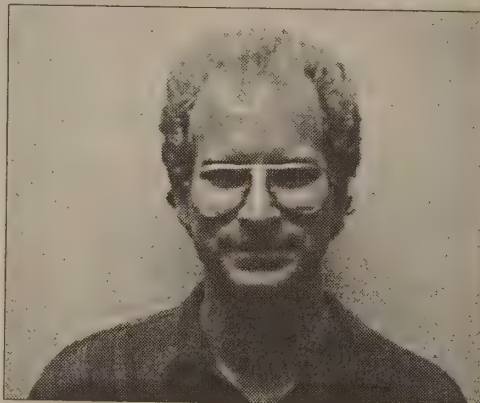
PRESIDENT, CHAIRMAN, AND CEO
LOTUS DEVELOPMENT CORP.

Many software giants of the personal computer revolution became unduly dependent on a single product, failed to change with the times, and disappeared. Manzi has confounded his critics by successfully guiding Lotus through a transition from a spreadsheet company (though 1-2-3 is still doing fine) to a veritable solutions empire. Its Notes software, which Manzi supported through an arduous development process, has become the industry leader in enterprise-wide collaboration, and is becoming a standard across hardware platforms.

MICHAEL MCCONNELL

PRESIDENT AND CEO
SUPERMAC TECHNOLOGY

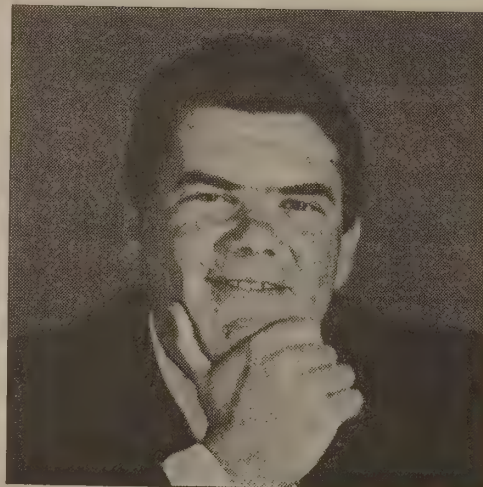
McConnell has led SuperMac to outstanding success in the booming worlds of multimedia and color publishing; its technology such as the VideoSpigot brings unprecedented power and ease of use to graphics and video professionals on both Mac and Windows platforms. McConnell's been able to keep SuperMac growing and profitable while many of his competitors struggle, and appears determined to keep the company on the leading edge—when his marketing VP Steve Blank resigned to start Rocket Science Games, McConnell was quick to invest on SuperMac's behalf, and also to cross-license the video compression technology Rocket Science will be developing for its CD-ROM games.



SCOTT MCNEALY

CHAIRMAN, PRESIDENT, AND CEO
SUN MICROSYSTEMS

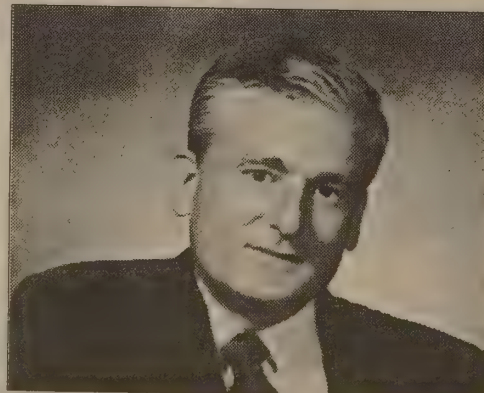
McNealy's kept Sun well ahead of its competitors in the workstation market, with its ever-faster SPARC hardware, its dual-platform Solaris operating system, and strengths in dealing with a multiplicity of networking issues. The company's venerable slogan "the network is the computer" has served to align it well with the trend to ever-greater connection of everything with everything else, and made it the mainstay of government, financial, corporate, and research computing systems.



JOHN MORGRIDGE

CEO
CISCO SYSTEMS

Morgridge has leveraged Cisco's early advantage in router technology to a preeminent position in the explosively expanding network field. The heterogeneous computing environments of today's corporations take advantage of Cisco devices to move data rapidly and seamlessly, and even now a major portion of the bridges on the Internet Data Highway are built by Cisco. Already achieving phenomenal growth and return on investment (the



Top to bottom: Lewis Platt, Brewster Kahle, Philippe Kahn, Robert Kavner.

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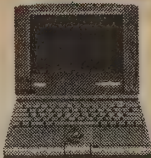


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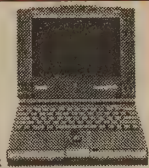
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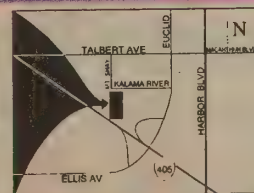
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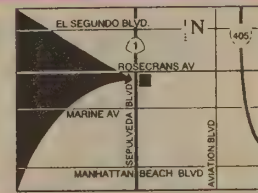


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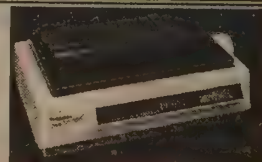
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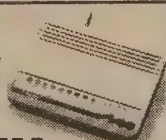


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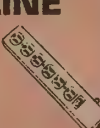
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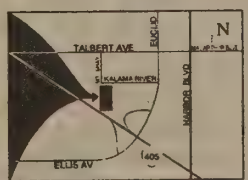
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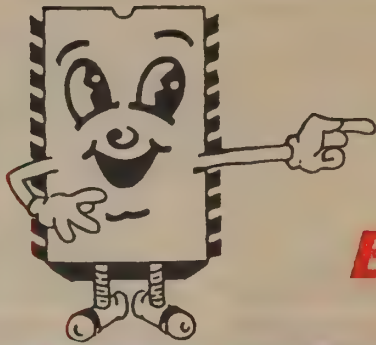
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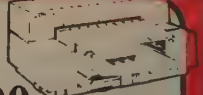


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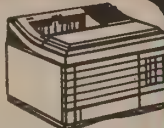
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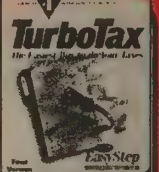
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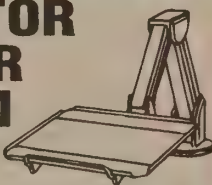
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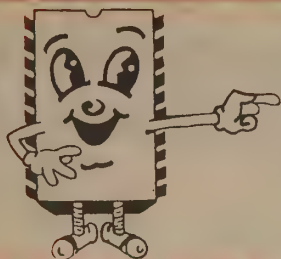
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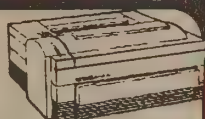
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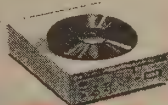
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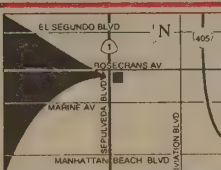
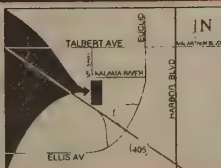
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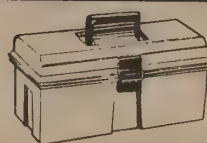


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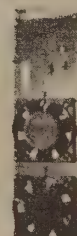


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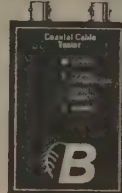
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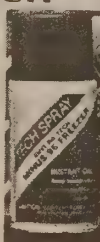
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CCT-1
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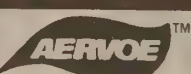
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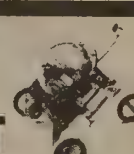
Provides capability of building a standard Appletalk Network for your MAC.



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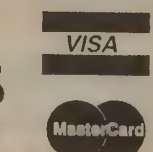
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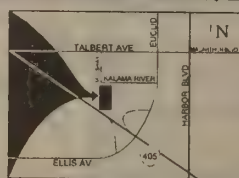
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Continued from page 92

stock's split three times since its IPO in 1990), the company stands to be one of the key architects of tomorrow's networks.

NATHAN MORTON
CHAIRMAN AND CEO
COMPUSA

Giving mail-order companies a run for their money, retail veteran Morton kept expanding CompUSA into more metropolitan areas, making it the undisputed national leader among computer superstores. So far his attention to service and support and his use of sophisticated point-of-sale technology have worked well to keep the retail giant responsive to its customers and market changes, and the company's sales are expected to top \$2 billion in the next year.

THERESE MYERS
PRESIDENT AND CEO

QUARTERDECK OFFICE SYSTEMS

Optimizing the price/performance ratio is an ongoing quest with Myers, who continues to drive Quarterdeck's efforts to provide versatile tools that help individual and networked users get the most out of not-necessarily-state-of-the-art hardware. In addition to the time-honored DESQview and QEMM tools for the DOS environment, the company is facilitating the migration of DOS users into multivendor environments with its DESQview-X products, which lets DOS machines operate as terminals on a UNIX XWindows network.

NEWTON TEAM

APPLE COMPUTER

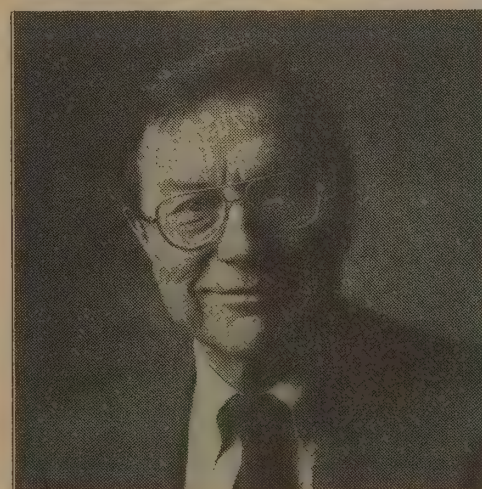
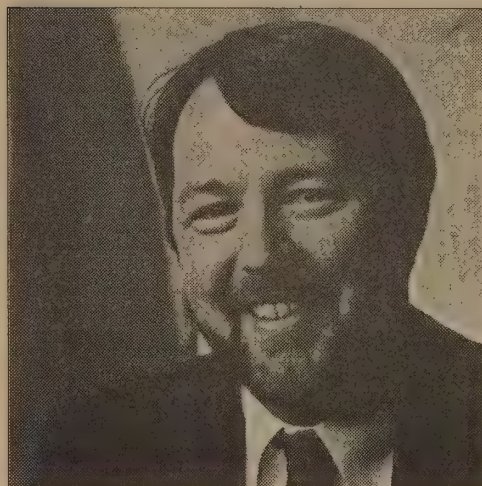
Like a number of significant developments of 1993, the Newton evolved over several years and required the intense collaboration of hundreds of people. Not unlike the Macintosh, it came to market in a form that was a considerable departure from its original concept; not unlike the Macintosh, it's the product of passionate fervor and zeal. It remains to be seen whether the hopes Apple's pinned on the technology will come to fruition, but in true Apple fashion, the hearts-and-minds campaign has been so successful that PDA users are frequently greeted with questions about their "Newton."

RAY NOORDA

CHAIRMAN, PRESIDENT, AND CEO

NOVELL

While the 69-year-old Noorda, who built Novell from near-ruin to the industry leader in networking, might initially seem an unlikely candidate for pitched battle with Bill Gates in the OS wars, he's been deliberately assembling strategic components to augment the company's historic strengths in LANs. In one of 1993's most startling acquisitions, Novell bought the UNIX operating system from AT&T, thereby presenting a formidable chal-



Top to bottom: Reese Jones, Trip Hawkins, Alain Rossman, Ray Noorda.

lenge to Windows NT before it ever shipped, and late in the year announced a new version of its Digital Research-created DOS to compete with the MS variety. It remains to be seen whether these disparate pieces can be effectively combined into a Microsoft killer or even a slower-down of Microsoft momentum, but Noorda's been surprising people for years now.

JOHN NORSTAD

AUTHOR

DISINFECTANT

Macintosh users sleep better and spend less money thanks to the tireless efforts of Norstad, who keeps his virus-killer updated at a rate that's the envy of commercial antivirus vendors, and best of all makes the program available for free, so people can pass it around without worrying about the tap on the shoulder from the Software Police.

ROBERT PALMER

PRESIDENT AND CEO

DIGITAL EQUIPMENT CORPORATION

Taking over DEC from ousted founder Ken Olsen, Palmer was faced with the awesome task of turning around a company with some good technology and quarterly losses in the hundreds of millions. While it's not out of danger yet, Palmer's made good progress in cutting losses and moving DEC's product line from the outmoded VAX technology to the super-fast Alpha chip, as well as collaborating far more closely with third-party software vendors than had been DEC's historic practice.

ECKHARD PFEIFFER

PRESIDENT AND CEO

COMPAQ

Pfeiffer has done a phenomenally effective job of reversing the lagging fortunes of Compaq, which was badly damaged by price wars and dropping margins of the recent past. He's pioneered a new level of customer responsiveness, with an excellent support program and a product line to address markets from MIS to budget-minded consumers, and the company's soaring bottom line shows the result.

LEWIS PLATT

CHAIRMAN, PRESIDENT, AND CEO

HEWLETT-PACKARD

Platt became president and CEO of HP in 1992, replacing the retiring John Young. In 1993 cofounder David Packard retired as chairman, and Platt became the first nonfounder to assume that role as well. During his tenure so far he's proved a strong and respected leader, keeping the company on an aggressive course of renewed innovation and excellence on platforms ranging from workstations (where HP's systems are once again posing a formidable challenge to Sun) to palmtops and notebook computers.

JERRY POURNELLE

COLUMNIST AND AUTHOR

The outspoken and often cantankerous Pournelle remains a reliable source of information to computer users in his *Byte* column, in which the differences between a product's alleged awesome features and actual performance often come to ignominious light. He also takes an active interest in the less mundane applications of technology, from the space program on which he's often advised the government to the science fiction world, in which he's a prolific author.

LAWRENCE PROBST

PRESIDENT AND CEO

ELECTRONIC ARTS

Relatively few game companies that were successful in the early days of the personal computer revolution have been nimble enough to survive the wild fluctuations of the home entertainment market, but Probst has managed to keep Electronic Arts in a leading position. The largest interactive entertainment company in the US, EA has prospered not only because of its market-savvy title development but its ability to anticipate platform shifts. After taking advantage of the wild popularity of cartridge games, Probst now has EA poised on the brink of the CD-ROM revolution, ready to deliver even more high-powered entertainment to throngs of eager consumers.

SAFI QURESHEY

PRESIDENT AND CEO

AST RESEARCH

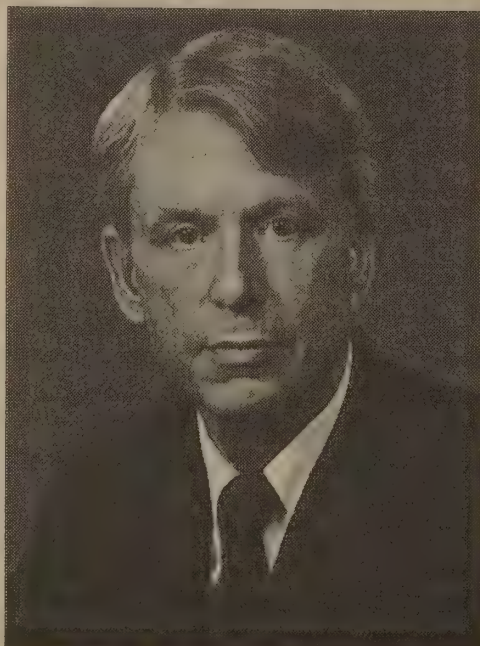
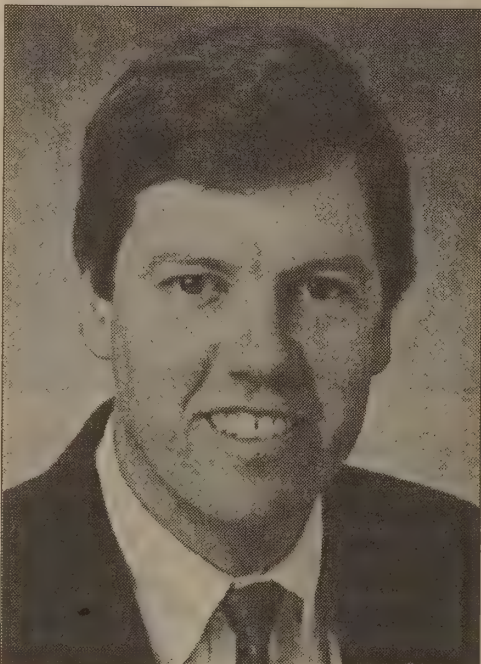
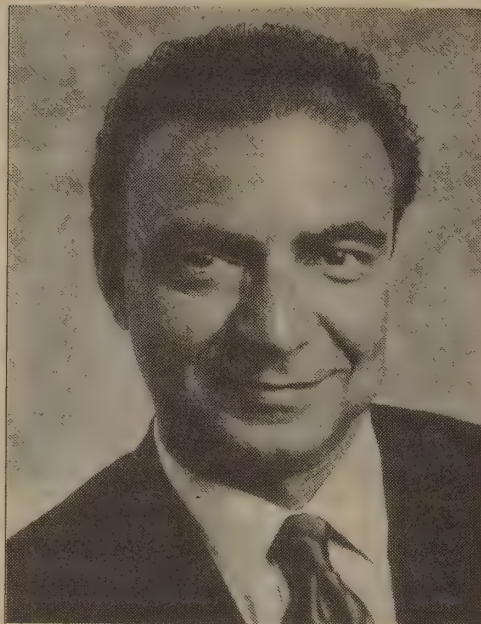
Qureshey laid to rest the oft-expressed doubts about his ability to run AST in the wake of his cofounders' departures, continuing the company's longtime practice of innovation and adaptability to market trends. In what was undoubtedly his most dramatic move of 1993, he acquired the PC manufacturing operations of Tandy, thereby making AST the fourth-largest computer manufacturer in the US and the sixth-largest in the world. While it remains to be seen what Qureshey will make of these new holdings, which include not only Tandy but GRiD and Victor as well as the Zoomer technology, he's certainly well positioned to take advantage of emerging trends in mobile computing.

HOWARD RHEINGOLD

AUTHOR

THE VIRTUAL COMMUNITY

As the Internet found its way into the mass media last year, books proliferated on dealing with its technical complexities. *Whole Earth Review* editor Rheingold found and told a different story—the human side, the relationships and events that wouldn't have existed without computer-based networks. In reading about sick children, dramatically organized disaster intervention, serendipitous



Top to bottom: Paul Jain, Scott McNealy, Jonathan Seybold.

collaborations, and passionate feuds, we discover that online interaction holds media-dependent possibilities and limitations, but in the end is fraught with the same human issues as the face-to-face version.

JACK RICKARD

EDITOR AND PUBLISHER

BOARDWATCH

The outspoken and opinionated Rickard continues to publish the indispensable resource for the online community. As more and more people come to terms with the data highway, *Boardwatch* provides the latest coverage of technical, legal, and cultural issues, and Rickard, in fine BBS fashion, both enlightens his readers and keeps them on their toes with lively arguments.

T.J. RODGERS

PRESIDENT AND CEO

CYPRESS SEMICONDUCTOR

The flamboyant Rodgers has probably garnered more attention lately for his take-no-prisoners management style and pronouncements thereon than for his company's technology. (*Fortune*, for example, recently gave him a prominent position in its list of Toughest Bosses.) Furthermore, he's not averse to suggesting how the country should be run to anyone who'll listen.

Nonetheless, after a year of rocky reorg in 1992, Rodgers' style and skills are clearly good for Cypress, which enjoyed success in targeted niche markets and expanded into mass markets by supplying cache memory modules for IBM's ValuePoint line. In a move Rodgers explained as part of a continuing strategy to expand into the broad personal computer market, Cypress also is in the process of acquiring IC Designs, whose specialized components are used by leading PC vendors worldwide.

JERRY ROGERS

PRESIDENT AND CEO

TOM BRIGHTMAN

VICE PRESIDENT OF BUSINESS AND TECHNOLOGY

CYRIX

It takes a liberal dose of both technical expertise and chutzpah to position one's company as "the intelligent alternative to Intel," but newcomer Cyrix, which went public in July, has managed to find wide acceptance in the OEM arena with its specialized Intel-compatible chips. A number of 486-compatible chips shipped in 1993 were especially well received in the notebook and upgrade markets.

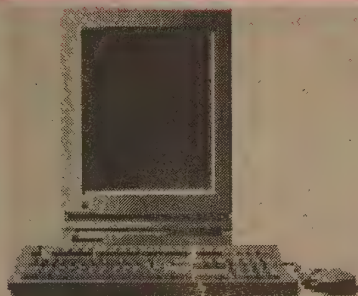
Cofounders Rogers and Brightman, both microprocessor-industry veterans, pioneered new technologies that allowed significant savings by enabling the testing of software compatibility and other crucial factors at the design stage, a factor



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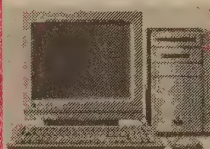


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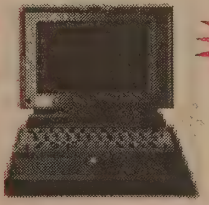


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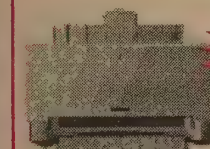


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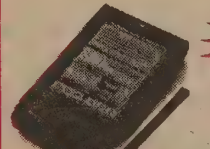


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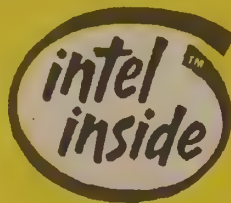
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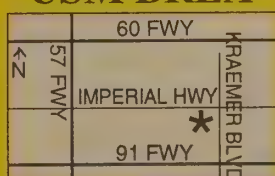


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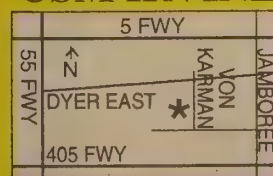
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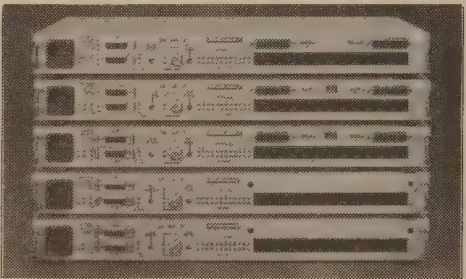
Intel Ether Express \$57

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Vesa Local Bus Windows Accelerator	\$95
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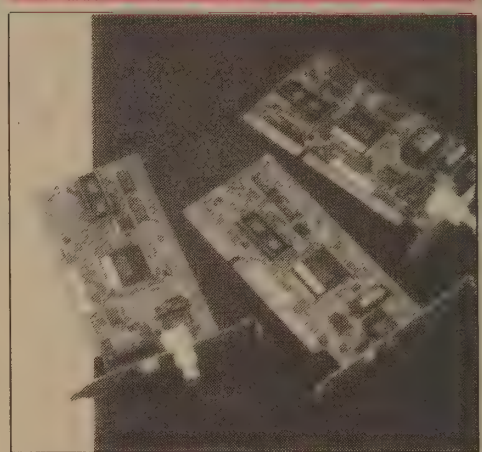
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that allows Cyrix to develop new chips in greatly reduced time and further shorten product cycles.

HEIDI ROIZEN
CEO

T/MAKER

Roizen's taken T/Maker through an impressive paradigm shift in the last year. After discovering in 1992 that sales of the clip art package FaxMania exceeded the sales of the new version of WriteNow by a considerable margin, she and the company's management set about repositioning it as a content provider rather than an application vendor.

After divesting itself of WriteNow early in the year, T/Maker proceeded to make great strides in its chosen direction, shipping graphics content software in product lines aimed at the professional and consumer markets. The company also shipped its first interactive CD-ROM, the edutainment "book" Four-Footed Friends. Friends is the first in a series of titles to be created around T/Maker's ZoomBook Interactivator! multimedia interface.

LOUIS ROSSETTO

PUBLISHER AND EDITOR-IN-CHIEF

JANE METCALFE

PRESIDENT

WIRED

Since *Wired's* hype-and-skepticism-ridden launch in January 1993, Rossetto and Metcalfe have not only confounded the naysayers by making a slick digital-lifestyle magazine profitable, they've made technology positively trendy in formerly nerd-intolerant circles. Technologies, cultures, and ideas converge with a vengeance in *Wired's* evolving rave-on-a-page format, and if the lines sometimes blur between content, style, and attitude, well, to invoke the magazine's patron saint Marshall McLuhan, the medium is the message.

ALAIN ROSSMAN

PRESIDENT AND CEO

EO

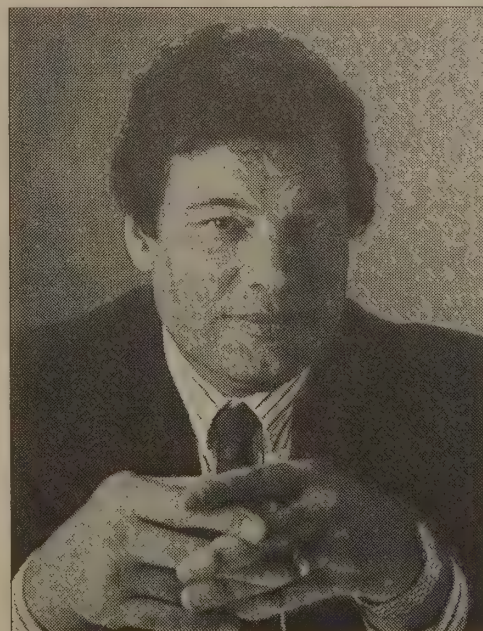
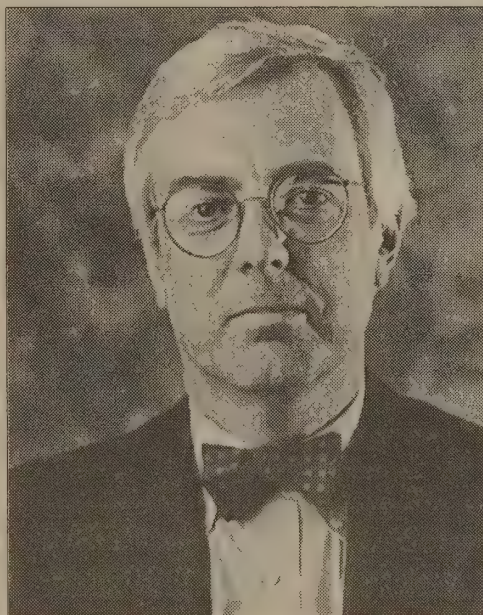
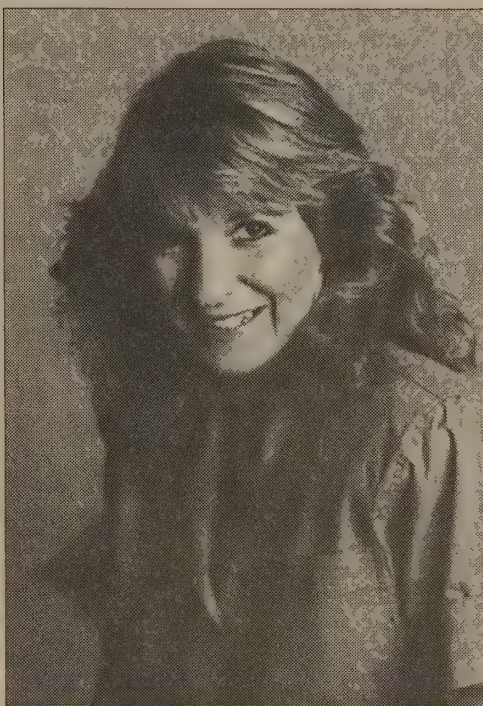
Rossmann has steered EO through an eventful year in which it shipped its first Personal Communicators, merged with pen-based OS developer GO, and was acquired by AT&T, one of its major investors, which is now marketing the Communicators under its own name. As Rossman himself admits, it remains to be seen what uses customers will find for the brand of tetherless mobile communication that EO represents, but the company's in an excellent strategic position to take advantage of the emerging market.

NICHOLAS A. SAMUEL

CHAIRMAN AND CEO

INSIGNIA SOLUTIONS

Samuel's been able to build a strong company by addressing a crucial need of heterogeneous com-



Top to bottom: Heidi Roizen, Dick Shaffer, Michael Spindler.

puter environments—the running of DOS and Windows packages on Macintosh and other non-Intel platforms. Critics argue about the performance downside of software emulators, but for thousands of users the SoftPC products have given them the affordable option of keeping their hardware platform of choice while running the software program of necessity.

TED SELKER

MANAGER, USER SYSTEMS ERGONOMICS RESEARCH
IBM ALMADEN RESEARCH CENTER

Reader Michael Mosher brings Dr. Selker to our attention for the significant feat of designing the TrackPoint II, an in-keyboard pointing device featured on many of IBM's ThinkPad computers. More than an alternative to a mouse or trackball, the TrackPoint II allows users to integrate typing and pointing seamlessly, without lifting their hands from the keyboard. This results in better ergonomics and enhanced productivity.

We're happy to take Mr. Mosher up on his suggestion and send Dr. Selker a hearty round of applause.

JONATHAN SEYBOLD

PRESIDENT

SEYBOLD SEMINARS

As computer-based publishing comes to encompass virtually all forms of human expression, Seybold brings together the key people and asks the tough questions that need to be addressed, from technology standards to legal issues. His Digital World and publishing expos serve as a mecca for print and multimedia professionals trying to keep up with the latest hardware, software, and connections.

DICK SHAFFER

PRINCIPAL

TECHNOLOGIC PARTNERS

A mecca for the investment and analyst communities, Shaffer's conferences provide a unique opportunity to discover new technologies and analyze emerging trends, as well as form companies and make deals. Shaffer's shrewd analysis cuts through market-department slogans and takes a no-nonsense view of the rollercoaster world of technology, and serves as an invaluable asset to the entrepreneur.

MICHAEL SLATER

EDITOR AND PUBLISHER

MICROPROCESSOR REPORT, MICROSYSTEMS

INSIDER

Slater and his band of technical experts provide the industry with reliable, up-to-date analysis of the silicon industry. They offer inside-track technical information on the strengths and weaknesses of new technologies, as well as their suitability for emerging computing environments. For designers

and vendors in the upcoming platform wars, Slater's publications are a vital survival guide.

MICHAEL SPINDLER

CHAIRMAN, PRESIDENT, AND CEO

APPLE COMPUTER

Longtime Apple employee Spindler assumed full charge of the company in the summer of 1993 after the much-ballyhooed ouster of John Sculley. While it's clearly too soon to tell what influence he'll have on the company's long-term direction, the short-term results bear out his reputation for balancing advanced technology and market responsiveness, as Mac prices keep falling, Windows makes its way to Mac on Houdini boards, and Power PC awaits its impatient audience.

ROBERT DAVID STEELE

PRESIDENT

OPEN SOURCES SOLUTIONS

The intelligence-gathering branch of the government was probably most in evidence this year in its probably-doomed efforts to keep strong cryptography out of the hands of the general populace. This, however, is a relatively small symptom of a much larger phenomenon—as the Tofflers explain in *War and Anti-War*, the military and intelligence communities are experiencing about the same level of culture shock moving into the information age as the rest of us.

With long experience in the military and diplomatic sectors, Steele has been able to put together what's probably the most interesting cross-cultural event in computerdom right now—the Open Sources conferences in Washington, DC, at which vendors hawk the latest in high-tech intelligence-gathering wares, and an audience of top research, law enforcement, and military types from around the world chats with lawyers, hackers, and journalists. Presentations at this year's conference included a youthful-but-senior official of the Croatian government explaining his country's conviction that Internet connectivity is vital to its future, military types daring to raise the notion that they often get timelier information from CNN than from that expensive top-secret report, attorneys suggesting impending changes in intellectual property laws, and other issues being confronted in our world of rapidly shifting borders.

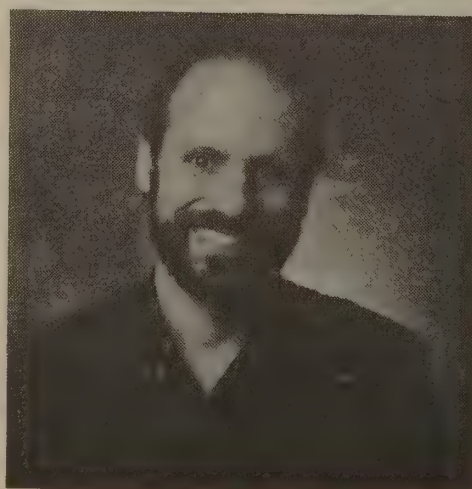
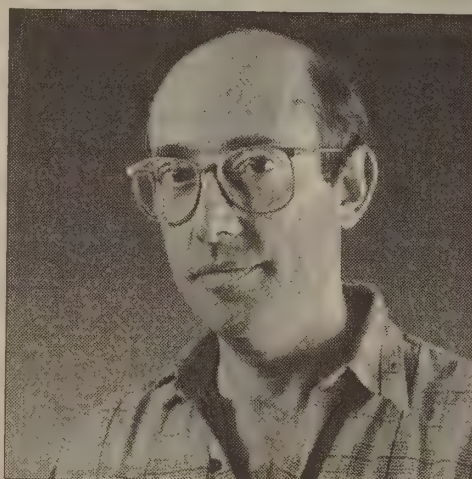
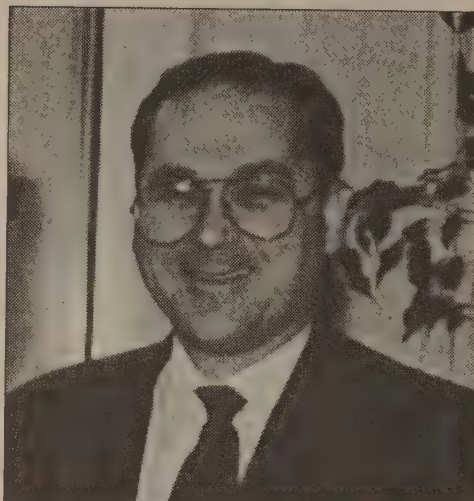
ROBERT STEIN

JONATHAN TURELL

COFOUNDERS

THE VOYAGER COMPANY

As computer technology evolves away from being an end in itself toward serving as a window on digital information, Stein and Turell have led the way in providing state-of-the-art digital content. While Silicon Valley and Hollywood try to figure out useful alliances, Stein, who oversees product develop-



Top to bottom: Robert Steele, Robert Stein, Alex Vieux, Ted Selker.

ment, and Turell, who focuses on acquisition and licensing, already have a healthy range of titles combining the best of technology and showbiz: the Criterion Collection of annotated films on laserdisc; the Expanded Books series of best-selling books with enhanced linking and search features; and a host of CD-ROM titles ranging from the pioneering Beethoven: Symphony No. 9 to a full-length version of *A Hard Day's Night*. Collaborating with distinguished authors and artists ranging from Spike Lee to Marvin Minsky to The Residents, Voyager appears likely to combat digital vacuity for years to come.

NEAL STEPHENSON

AUTHOR

SNOW CRASH

Long before the spreadsheet, science fiction was an important visualization tool. In *Snow Crash*, one of the year's most widely read and thought-provoking books, Stephenson creates an all-too-plausible scenario of artificial reality in the Metaverse, a digital world in a constant state of line-blurring with its analog counterpart. By the time you've been through its horrifyingly engaging adventures, you've developed a new appreciation for unsuspected aspects of human-computer interaction and lost any sense you may have had of multimedia as a panacea.

Snow Crash itself started out as a multimedia project, but the state of technology at the time convinced Stephenson that text was the proper medium in which to tell the story. This is not to say that some enterprising developer won't have some ideas on the subject, however.

ALEX VIEUX

CHAIRMAN

ETRE/ATRE CONFERENCES

Global data highways are becoming increasingly efficient, but global business collaboration often lags behind. Vieux effectively catalyzes mutual understanding and business development with the ETRE and ATRE conferences in Europe and Asia, allowing the leaders of the world's high-tech companies to meet, share views, and develop strategic plans in their mutual interests.

VERNOR VINGE

AUTHOR

A FIRE UPON THE DEEP

Vinge, a computer scientist and professor at San Diego State, won a Hugo Award for this epic, and well deserved it was, too. Most of the technology and events portrayed therein take place well outside this magazine's normal frame of reference, at least until they emerge in the interactive computerized version.

But, especially since 1993 was the year in which the Internet became a media darling, we feel compelled to salute Vinge for his masterful

Continued...

The CALIFORNIA COMPUTER The CALIFORNIA

Does The Name NANA O Ring A Bell To You?

NANA O flexscan F780i-W

- 21", Full flat screen CRT
- NEW power save feature
- Ultra High Resolution
- 1600 x 1200 flicker-free 77Hz refresh
- .26 mm Dot Pitch
- Ergonomic standard MPR-II
- VESA DPMS

New
\$Call

NANA O flexscan F760i-W

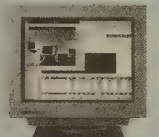
- 21", Full flat screen CRT
- NEW power save feature
- Microprocessor pic & color control
- 1280 x 1024 flicker-free 72Hz refresh
- Ergonomic standard MPR-II
- 30-78kHz H. scan/ 55-90Hz V. Scan
- 120 MHz Video bandwidth



\$2095

NANA O Trinitron T660i

- Trinitron 20" screen 0.31mm
- Up to 1664 x 1200 resolution
- 1280 x 1024 flicker-free 70Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation



\$2350

NANA O flexscan F560i-W

- 17", Full flat screen Invar Shadow Mask
- Ultra high resolution, .26 Dot Pitch
- 65kHz H.scan frequency with 76Hz high refresh rate for flicker-free 1280 dots x 1024 lines resolution
- Advanced Image Control for automatic picture adjustment and color control
- Low magnetic field and electric field radiation



\$1495

NANA O flexscan F550i

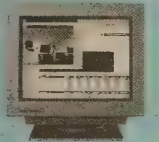
- 17", Full flat screen
- Up to 1280 x 1024
- 1024 x 768 at flicker-free 75Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation



\$995

NANA O Trinitron T560i

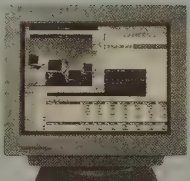
- Trinitron 17" screen 0.26mm
- Up to 1664 x 1200 resolution
- 1280 x 1024 flicker-free 70Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation



\$1675

NANA O flexscan F550i-W

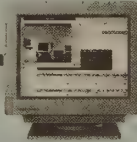
- 17", Full flat screen Invar Shadow Mask
- Ultra high resolution and wide usage with auto-adjusting H. scan frequencies from 30 kHz to 65kHz
- 65kHz H.scan frequency with 75Hz high refresh rate for flicker-free 768 dots x 1024 lines resolution
- Advanced Image Control for automatic picture adjustment and color control
- Low magnetic field and electric field radiation



\$1095

NANA O flexscan 9080i

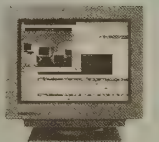
- 16", 1280 dots x 1024 lines, Non-interlaced
- 75Hz high refresh, flicker-free 1024 dots x 768 lines resolution
- A microprocessor-based digital control system for automatic picture adjustment
- Low frequency magnetic induction and magnetic radiation



\$670

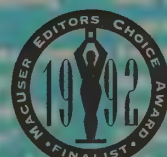
NANA O flexscan F340i-W

- 15", Full flat screen
- New power save feature
- 1024 x 768 at flicker-free 75Hz refresh
- Microprocessor control for pic. & color
- Low magnetic & electricfield radiation



\$675

AWARDS



NANA O flexscan F550i

2nd Inventory
17 inch, Full flat screen



\$795

NANA O

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Distributed by CAD MICRO

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COMPUTER



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Ask About Our 90 Day Same as Cash

The CALIFORNIA COMPUTER The CALIFORN

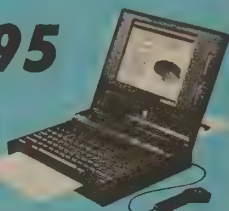
World-Class Portable Power

Canon

Notejet 486
**Bubble Jet Printer
BUILT-IN TWO-IN-ONE!**

- 486SLC-25 Mhz
- 4MB Up to 12MB
- 1.44MB Floppy Drive
- 85MB Hard Disk (190MB Option)
- Bubble Jet Printer Built-In
- Automatic Sheet Feeder Built-In
- 10" LCD VGA Screen
- Canon 2-Button Hand Held Trackball
- MS DOS 6.0, WINDOWS 3.1
- 4 Hour Battery
- 7.7 Lbs. w/Bubble Jet Printer Inside

\$2195



Canon

INNOVA 486 TX
Active Color 4hr

- Intel 486SL-25Mhz (Low Power) W/Math-Co
- 4Mb RAM up to 20Mb
- 3.5" 1.44Mb Floppy Drive
- 120Mb Hard Disk (Removable)
- Build-in Trackball Mouse in Center
- SMI Power Saving
- PCMCIA Type III Slot
- 1 Serial, Parallel, Keyboard, VGA, Mouse
- 9.5" TFT Active Color 640x 480, Ext. 1024 x 768
- Weight: 6.7lbs W/Battery
- MS-DOS 6.0, Windows 3.1, Works, Preload.



\$3425

Canon

- Intel 486SX-25
- 4MB RAM
- 120Mb Hard Disk
- 3.5" 1.44Mb Floppy Drive
- 9.5" Mono Passive LCD 640 x 480, 640 x 480
- 9.5" Dual Scan Color Passive LCD 640 x 480
- 1 Serial, Parallel, VGA, Mouse, Fax/Modem 9600/2400 (Send/Receive)
- Build-In Trackball mouse in center
- Weight: 6.3lbs W/battery
- MS-DOS 6.0, Windows 3.1, MS-Works, Micro Fax Preload

DUAL-400 SERIES

Active-Matrix Color

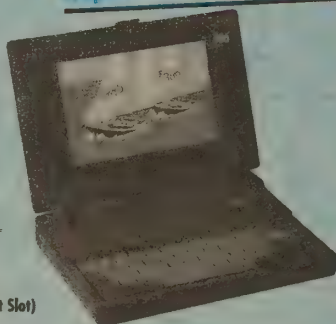
Removable Hard Drive

PCMCIA*

- Intel 486 series CPU (Easy to Upgrade)
- 4MB RAM, Easy to Expand up to 20MB
- Removable 120MB Hard Disk (80,200MB)
- 3.5" 1.44MB Floppy Drive
- 9.5" Mono 640 x 480 Backlit 64 Gray (Upgrade to Color LCD)
- 9.5" Passive Color 640 x 480, 256 color
- 9.5" Active Color 640 x 480, 512 color
- Simultaneous CRT & LCD Operation
- Ports for IS, 1P, Ext VGA Monitor/Keyboard
- Ports for AT expansion box
- 83-Key Keyboard
- Carrying Case & AC/Adapter
- Weight 6 lbs. with Battery
- 11.7"W x 8.4"D x 1.95"H

**OPTIONAL MODULE PACK
AND OTHER OPTIONS:**

- Trackball (Standard) Module
- Fax/Modem (9600/2400bps) Module
- Lan Adapter Module / 2nd Serial Port Module
- PCMCIA* Type II Interface Module
- Scanner Module / SCSI Module
- AT Expansion Box (Four 16-bit Slots & One 8-bit Slot)



	MONO	DUAL SCAN COLOR	ACTIVE COLOR
486SX-33, 4MB/120MB	\$1695	\$2245	\$3210
486DX-33, 4MB/120MB	\$1765	\$2375	\$3350
486DX2-66, 4MB/120MB	\$1995	\$2605	\$3580

NP-800

**LOCAL-BUS
NOTEBOOK**

PCMCIA

- Intel 486DX-33 Upgrade to 66
- 4MB RAM up to 20MB
- 120MB Hard Disk (200MB Option)
- 10" Mono 640x480 Backlit LCD
- 10" Color Passive/Active screen
- Two PCMCIA II Slots or one PCMCIA III
- Built-in Track Ball Mouse, Weight 6.1 lb.
- Carrying Case AC/DC Adapter

	MONO	DUAL SCAN	ACTIVE COLOR
486SX-25 4MB/120MB	\$1635	\$2250	\$3395
486DX-33 4MB/120MB	\$1810	\$2425	\$3570
486DX2-66 4MB/120MB	\$2050	\$2695	\$3875



Canon

**Bubble Jet
BJ-10sx**

- 110 Characters Per Second
- Laser-Like Printer
- 2-Year Warranty



Call

Canon

**The Bigger, Better
Budget Minded BJ-230**

- Handles A Variety Of Paper Sizes Up To 11" x 17"
- Fast Letter-Wide Printing
- 2-Year Limited Warranty



\$395

Canon

BJ-200

- 4 Page Per Min., 360 DPI
- 100 Sheets or 10 Envelopes
- EPSON & IBM Emulation
- 49KB Buffer, Weight 6.6 lb
- 2 Year Factory Warranty

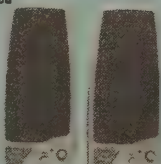
**Internal 9600/2400 bps
Voice Fax Modem
Smart Answering, Smart Fax**



\$99

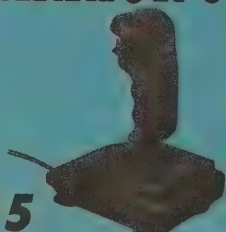
**Bass Boost
Tower Speakers**

- Individual Volume Controls
- Built-in Power AMP.
- Power on/off Led
- Two Tweeters



\$29

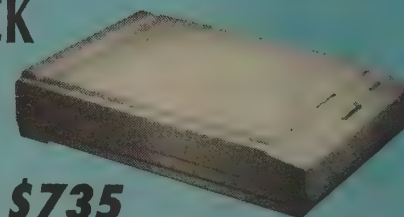
WARRIOR 5



\$15

**ColorScanner Model 6000C
TAMARACK**

- Max. Resolution 1200 dpi
- 24-bit 16 million color
- Gray scale line art
- TWAIN compatible with color shop software
- SCSI controller card



\$735

**Practical Peripherals
Pocket Size Fax/Modem
9600/2400 bps**



\$95

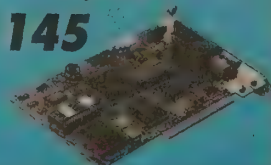
**14.4K Ext. Fax/Modem
V.32, V.32bis
V.42, V.42bis
w/NMP5**

\$195

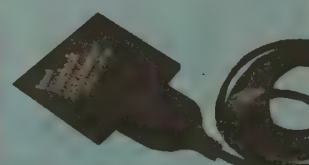


**14.4K Int. Fax/Modem
V.32, V.32bis
V.42, V.42bis
w/NMP5**

\$145



**PCMCIA 14.4K
Fax/Modem**



\$365

**PCMCIA 96/2400
Fax/Modem**



\$185

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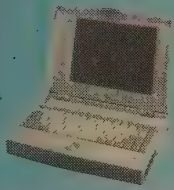
Ask About Our 90 Day Same

IA COMPUTER The CALIFORNIA COMPUTER

From California Computer



Dual Scan Color



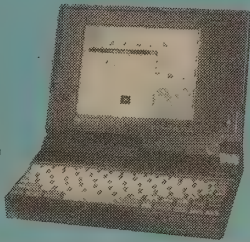
	MONO	Dual Scan Color
486SX-25 4MB, 120MB	\$1655	\$2295

EPSON 486SLC-33 Sub notebook

Removable Hard Drive PCMCIA

- 4Mb RAM, 1K cache
- Ext. 1.44Mb Floppy Drive
- 80/120Mb Hard Disk Removable
- PCMCIA Type II slot
- 7.5" Mono LCD Passive 640 x 480, 64 gray
- Build-in 2 button Trackball mouse
- 1 Serial programmable, Parallel, Mouse, VGA, Keyboard Port
- 79/80-key keyboard
- Lightweight: 3.85lbs
- Small: 1.5" x 10" x 7.6"
- MS-DOS6.0, Windows 3.1 Preload
- One Year Road Service In U.S.

\$Call

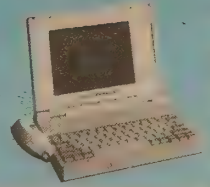


EPSON ActionNote 4SLC/33

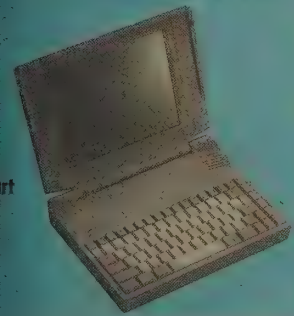
Removable Hard Drive

- 486 SLC/33
- 4Mb RAM, 1K cache
- 1.44Mb Floppy Drive
- 80/120/180Mb HD
- 10" Mono LCD Passive 640 x 480, 64 gray
- Logitech Trackman Trackball Mouse
- 2 Serial programmable, Parallel, Mouse, VGA, Keyboard, Fax/Modem Port
- 79/80-key keyboard
- Lightweight: 5.5lbs
- Small: 1.5" x 10" x 7.6"
- MS-DOS6.0, Windows 3.1, WinFax Lite & BitCom Preload
- One Year On-Site Service In U.S.

\$1655



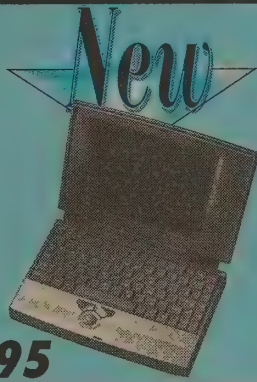
486SLC-25MHz



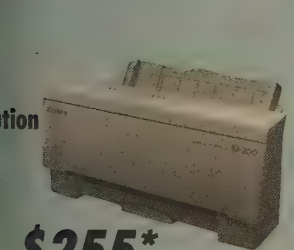
NP-602

- 486SLC-33
- 4Mb RAM, 64K cache
- 1.44Mb Floppy Drive
- 120Mb HD Removable
- 10" Mono LCD Passive 640 x 480, 64 gray
- Build-in Trackball Mouse
- 1 Serial, Parallel, Mouse, VGA(800 x 600), Keyboard, Port
- 83-key keyboard
- Lightweight: 5.5lbs
- Dimensions: 8.7" x 11.1" x 1.65"

\$1395



LASER QUALITY Bubble JET PRIC



\$255*
After Rebate

Canon BJC-600 PERSONAL COLOR PRINTER

- Prints 360 dpi on Plain Paper for Brilliant Color Quality
- Doubles as a Laser Quality, Black & White Printer
- Individual Ink Cartridges
- 100 Sheet Feeder for Letter, Legal, Envelopes
- 20 Scalable True Type Font
- 2 Year Warranty

\$585



PRO-5000 SERIES PCMCIA

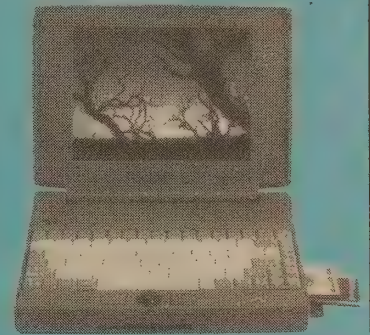
Docking Station*

Local Bus Video

Removable Hard Drive

- Intel 486SX-25 upgradable 486DX2-66
- 4Mb RAM up to 32Mb
- 3.5" 1.44Mb Floppy Drive
- 120Mb Hard Disk (Removable) up to 340Mb*
- Build-in Trackball mouse in center
- PCMCIA Type III Slot
- 2 Serial, 1 Parallel, VGA, Mouse Keyboard, Docking Port
- 9.5" Mono/Passive/Active 640 x 480, 64 Gray
- Ext. 1024 x 768 W/1Mb RAM
- Weight: 5.8lb W/battery
- MS-DOS 6.0, Windows 3.1 Preload

*Upgrade to 340MB \$350
Upgrade to 200MB \$150



	MONO	DUAL SCAN	ACTIVE COLOR
486SX-25, 4MB, 120MB	\$1785	\$2395	\$3295
486DX-33, 4MB, 120MB	\$1925	\$2535	\$3435
486DX2-66, 4MB, 120MB	\$2235	\$2845	\$3645

GrayScanner ScanPlus

- Full Page Sheet Feed
- 300 dpi Gray scale/Line Art
- OCR WordScan software
- Compact, Light weight

\$425

Canon LBP-430 LASER PRINTER

Same as HP 4L

- Energy Saving
- 22 Fonts (8 Scalable)
- 1Mb up to 5Mb
- 2 Year Warranty

\$585



Pocket Ethernet Adapter Combines 10 Base-T & 10 Base-2

\$175



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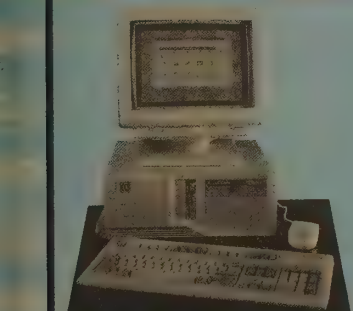
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NANAO

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Panasonic

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All systems come with 245 MB hard drive, 4 MB RAM, TEAC 1.2 & 1.44 MB floppy drives, 14" SVGA monitor 0.28mm, VESA Local-Bus SVGA card, Local-Bus IDE I/O with 2 serial, 1 parallel ports, Mini-Tower case, 101-key keyboard, Serial mouse and Upgradeable 238-pin ZIF CPU Over-Drive socket.

486DX2 VLB 66

\$1495

486DX2 VLB 50

\$1425

486DX VLB 33

\$1235

486DX ISA 33

\$1185

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SYSCOM

COMPUTER



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Free Financing O.A.C.

Hot, Hot!!!
Price
Performance

SYS486DX2/66MHz SYS486DLC/40MHz

- Local Bus/256K Cache
- 240W Power Supply
- 2MB RAM Memory
- 170MB HDD
- 1.2 & 1.44MB FDD
- SVGA Monitor (Made in Korea)
- 32 Bit VLB I/O Card
- 32 Bit VLB Graphic Card w/1MB
- Mini Tower Case (UL Approved)
- Enhanced 101 Keyboard

\$1249

- 486/40MHz Motherboard/128K Cache
- 2MB RAM Memory
- 170MB HDD
- 1.2 & 1.44MB FDD
- SVGA Monitor (Made in Korea)
- Super I/O Card
- SVGA Graphic Card
- Mini Tower Case (UL Approved)
- Enhanced Keyboard

\$849



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STUDENT
SPECIAL!!**

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**NOTEBOOK
BIG BARGAIN!!**

Price starts
from \$1199

**486DX2,
486DX and
486SX
Notebook
Computers**

SYS486DX/40MHz SYS386DX/40MHz

- Local Bus/256K Cache
- 2MB RAM Memory
- 170MB HDD
- 1.2 & 1.44MB FDD
- SVGA Monitor (Made in Korea)
- Super I/O Card
- SVGA Graphic Card
- Mini Tower Case (UL Approved)
- Enhanced 101 Keyboard

\$995

- 2MB RAM Memory
- 130MB HDD
- 1.2 & 1.44MB FDD
- SVGA Monitor (Made in Korea)
- Super I/O Card
- SVGA Graphic Card
- Mini Tower Case (UL Approved)
- Enhanced 101 Keyboard

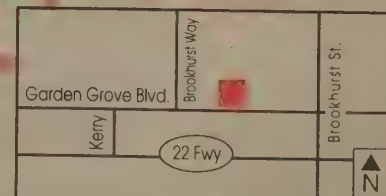
\$799

SYSCOM COMPUTER CO.

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Fax: (714) 530-4570



evocation of its future intergalactic counterpart, in which the full range of arrogance, bozohood, dweebdom, and flamage that entertain today's users flourishes, complete with even more technology-driven communication problems. Quite aside from the book's compelling plot, it's a must-read for any net denizen just for that look at a unique aspect of net culture.

JOHN WARNOCK
CHAIRMAN AND CEO
ADOBE

Anticipating the commoditization of Adobe's flagship product PostScript, Warnock's led the push for a next-generation standard of universal document exchange with a technology called Acrobat, which allows digital information of assorted media and platforms to be passed around transparently regardless of such previously crucial issues as platforms and applications. Acrobat's acceptance as a standard seems to have been slowed somewhat by Adobe's decision to charge customers for each copy of the reader software, which in turn created a lucrative niche for shrewd competitors who proceeded to give their readers away. However, if PostScript's career is any indication, Warnock's ability to combine vision and market sensitivity will stand him in good stead as Acrobat evolves.

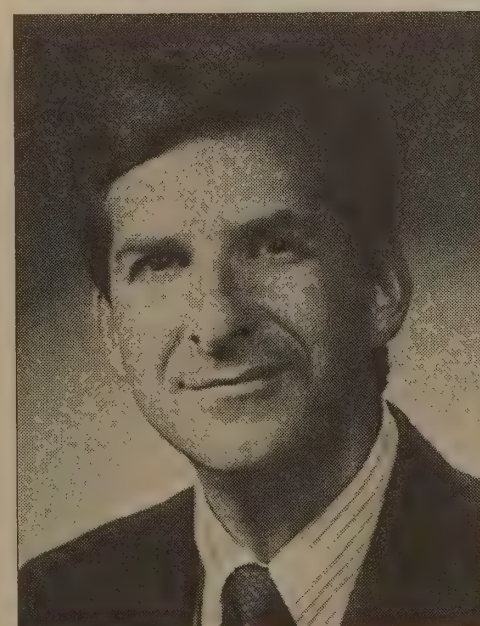
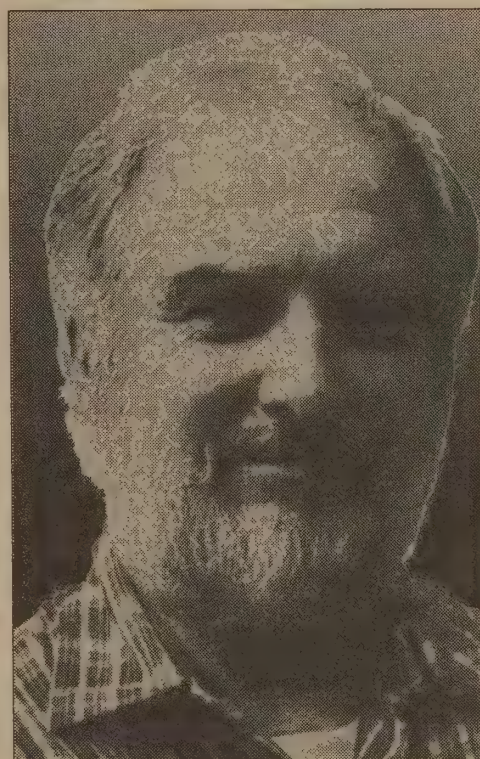
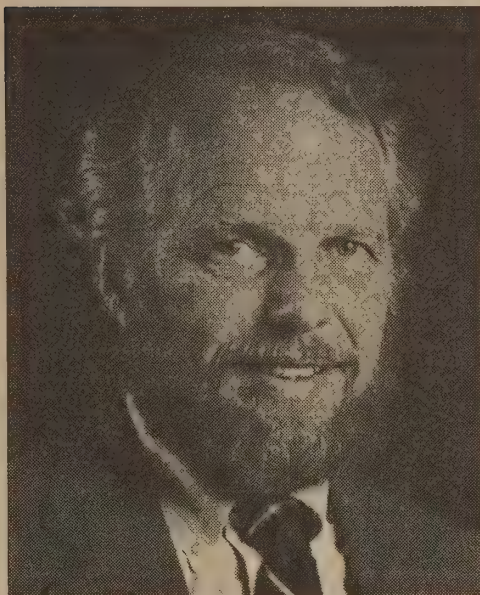
JIM WARREN
CITIZEN

You can read some of Jim Warren's sterling career accomplishments in the bio that accompanies his column in this issue, but his major feat in 1993 was his tide-turning support of AB1624, Assemblywoman Bowen's bill to make pending legislation available to the public in electronic form. Bowen's staff had all but given up on the bill, but Warren led a charge on the nets and in print to rally support for it. Many, many faxes, email messages, political wrangles, and forays to Sacramento later, the bill is law.

Jim is now contemplating online access to campaign contribution records...

KEN WASCH
EXECUTIVE DIRECTOR
SOFTWARE PUBLISHERS ASSOCIATION

While perhaps best known for his hawkish stance on intellectual property issues, Wasch is involved with a myriad of important efforts of the SPA, from its annual awards program for excellence in software to the rapid changes in software distribution and their implication for publishers. Wielding considerable influence in the creation of software-related legislation, he is also an effective and passionate advocate for the interests of the software industry in numerous talks and panels throughout the year.



Top to bottom: John Warnock, Jim Warren, Ken Wasch.

MAURICE WEITMAN
GENERAL MANAGER
THE WELL

Weitman and his resourceful staff displayed enormous grace under frequent and weird pressure during 1993 as The WELL was suddenly discovered big-time by the mass media and the global network. By year's end, a major hardware upgrade had been implemented and most of the attendant hassles eliminated; meanwhile new users continue to arrive from all over the world attracted by pointers as varied as longtime WELL denizen Howard Rheingold's *Virtual Community* and national news coverage of the peculiar episode of the Online Lothario.

PHILLIP E. WHITE
CHAIRMAN, PRESIDENT, AND CEO
INFORMIX SOFTWARE

Three years ago, Informix was losing millions, and by 1992 White had achieved a dramatic turnaround, quadrupling the stock's value and more than doubling its earnings. Today the company has the world's largest installed base of UNIX database management systems; its current earnings are exceeding the 1992 performance that garnered White several prestigious awards, including Entrepreneur of the Year in the "turnaround" category from the San Francisco Bay Area Entrepreneur of the Year awards, and CEO of the Year from *Financial World* magazine.

ALAN YU
CHAIRMAN
UNSC DEVELOPMENT

Yu, a successful entrepreneur with a strong presence in all aspects of the PC industry from design to retail, was a driving force behind the creation and production of CompuExpo, a new globally oriented trade show that allowed product designers and manufacturers to meet with system integrators and other interested customers from the vendor community. This provided a significant opportunity for small, relatively unknown developers to showcase their innovations and reach markets formerly closed to them, and for large vendors to find new product sources.

PIERLUIGI ZAPPACOSTA
PRESIDENT AND CEO
LOGITECH

Zappacosta's attention to emerging technologies and markets has made Logitech a big winner in the graphics and multimedia market. In addition to a host of mice, cameras, sound devices, and such under its own label, Logitech is involved in OEM relations with many computer and peripheral vendors. As digital communications keep getting more sophisticated, Logitech's staying ahead of the curve.

Continued on page 128

New Products

PC Hardware

ANTHURIUM PCI LOCAL BUS SYSTEM

Anthurium's PCI Local Bus system is powered by a 486DX2-66 processor, housed in a full-size tower case. Intel's PCI Local Bus offers 35% increased performance over the VESA Local Bus and features the Intel Saturn 82420 chipset, 256K cache on-board (upgradable to 512K), and three PCI Local Bus slots. The system includes 8MB of RAM (expandable to 128MB), 500MB SCSI II hard drive, 1.2MB and 1.44MB floppy drives, 15" SVGA monitor, 124-key keyboard, three-button mouse, two serial and one parallel ports, and MS-DOS 6.0. (\$2699) Anthurium Technology, Inc., 16371 Gothard St., Unit D, Huntington Beach, CA 92648. (714)375-0210.

ENPOWER 486DX2-80

Using individually selected and tested 66MHz Intel 486 processors that can run at 80MHz, PC Club has developed a proprietary motherboard that will let you work this higher speed. They have also designed the Crystal Cooler to handle the heat problems. The system includes a Pentium ready ZIP socket on the motherboard, three VESA Local Bus slots, 4MB of RAM (expandable to 64MB), 1MB of VRAM, 340MB hard disk drive, 1.2MB and 1.44MB floppy drives, 101-key keyboard, MS-DOS 6.0, and Windows 3.1. (\$1999) PC Club, Inc., 18537 E. Gale Ave., #B, Industry, CA 91748. (818)913-2582.

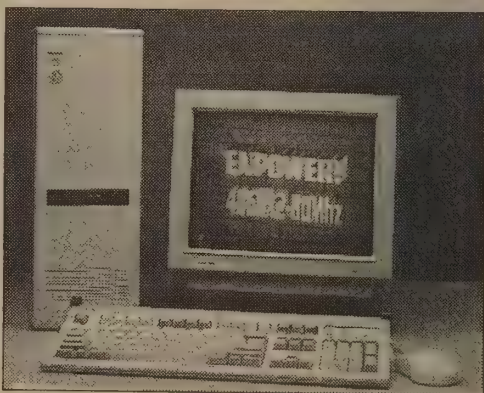
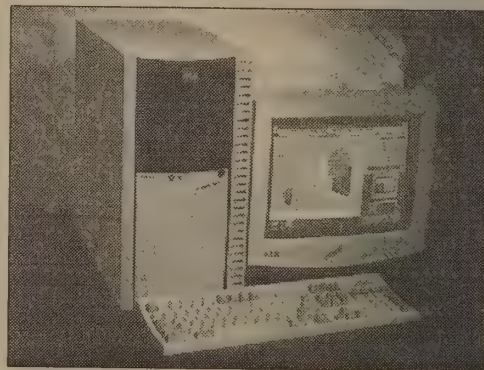
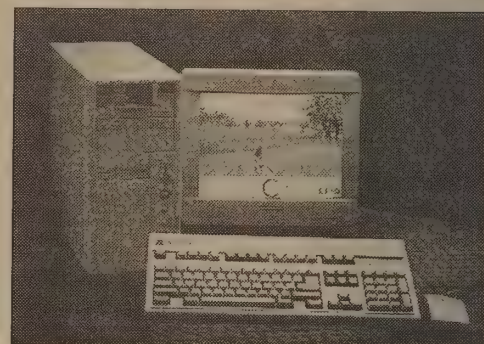
NEC POWERMATE 486ES SERIES

The PowerMate 486es Series represents NEC's second generation of economical PowerMate PCs for the general business user. NEC has incorporated a roster of

advanced features, including compliance with the EPA's Energy Star Program, accelerated local bus video technology, second level cache, and a scalable architecture. All PowerMate 486es systems support a built-in CD-ROM drive and ship with 1MB of video memory, 4MB of RAM (expandable to 36MB), three expansion slots, three device bays, a 1.44MB floppy disk drive, preinstalled MS-DOS 6.0 and Windows 3.1, and an NEC keyboard and mouse. (PowerMate 425es, \$975; PowerMate 433es, \$1199; PowerMate 466es, \$1619) NEC Technologies, Inc., 1414 Massachusetts Ave., Boxborough, MA 01719. (508)264-8000.

VIDEOTIGER

VideoTiger is a multimedia PC suited for small-business users. It combines CD-quality sound, full-motion video, and high resolution. With VideoTiger, you can create your own videos and multimedia presentations, play audio CDs, and handle all your business computer tasks. Based on a 33MHz, 486 processor, it includes 8MB of RAM, CD-ROM drive, SVGA monitor, 16-bit sound card, stereo speakers, and Xingit!, a thirty-frames-per-second video card. Xingit! provides real-time video capture, so you can freeze a video frame and print out a high-resolution copy of it, and MPEG compression, so you use less space to store your information. (\$3995) Quadrant Components, 4378 Enterprise Street, Fremont, CA 94538. (510)656-9988.



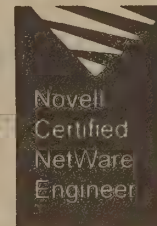
Top to Bottom:
Quadrant VideoTiger;
Micro Express
MicroFLEX VL/S; the
Evolution V STP from
Advanced Logic
Research, Inc.; the
Enpower 486DX2-80
from PC Club, Inc.;
NEC's PowerMate
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Intel Inside

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PC Hardware

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Based on the 40MHz, Cyrix Cx486S, the new MicroFLEX-VL/S can outperform PCs based on the Intel 486DX2-66. While the 486DX2-66 chip operates internally at 66MHz and externally at 33MHz, the 40MHz Cx486S chip operates both internally and externally at 40MHz. This means that the VESA local bus components, such as the video and disk drive controllers operate at 40MHz instead of at only 33MHz. The MicroFLEX VL/S comes with 4MB of RAM, a 200MB hard disk drive with VESA caching controller, both 5.25" and 3.5" floppy drives, a VESA-standard local bus video card, SVGA monitor, math coprocessor, a mouse, MS-DOS 6.0, and Windows 3.1. (\$1795. For an additional \$25 each, PFS:WindowWorks v2 and PFS:Publisher for Windows will be bundled with the system) Micro Express, Inc., 1801 Carnegie Ave., Santa Ana, CA 92705. 1-800-989-9900.

ALR EVOLUTION V STP

The Evolution V STP (Sport Tower PCI) is a new sport tower-styled chassis, offered in a variety of configurations using the Intel 60 and 66MHz Pentium processor. The systems include nine slots, four of which are PCI slots, 8MB of RAM (upgradable to 192MB), and 256K read/write-back cache. Integrated on the STP motherboard is a PCI-based 32-bit fast SCSI II interface providing high-speed access to as many as seven SCSI devices. The new sport tower-styled chassis is designed for network environments and holds a total of six drive bays for a total of up to 6GB of data storage. (\$3295) Advanced Logic Research, Inc., 9401 Jeronimo, Irvine, CA 92718. (714)581-6770.

TAGRAM CONCERTO HI-NOTE

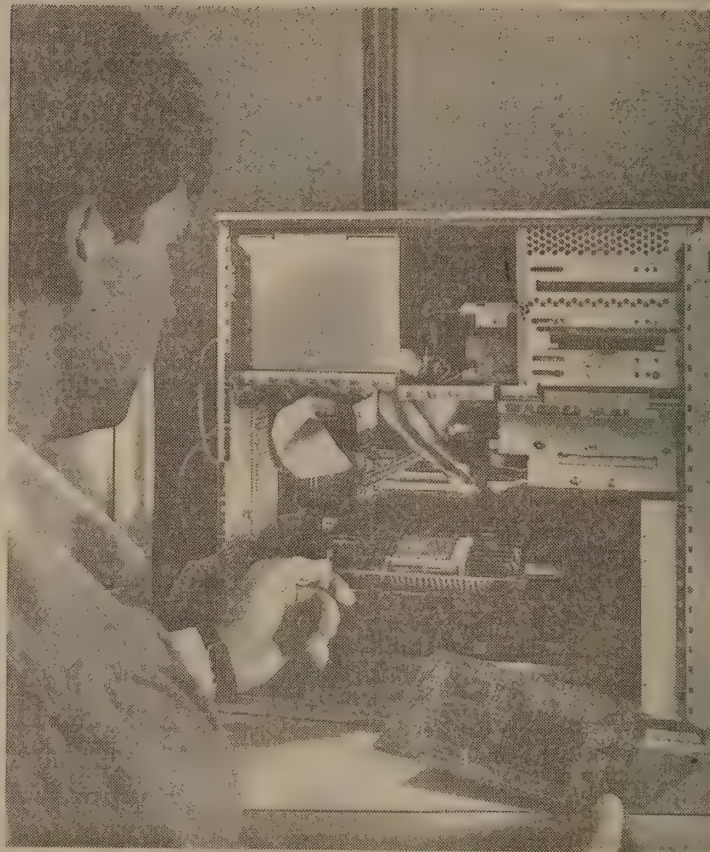
Available with an Intel 486DX-33, DX2-50 or DX2-66 processor, the Concerto Hi-Note includes a Pentium ready, VESA Local Bus motherboard, 4MB of RAM (expandable to

32MB), 128K cache (expandable to 256K), numeric coprocessor, AMI BIOS, five 16-bit and two 32-bit VLB slots, 250MB hard drive, seven bay desktop case, and 101-key keyboard. Providing powerful multimedia capabilities, the system features the 16-bit sound card, Panasonic CR562 CD-ROM drive, and 14" Proton Multimedia low-radiation monitor with built-in stereo dual speakers. In addition, Tagram bundles multimedia software (MS Works Multimedia version, Asymetrix MediaBlitz, Voice Recognition software, Monologue for Windows, MS-DOS 6.0, Windows 3.1, and more) and six CD-ROM titles. (\$2059) Tagram Systems Corp., 1451-B Edinger Ave., Tustin, CA 92680. (714)258-3222.

DECPC XL SERIES

The series is comprised of four new system models—DECpc XL 433dx, DECpc XL 466d2, DECpc XL 560, and DECpc XL 566—offering users the choice of a high-performance i486 or Pentium processor. Using a unique motherboard/daughterboard modular approach, the series is designed to provide users with an easy upgrade path for multiple generations of Pentium and Alpha AXP C P U

technology, while preserving the investment in the DECpc XL platform. Digital's easy access, micro-tower enclosure includes a PCI/ISA main logic board, up to 192MB of RAM, upgradable flash BIOS, five bays (one internal, four external), and six slots (two PCI, three ISA, and one Interleaved). In addition, the thermal

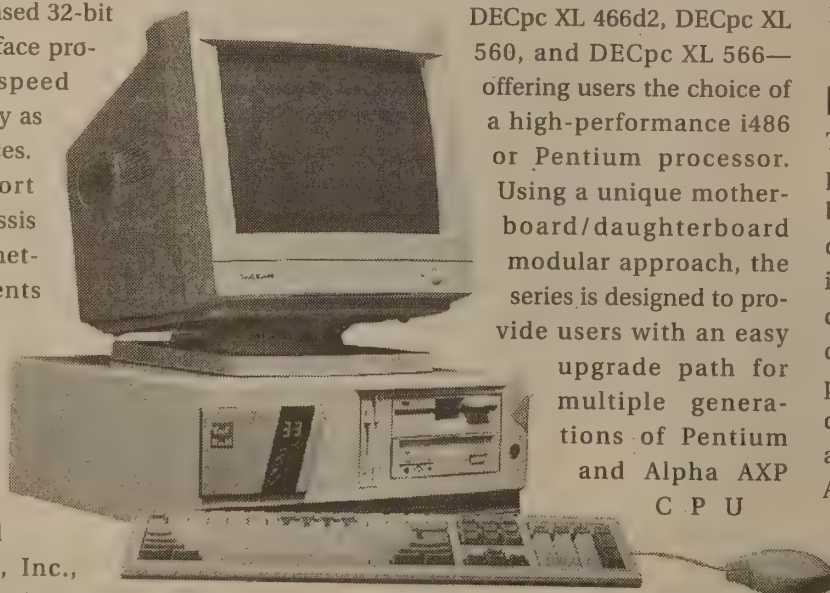


design of the system box features two variable speed fans that are heat sensitive and activate automatically. (DECpc XL 433dx, \$2899 includes 8MB of RAM, 340MB SCSI hard drive, 3.5" floppy drive, S3-928PCI local bus video, 1MB of VRAM, dual SCSI CD-ROM, MS-DOS, Windows, mouse, and keyboard.) Digital Equipment Corp., Maynard, MA 01754-2571. 1-800-210-1408.

PEGASUS PCI ACCELERATOR BOARD

The Pegasus PCI is a PCI Local Bus-compatible graphics accelerator that is capable of displaying 16.7 million colors at resolutions up to 1024 x 768. To simplify installation and provide easy access to configuration menus, the Pegasus PCI comes with an install utility that makes it possible to change monitor resolution and color settings from a Windows menu accessed by double clicking on an icon. Also included is a PowerStar power management utility that will allow a user to reduce their monitor's power usage after a specified time period. The Pegasus PCI comes standard with a BNC-style RGB connector and VGA 15-pin D-sub connector. (\$999 with 4MB of VRAM) STB Systems, Inc., 1651 N. Glenville, Richardson, TX 75081. (214)234-8750.

Top: DECpc XL Series from Digital Equipment Corp.; Middle: the Concerto Hi-Note from Tagram Systems Corp.



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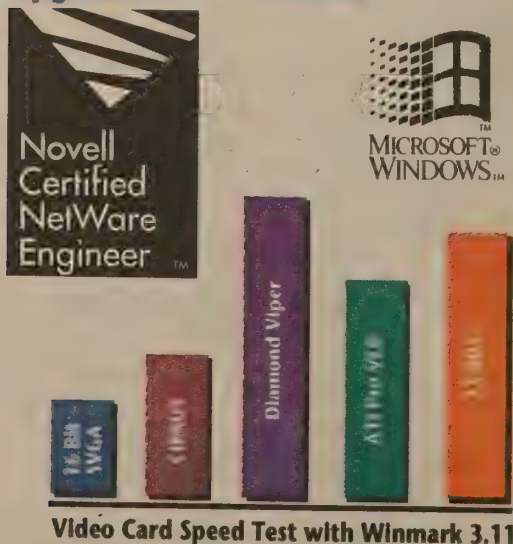
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STB 1MB VLB (S3-805).....	135
Orchid Fahrenheit 1MB VLB.....	155
Orchid Fahrenheit VA 1MB VLB.....	165
Orchid Celsius SVGA	
1MB VRAM.....	220
Orchid Celsius SVGA	
2MB VRAM.....	330
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340MB IDE.....	279
420MB IDE.....	410
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340MB SCSI.....	359
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1.2GB SCSI Maxtor (8.5ms).....	1199
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Parallel Port.....	12
Game Port.....	12
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Caching.....	360
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Adaptec 1522BK w/Kit.....	149
Adaptec 1542BK w/Kit.....	259
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Adaptec 2742 w/Kit.....	379
Adaptec 2742 (Bare).....	325
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Promise VLB IDE Cache	
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VL-200 VLB IDE Cache	
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Tekram DC680 VLB IDE	
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Encyclopedia.....	52
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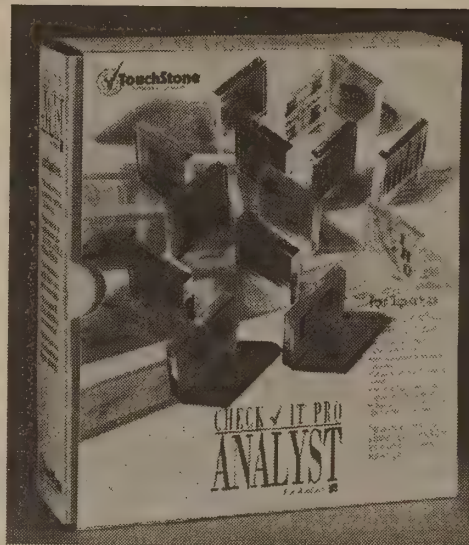
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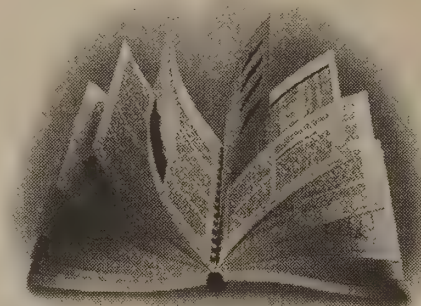
CHECKIT PRO: ANALYST

CheckIt Pro: Analyst is a Windows-based diagnostic utility that provides comprehensive system analysis. It will be simple to collect configuration and performance data, test hardware integrity, and access an extensive technical reference library. In addition, CheckIt Pro: Analyst can evaluate a system to find changes, compare performance with other systems to determine upgrade needs, assess the compatibility of hardware and software upgrades, and recommend setup specifications for add-on equipment. (\$149.95) TouchStone Software Corp., 2130 Main St., Suite 250, Huntington Beach, CA 92648. 1-800-531-0450.



FRAMEMAKER 4.0 FOR WINDOWS

FrameMaker 4.0 includes more than one hundred new features and enhancements designed to make the power of this application more accessible and easier to use for creating demanding documents in advanced desktop computing environments. Version 4 offers a redesigned user interface to improve access to frequently used features as well as significant new capabilities such as formatting features that allow users to more easily design their documents, an innovative document comparison feature, enhanced word processing, and advanced color and graphics. Frame Technology has also extended the power of FrameMaker by adding flexible menus that VARs and system administrators can customize to meet specific user needs. Along with the introduction of FrameMaker 4.0 for Windows, Frame is introducing versions for Sun SPARCstations, HP workstations, and Macintosh computers. (Windows 3.1 and Macintosh, \$895; Sun and HP, personal license, \$1295, shared license, \$2495) Frame Technology, Inc., 1010 Rincon Circle, San Jose, CA 95131.

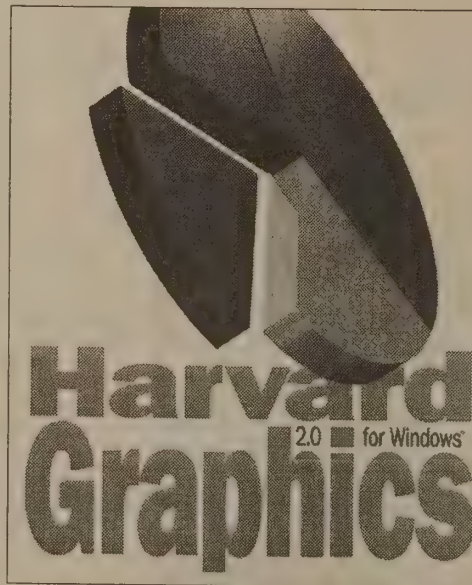


FrameMaker 4
Windows Version

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Utilizing FrameMaker's new C-based API, BrioPublish extends the power of FrameMaker 4 by bringing extensive client/server database access capabilities to its users. This easy-to-use database publishing tool for FrameMaker 4, is designed for publishers of professional database documents. BrioPublish automatically generates fully formatted FrameMaker 4 documents directly from information stored in a database, thereby eliminating manual cutting,

pastings, and reformatting of corporate data into a document. The advantage of the BrioPublish database publishing solution is its close integration with FrameMaker 4. BrioPublish is completely accessible from within FrameMaker so users encounter a familiar interface. BrioPublish runs on both Windows and Macintosh computers. (\$795) Brio Technology, Inc., 444 Castro St., Suite 700, Mountain View, CA 94041. 1-800-486-BRIO



CC:MAIL LINK TO UUCP 2.0

Lotus cc:Mail Link to UUCP v2.0 provides a gateway connecting cc:Mail email users to UNIX systems via the UNIX-to-UNIX Copy Protocol (UUCP). Outbound cc:Mail messages are translated to UUCP-format messages, where they can then be sent to and read by users on a UNIX host computer. Incoming UUCP mail messages are translated to the cc:Mail format. Key features in the new release are enhanced reliability through the provision of additional error checking and more robust asynchronous communications protocols; support for the transfer of multiple file types, including fax files and transmission of Macintosh file attachments; and simpler, more flexible procedures for installation and configuration. A Smart Addressing feature enables Lotus cc:Mail Link to UUCP to automatically match names in an existing cc:Mail Post Office with incoming UUCP messages, saving LAN administrators from having to manually create and maintain address-translation files. (\$495, free upgrades to registered users of previous versions are available) Lotus Development Corp., 55 Cambridge Pkwy., Cambridge, MA 02142. (617)577-5800.

ALTAMIRA COMPOSER

Composer is a creative application designed for professional use by desktop publishers, graphic artists, photographers, and multimedia authors working in the Windows environment. Every image is a separate image object that is never pasted into a background image, but floats in a stack. In addition to featuring image objects, Composer allows users to perform hundreds of functions "on" and "between" these image objects with superior quality and flexibility. Users can move images not just horizontally and vertically, but up and down in a stack, covering up or revealing images that lie underneath. (\$795) Altamira Software Corp., 150 Shoreline Hwy., Suite B27, Mill Valley, CA 94941. (415)332-5801.

HARVARD GRAPHICS 2.0 FOR WINDOWS

Harvard Graphics 2.0 provides users with content assistance and professional design advice. A new feature called the Advisor offers on-screen Design Tips to help users improve the overall visual effectiveness of their presentations. Design Tips helps users select the best chart type for their presenta-

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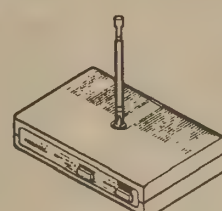
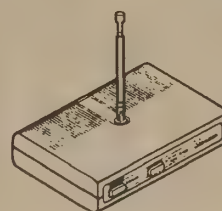
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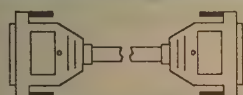
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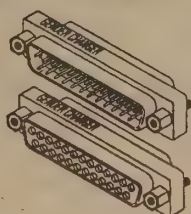
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#GC-09M-2	DB9	\$2.50
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#GC-37M-2	DB37	\$5.00
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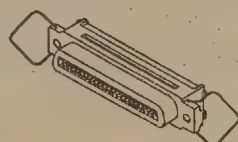
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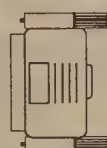
Female

#CN-680	50 pin SCSI	\$1.50
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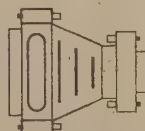
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20 @ \$3.80 ea.



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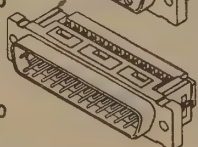
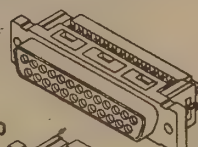
IDC Connector DB Type

Male

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#CN-554	DB25	\$1.00 6-\$5.00
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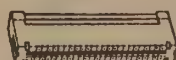
Female

#CN-568	DB9	\$1.50
#CN-555	DB25	\$1.00 6-\$5.00
#CN-477	DB37	\$4.00
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IDC Card Edge Connector

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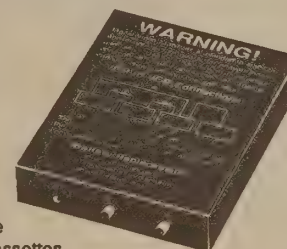


Specials

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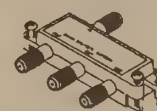
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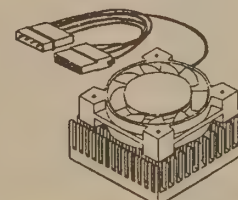


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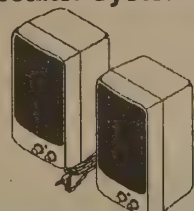
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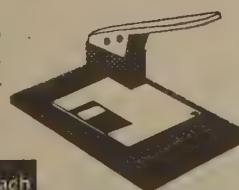


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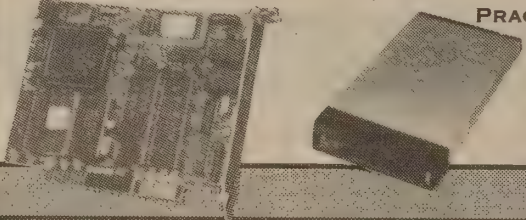
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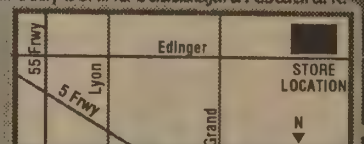
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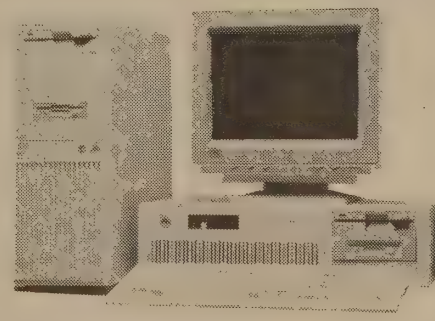
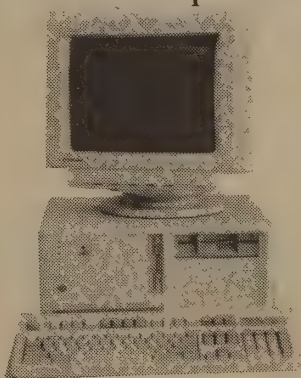
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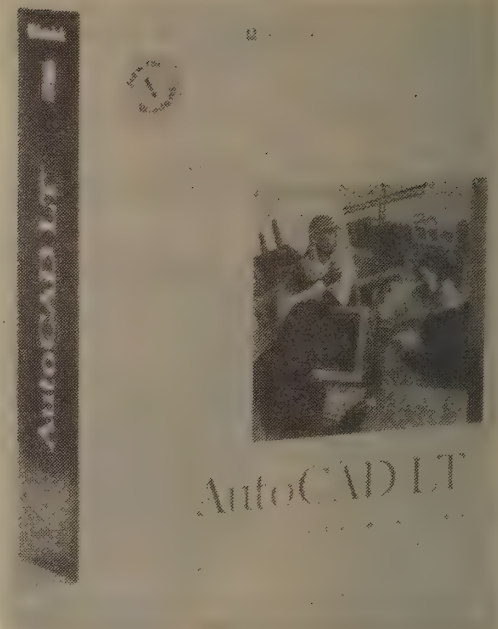
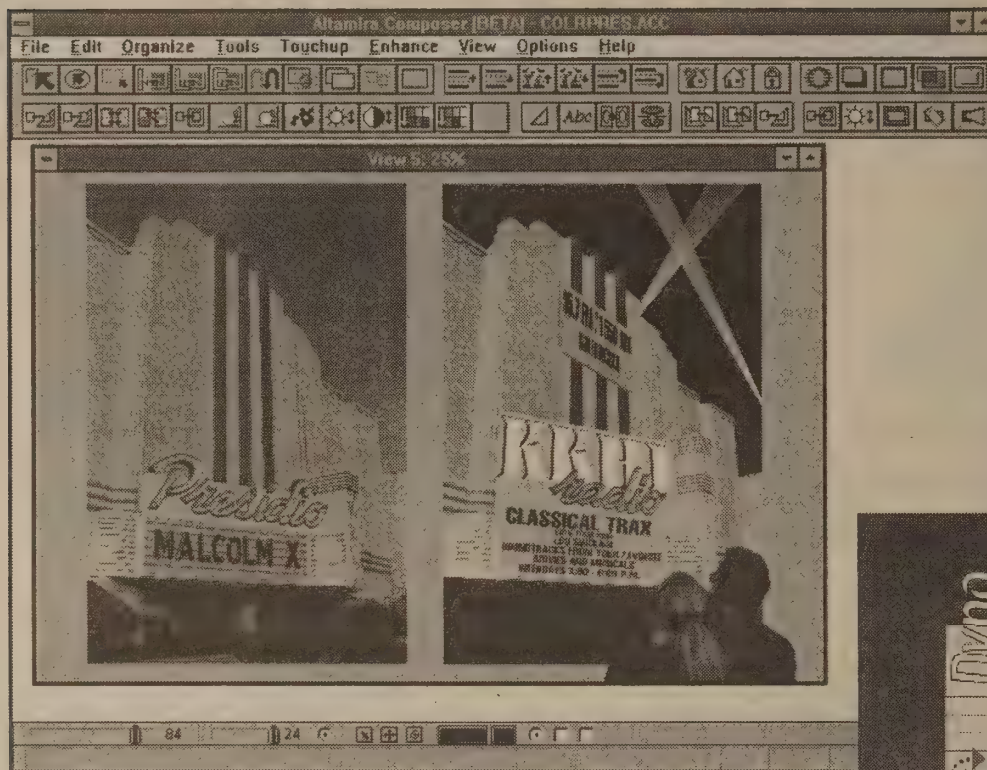
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PC Software



Clockwise: Altamira Composer, AutoCad for Windows, Dyno Notepad for Windows

tions and offers special advice on creating more effective visuals. In addition to Design Tips, the Advisor offers Quick Tips and Quick Looks. Version 2.0 also features

a Runtime Player that allows users to display their Harvard Graphics presentation on DOS or

Windows systems, even if Harvard Graphics is not loaded. (\$395; users of previous Windows or DOS versions and users of competitive

graphics products can upgrade to v2.0 for \$125) Software Publishing Corp., 3165 Kifer Rd., PO Box 54983, Santa Clara, CA 95056-0983. 1-800-234-2500.

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Dyno Notepad is a flexible and compact PIM outliner that helps users organize their thoughts, write correspondence, and create "to-do" lists. Users can work with Dyno Notepad the same way they do with a familiar paper notepad. For example, they can capture their thoughts, outline them, write basic documents, prioritize action items, develop proposals, and keep lists of things to accomplish. Notebook and mobile PC users

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ADDSTOR DOUBLETOLS 1.0

DoubleTools is a Windows-based enhancement utility for the DoubleSpace data compression feature of MS-DOS 6.0. It provides extensive graphic displays in the Windows environment to help MS-DOS 6.0 users to manage disks and files compressed by DoubleSpace, and extends DoubleSpace support to removable media such as floppy and Bernoulli disks. This utility offers background defragmenting of disks, environ-

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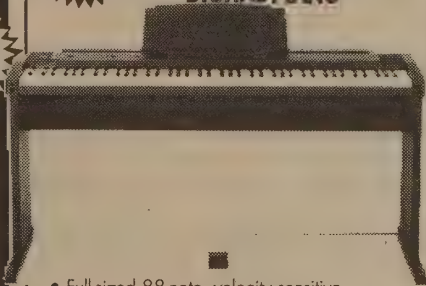
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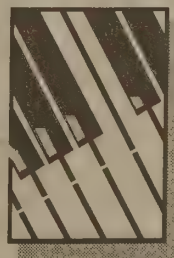


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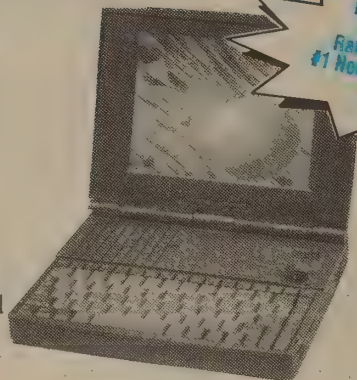
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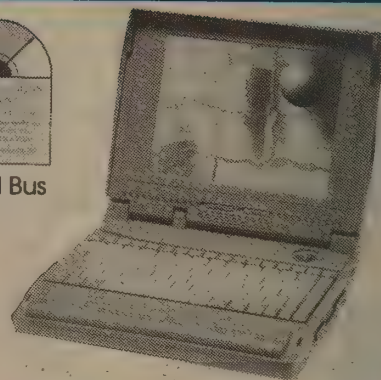
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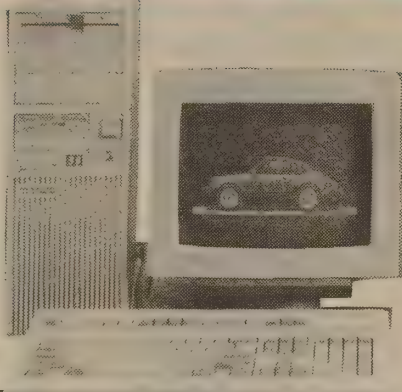


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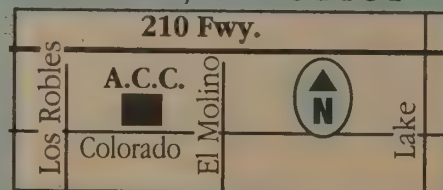
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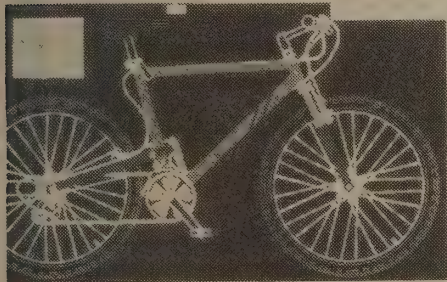
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ment-sensitive help, simplified file sharing, and automatic mounting of removable media. In addition, DoubleTools supports Universal Data Exchange (UDE), which enables users to read and write to compressed files on any DOS system. (\$99.95) Addstor, Inc., 1040 Marsh Rd., Menlo Park, CA 94025. (415)688-0470.

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AUTOSKETCH RELEASE 2.0 FOR WINDOWS

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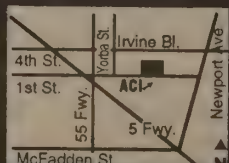
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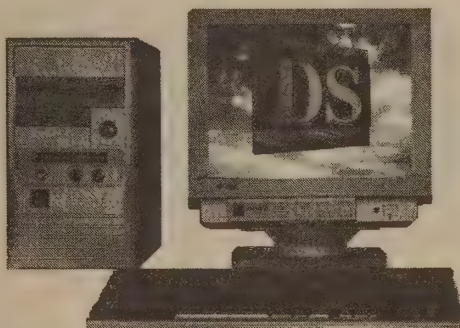
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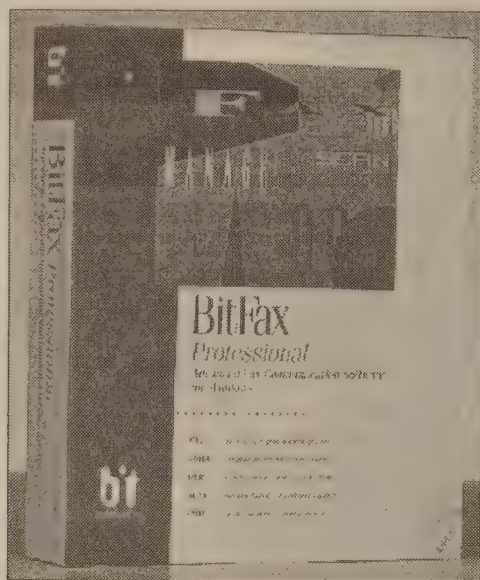
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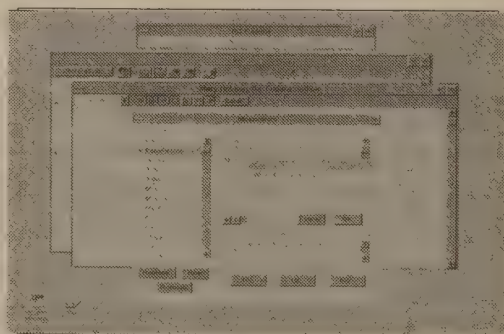
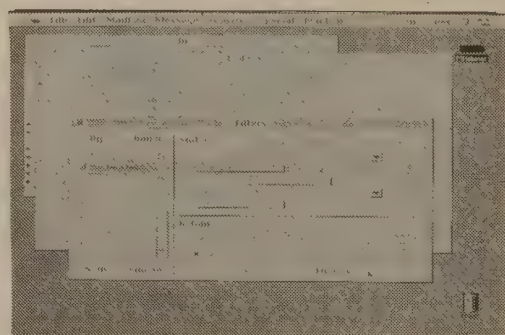
to commercial online services, bulletin board services, and the Internet. Its features include automated logons, auto-expansion of compressed files, built-in compression, translation of non-Mac files, and scripting capabilities with AppleScript or UserLand Frontier. SITcomm automates logons through an Address Book that contains the user's settings for each service used. Each Address Book entry includes the service type, phone number, user ID, password, and other logon information. SITcomm also offers features for travelers and PowerBook users, including calling card dialing and power sav-

ing enhancements. (\$120; registered users of any Aladdin commercial or shareware product can purchase SITcomm for \$39; for registered users of competing telecommunications programs it is \$49) Aladdin Systems, Inc., 165 Westridge Dr., Watsonville, CA 95076. (408)761-6200.

EUDORA EMAIL SOFTWARE

Eudora email management software was originally developed for the Macintosh at the University of Illinois and is now available for both the Macintosh and PC by Qualcomm. It allows users to send, receive, sort, and otherwise manage electronic mail over TCP/IP networks, such as the Internet. New features integrated in the program include message filtering, support for AppleEvents (Macintosh version only), drag and drop attachment (Macintosh version only), double-click attachment lines (PC-compatible version), and Multipurpose Internet Mail Extensions

Below: Eudora email management software for the Mac and (bottom) for the PC.



(MIME) compatibility. Qualcomm's Eudora customer support specialists provide customer service and technical support through a toll-free telephone number and Internet mail addresses. (Per unit pricing is \$50 for 1-9 users, \$45 for 10-49 users, \$40 for 50-99 users, \$36.50 for 100-499 users, and \$32.50 for 500-999 users.) Qualcomm, Inc., 10555 Sorrento Valley Rd., San Diego, CA 92121. 1-800-2-EUDORA. Email: eudora-sales@qualcomm.com. Technical support, email: eudora-hotline@qualcomm.com.

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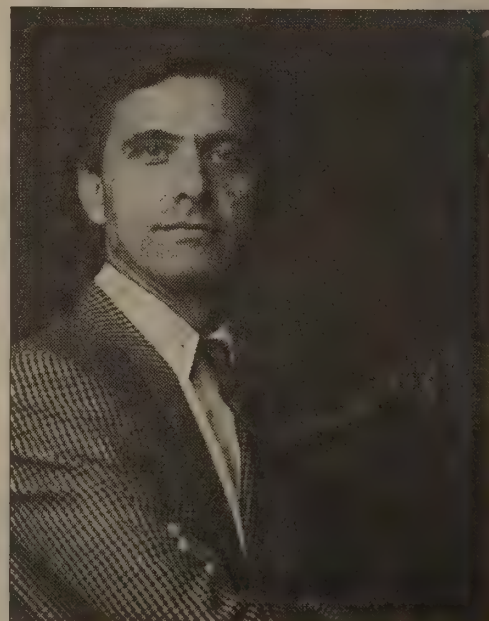
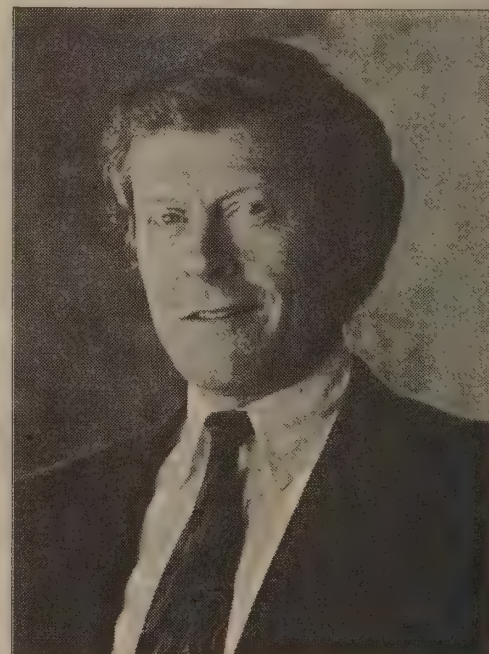
PHIL ZIMMERMANN

AUTHOR

PRETTY GOOD PRIVACY (PGP)

While we think it's reasonable to wish that Zimmermann had been more assiduous in his attention to the intellectual property issues involved in the use of RSA-patented algorithms, we salute his overall achievement in creating this free and widely distributed cryptography software. In an era of digital snooping and eroded privacy, PGP is a powerful leveller of the playing field for mere humans against technologically sophisticated snoopers.

We wish Zimmermann a speedy resolution of his legal difficulties with RSA (likely to be functionally resolved with a collaboration with an RSA-licensed third party) and the feds (currently taking the position that the software, available on US Internet sites from which it's globally accessed, is a "munition" subject to heavy export restrictions). ■



Top: Phillip White; bottom: Pierluigi Zappacosta.



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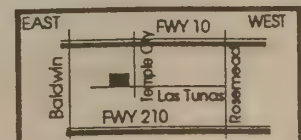
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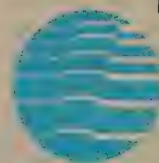
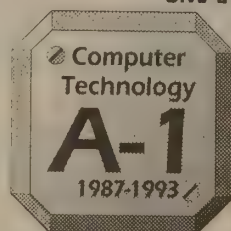
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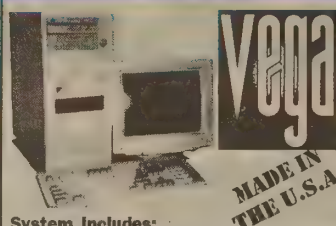
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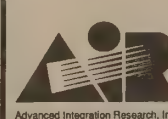
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486DX2-50Mhz \$965.
486DX-40Mhz \$915.
486DX-33Mhz \$935.
486SX-33Mhz \$785.
486SX-25Mhz \$745.

VLB 486 M/B, 256K Cache, Add \$10.00 for ZIF Socket. Intel CPU (AMD for DX-40Mhz), 4Mb Memory Exp. to 32Mb TEAC 1.2Mb & 1.44Mb Floppy Drives w/ VLB IDE Controller Cirrus Logic GD5424 1Mb VLB Graphics Accelerator Card 2 Serial, 1 Parallel, 1 Game Ports, Chicony 101 Keyboard CS-609T Mini-Vertical Case w/230Watt P.S.



ISA Bus Systems

486DX2-66Mhz \$1005.
486DX-50Mhz \$955.
486DX2-50Mhz \$855.
486DX-40Mhz \$745.
486DX-33Mhz \$815.
486SX-33Mhz \$665.
486SX-25Mhz \$625.

ISA 486 M/B, 128K Cache, 4Mb Memory, TEAC 1.2Mb & 1.44Mb FDD, IDE Controller 2 Serial, 1 Parallel, 1 Game Ports, Chicony 101 Keyboard CS-609T Mini-Vertical Case w/230Watt P.S.



486 DLC Systems

486DLC-40Mhz \$610.
486DLC-33Mhz \$605.
386DX-40Mhz \$530.
386DX-33Mhz \$550.
386SX-40Mhz \$365.

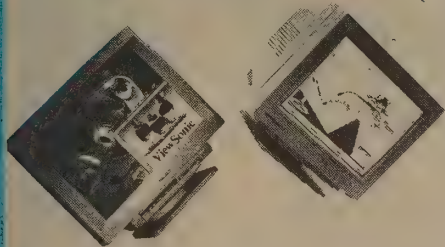
486DLC M/B w/Cyrix CPU & Math-Co or 386DX/SX M/B Intel CPU on 386DX-33, AMD CPU on 386DX/SX 40, 4Mb Memory on DLC/DX, 2Mb Memory on SX, TEAC 1.2Mb & 1.44Mb Floppy Drives & IDE Controller 2 Serial, 1 Parallel, 1 Game Ports, Chicony 101 Keyboard CS-609T Mini-Vertical Case w/230Watt P.S.

Terms & Conditions:

All parts and systems carry a one year limited warranty except for monitors and printers which are warranted by manufacturers. Any consumable products are not returnable nor refundable. Any opened software is non-refundable. All sales on monitors & printers are final. Repairs need to be sent to the manufacturer. No refund. All returns are subject to our approval and must have prior authorization return items must be in its original condition with invoice. Send shipping prepaid. All refunds or credits are less shipping and bank charges. All refund items must be returned within 14 days of invoice. There will be a 20% restocking fee after the 14 day period and within 30 days of invoice. Thereafter only exchanges and repair for the rest the warranty period. Price, specification and availability subject to change without any notice.

Without The Hassles

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AMDEK 432N 14" MonoVGA (Amber/White) \$125.

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5439A 14" SVGA (1024x768,.39dp) \$222.
5468A 14" SVGA (1024x768,.28dp) \$254.
1451 14" Full-Screen NI (1024x768,.28dp) .. \$274.
1461 14" NI (1024x768, 72Hz refresh) \$300.
1461LR 14" NI (1024x768, 72Hz refresh) \$310.
1560LR 15" Digital NI (1024x768,.28dp) \$390.
1760LR 17" Digital NI (1280x1024,.28dp) ... \$730.

Digiview

HR-1401 14" SVGA (1024x768,.39dp) \$212.
HR-1428 14" SVGA (1024x768,.28dp) \$245.
HR-1430ni 14" SVGA NI (1024x768,.28dp) .. \$263.

MAG

1564 15" SVGA NI (1280x1024,.28dp) \$420.
MX-15H 15" Digital NI (1280x1024,.28dp) ... \$480.
MX-17H 17" Digital NI (1280x1024,.28dp) ... \$895.

MITAC

1464P 14" SVGA NI (1280x1024,.28dp) \$310.
1564PD 15" Digital Screen (1280x1024,.28dp) ... \$395.

NEC

3V 15" Multi-Freq Green EPA (.28dp) \$575.
3FGe 15" Color Monitor (1024x768,.28dp) ... \$625.
4FGe 15" Multi-Freq (1024x768,.28dp) \$740.
5FGe 17" Multi-Freq (1024x768,.28dp) \$1125.
MultiSync 5FG 21" (1280x1024,.28dp) \$1330.
MultiSync 6FG 21" (1280x1024,.28dp) \$2380.
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OPTIQUEST

800S 14" VGA (640x480,.39dp) \$209.
900S 14" SuperVGA (1024x768,.28dp) \$252.
1000S 14" SVGA NI (1024x768,.28dp) \$275.
1500D 14" Digital NI (1024x768,.28dp) \$357.
2000DX 15" Digital NI (1280x1024,.28dp) \$375.
4000DC 17" Digital NI (1280x1024,.28dp) .. \$775.

SONY

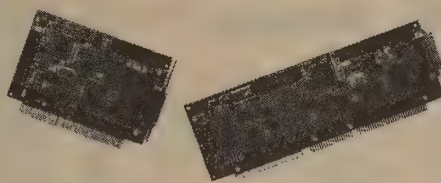
CPD-1320 14" SVGA NI (640x480,.25dp) \$357.
CPD-1430 14" SVGA Multiscan NI (.25dp) \$597.
CPD-1730 17" SVGA Multiscan NI (.25dp) \$1043.
CPD-2036S 20" SVGA Multiscan NI (.30dp) .. \$1995.

ViewSonic®

4E 14" SuperVGA (1024x768,.28dp) \$273.
6E 14" SuperVGA NI (1024x768,.28dp) \$296.
7 17" Digital Multi-Freq (1280x1024,.28dp) .. \$808.
15E 15" Flat Screen (.28dp, 76Hz refresh) \$385.
15 15" Digital Multi-Freq (.28dp, 1280x1024) ... \$459.
17 17" Digital Multi-Freq (.28dp, 1600x1280) ... \$975.
20 20" Digital Multi-Freq (.28dp, 1600x1280) ... \$1655.
21 21" Digital Multi-Freq (.28dp, 1600x1280) ... \$1885.

*** Please call for other specific brands.

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Mono/Graphics/Printer Card \$14.
AVGA-1 VGA Card w/256K \$27.
AVGA-3 (CL GD5420) 1MB Accelerator (32K color) ... \$62.
AVGA-3 (CL GD5422) 1MB Accelerator (65K color) ... \$70.
Cirrus Logic GD5424 VLB Accelerator w/1MB ... \$88.
Cirrus Logic GD5426 VLB Accelerator w/1MB ... \$95.
Cirrus Logic GD5428 VLB Accelerator w/1MB ... \$100.
TVGA-9000 VGA w/256K (up to 512K) \$32.
TVGA-8900CL 1MB SuperVGA Card (2x faster than) ... \$62.
TVGA-9200 VESA VLB 1Mb Accelerator Card \$86.
WD-90C33 VLB Accelerator w/1MB \$108.
Paradise VL Plus Accelerator w/1MB \$160.



Graphics Ultra+ VLB mach32 w/1MB Dram \$249.
Graphics Ultra+ (1280x1024, 2MB Dram) \$249.
Graphics Ultra Pro (1280x1024 NI, 2MB VRam) ... \$349.
Graphics Ultra Pro EISA w/2MB VRAM \$455.
VLB mach32 Graphics Ultra Pro w/2MB VRam \$380.



SpeedStar Pro Graphics Accelerator w/1MB \$118.
SpeedStar Pro VLB Accelerator w/1MB \$118.
Stealth-24 VLB Windows Accelerator w/1MB \$168.
Stealth Pro Graphics Accelerator w/1MB VRam ... \$260.
Stealth Pro VLB Accelerator w/1MB VRam \$265.
Viper VLB Graphics Accelerator w/2MB VRam \$385.
BRAND NEW!! SpeedStar 64, Stealth 32 and .. CALL
BRAND NEW !! VIPER PCI w/2Mb VRAM \$390.



Pro-Designer IIs-E EISA w/1MB & Sierra RAMDAC .. \$163.
Fahrenheit Windows Accelerator w/1MB \$170.
Fahrenheit VA w/Voice Annotation w/1Mb \$185.
Fahrenheit VLB Windows Accelerator w/1MB ... \$170.
Celsius VLB Graphics Accelerator w/1MB \$220.
Celsius VLB Graphics Accelerator w/2MB \$280.
BRAND NEW!! Orchid KELVIN 64 VLB CALL.

Controllers

High Speed AT I/O (2 Ser. 1 Par.) 16c550 Clone \$35.
AT Super IDE IO Adapter (Fdd/Hdd, 2S, 1P, 1G) \$16.
VESA Local Bus Super IDE & IO (2S, 1P, 1G) \$30.
PCI Local Bus Super IDE Adapter \$38.
BOCA I/O - 4 Serial & 2 Parallel ports \$95.

GSI-11V 2.88M Four (4) Floppy Controller & Cable .. \$55.
GSI-18V Co-resident IDE Controller \$42.
GSI-21V 2.88M Four (4) Fdd & IDE Adapter \$62.

Promise
DC-200 ISA IDE Caching (0K, upto 16MB) \$100.
DC-2040 ISA SCSI Caching (0K, upto 16MB) \$265.
DC-4030VL VLB IDE Caching (0K, upto 16MB) \$145.

Tekram DC-600B ISA IDE Caching (up to 16MB) ... \$110.
Tekram DC-680 VLB IDE Caching (up to 16MB) \$145.

Bus Logic KT445S VLB SCSI Controller Kit \$275.
Bus Logic KT542B ISA SCSI Controller Kit \$225.
Bus Logic KT545S ISA FAST SCSI-2 Kit \$235.
Bus Logic KT747S EISA FAST SCSI-2 Kit \$355.

DTC-2290 EISA IDE Floppy/Hard Disk \$118.
DTC-3270VL VLB SCSI-2 Controller \$130.
DTC-3290 EISA SCSI Caching FD/HD (0K to 4MB) .. \$435.
DTC-3292 EISA SCSI FD/HD Controller \$325.

Controllers Continued

UltraStor 14FA SCSI FD/HD Controller \$210.
UltraStor 14FA SCSI FD/HD Controller Kit \$250.
UltraStor 24F EISA SCSI FD/HD Controller \$370.
UltraStor 24F EISA SCSI FD/HD Controller Kit .. \$410.
UltraStor 34F VESA Local Bus SCSI FD/HD \$285.
UltraStor 34F VESA Local Bus SCSI FD/HD Kit ... \$325.

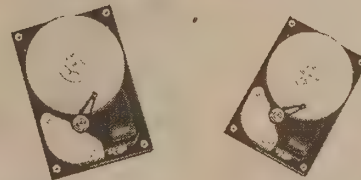
Future Domain 1680SVP 16-bit SCSI Fdd/Hdd Kit .. \$145.

Always IN-2000 16-bit SCSI Host (Novell Certified) . \$189.
Always AL-1000 Parallel to SCSI Adapter \$168.

adaptec®

AHA-1522K SCSI Adapter Kit \$153.
AHA-1542C SCSI Bus Mastering (Card only) \$205.
AHA-1542CK SCSI Bus Master Host Adapter Kit ... \$257.
AHA-1542CK + SCSI Bus Master Host Adapter Kit. \$320.
AHA-2742AK EISA SCSI Bus Master Adapter Kit ... \$370.
AHA-2842AK VLB SCSI Bus Master Kit \$305.

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TEAC 1.2MB FDD (5.25") \$54.
TEAC 1.44MB FDD (3.5") w/Mounting Kit \$45.
TEAC 2-in-1 1.2/1.44MB FDD \$118.
TEAC 2.88MB FDD (3.5") w/Mounting Kit \$87.
Toshiba 1.2MB FDD (5.25") \$52.
Toshiba 1.44MB FDD (3.5") w/Mounting Kit \$43.
Toshiba 2.88MB FDD (3.5") w/Mounting Kit \$73.
Iomega Floptical Drive w/SCSI Interface (21MB) ... \$429.
Iomega Floptical Disk (21MB) \$27.
Sysgen ValueStor Floptical Drive w/Kit \$332.
Sysgen ValueStor Floptical Disk - Dual pak \$52.

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CP-30174 170MB IDE HDD (17ms) \$220.
CP-30170E 170MB SCSI HDD (17ms) \$225.
CPS-210A 210MB IDE HDD (14ms.) \$230.
CP-30254H 250MB IDE HDD (14ms, 64K cache) . \$245.
CPA-340A 340MB IDE HDD (13ms) \$290.
CP-30544 540MB IDE HDD (12ms, 256K cache) . \$550.
CP-30540 545MB Fast SCSI-2 HDD (12ms) \$570.
CP-1060S 1.06Gb Fast SCSI-2 HDD (9ms) \$990.
CP-31370 1.37Gb Fast SCSI-2 HDD (10ms) \$1070.

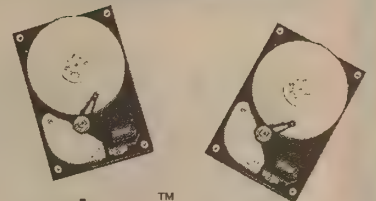
FUJITSU

M2624T 520MB IDE HDD (12ms, 5yr warranty) ... \$570.
M2624FA 520MB SCSI HDD (12ms, 5yr wmtly) ... \$575.
M2694SA 1.2GB SCSI HDD (10.5ms, 5yr wmtly) .. \$940.
M2652S 2.0GB SCSI HDD (12ms, 5yr warranty) ... \$1590.
M2654S 2.4GB SCSI HDD (12ms, 5yr warranty) ... \$1650.

Maxtor®

Maxtor MX-7120S 120MB SCSI HDD (15ms) .. \$217.
Maxtor MX-7213A 213MB IDE HDD (15ms) \$235.
Maxtor MX-7213S 213MB SCSI HDD (15ms) \$277.
Maxtor MX-7245A 245MB IDE HDD (14ms) \$254.
Maxtor MX-7245S 245MB SCSI HDD (14ms) \$265.
Maxtor MX-7345A 345MB IDE HDD (14ms) \$305.
Maxtor MX-7345S 345MB SCSI HDD (14ms) \$350.
Maxtor MX-540A 540MB IDE HDD (8.5ms) \$735.
Maxtor MX-540SL 540MB SCSI HDD (8.5ms) \$735.
Maxtor MXT-1240S 1.2GB SCSI HDD (8.5ms) \$1280.

Drives Continued



Quantum™

Brand New! ProDrive 270MB & 340MB IDE
ProDrive ELS 170MB IDE HDD (17ms, 2yr wmtly) . \$190.
ProDrive LPS 240MB IDE HDD (15ms, 256K) \$245.
ProDrive LPS 270MB IDE HDD (13ms, 128K) \$285.
ProDrive LPS 342MB IDE HDD (13ms, 128K) \$325.
ProDrive ELS 170MB SCSI HDD \$227.
ProDrive LP 240MB SCSI HDD \$275.
ProDrive 1080S 1080MB SCSI-2 HDD (5yr wmtly) . \$940.
ProDrive 1225S 1225MB SCSI-2 HDD (5yr wmtly) .. \$985.
ProDrive 1800S 1.8GB SCSI-2 HDD (5yr wmtly)..... \$1330.

Toshiba MK-438FB 877MB SCSI-2 HDD (12.5ms) \$820.
Toshiba MK-538FB 1.2GB SCSI-2 HDD (12.5ms) . \$920.

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Western Digital AC2200 209MB IDE HDD (13ms) \$230.
Western Digital AC2250 250MB IDE HDD (13ms) \$250.
Western Digital AC2340 340MB IDE HDD (13ms) \$290.
Western Digital AC2420 420MB IDE HDD (13ms) \$375.
Brand New! WD AC2540 540Mb IDE HDD \$520.
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SQ555 44MB SCSI Removable Disk Drive \$265.
SQ5110C 88MB SCSI Removable Disk Drive \$320.
SQ3105 105MB IDE Removable Disk Drive (3.5") ... \$320.
SQ3105 105MB SCSI Removable Disk Drive (3.5") .. \$425.
SQ3105 105MB IDE Int. Removable Disk Kit \$350.
SQ3105 105MB Ext. IDE Removable Disk Drive \$430.
SQ400 44MB Cartridge \$75.
SyQuest SQ800 88MB Cartridge \$108.
SyQuest SQ310 105MB 3.5" Cartridge \$72.
SyQuest SQ01 SCSI Adapter w/Software \$45.
SCSI External Case for SyQuest 5.25" Disk Drive \$95.

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Conner TapeStor 250MB Tape Backup w/One
Pre-formatted Cartridge \$159.
Conner TapeStor 250MB External Parallel Port
Tape Backup w/One Pre-formatted Cartridge \$335.

COLORADO

MEMORY SYSTEMS INC.

Colorado JT-10 120MB Parallel Port External .. \$305.
Colorado JT-20 250MB Parallel Port External .. \$349.
Colorado DJ-10 120MB Internal Tape Backup ... \$109.
Colorado DJ-20 250MB Internal Tape Backup ... \$179.
Colorado AB-11 External Adapter Kit \$32.
Colorado KE-09 External Drive Kit \$69.
Colorado FC-10 500Kb/s-1Mb/s Adapter Kit \$70.
Colorado TC-15 Data Compression Adapter Kit .. \$149.
Colorado Int. Power Tape 2.0GB Tape Backup .. \$985.
Colorado Int. Power Tape 4.0GB Tape Backup .. \$1480.
Colorado Ext. Power Tape 2.0GB Tape Backup . \$1125.
Colorado Ext. Power Tape 4.0GB Tape Backup . \$1620.

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- Sound Blaster 16 Stereo Sound Card - 16bit Sound
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- A Microphone & a pair of Mini Speakers



Mitac Multimedia Upgrade Kit\$395
- Mitsumi Internal FX001D CD-ROM (250ms, Kodak Photo CD compatible, Double Speed 300k Transfer)
- Sound Galaxy 16 DSP PRO Sound Card
- Shielded Stereo Computer Speakers
- Software bundled: Compton's Multimedia Encyclopedia for Windows, The KGB/CIA World Factbook, Dictionary of the Living World, Mayo Clinic, Dinosaurs



Creative CD Mult-Media Upgrade Kit (Internal)\$399
- **Sound Blaster Pro** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, Double Speed 300KB/sec Data Transfer, 320ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: Multimedia Encyclopedia, The ... Animals!, Secret of Monkey Island, Loom, 3 Karaoke CD's

Discovery CD 16 Upgrade Kit (Internal)\$445
- **Sound Blaster 16** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 300KB/sec Data Transfer, 320ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: Multimedia Encyclopedia, The ... Animals!, Lemmings

Edutainment CD 16 Upgrade Kit (Internal)\$505
- **Sound Blaster 16** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 300KB/sec Data Transfer, 320ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: The San Diego Zoo Presents ... The Animals!, Where in the World is Carmen Diego?, Multimedia Encyclopedia, Just Grandma and Me, The Secret of Monkey Island, Loom, Secret Weapons of the Luftwaffe, Sherlock Holmes - Consulting Detective



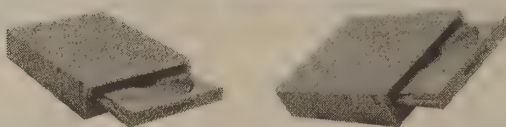
Fusion DoubleCD 16 (Internal)\$615
- NEC CDR-55J Internal CD-ROM Drive - 350ms
- Media Vision Pro Audio 16 Stereo Sound Card
- High-quality Labtec Amplified Speaker System
- Software bundled: 7th Guest, Battle Chess, Compton Interactive Encyclopedia, Arthur's Teacher Trouble

Pro-16 Multimedia System II (Internal)\$895
- NEC CDR-84 Internal SCSI CD-ROM (Multi-Session, 280ms)
- Media Vision **Pro Audio Studio 16** Stereo Sound Card
- Software bundled: Carmen San Diego, Compton's Encyclopedia, Lotus 1-2-3, King's Quest V, Nautilus CD, and MacroMind Action! CD

Multi-Media Systems Continued

Hi-Lite Multi-Media Bundle\$595
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- Media Vision Pro Audio Spectrum 16 Stereo Sound Card
- A pair of Speakers
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CD-ROMs



Mitsumi FX001D Int. CD-ROM (Double Speed, 250ms)\$235



NEC CDR-55 Int. OEM SCSI CD-ROM (350ms, 300k,)\$335
NEC CDR-74J-1 External SCSI CD-ROM (280ms)\$450
NEC CDR-84J-1 Internal SCSI CD-ROM (280ms)\$425
NEC CDR-84J-1 Int. SCSI CD-ROM (280ms OEM)\$365
NEC CDR-3XI Internal SCSI CD-ROM (195ms, 450K)\$475

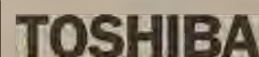


Panasonic CR-522-B Int. CD-ROM w/Interface\$195
Panasonic CR-563 Int. CD-ROM (Double spin)\$230
Panasonic CR-563 Int. CD-ROM (Double spin) w/Interface\$255



SONY CDU-31A Internal CD-ROM w/Interface\$195
SONY CDU-31A-03 Int. CD-ROM w/Interface (300k, 300ms) ...\$235
SONY CDU-31A External CD-ROM w/Interface\$295

TEXEL DM3028 Int. SCSI CD-ROM (235ms Access)\$395
TEXEL DM5028 Ext. SCSI CD-ROM (235ms Access)\$485

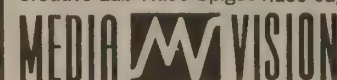


Toshiba 3401B Int. SCSI CD-ROM (300k, 200ms)\$380
Toshiba 3401B Int. SCSI CD-ROM w/Interface\$430
External SCSI Case for SCSI CD-ROM w/Cable\$95

Sound Cards



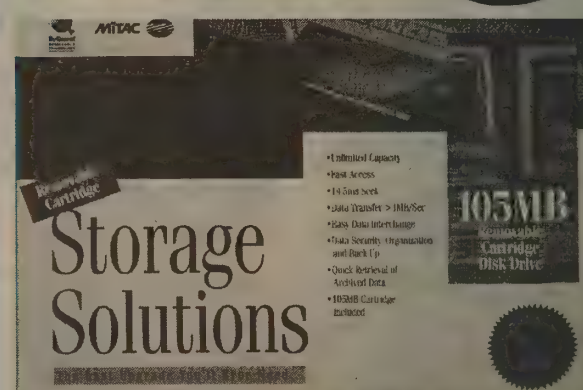
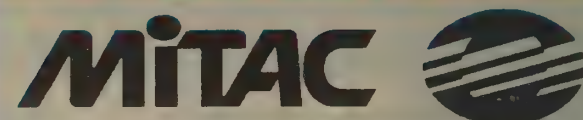
Creative Lab Sound Blaster Deluxe\$78
Creative Lab Sound Blaster Pro Deluxe\$118
Creative Lab Sound Blaster 16 Basic\$148
Creative Lab Sound Blaster 16\$178
Creative Lab Sound Blaster 16 ASP\$228
Creative Lab Sound Blaster 16 MCD\$185
Creative Lab Sound Blaster 16 MCD ASP\$210
Creative Lab Sound Blaster 16 SCSI\$200
Creative Lab Sound Blaster 16 SCSI ASP\$225
Creative Lab Video Blaster w/Microsoft video for Win ...\$355
Creative Lab Video Spigot video capture card\$355



Media Vision Pro Audio Spectrum 16 Basic\$149
Media Vision Pro Audio Spectrum 16 Sound Card\$169
Media Vision Pro Audio Studio 16 Sound Card\$229
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Lotus 1-2-3 V3.1 (MPC)\$25
Macromind Action! (MPC)\$36
Marketing Master 1992 (DOS)\$28
Microsoft Works (MPC)\$50
Publish It 2.0 (DOS)\$27
TEMPRA Access Photo CD Imaging Software (DOS)\$24
Survey of Western Arts (MPC)\$34
TIME Almanac - 1991 (DOS)\$32
Time Table of History (DOS)\$21
Toolworks Encyclopedia (MPC)\$57
Toolworks Reference Library (DOS)\$25
U.S. Atlas & Automap (DOS)\$28
Atlas Pak - US / World Atlas (DOS)\$23
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USA Wars: Civil War (DOS)\$46
USA Wars: Desert Storm (MPC)\$28
USA Wars: Korea (DOS)\$46
USA Wars: World War II (DOS)\$46
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Wild Places (DOS)\$19
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Arthur's Teacher Trouble (MPC)\$32
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Audubon's Birds (DOS)\$31
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Bring the World Your Senses (DOS)\$19
Carmen San Diego (DOS)\$30
Choose your College\$21
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Composer Quest (MPC)\$34
Compton's Encyclopedia (MPC)\$64
Corp Snapshot (DOS)\$36
Dictionary of the Living World (MPC)\$34
Dinosaur Adventure (MPC)\$32
DTP Pro FM - Wave Clipart\$26
Electronic Home Library (DOS)\$30
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Family Doctor (DOS/MAC)\$27
Family Education Collections (DOS)\$28
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Great Cities - Vol. 2 (DOS)\$28
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Sleeping Beauty (MPC)\$25
Sound Library (MPC)\$21

ENTERTAINMENT

Amanda Stories (MPC)\$83
Battle Chess (DOS)\$26
Beauty & Beast (MPC)\$22
Beyond the World of Stars (DOS)\$29
CD Game Pak II (DOS)\$30
CD Storytime (DOS)\$25
Chessmaster 3000 (MPC)\$23
CIA World Fact Book (DOS)\$27
Guinness Records 1993 (MPC)\$30
Guinness Disc of Records (DOS)\$19
Interactive Storytime Vol 1 (DOS)\$27
Jones in the Fast Lanes (MPC)\$25
King's Quest V (DOS)\$25
Loom from Lucas Film (DOS)\$25
Mantis Experimental Fighter (DOS)\$22
Mario's Missing/DGeneration\$33
Mario Mission/ World Atlas (DOS)\$30
Mayo Clinic Family Health (DOS)\$27
MIDI Music Shop (MPC)\$27
Mixed up Mother Goose (MPC)\$25
The Secret of Monkey Island (DS)\$24
PC-SIG 11th Edition (DOS)\$23
Peter & the Wolf (MPC)\$22
Secret Weapons of Luftwaffe\$25
Sherlock Holmes (DOS)\$25
So Much Shareware I (DOS)\$20
So Much Shareware II (DOS)\$25
Space Adventure (MPC)\$32
Space Quest IV\$25
Sport's Best (3 in 1) (DOS)\$26
Stellar 7 (DOS)\$25
Total Baseball (DOS)\$25
Who Killed Sam Rupert (MPC)\$34
Willie Beamish - The Adventure\$25
Wing Commander/Ultima VI (DOS)\$25
Wizard\$21

CD Pak for DOS\$82

- 6 Titles: Multimedia Encyclopedia, The Animals!, Reference Library, US Atlas, World Atlas, & The Secret of Monkey Island

CD Pak for Windows\$82

- 6 Titles: Multimedia Encyclopedia, The Animals!, Chessmaster 3000, US Atlas, World Atlas, & Beacon Teaches Typing 2.0

CD Quartet 1\$38

- US Atlas, World Atlas, Chessmaster 3000, Mavis Beacon Teaches Typing

CD Quartet 2\$43

- US Atlas, World Atlas, Reference Library, Secret of Monkey Island

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System Boards

SYSTEM BOARDS (w/CPU, OK Memory) - AMI

AMI Enterprise IV 486DX2-66MHz EISA VLB M/B w/256K Cache .. \$1230
AMI Enterprise IV 486DX-50MHz EISA VLB M/B w/256K Cache \$1145
AMI Enterprise IV 486DX-33MHz EISA VLB M/B w/256K Cache \$965

AMI Super Voyager 486DX2-66MHz VLB M/B w/256K Cache \$985
AMI Super Voyager 486DX-50MHz VLB M/B w/256K Cache \$905
AMI Super Voyager 486DX-33MHz VLB M/B w/256K Cache \$715
AMI Super Voyager 486SX-33MHz VLB M/B w/256K Cache \$522
AMI Super Voyager 486SX-33MHz VLB M/B w/64K Cache \$473
AMI Super Voyager 486SX-25MHz VLB M/B w/64K Cache \$359

**Call for latest AMI System Boards, Inc. AMI PCI Boards

SYSTEM BOARDS (w/CPU, OK Memory) - IBM (Alaris)

IBM Leopard 486SLC2-50 VLB M/B w/64K Cache \$290
IBM Leopard 486SLC2-66 VLB M/B w/64K Cache \$335
*Leopard 486SLC2 M/B has 2 VLB slots, & 16K Internal Cache
*Manufactured in the U.S.A. by IBM Charlott, NC, w/ 3yr limited warranty
*128K Cache Upgrade from 64K +\$15., Math-Co Upgrade +\$45.

SYSTEM BOARDS (w/CPU, OK Memory) - MICRONICS

Micronics EV 486DX2-66MHz EISA VLB M/B w/256K Cache \$1165
Micronics EV 486DX2-50MHz EISA VLB M/B w/256K Cache \$990
Micronics EV 486DX-33MHz EISA VLB M/B w/256K Cache \$865

Micronics E3 486DX2-66MHz EISA M/B w/256K Cache \$1065
Micronics E3 486DX-50MHz EISA M/B w/256K Cache \$1015
Micronics E3 486DX-33MHz EISA M/B w/256K Cache \$770

Micronics MX-30 486DX2-66MHz VLB M/B w/256K Cache \$900
Micronics MX-30 486DX-50MHz VLB M/B w/256K Cache \$735
Micronics MX-30 486DX-33MHz VLB M/B w/256K Cache \$620
Micronics MX-30 486SX-25MHz VLB M/B w/0K Cache \$292

Micronics Mini 486DX2-66MHz M/B w/256K Cache w/IO \$880
Micronics Mini 486DX-50MHz M/B w/256K Cache w/IO \$830
Micronics Mini 486DX-50MHz M/B w/256K Cache w/IO \$715
Micronics Mini 486DX-33MHz M/B w/256K Cache w/IO \$600
Micronics Mini 486SX-25MHz M/B w/0K Cache w/IO \$272

**Call for latest Micronics System Boards, Including PCI Boards

SYSTEM BOARDS (w/o CPU, OK Memory) - EISA

AIR Baby 486 EISA VLB M/B w/256K Cache (72pin Memory) \$385
AIR Baby 486 EISA VLB M/B w/256K Cache (30pin Memory) \$395
*AIR EISA VESA Local Bus M/B has 3 VLB slots & Bus Master function, ZIF socket, USA made

VEGA Baby 486 EISA M/B w/256K Cache (USA made) \$365

SYSTEM BOARDS (w/o CPU, OK Memory) - VESA Local Bus

AIR Baby 486 VLB M/B w/256K Cache \$200
*AIR (UMC) VESA Local Bus M/B has 3 VLB slots & Bus Master function, ZIF socket
AIR PENTIUM VLB M/B w/512K Cache CALL
*3 VLB slots w/Bus Master function, ZIF socket, AMI Flash BIOS
72Pin 36Bit Simm Memory
HINT Baby 486 EISA VLB M/B w/256K Cache \$227
*HINT EISA VESA Local Bus M/B has 3 EISA & 2 VLB slots, ZIF

OPTI Mini 486 VLB M/B w/128K Cache (Slave mode) \$118
OPTI Mini 486 VLB M/B w/128K Cache (Bus Master mode) \$122
OPTI Mini 486 VLB M/B w/256K Cache (Bus Master mode) \$134
OPTI Mini 486 VLB M/B w/256K Cache (Bus Master mode) w/ZIF \$144
*OPTI VESA Local Bus M/B has 2 VLB slots
OPTI PENTIUM VLB M/B w/512K Cache (Bus Master mode) \$495

VEGA Mini 486 VLB M/B w/256K Cache (USA made) \$185
*VEGA VESA Local Bus M/B has 3 VLB slots & Bus Master function, ZIF socket

SYSTEM BOARDS (w/o CPU, OK Memory) - PCI Bus

Opti 486 PCI M/B w/256K Cache (USA made) \$549
*Opti PCI M/B has 3 PCI & 5 ISA slots, Bus Mastering
**Includes Onboard PCI SCSI HDD Interface & 32Bit PCI SVGA Windows Accelerator (S3 chipset, 16.8M Colors)

VEGA 486 PCI VLB M/B w/256K Cache (USA made) \$365
*VEGA PCI Bus M/B has 4 PCI & 3 VLB slots, Bus Mastering

SYSTEM BOARDS (w/o CPU, OK Memory) - ISA

VEGA ISA 486, 64MB 640x480 M/B:
VEGA Baby 486 M/B w/64K Cache (USA made) \$180
VEGA Baby 486 M/B w/256K Cache (USA made) \$205
VEGA ISA 3486, 32MB M/B:
VEGA Baby 3486 M/B w/64K Cache (USA made) \$155
VEGA Baby 3486 M/B w/256K Cache (USA made) \$180

SIS Mini 486 M/B w/256K Cache \$120

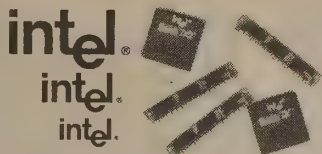
Cyrix 486DLC M/B (w/o CPU):

OPTI Mini 486DLC M/B w/128K Cache (w/o CPU & Math Co) \$90

OPTI Mini 386DX M/B w/128K Cache (w/o CPU) \$90
OPTI Mini 386DX-40MHz M/B w/128K Cache (w/CPU) \$147
OPTI Mini 386DX-33MHz M/B w/128K Cache (w/CPU) \$171

SARC 386SX-40MHz M/B \$92

CPU's & RAM



MICROPROCESSORS (CPU)

Intel PENTIUM 60MHz CPU \$1280
Intel 486DX2-66MHz CPU \$485
AMD 486DX2-66MHz CPU \$440
Intel 486DX-50MHz CPU \$435
Intel 486DX2-50MHz CPU \$335
AMD 486DX2-50MHz CPU \$298
AMD 486DX-40MHz CPU \$275
Intel 486DX-33MHz CPU \$285
Intel 486SX-33MHz CPU (PGA) \$138
Intel 486SX-33MHz CPU (PQFP) \$135
Intel 486SX-25MHz CPU (PGA) \$108
Intel 486SX-25MHz CPU (PQFP) \$106
Cyrix 486DLC-40 CPU with Math Co \$113
AMD 386DX-40MHz CPU (PGA) \$70
AMD 386DX-40MHz CPU (PQFP) \$67
Intel 386DX-33MHz CPU \$81

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Irvine (714) 580-6990

Modems

Hayes Modems

Optima Ext. 9600 Data Modem \$335
Optima External 9600 Fax/Modem \$348
Optima External 14400 Data Modem \$355
Optima External 14400 Fax/Modem \$378



Internal 144/144 Fax/Modem \$179
External 144/144 Fax/Modem \$209
SatisFAXtion 100 Internal Fax Modem \$105
SatisFAXtion 200 Internal Fax Modem \$305
SatisFAXtion 400 Internal Fax Modem \$395
SatisFAXtion 400 External Fax Modem \$405



Sportster 9600PC Internal Data Modem \$159
Sportster 9600 External Data Modem \$189
Sportster 14400PC Int. Data Modem \$179
Sportster 14400 External Data Modem \$209
Sportster 144/144 Int. Fax/Modem \$189
Sportster 144/144 Ext.Fax/Modem \$219

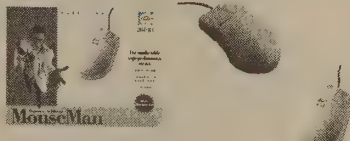
Zoltrix Modems

2400i Int. 2400Baud Data Modem \$29
Standard Internal 96/24 Fax/Modem \$49
Windows Internal 96/24 Fax/Modem \$50
Enhanced Internal 96/24 Fax/Modem \$85
-w/Hardware MNP5 & V.42bis
Pocket 96/24 Send/Recv. Fax/Modem \$99
Internal 144/144 Fax/Modem \$145
External 144/144 Fax/Modem \$175
External Pocket 144/144 Fax/Modem \$215

Aceex Modems

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Internal 9600/2400 Baud Fax/Modem \$49
Internal 9600Baud Data Modem \$125
External 9600Baud Data Modem \$150
Internal 144/144 Fax/Modem \$145
External 144/144 Fax/Modem \$175
External 192/144 Full Duplex Modem & 14.4 S/R Fax \$340

Mice



Honeywell 3-button Serial Mouse \$42
Keytronic 400dpi Serial Mouse \$18
Z-Nix Serial Mouse \$16



Dexa Mouse \$24
MouseMan Bus Version \$70
MouseMan PS2/Serial Combo \$68
Trackman II (Serial) \$79
Trackman Portable \$98
Cordless Mouse \$96
ScanMan 256 w/OCR software \$218

Microsoft Corp.

Serial Mouse \$69
Bus Mouse \$85
BallPoint Mouse (PS-2 Version) \$89
BallPoint Mouse (Serial,PS-2 Version) \$115

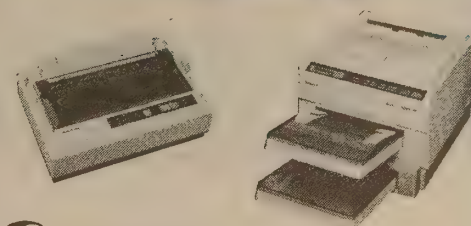
Keyboards

BTC 5339SX 101keys Kbd \$25
Chicony KB-5181 101keys Kbd \$38
Chicony KB-5311 101keys Kbd \$23
Chicony KB-5911 TrackBall Kbd \$63
Focus-2001 101keys Kbd w/Hard Dustcover (Click) \$40
Focus-2001B 101keys Kbd w/Hard Dustcover (Click) - Black \$45
Focus-6000 101keys Kbd (Soft click) ... \$36
Focus-8000 111keys Kbd w/ (Calculator, Soft click) \$45
Focus-9000 128keys Kbd w/ (Programmable, Click) \$62
Fujitsu-4700 101keys Kbd \$47
Fujitsu-4870 101keys Kbd \$37
Honeywell-101WN 101keys Kbd (3yr. warranty) \$40
KT-2000 101keys Kbd (Made by Keytronic) \$36
MaxSwitch 101 keys Keyboard \$36
MaxiSwitch 124keys Programmable \$63

Chassis (Cases)

CS-B01 Baby AT Case w/200W P.S. (3x5.25",1x3.5") \$51
CS-20 Baby AT Case w/200W UL P.S. (3x5.25",1x3.5") \$83
CS-36 Full Vertical Case w/230W UL P.S. (6x5.25",2HD,Digital) \$122
CS-300GTS Full Vertical Case w/300W UL P.S. (7x5.25", Double fan) \$175
CS-510 Baby AT Case w/200W P.S. (3x5.25",1x3.5") \$53
CS-109T Desktop Case w/230W P.S. (2x5.25",1x3.5) \$56
CS-609T Mini Vertical Case w/230W P.S. (2x5.25",3x3.5") \$54
CS-609M Mini Vertical Case w/230W P.S. (2x5.25",3x3.5",Digital) \$56
CS-740 Mini Vertical Case w/230W P.S. (2x5.25",3x3.5",Door,Digital) \$64
CS-760 Mid Vertical Case w/230W P.S. (3x5.25",3x3.5",Door,Digital) \$86
CS-780 Full Vertical Case w/230W UL P.S. (4x5.25",2HD,Door,Digital) \$117
CS-932 Mini Vertical Case w/230W P.S. (2x5.25",3x3.5") \$52
CS-923 Mid Vertical Case w/230W P.S. (3x5.25",3x3.5",Digital) \$72
CS-912 Full Vertical Case w/230W UL P.S. (4x5.25",2HD,Digital) \$105
CS-836 MPC Desktop Case w/200W UL P.S. & 20Watts Speakers \$125

Printers



Canon

Canon BJ-10ex Bubble Jet Printer \$245
Canon BJ-200 Bubble Jet Printer \$330
Canon BJ-230 Bubble Jet Printer (Wide) \$408
Canon BJ-300 Bubble Jet Printer \$333
Canon BJ-600 Color Bubble Jet Printer \$595
Canon BJC-800 Color Bubble Jet Printer \$1533
Canon BJC-820 Color Bubble Jet Printer (Wide) \$1647



Citizen PN-48 Notebook Printer (Professional) \$225
Citizen Notebook II Printer (Professional,Optional Color) \$318
Citizen GSX-190 Printer (9pin/color option) \$159
Citizen GSX-230 Quiet Printer (24pin/270cps/color option) \$219
Citizen GSX-240 Quiet Printer (24pin/300cps/80col/color opt.) ... \$290
Citizen GSX-145 Printer (24pin/192cps/132col/color option) \$355
*** Color Kit for Citizen 200GX, GSX-230 or GSX-240 +43



Epson Action Printer 2250 (9pin) \$120
Epson Action Printer 3250 (24pin) \$179
Epson FX-870 Printer (9pin) \$275
Epson FX-1170 Printer (9pin, Wide) \$368
Epson LQ-570+ Printer (24pin) \$249
Epson LQ-870 Printer (24pin) \$455
Epson LQ-1070 Printer (24pin, Wide) \$365
Epson LQ-1170 Printer (24pin, Wide) \$625
Epson LQ-2550 Printer (24pin, Wide) \$930
Epson Action Laser 1500 (1MB,6ppm) \$680
Epson EPL-8000 Laser Printer \$885



Panasonic KX-P1150 Printer (9pin/240cps/80col) \$139
Panasonic KX-P2023 Quiet (24pin/240cps/80col) \$199
Panasonic KX-P2123 Quiet (24pin/240cps/80col/color opt.) \$229
Panasonic KX-P2124 Quiet (24pin/320cps/80col/color opt.) \$315
Panasonic KX-P2624 Quiet (24pin/300cps/132col) \$380
*Color Kit for Panasonic KX-P2180, KX-P2123 or KX-P2124 +45
Panasonic KX-P4400 LED Page Printer (4ppm/512k/300dpi) \$519
Panasonic KX-P4410 Laser (5ppm/512k/300dpi) \$549
Panasonic KX-P4430 Laser w/SaintPrint (5ppm/1MB/300dpi) \$659
Panasonic KX-P4440 Laser w/SaintPrint (10ppm/1MB/300dpi) .. \$1189
*** Please call for Panasonic Printer Accessories and Consumables Products



Okidata ML320 \$307
Okidata ML321 \$430
Okidata OL400P LED Page Printer \$557
Okidata OL810 LED Page Printer \$920
Okidata OL830 Plus LED Page Printer \$1105
Okidata OL850 LED Postscript Printer \$1227



Hewlett Packard

Hewlett Packard Portable Printer \$395
Hewlett Packard DeskJet 500 InkJet Printer \$350
Hewlett Packard DeskJet 550C Color InkJet Printer \$699
Hewlett Packard LaserJet 4L Personal Laser \$675
Hewlett Packard LaserJet 4P Laser \$995
Hewlett Packard LaserJet 4 Laser \$1445
Hewlett Packard LaserJet 4M Laser \$1985

Chassis (Cases) Continued

Diamond Series: (Black color model available +\$3.00)
CS-130 Full Vert Case w/250W UL P.S. (4x5.25",2HD,Digital) \$126
CS-230 Mid Vert Case w/250W UL P.S. (4x5.25",2HD,Digital) \$110
CS-330 Mini Vert Case w/220W UL P.S. (2x5.25",3x3.5",Dig.) \$81
CS-530 Desktop w/250W UL P.S. (2x5.25",2x3.5",2HD,Digital) \$86
CS-730 Baby AT w/220W UL P.S. (2x5.25",1x3.5",1HD,Digital) \$81
CS-830 Slim Line w/220W UL P.S. (1x5.25",1x3.5",1HD,Digital) \$81
2nd Fan for Diamond Series cases (CS-130,CS-230,CS-530) \$10

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RESOURCES

Calendar Of Events

CONFERENCES, SHOWS, AND OTHER SPECIAL EVENTS

JANUARY

January 1 Fifth Annual CorelDRAW \$1,000,000 World Design Contest. Ottawa, Canada. Corel Corp. Call: (613)728-9790.

January 2 Computer Show & Sale. Civic Auditorium, Glendale. Richard James Corp. Call: 1-800-685-1400.

January 2 Computer Show & Sale. Community Center, Oxnard. MarketPro Shows. Call: (415)388-8893.

January 10-13 Object World Conference. Boston, MA. IDG World Expo. Call: 1-800-225-4698.

January 11 Federal On-Site Technology Expo. Twentynine Palms MCAGCC, Twentynine Palms, CA. SBPRC Inc. Call: 1-800-878-2940.

January 13 Federal On-Site Technology Expo. Balboa Naval Hospital, San Diego. SBPRC Inc. Call: 1-800-878-2940.

January 13 Federal On-Site Technology Expo. San Diego Naval Station, San Diego. SBPRC Inc. Call: 1-800-878-2940.

January 15-16 Computer Show & Sale. CSU Northridge, North Campus. Richard James Corp. Call: 1-800-685-1400.

January 27-30 Interactive Technology And Healthcare Conference: Visionary Applications For Simulation, Visualization, And Robotics. San Diego. UC San Diego. Call: (619)751-8841.

January 30 ACP Computer Swap Meet. Santa Ana, ACP. Call: (714)558-8813.

FEBRUARY

February 8-10 HP And Apollo Workstation Expo '94. San Jose. PCI Trade Show Management. Call: 1-800-727-EXPO(3976) or email at workexpo@pcinews.lonestar.org.

February 12 Computer Show & Sale. Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

February 13 Computer Show & Sale. Glendale Civic Auditorium. Richard James Corp. Call: 1-800-685-1400.

February 19 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

February 20 Computer Show & Sale. CSUN, North Campus.

DUE JANUARY 7

SILICON GRAPHICS EXPO '94 CALL FOR PAPERS *San Jose*

Expo '94 will address the current status of the Silicon Graphics community, its recent developments, and its goals for the next five years. The conference is soliciting technical papers and presentations on topics of interest to the Silicon Graphics marketplace. Specific topics of interest include: animation applications, automating storage management, and collaborative computing. Manufacturers of computer equipment and software used in conjunction with Silicon Graphics technology are encouraged to participate with conference presentations. Abstracts of papers are due January 7, 1994. Call: (512)331-7761. Fax: (512)331-3950. Email: sgiexpo@pcinews.lonestar.org.

JANUARY 27-30

INTERACTIVE TECHNOLOGY & HEALTHCARE: VISIONARY APPLICATIONS FOR SIMULATION, VISUALIZATION, ROBOTICS *San Diego*

Virtual reality may change the way society approaches healthcare forever. This symposium is a unique opportunity to learn how the cutting-edge technologies of simulation, visualization, and robotics will affect the future of medical and surgical practice. Physicians and technology researchers and developers will explore advanced technological methods for improving access, quality, and continuity of healthcare while reducing cost. Sponsored by the University of California, San Diego, School of Medicine. Call: (619)751-8841.

MARCH 18-20

LOS ANGELES COMPUTER FAIR *Fairplex Expo Center, Pomona*

This fair will focus on consumer education, business and home solutions, product and brand awareness, and technology overviews. With 450 exhibitors and an estimated fifty thousand attendees, it promises to be one of the largest consumer-oriented computer shows ever. Admission is free. Call: National Productions, 1-800-800-5600.

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Hundreds of companies having price wars to compete for your business. You couldn't find this much inventory in a hundred computer stores nor at these prices. There is also a consignment table to sell your computer equipment.

Pomona Shows
FREE SEMINARS
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SHOW DATES

January 8 & 9
Saturday & Sunday

POMONA - Fairplex (LA County Fairgrounds)
Exit Highway 10 at Fairplex Drive. Go North to McKinley,
turn right. Turn Left on White Avenue to Gate 14.

Admission: \$7.00

January 22 & 23
Saturday & Sunday

POMONA - Fairplex (LA County Fairgrounds)

Admission: \$7.00

January 29
Saturday

SANTA BARBARA - (Earl Warren Showgrounds)
Highway 101 and Las Positas

Admission: \$5.00

February 5 & 6
Saturday & Sunday

POMONA - Fairplex (LA County Fairgrounds)

Admission: \$7.00

February 12
Saturday

RESEDA - Sherman Entertainment Center
From 101 Freeway, take Reseda off ramp, turn left (if traveling East)
to Sherman Way, turn right, one block to Canby Street. 18430 Sherman Way.

ADMISSION FREE!

February 13
Sunday

BUENA PARK - Sequoia Conference Center
Take the Beach Blvd. Exit off the 91 Freeway,
go one block North to 7530 Orangethorpe.

Admission: \$5.00

Computer Training Seminars at all Pomona Shows!

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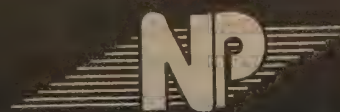


Reserve exhibit space today! Speakers also invited!

March 18, 19, 20, 1994

At the LA County Fairgrounds - Pomona (Fairplex)

The largest and ONLY full spectrum computer Fair on the West Coast! Hundreds of exhibits and seminars. Major companies will be exhibiting. "The" place to learn about new technology and new product releases. Limited exhibit space is still available.



National Productions, Inc.

(408) 778-5200 or 800-800-5600

Calendar Of Events continued

Richard James Corp. Call: 1-800-685-1400.
February 21-25 Documentation '94 Conference And Exposition. Los Angeles. Graphics Communications Assoc. and Publishing Technology Mangement, Inc. Call: Tanya Boss, (703)519-8174.

MARCH

March 1-3 Intermedia: International Conference And Expo On Multimedia And CD-ROM. San Jose. Stamford Division. Call: (203)352-8254.

March 18-20 Los Angeles Computer Fair. Pomona. National Productions. Call: 1-800-800-5600.

March 18-20 National Products Computer Fair '94. Los Angeles Fairgrounds, Building 4. National Products. Call: 1-800-800-5600.

CLASSES, SEMINARS, AND WORKSHOPS

JANUARY

January 4-25 How To Use A Computer Using Windows/DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

January 7-28 WordPerfect 5.1 For DOS Intensive Class. Monrovia. The Organizers. Call: (818)303-3311.

January 8 Intro To IBM PC Class. Monrovia. The Organizers. Call: (818)303-3311.

January 8-February 12 Part One Of Computer Animation And Storyboarding With 3-D Studio Class. Universal City. UCLA Extension. Call: (310)825-9064.

January 9 WordPerfect 5.1 For DOS Class.

Monrovia. The Organizers. Call: (818)303-3311.

January 11-March 29 Intro To Programming With Microsoft Windows Class. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 11-March 29 Intro To Programming With Visual Basic For Windows Class. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 11-March 29 Fundamental Issues In Designing And Developing Interactive Media Class. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 12 Apple's Mobile Communications Workshop. Los Angeles. Apple Computer. Call: 1-800-947-5670.

January 12 Lotus 1-2-3 For DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

January 12-February 16 Managing The Transition To NT. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 13 Windows 3.1 Class. Monrovia. The Organizers. Call: (818)303-3311.

January 13-February 17 Microsoft Windows For The New User Class. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 13-March 24 Business Realities Of Interactive Entertainment Class. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 15 Accessing The Resources Of The Internet Class. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 17-March 18 Special Effects As A Narrative Tool In Film And Television Class. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 18-21 CD-ROM Development Workshop: From Multimedia Publishing To Data Archival. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 19 Intro To Microsoft Windows: A One-Day Workshop. Los Angeles. UCLA Extension. Call: (310)825-9064.

January 19 Lotus 1-2-3 For DOS Class. Monrovia. The Organizers. Call: (818)303-3311.

January 20 Word For Windows Class. Monrovia.

The Organizers. Call: (818)303-3311.

January 22 Excel For Windows Class. Monrovia. The Organizers. Call: (818)303-3311.

January 23 Intro To The IBM PC Class. Monrovia. The Organizers. Call: (818)303-3311.

January 24 Lotus 1-2-3 4.0 For Windows Class. Monrovia. The Organizers. Call: (818)303-3311.

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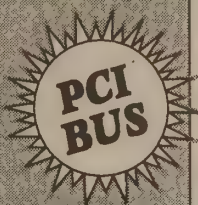
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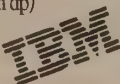
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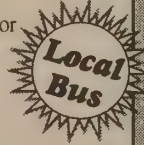
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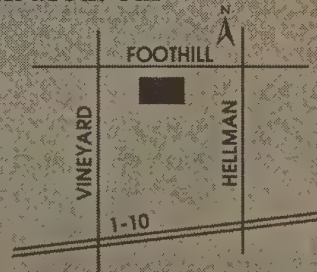
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BBS Spotlight

By John Wolcott

It's Child's Play

Most bulletin boards available for your use will attempt to offer a wide range of features and address many interests. Few and far between are the bulletin boards specializing in a particular subject area. Fewer still are those specialized boards that specifically fill a special public need. This month's BBS Spotlight presents just such a BBS.

Most all of the folks who have ever asked me about buying a computer have been specifically interested in obtaining and using educational software for themselves or their children. The Child's Play BBS is an excellent resource for this purpose. The BBS is specifically oriented toward providing educational information and software for download. Better still, it's free!

Child's Play BBS is located in La Puente. With two incoming telephone lines supported by Practical Peripherals PM14400FXSA v.32BIS modems, the BBS may take some persistence to access. The effort is worth it. Child's Play runs on Wildcat v3.9 to present a professional and visually pleasing atmosphere.

System Operator Doug Padgett is enthusiastic about offering a bulletin board service that is an asset to the BBS community. Having been in existence for a year and a half, the registered membership exceeds 280 users. Doug enjoys running the BBS because it is such a great feeling to be thanked by the users for providing a great service. Doug commented, "I was looking for a new challenge, so I started the BBS. It has been a rewarding experience."

After logging on and registering, you'll be greeted with system bulletins, a graphical donation request, various social announcements, and a check for outstanding email. The main system bulletin will give you some system guidelines for use; including a message about the board being directed toward education and not carrying X-rated files of any type. New users will not have system access until downloading the "register.zip" file from the "Free File" file library area and returning this; completed with the requested information.

Once you've registered, all of the options from the Main Menu are available. The features offered on this BBS are somewhat minimal. They include a message menu, system bulletins, "Doors" online games, a file library, and the ability to chat with other users currently connected. With the system being educationally based, most of your system needs will be met with file upload and download.

You may join specific topical discussion conferences to address whatever may interest you. Conferences to join include just about anything you'd care to discuss. Getting into message base use is a world of its own. The message menu will allow you to leave and retrieve electronic mail to and from other system users. You may also join in the fun on the national email networks "WallNet" and "CoastNet." All you need do to participate in one of these networks is "join a conference" that supports this. With these networks, you'll be able to converse by email with local BBS users across the country.

"Doors" online games allow you to play system games

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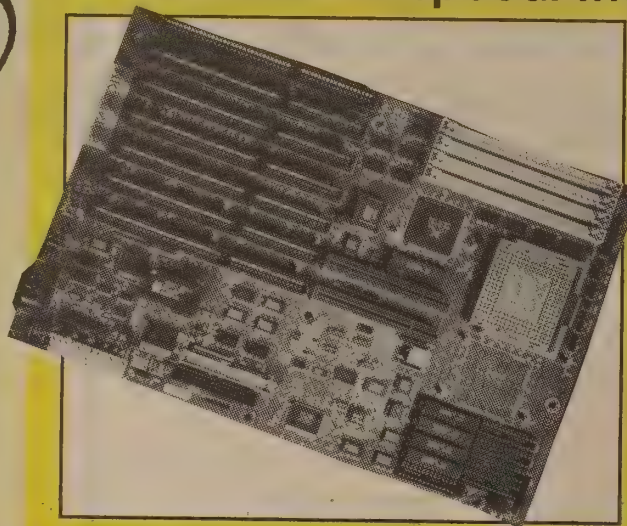
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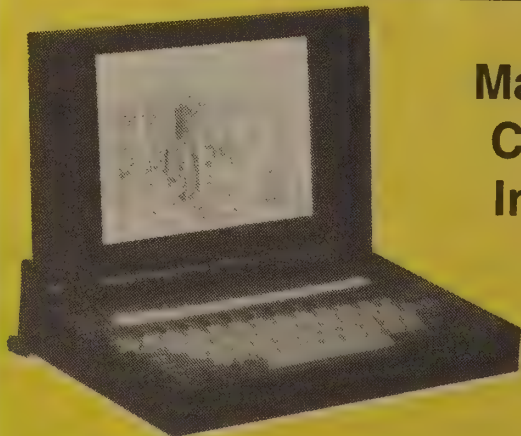
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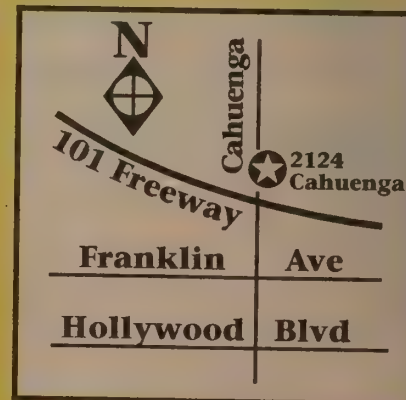
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Moroni BBS. (310)392-3981. 24 hrs., 300/1200/2400/9600. 15,000 shareware files plus an expanding section dealing with Latter-Day Saints. Free. [Exp. #117.]

MortgageNet BBS. (310)598-6054. 8-N-1, 24 hrs., 300/1200/2400/9600. Online pre-qualifying, interest rate updates, loan programs, repo's/foreclosures. Free. Sysop: Dennis Loput. [Exp. #120.]

The Original Off-Off Broadway BBS. (310)453-7038. 8-N-1, 24 hrs., 300/1200/2400/9600. Nonsubscription, text files/messages only. Using MajorBBS software and CompuCom Speedmodem. Sysop: James Gossage. [Exp. #120.]

PS&A BBS. (310)374-9994. 8-N-1, 24 hrs., 14,400. Tons of IBM, Mac, and OS/2 shareware, CD-ROMs, Fidonet with echomail, and more. Free. Sysop: Paul Swanno. [Exp. #120.]

Rola-Tek's BBS Effects. (310)673-8976. 24 hrs., 2400/9600/14,400. GIFs, shareware files, and DOS util-

ities. Free downloads. [Exp. #117.]

South Bay Apple Mac User Group BBS. (310)792-9600, 300-9600. 24 hrs., OneNet, first class, graphical user interface. [Exp. #120.]

The Spider's Web BBS. (310)322-1614. Online games, message areas include recovery and 12-step. Ecology, spirituality, science, and more. Free first call. Sysop: [Exp. #120.]

Starlight BBS. (310)830-5798. International echomail, Paradox, Windows, OS/2, C++, programming, finance, and more. Free. [Exp. #117.]

TVTIX. (310)441-0693. Reserve free seats to LA's hottest TV shows. Type Go TVTIX. [Exp. #118.]

Wildlife In Venice Beach. (310)827-3373. 1200/2400/9600. 10 lines, local nodes, 2 Gig of shareware and adult files. Parties. Meet someone hip. Free trial. Sysop: Salina Hassell. [Exp. #120.]

Xchange. (310)452-3374. 8-N-1, 300/1200/2400/9600. All classified ads, all free. A swap meet of ideas, objects, and everything this side of Jupiter. [Exp. #120.]

619

Red Crystal Inn. (619)373-8969. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Adults only. Doors, games. Free for limited use, fee to see all. Sysop: Harry B. Alls. [Exp. #120.]

Time Link Unlimited BBS. (619)373-1325. 8-N-1, 24 hrs., 14,400. Shareware, doors, 30 minutes free daily. Fee for upgrade use and door games. Sysop: Dale Kay. [Exp. #120.]

714

Homes For Sale In SoCal. (714)990-4802. 8-N-1, 24 hrs. 300/1200/2400/9600. Free. [Exp. #120.]

The Mouse House. (714)535-3761. 300/1200/2400/9600/14,400. All disney bbs. Messages, job listings, Disneyana, classifieds, Westcot 2000. Sysop: Uncle Walt. [Exp. #117.]

BBS Spotlight continued...

and shoot for high scores in competition with other users. The games available include titles such as Super Slots, Solitaire, Press Your Luck, Draw Poker, Kings Last, Great White, Trapper, and Yachtsee. The online games will be a pleasant pastime when you need a break from the upload/download monotony.

The files menu is where this BBS really shines. Regular hard drive access to files is complemented by CD-ROM libraries. After selecting the Files Menu choice from the Main Menu, you'll be able to search for specific files, browse through new files, select a specific file library for your perusal or give an upload or download command. Library titles cover all aspects of education as well as a number of computer utility functions such as virus scanning, word processing, and database use. Educational topics offered are history, science, chemistry, health, physics, art, languages, math, astronomy, and geography; to name a few. Over 5,500 files for download appoint the file library.

All popular file transfer protocols are supported including Zmodem, which will enhance your download pleasure tremendously. The 14,400 baud rate transfer ability will make transfer of even the largest files almost painless. All files available for download have been virus-scanned for your protection. Since this is a user-supported BBS, upload of any educational material is always appreciated.

Chatting with another user currently connected can be an entertaining experience. Exchanging educational information is the mainstay of this system and you'll find that users are here for just that reason. Don't be shy about chatting with the other "node" or even the sysop. These folks here are here to help.

The Child's Play BBS can be reached by calling (818)965-3921 with the standard modem parameters of 8-N-1. Give this BBS a call to participate in an educational experience. ■

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Bits and Pieces BBS. (714)630-8897. 8-N-1, 24 hrs., 9600/14,400. Conferences, email, shareware files, forums, IBM, Amiga, two-line and more. [Exp. #118.]

Check Six BBS. (714)362-8299. 8-N-1, 14,400. Flight simulation files, utilities, SimNet. 714th TFW user group. [Exp. #117.]

Commodore Computing. (714)673-2185. 8-N-1, 24 hrs., 300/1200/2400. Supports C64/128. Free. Sysops: Stephen Fabre/Jay Darrow. [Exp. #120.]

Lake Forest BBS. (714)770-5977, 770-0728. 8-N-1, 24 hrs., 1200/2400/9600/14,400/38,400. CD-ROM files, email, chat, Chinese character support forums. Sysop: Joe Hsu. [Exp. #118.]

The PC Sports Connection.

(714)533-6728. 8-N-1, 24 hrs., 300/1200/2400. Using Searchlight for unique games, fantasy leagues, and sports talk. Sysop: Keith Jefferson. [Exp. #118.]

The Punkin Duster BBS. (714)522-3980. 8-N-1, 24 hrs., 2400/9600/14,400/16,800. RIME email, thousands of files, online games, multinode PC board 15.0. Sysop: Dave Ludwig. [Exp. #120.]

Reality Network BBS. (714)969-9624. 8-N-1, 24 hrs., 300/1200/2400/9600/14,400. 14 lines. ANSI & RIP. Realty info, major-net, maillink for email, forums, chat. Free. Sysop: Dnug Cambell. [Exp. #120.]

Shoot The Moon Music BBS. (714)995-1004. 8-N-1, 24 hrs., 14,400. Music, gifts. Sysop: Ken Hada; John Wackerman. [Exp. #120.]

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805

The Brainstorm BBS. (805)584-6088. 2400/9600/14,400. Gigs, GIFs, interlink, online games, international messages, chat. Sysop: Eric Higgins. [Exp. #117.]

Real Estate Network. (805)298-2671. 2400. Free access to homes, agents, and software. [Exp. #117.]

ROLNet. (805)948-4900. 24 hrs., 14,400. Public policy discussions, White House Info, Antel, Valley Business and Community Board, HomeSchool Net, and more. [Exp. #120.]

818

Asian American BBS. (818)284-4519. 1200/2400/9600/14,400. Focus on cultural and business exchanges, serious and mature users only. Sysop: Gerald Fong. [Exp. #120.]

Compendium Of Wisdom. (818)904-3403. 300/1200/

2400. Dedicated to the Urantia book, cosmology, astronomy, philosophy, and more. Internet and FidoNet. [Exp. #117.]

Compu-Ad Information Network. (818)858-2763. 2400-19,200. Online real-time graphic listings of real estate, loan info, etc. Free. [Exp. #117.]

E-Qube BBS. (818)951-2796, 951-6097. 8-N-1, 24 hrs., 1200/2400/9600/14,400. Serving the engineering community. Online programs, offline mail, FidoNet. Sysop: Tom Honles. [Exp. #117.]

File Exchange BBS. (818)890-5678. 24 hrs., 300/1200/2400/9600/14,400. Registered Esterian Conquest. Over 4 Gigs of files online. No ratios. Download files on your first call. Sysop: Dennis Stover. [Exp. #117.]

Hotlips BBS. (818)248-3088, 1200/2400/14,400. Five lines, 6000+ files, 1000+ users,

1GB online, QWK mail door, professional emphasis. RIME Network. Sysop: Michael D. Callaghan. [Exp. #117.]

InvestorLink. (818)331-4611. 24 hrs., 2400. Stocks, mutual funds, real estate, personal finance, updated daily. Free. Sysop: Steve Painter. [Exp. #120.]

KeyHole BBS. (818)545-0870. 8-N-1, 300/1200/2400. Bring your Mac, UNIX, DOS questions or problems to us for a solution. Free. [Exp. #117.]

Kimo's Kinky Korner BBS. (818)858-0098. 2400/9600. Adult BBS, adult networks and files, echoing dove-net, quest-net, and kimo net. Fee. Sysop: [Exp. #118.]

Koncept BBS. (818)830-8467. 24 hrs., 9600. 30-day free trial. Used by SPCA, Marine Animal Services. Pay for extras. Sysops: David Pacifico and Larry Hess.

[Exp. #117.]

The Patchbay BBS. (818)441-3965. 8-N-1, 300-38,400. MIDI, Win3, graphics files. First call access. Free. Sysop: Daniel Bise. [Exp. #117.]

Southland Matchmaker. (818)793-9108. 14,400. Internet email, usenet groups, MUD, chat. Enter "mm" at login prompt. Sysop: @atrium.ucm.org. [Exp. #117.]

The Sprawl. (818)342-5127. 8-N-1, 24 hrs., 300/1200/2400/9600. Civil liberties, electronic publishing, data encryption, Fidonet, free full access. Sysop: John Schofield. [Exp. #118.]

Tin Shack BBS. (818)992-3321. 14,400. Immediate access. 1 Gig at high speed. We help BBS callers. Sysop: Guy Nohrenberg. [Exp. #120.]

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150 message subs, 50 online games, 1 Gig of files. Free. Sysop: [Exp. #120.]

Valley Computer Club BBS. (818)999-0925. 8-N-1, 1200/2400. Sysop: Jeff Woolf. [Exp. #118.]

The Wine Connection BBS. (818)718-5994. 8-N-1, 14,400. Five lines. Chat, message boards for wine enthusiasts and much more. Free. Sysop: Paul Sennett. [Exp. #120.]

Wizardry BBS. (818)222-4444. 1200/4800/9600/14,400. Chat, games, U/L, D/L, multiline. Free. [Exp. #120.]

909

BBS Pavillion. (909)245-2171. 8-N-1, 24 hrs., 14,400. Shopping mall, CD-ROMs, matchmaker, conferences, games, adult section. \$3.00 per month membership. [Exp. #120.]

ASSOCIATIONS

Computer Language Society. Meetings: 3rd Wed., 7:00 pm, Veterans Memorial Building, Room A, Overland and Culver, Culver City. Call: Bill Sharpe. (310) 451-9598. [Exp. #119.]

Independent Computer Consultants Association, Los Angeles Chapter.

Meetings: 1st Thurs., 6:00 pm. Prepaid reservation, \$25, or at the door, \$35. The LA chapter provides referral services. Call: (213)872-1811. [Exp. #116.]

Orange County Independent Computer Consultants Association. Call: (714)552-2384. [Exp. #116.]

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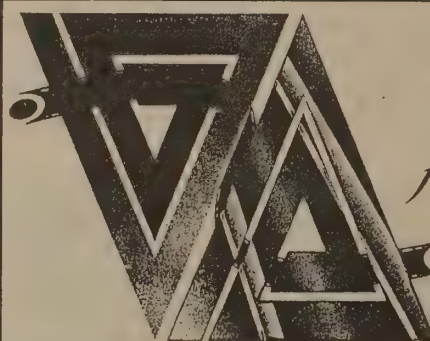
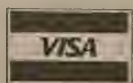
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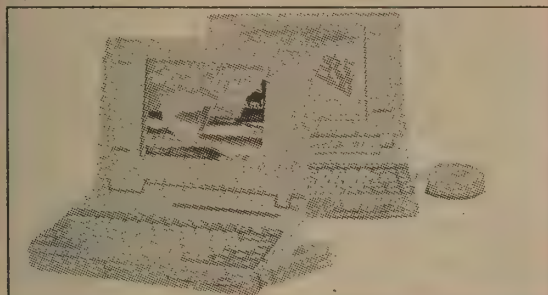


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USER GROUPS

ACCOUNTING

M*A*S90 User Group. Meetings: 3rd Wed., 6:30 pm, 22952 Alcalde Dr., Suite 130, Laguna Hills. Call: Ron Jacobs, (714)583-0424 x151. [Exp. #119.]

AMIGA

Amiga Friends User Group. Meetings: 3rd Sun., 1:00 pm, Ocean View High School at Warner and Gothard, Huntington Beach. [Exp. #119.]

Amiga User Group Of Long Beach. Meetings: 1st Thurs., 7:00 pm, 5373 E. Second St., Belmont Shores (in the Fire Station Bldg.). Call: Larry, (310)429-0752. [Exp. #123.]

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wednesday, 7:30 pm. Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Super SIGs, PD disks. Call: Kip Hammond, (310)390-3010. [Exp. #118.]

SCAUG—Southern California Amiga Users Group. Meetings: 1st Tues., 7:30 pm, 2nd Floor, Huntington Hall, St. Thomas of Canterbury Episcopal Church, 5903 Arbor Road, Long Beach. Call: (310)630-2712. [Exp. #119.]

APPLE

Champions Of The Mac Proletariat (CHOMP). Meetings: 4th Thurs., 7:30 pm, Cal Poly Pomona. Question and answer, raffle of useful software, opportuni-

ty to purchase disks. Call: Craig Richards (909)985-7385. [Exp. #123.]

ATARI

Atari Computer Association Of Orange County. Meetings: 2nd Sun., 12:30 pm. Fullerton Savings, 12860 Euclid, Garden Grove. Open to the public. Call: Tom Mynar, (714)960-6111, after 7:00 pm. [Exp. #118.]

ATESIG—Atari 8-Bit SIG. Meetings: 145 Surf Pl., Seal Beach. Cooperative group for Model Railroad applications. Call: (310)430-5433. [Exp. #123.]

South Bay Atari Computer Enthusiasts (SPACE). Meetings: 2nd Tues., 7:30 pm, Lomita VFW Hall, 1865 W. Lomita Blvd. Active in all user interests since 1981. Call: (310)375-4839 (10am-10pm). [Exp. #119.]

CD-ROM

CD-ROM SIG. Call: Bill Fisher, (714)241-0601, ext. 11. [Exp. #118.]

CLARISWORKS

ClarisWorks User Group. Supports both Macintosh and Windows. PO Box 701070, Plymouth, MI 48170. Call: (313)454-1969. [Exp. #117.]

CLIPPER

Clipper User Group Of Orange County. Meetings: 4th Thurs., 7:00 pm, Irvine

Host Hotel, 1717 E. Dyer Rd., Santa Ana. Call: Bruce Jones, (714)960-9680. [Exp. #118.]

COMMODORE

Commodore Technical Users Group (C=TUG). Meetings: 4th Sunday, 1:00 pm, Senior Citizen Center, 170 S. Olive St., Orange. Public domain library, documents library, and magazine. Software and hardware help. Call: Lou Palush, (714)532-1802. [Exp. #123.]

South Bay Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm. SEC Redondo Generating Station, 1100 Harbor Dr. (across from King Yacht Harbor). Support for 64/128 computers. Open to all users of Commodore Computer equipment and those who would like to receive or exchange information on programs, applications, or hardware. Call: Dave LeGalley, (310)324-8357. [Exp. #123.]

DESKTOP PUBLISHING

Southern California Ventura Publisher User Group (SC-VPUG). Meetings: Last Tues. 7:00 pm, Glendale Federal Bank, Carillon Room, 401 N. Brand Blvd., Glendale. Product demos, Q & A's, library resources. Call: (818)955-5830. [Exp. #119.]

IBM & COMPATIBLES

Greater South Bay PC User

Group. Meetings: 2nd Thurs., 7:30 pm, Christ King Lutheran Church, 2706 W. 182nd St., Torrance. Visitors welcome. Call: (310)329-2804. [Exp. #123.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed, 7:00 pm, Masonic Temple, 1120 E. Market St., Long Beach. Novice and experienced welcome. \$25/yr, \$35 for a family. Call: Jim Wells, (310)439-7114. [Exp. #121.]

Los Angeles Computer Society. Meetings: 2nd Tues., 7:00 pm, Culver City High School. Live presentations and giveaways. Meetings are free. Call: (310)471-2726. [Exp. #118.]

Orange County IBM PC Users Group. Meetings: 2nd Tuesday, 6:30 pm. Computer Learning Center, 1240 S. State College Blvd., Anaheim. Speakers, software, newsletter. Open to public, all welcome. Call: (714)990-0580 [Exp. #123.]

Pasadena IBM User Group. Meetings: 3rd Wed., 7:00 pm, 2184 N. Lake Ave., Altadena. Speakers on hardware/software, SIGs, library, newsletter, and BBS. Call: Steve Bass, (818)791-1300. [Exp. #123.]

Public Domain Users Group. 1000s of programs for IBM, Commodore, and CP/M computers. For free catalogue write to: T&T Shareware Marketplace, P.O. Box 390644, San Diego, CA 92149. [Exp. #119.]

San Bernardino Personal Computer User Group.

Meetings: Last Wed., 7:00 pm, CSU, San Bernardino, Pfau Library Bldg., Rm. PL-8. Call: Arthur Saltzman, (909)880-5755. [Exp. #118.]

Southwest PC User Group. Meetings: 3rd Sat., call for location, or write: PO Box 78785, Los Angeles, CA 90016. Call: Christine Tripp, (213)935-4105. [Exp. #117.]

Thousand Oaks Personal Computer Club (TOPCC). Meetings: 4th Thurs., 6:30 pm, Goebel Senior Adult Center, 1385 E. Janss Rd., Thousand Oaks. Call: (805)523-1924. [Exp. #123.]

TUG-NET. Meetings: 1st three Thurs., 7:00 pm, Tektronix Corp., 21300 Erwin St., Woodland Hills. Enter through back door of building, press buzzer. Call: (818)249-1629. [Exp. #123.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Glendale Federal Bank, 7119 Topanga Cyn., Canoga Park. BBS, PD library, SIGs, newsletter. All welcome. Call: Estella McClintock, (818)848-1948; or Grayce Hruda, (818)842-3707. [Exp. #123.]

MACINTOSH

Champions Of The Mac Proletariat (CHOMP). Meetings: 4th Thurs., 7:30 pm, Cal Poly Pomona, grey building near administration building, rm. P2-7. Call: Craig Richards (909)985-7385 or Mitch Cohen, (909)598-5766. [Exp. #123.]

South Bay Apple Macintosh User Group. Meetings: Last Wed., 7:30 pm, Pacific Elementary School, 1214 Pacific Ave., Manhattan Beach. Call: (310)644-3315. [Exp. #123.]

West Orange County Macintosh User Group (WOCMUG). Meetings: last Tues., 7:00 pm, Carver Elementary School Auditorium, 5335 E Pavo St., Long Beach. Come and join with other Mac Users to share knowledge and experiences. Call: Lynn Goodrich (714)892-8910 or Tony Muller (310)493-1240. [Exp. #123.]

MULTIMEDIA

Multimedia Audio Technology Group. Multiple platform, multimedia audio presentations. Call: Chris Palmer, (818)364-2577. [Exp. #118.]

The International Interactive Communications Society, LA Chapter. Meetings: 7:30 pm, Electronic Cafe, 1649 18th St., Santa Monica. Free for members, \$10 for non-members. Call: (310)535-1293. [Exp. #118.]

NEXTSTEP

Southern California NeXTSTEP User Group. Meetings: throughout LA County. Call: Mike Mahoney, (310)985-1550. Email: mahoney@csulb.edu. [Exp. #118.]

PROGRAMMING LANGUAGES

APL User Group—SoCal SIGAPL. Meetings: 2nd Wed., Los Angeles City College. Membership includes newsletter. Call: G. Smith, (818)716-6271. [Exp. #119.]

San Fernando Valley C++ User Group. Meetings: 7:00 pm, HP Bldg., Van Nuys. Speakers, discussions, demon., etc. on C++ and OO technology. Call: (818)332-8879. [Exp. #118.]

The Software Toolsmiths. Meetings: Last Sat., 10:00 am, Joslyn Center, 339 Sheldon St., El Segundo. Discussions and tutorials on programming. Neophytes welcome. Call: John LuValle, (818)797-1820, or Howard Rogers, (310)532-3342. [Exp. #118.]

SGML

SGML (Standard Generated Markup Language) User Group, Southern California Chapter. Discussions, presentations, tutorials, networking, and educational forums applying to SGML. Call: Roger Watson, (310)337-0309. [Exp. #118.]

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 - IDE with I/O (2S/1P/1G)
 - 127MB IDE Hard Drive
 - Mini Tower Case w/200W Power Supply
 - Trident 8900CL SVGA w/1MB
 - 14" CTX Super VGA Monitor .28dp
 - 101 Key Enhanced Keyboard
 - Mouse
- 486DX-33MHz \$1189**
486DX-50MHz \$1329
486DX2-66MHz \$1399

486 MultiMedia System

- 4MB (70ns) RAM & 128K Cache (OK in SX)
 - 1.2MB Floppy Drive
 - 1.44MB Floppy Drive
 - IDE with I/O (2S/1P/1G)
 - 127MB IDE Hard Drive
 - MultiMedia Desktop Case w/Speaker Built-in
 - 16 Bit Super VGA Card with 1MB
 - 14" CTX Super VGA Monitor .28dp
 - 101 Key Enhanced Keyboard
 - Mitsumi CD-ROM 280ms
 - * Sound Blaster Pro Deluxe
- 486SX-25MHz \$1199**
486SX-33MHz \$1359

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- 8 BIT ARCNET, COAX STAR \$39
- 8 BIT ARCNET, TWISTED PAIR (3-in-1) 45
- 16 BIT ARCNET, COAX BUS 49
- 16 BIT ARCNET, COAX STAR 47
- 16 BIT ARCNET, TWISTED PAIR 59
- ARCNET 8 PORTS ACTIVE HUB, COAX 99
- ARCNET 8 PORTS ACTIVE HUB, TWISTED PAIR 145
- ARCNET 4 PORTS PASSIVE HUB 15
- 8 BIT ENET, COAX 49
- 16 BIT ENET, COAX 55
- 16 BIT ENET (RJ-45/BNC/AUI) JUMPERLESS 75
- 16 BIT ENET 2000PLUS (RJ-45/BNC/AUI) JUMPERLESS 82
- 32 BIT EISA ENET (AUI/BNC/TP) 3-in-1 215
- 10-B-T 8 BIT ENET NE1000 COMPATIBLE 49
- 10-B-T 16 BIT ENET NE2000 COMPATIBLE 55
- D-LINK 16 BIT 10-B-T OR BNC ENET (OEM) 72
- D-LINK 16 BIT ENET COMBO (OEM) 175
- D-LINK 32 BIT VESA LOCAL BUS ENET 365
- SMC 16 BIT ETHERNET CARD COAX 139
- SMC 16 BIT ETHERNET CARD 10-B-T 139
- EAGLE TECHNOLOGY NE2000PLUS ENET 145
- EAGLE TECHNOLOGY NE2000PLUS-3 ENET 165
- EAGLE TECHNOLOGY NE2000T PLUS ENET 10BT 135
- EAGLE TECHNOLOGY NE3200 EISA 32 BIT ENET 670
- 3COM 3C503 ETHERLINK II 185
- 3COM 3C503 ETHERLINK II 16 TP 205
- 3COM 3C501 ETHERLINK 310
- 3COM 3C509 ETHERLINK II 16 BIT BNC 130
- 3COM 3C509 ETHERLINK II 10BT TP 130
- ARTISOFT LANTASTIC/AI V 5.0 FOR DOS 89
- ARTISOFT LANTASTIC/AI V 5.0 FOR WINDOW 99
- ARTISOFT LANTASTIC V 5.0 AE-2 STARTER KITS 535
- ARTISOFT LANTASTIC AE-2 ADAPTER ENET 215
- 8/16 BIT COAX 249
- ARTISOFT LANTASTIC AE-3 ADAPTER 10 BASE T 249
- NOVELL NETWORK 386 V.3.12 5-USER DSKS \$45**
- NOVELL NETWORK 386 V.3.12 10-USER DSKS 1195
- NOVELL NETWORK 386 V.3.12 25-USER DSKS 1795
- NOVELL NETWORK 386 V.3.12 50-USER DSKS 2355
- NOVELL NETWORK 386 V.4.0 25-USER CALL
- NOVELL NETWORK 386 V.4.0 50-USER CALL
- NOVELL NETWORK LITE V.1.1 SINGLE 55
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- 12 PORTS ETHERNET CONCENTRATOR 1 AUI/1 BNC/12 RJ-45 425
- SMARTLINK (GATEWAY 2000 OEM) 9600/2400 FAX MODEM INT./EXT. 45/75
- SMARTLINK (GATEWAY 2000 OEM) 14400/14400 FAX MODEM INT./EXT. 160/190
- SMARTLINK (GATEWAY 2000 OEM) 2400 MODEM INT./EXT. 35/55
- CONNER C250MQT 250MB TAPE BACKUP W/FREE CARTRIDGE 160
- COLORADO JT-10 JUMBO TRAKKER 120MB (PARALLEL) TAPE DRIVE 299
- COLORADO JT-20 JUMBO TRAKKER 250MB (PARALLEL) TAPE DRIVE \$325**
- COLORADO DJ-10 JUMBO 120MB TAPE BACKUP 125
- COLORADO DJ-20 JUMBO 250MB TAPE BACKUP 179
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- COLORADO POWER TAPE 4.0GB BACKUP INT./EXT. 1480/1620
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- MAYNARD ARCHIVE VIPER 525MB SCSI TAPE DRIVE INT./EXT. 495/955

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- MB386SX-40 up to 16MB 98
- MB386DX-40/128K UP TO 32MB 126
- MB486SX-25/OK UP TO 32MB 175
- MB486SX-33/OK UP TO 32MB 215
- MB486DX-33/256K up to 32MB 375
- MB486DX-33/256K PIC + ISA up to 128MB (72) Green PC 498
- VLB MB486DX-33/256K 2 VLB/ZIF 418
- VLB MB486DX-33/256K 3 VLB/ZIF 430
- EVLB MB486DX-33/256K 2EVLB/6 EISA/ZIF 560
- EPIC MB5861M Pentium PIC + EISA/256K up to 128MB (72) Green PC Call
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- AIR EISA VLB 486DX-33/256K 3 VLB/ZIF 649
- Heatsink & Fan Add 9
- DX2-50 cpu Add 110
- DX-50 cpu Add 140
- DX2-66 cpu Add 220

- MICRONICS**
- EISA MB486DX-33 256K ICP/E3 815
- EISA MB486DX-50/256K ICP/E3 1085
- EISA MB486DX-50/256K ICP/E3 1095
- EISA MB 486DX2-66/256K ICP/E3 1165
- VESA LB 486DX-33/256K VCPL 645
- VESA LB 486DX2-50/256K VCPL 815
- VESA LB 486DX2-66/256K VCPL 1045
- VESA LB 486SX-25/256K VCPL 315
- * VCP Version Add 75
- EISA VESA LB 486DX-33/256K 955
- EISA VESA LB 486DX2-50/256K 1155
- EISA VESA LB 486DX2-66/256K 1345

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- CONNER 210MB/17MS IDE \$205
 - CONNER 250MB/14MS/64K IDE 239
 - CONNER 520MB/12MS/256K IDE 550
 - CONNER 520MB/12MS/256K SCSI-2 559
 - WD 212MB/13MS IDE 215
 - WD 250MB/13MS IDE 235
 - WD 340MB/13MS IDE 290
 - WD 420MB/13MS IDE 390
 - MAXTOR 130MB/15MS IDE 179
 - MAXTOR 213MB/15MS IDE 225
 - MAXTOR 245MB/15MS IDE/SCSI 245/289
 - MAXTOR 340MB/13MS IDE/SCSI 309/360
 - MAXTOR 540MB/13MS IDE SCSI-II (3.5") 750/750
 - QUANTUM 240MB SCSI II 245
 - QUANTUM 240MB IDE 235
 - QUANTUM 525MB/10MS IDE/SCSI-II 550/555
 - QUANTUM 1.05GB/10MS SCSI-II 925
 - QUANTUM 1.2GB/10MS SCSI-II 1010
 - MICROPOLIS 1.2GB/10MS/3.5" SCSI-II 1070
 - MICROPOLIS 1.75GB/10MS/3.5" IDE/SCSI II 1425/1425
 - TOSHIBA 870MB/12.5MS SCSI II 799
 - TOSHIBA 1.05GB/12MS/SCSI II 879
 - TOSHIBA 1.2GB/12MS/SCSI II 969
- * 5 Year Warranty from Micropolis Mfg.

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- KFC 9" MONO PAPER WHITE \$115
- KFC 9" MONO-VGA PAPER WHITE 135
- 12" MONOCHROME AMBER 75
- 14" MONO PAPER WHITE MONITOR 86
- CTX 5439G 14" SVGA 1024x768 .39DP 209
- CTX 5468A 14" SVGA 1024x768 .28DP 250
- CTX 1451 14" SVGA 1024x768 .28DP N.I. 255
- CTX 1461 14" VESA 1024x768 .28DP N.I. 289
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- NEC3V 15" FLAT (28) 1024x768 565
- NEC4FGE 15" FLAT (28) 1024x768 N.I. 710
- NEC5FGE 17" .28 1024x768 N.I. 1089**
- NEC6FG 21" .28 1024x768 N.I.72MHz 2350
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- MAG MX157 1280 X 1024 .28 N.I. DIGITAL, LOW RAD. 435**
- MAG MX177 1280 X 1024 .26 N.I. DIGITAL, LOW RAD. 860**
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- VIEWSONIC 15 15" .28DP 1280 X 1024, 60Hz, LOW RAD, FLAT 459
- VIEWSONIC 7 17" .28DP 1280 X 1024 LOW RAD, FLAT 808
- VIEWSONIC 17 17" 27DP1600X1280N.I. 76Hz, LOWRAD, FLAT 975
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- Promise-DC200 ISA IDE Caching Cntrl, 4HD/2FD (up to 16MB) \$109
- Promise-4030VL VLB 32BIT IDE Caching Cntrl, 4HD/2FD (up to 16MB) 159
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- Promise-2000VL VLB 32BIT IDE/O Cntrl, 50MHz up to 4MB/Sec 39
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- Adaptec 1542CK SCSI Ctrl w/Novell S/W (Bus Master) 255
- Adaptec 2742T EISA SCSI-II Ctrl (Bare) 360
- Adaptec 2742TK EISA SCSI-II Ctrl w/Novell S/W (Bus Master) 410
- Adaptec 2842VLK VLB SCSI II Ctrl w/Novell, OS2 S/W 315**
- BUSLOGIC BT4455 VLB SCSI Bus Master Host w/Floppy & Drivers 285
- BUSLOGIC KT742A EISA SCSI Host w/Floppy, 5MB/Sec & Drivers 305
- BUSLOGIC KT747A EISA SCSI Host w/Floppy, 10MB/Sec & Drivers 355
- Ultrastor 15C ISA IDE Caching Ctrl, 2HD/3FD, w/Drivers (up to 8MB) 179
- Ultrastor 14F ISA SCSI Ctrl, 32K Cache Buffer 205
- Ultrastor 24F EISA SCSI Ctrl, 64K Cache 370
- Ultrastor 24FK U24F w/Drivers 449
- Ultrastor 34F VLB SCSI Ctrl (HD) 32K Cache on board 275
- Ultrastor 34FK U34F w/Drivers 349
- DTC 2290 EISA IDE Ctrl, 4HD/4FD 119
- DTC 3290HD EISA SCSI Caching Ctrl, (OK up to 4MB) 437
- DTC 3292 EISA SCSI Ctrl 315
- DTC 3270VL VLB SCSI Controller 115**

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- DESKTOP CASE W/200W (3" X 5.25", 1" X 3.5") 49
- MINI TOWER CASE W/200W (2" X 5.25", 1" X 3.5", 1" X 3.5") 39**
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- FULL TOWER CASE W/250W (4" X 5.25", 2" X 5.25") W/DISPLAY 89
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- NEC CDR84-1 INT. CD ROM 680MB/280MS SCSI W/PHOTO CD 470
- MITSUMI FX001-D CD ROM/DOUBLE SPEED/280MS W/INTERFACE 215
- TEKEL DM3024N CD ROM/DOUBLE SPEED/265MS/SCSI 330
- TEKEL DM3028 CD ROM/DOUBLE SPEED/235MS/SCSI 350
- TEKEL T-130 INTERFACE CARD W/CABLES 369
- TOSHIBA 3401 CD ROM/DOUBLE SPEED/260MS/SCSI 395
- CREATIVE LAB SOUND BLASTER PRO DELUX 16 BIT 125
- CREATIVE LAB SOUND BLASTER 16 M-CD 189
- CREATIVE LAB SOUND BLASTER 16 SCSI II 205
- CREATIVE LAB SOUND BLASTER 16 AM-CD 199
- LABTEC CS150 MICRO STEREO SPKRS, 3.6 WATTS B&T BOOST 19
- LABTEC CS550 AMPL'D STEREO SPKRS, 4 WATTS B&T BOOST 25
- LABTEC CS700 4 WATTS 3 BAND EQUALIZER 35
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- Orchid Fahrenheit-VA S3 VLB w/1MB 195
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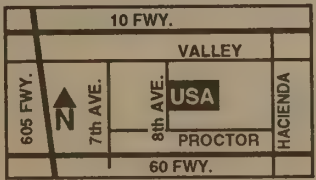
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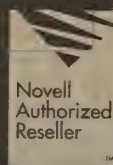
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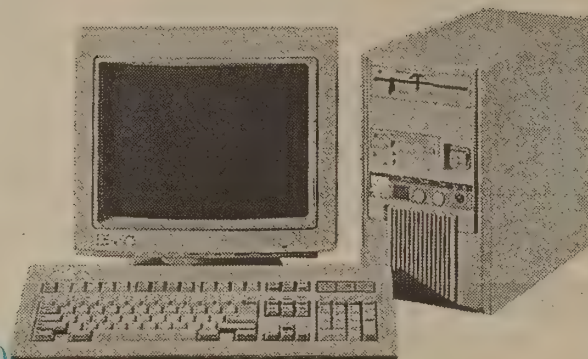


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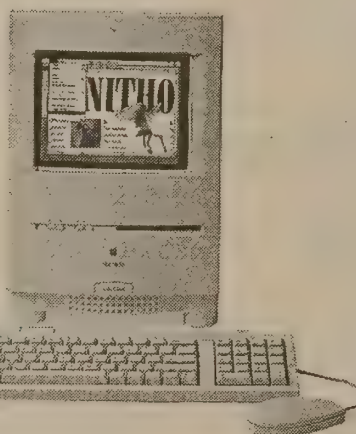
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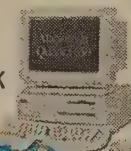


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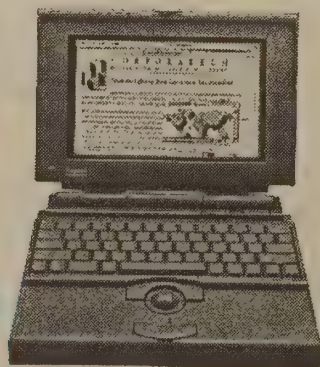


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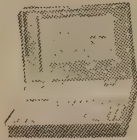
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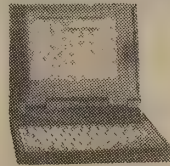
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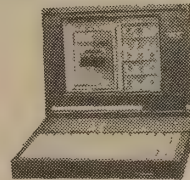


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- Logitech Trackball
- 120MB Hard Disk
- 1.44MB Floppy Drive
- Carrying Bag
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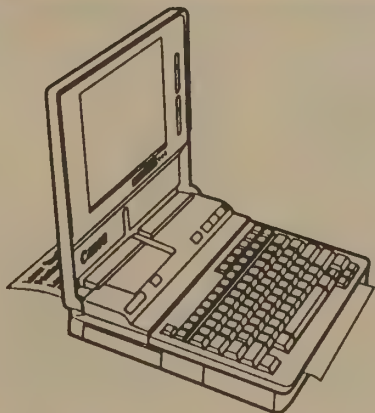
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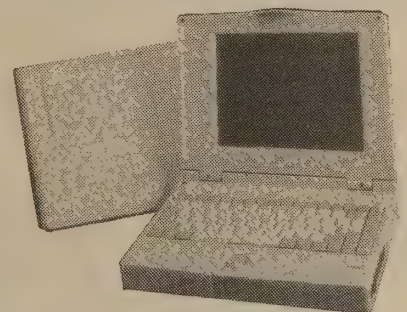
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- Epson Emulation
- 30% Faster than 10EX

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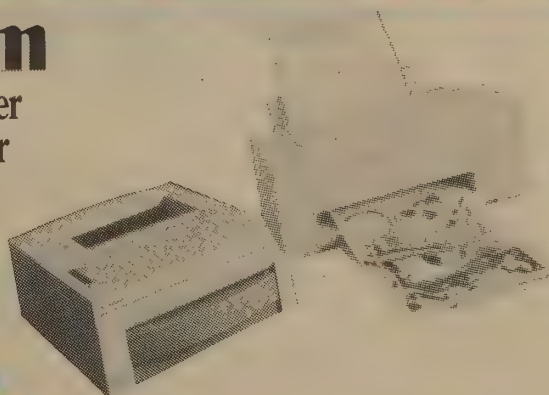
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- 100 Sheets or 10 Envelopes
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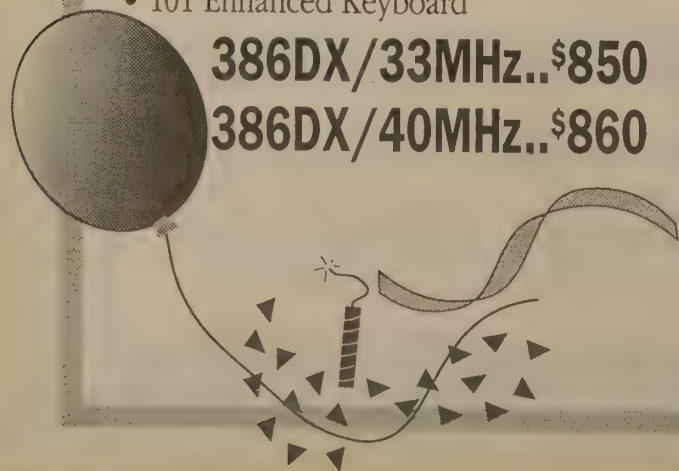
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R E L E A S E 3

3D STUDIO

Awesome PC Modeling And Animation From Autodesk

BY RICHARD RAUCCI

3D Studio Release 3 from Autodesk is a high-end photorealistic modeling and rendering package that can also generate broadcast-quality animation. It also has the rare ability to achieve workstation-level performance on the ubiquitous PC platform—I used a 486 with an Intel-compatible DX/33 with 8MB of RAM in reviewing the package, and had no difficulties whatsoever.

REQUIREMENTS

3D Studio installs from eight 1.44MB floppy disks. Installation runs a batch program which copies the files into a directory on your hard disk.

The minimum space required for full installation is 20MB, and the install program won't check for space first. If you don't have enough space, the batch file will keep installing files until it runs out of space.

Disk-compression software can incorrectly judge the amount of space left on a hard drive. Graphics files (like the materials maps in 3D Studio) are often already tightly packed, and loading them to compressed hard drives can result in an "out-of-space" message even when you think you've cleared enough space.

Autodesk recommends 20MB for the program and at least an additional 20MB for files that you create. This will work, but 40–60MB is better; files, especially animations, take up a lot of space, and the Phar Lap DOS subsystem needs the space as well. Phar Lap DOS Extender is automatically installed, and uses hard drive space to simulate RAM; 3D Studio only loads Phar Lap when it starts, so the program doesn't interfere with your current DOS configuration. You'll need a minimum of 8MB of RAM; thanks to the DOS Extension system, this works well, but you'll want more for better performance.

After loading files, the install program

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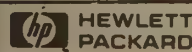
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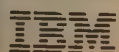
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runs the Vibrant graphics setup menu. From a scrolling list, you can pick drivers for a good range of SVGA video cards, and configure them for rendering, hard copy output, and animation viewing. 3D Studio's minimum video card requirement is VESA-compliant 8-bit, 256-color mode, at multiple resolutions. The program defaults to 800 x 600 mode, but also works with 640 x 480. Higher resolutions with millions of colors are also supported with the proper drivers.

After installation, you can edit the 3DS.SET configuration file for faster rendering. Under the Rendering Parameters section, change the RENDER-BAND-HEIGHT from the default of 10 to a higher number. You can do this editing with DOS 5.0/6.0's Edit program, or with the Text Editor built into 3D Studio. (Doing this could increase the RAM you may need.)

Windows 3.1 is also supported, but you'll have to install 3D Studio support by yourself, by moving the program information file and the icon file to your Windows directory, and by configuring a Phar Lap driver in your System.ini file. 3D Studio is stable under Windows 3.1, but Windows' overhead detracts from its performance. Running under Windows is only recommended if you want to run multiple instances of 3D Studio at the same time, or if your network has a Windows front-end, and you want to do Network Rendering.

Lastly, you'll have to play with your dongle. This is a plastic circuit box that attaches to the parallel port of your PC. 3D Studio checks for this when it starts, and periodically polls it during operation. Without it, the program won't run or will shut down. You can still render from the command line, and you can install the program on

multiple DOS machines for network operation.

I will abstain from commenting on infernal copy protection schemes, and will just state that when you install the dongle firmly (screw it into place), it works transparently; the pass-through port for my printer gave me no troubles.

OVERVIEW

The main features of 3D Studio R3 are grouped into five modules, each of which builds upon the others. These include the 2D Shaper, the 3D Loft, the 3D Editor, the Materials Editor, and the Keyframer. Each module shares a menu bar, with pull-down sections for loading files, setting parameters, adjusting drawing aids, and more. In addition, all of the modules except the Materials Editor have the same basic layout, which consists of one to four viewports. The viewports allow for multiple-perspective views of your objects.

On the upper left of this layout is a hierarchical menu layout similar to AutoCAD, which controls the special functions of the particular module. The lower left controls are a series of icons for zooming in and out of views, aligning viewports, switching between selection sets, and selecting objects. The consistent interface between the different modules makes the learning curve for 3D Studio relatively short.

The basic starting point for 3-D rendering is often a 2-D concept drawing. The 2D Shaper module is a complex drafting asset for doing just that. With it, you can create the basic planar shapes that make up a 3-D object. In the framework of this program, the Shaper is used in conjunction with the

3D Loft. The Loft then moves the 2-D object through space to make it in three dimensions.

SHAPER

The Shaper has tools for creating and modifying a variety of shapes. You can also operate directly upon vertices (where lines join), to extend and deform edges. AutoCAD .DXF files can be loaded into the Shaper preparatory to rendering, and you can save your own 2-D templates. You can use custom font files, including Adobe Type 1 (.PFB) typefaces. Text placement is easy, and 2-D vertices are automatically generated that can be adjusted to customize type styles. The Shaper also works with Adobe Illustrator .AI files.

LOFTER

The Loft transforms 2-D objects into 3-D objects, but its complexity and power go beyond this simple definition. Not only can objects be rotated around a simple circular path, but custom paths can be generated as well. There's also a custom feature that can make spiral and helical paths from a single plane, and a great visual editor for adjusting the angle of a loft.

You can also make a 3-D preview. The Loft's powerful sculptural features are essential to understanding and creating complex 3-D objects from 2-D designs. Once you've completed the loft, you can transfer it to the 3D Editor for more manipulations.

3D EDITOR

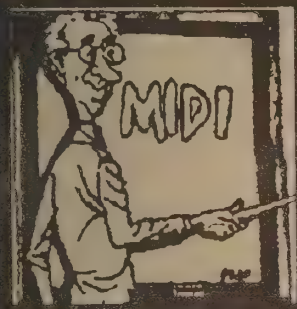
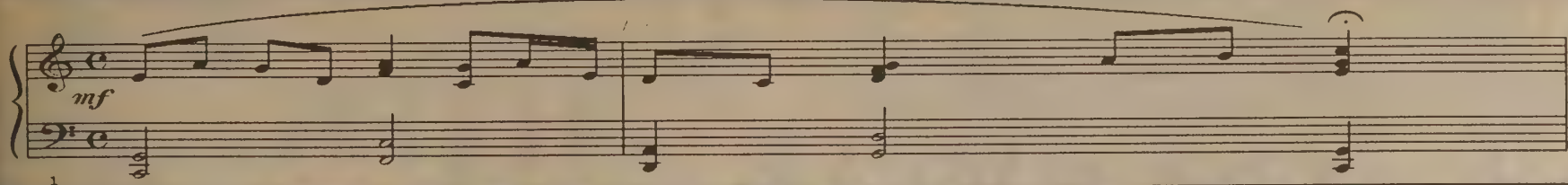
3D Studio's 3D Editor is the heart of the rendering engine of the program. In conjunction with the Materials Editor, it can make stunning photorealistic images from objects. As a rapid prototyper, it works well.

The 3D Editor contains many drawing tools like the 2D Shaper, but for generating 3-D objects. In many cases you can bypass the 2D Shaper and Loft and work in the 3D Editor—it's the default module open when you start the program.

Here you can create shapes in three dimensions. These shapes are made up of faces, which are angled according to their position in the object. For example, a simple cube will have only six faces, but a simple

RESOURCES:

Autodesk 3D Studio Release 3.0, \$2995 (upgrade, \$497) Also available bundled with AutoCAD R12 as part of the Visualization Power Pack, \$4995 until 12/31/93. Autodesk, Inc. Multimedia Division 2320 Marinship Way Sausalito, CA 94965 1-800-879-4233



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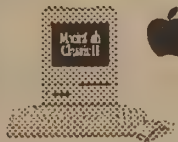
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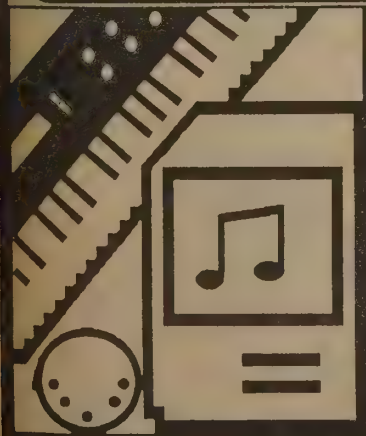
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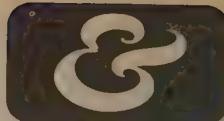
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sphere will have many more. You can choose whether an object will be smooth or faceted (this controls the number of relative faces used to make up an object), and you can operate on any of the faces independently.

The editor includes controls for deforming an object. I especially liked the skew command—it allows you to bend standard objects into interesting shapes by clicking on their wireframe outlines in the viewport and slewing them about.

3D Editor lets you clone objects, to plant a row of trees, for example. You can work in very fine detail by zooming in on surfaces. For example, you can set up a very large room (like a banquet hall) by cloning several rows of tables. Then you can zoom in on each table, and create a 3-D place setting. In the larger view, these objects will render correctly, and add realism. Snap-to-grid tools help such precision alignment work.

Lighting is an essential part of any 3-D scene, and the 3D Editor has good lighting control. You can adjust the intensity of lights, and use either omni lighting for an overall effect, or adjustable spotlighting. A nice feature is the Place HiLite command, which allows you to select an area on your object to receive a highlight, then choose which light will deliver it. The light will then automatically move to the proper position. Light color can also be adjusted, and you can control hues, saturation, and luminance, as well as attenuation (light falloff).

Another important aspect of 3-D work is the camera concept. Since a visualized scene has to have a viewpoint, 3D Studio uses a camera metaphor to create views of objects and scenes that will then be rendered with an appropriately photorealistic look. The virtual cameras come with a large selection of lenses, from a 15mm fisheye to a 200mm long. Placing cameras is easy, and you can use a field-of-view cone projection to help keep an object in view. 3D Studio also supports normal camera movement, so you can dolly, roll, and pan around your scene. A switchable camera viewport gives a clear view of any changes you make.

Perspective camera controls are included, which make for a very dramatic effect. When you use perspective on an object it will automatically adjust itself, changing its dimensions to reflect a realistic perspective view.

3D Studio uses a camera metaphor to create views of objects and scenes that will then be rendered with an appropriately photorealistic look.

MATERIALS EDITOR

Once you've got your objects created, set your lights, and placed cameras, you're almost ready to render. This is where 3D Studio's powerful Materials Editor comes into play.

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The Materials Editor is a separate module where you can select textures and patterns, mix colors, adjust transparency and shininess, and generally do almost anything to the surface of an object. A set of preview windows at the top of the main window will reflect your choices on a sam-

ple sphere or cube, and is good for doing side-by-side comparisons.

The Materials Editor is also used to show the effects of 3D Studio's different rendering styles. You can select a texture, overlay it with a pattern, change its color, adjust the hue and saturation, change the

specular, diffuse, and ambient light properties, and even apply self-illumination! The supplied mapping files you can use are in industry-standard TARGA, .TIF, .GIF, and .BMP formats, and you can use paint programs to create and import your own.

Drag-and-drop features make it easy to change color swatches, generate new samples, and queue texture and pattern files.

After creating a material sample with the properties you want, you can then switch back to the 3D Editor to apply it to objects in the scene. Generating mapping

You can set up a very large room (like a banquet hall) by cloning several rows of tables. Then you can zoom in on each table, and create a 3-D place setting. In the larger view, these objects will render correctly and add realism.

coordinates for this purpose is as easy as clicking on the object. You then assign the material to it, and you're ready to render. If you preselected the object in the 3D Editor, you don't even have to leave the Materials Editor. Selecting Auto Put from the Materials Editor control panel will do this automatically, and you can invoke the renderer from there as well.

Rendering with 3D Studio is great. The main selection controls are in the 3D Editor, and you can choose to render by viewport, region, blowup, or object. By rendering each viewport, you can generate precision top, front, and side views, as well as camera shots. Regional rendering allows



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Sample Rendering Speeds

on 50PMAN.3DS, a 3000-face posable manikin figure file included with 3D Studio, on a 486/33DX, Phong shading, default setup:

Release 3.0 (DOS)	46 seconds
Release 3.0 (Win 3.1)	53 seconds
Release 2.0 (DOS)	59 seconds

you to mark off a specific area in the viewport to be rendered (blowup works in much the same way, but enlarges the area selected). Object rendering means you can prototype specific objects without having to make the whole scene.

You can also set up backgrounds, apply special effects like layered fog, configure file formats (including TARGA, .GIF, JPEG, .TIF, and .BMP), and control shadows. Very tight option controls are included for creating object and motion blur, controlling dithering, selecting pixel size, and more.

Upon selecting the setup or view to be rendered, you then choose options in the Render panel. These include antialiasing, wireframe generation, and auto-reflection. You can also switch between different rendering styles, save your image to disk, send it to a printer, and render to a network. As the rendering proceeds, a "blood bar" at the top of the panel indicates progress, and the image is automatically displayed (if you have the Display option selected). Rendering speeds on fairly complex scenes were quite passable on my 486/33, thanks to the enhanced rendering engine.

Network rendering is also included with this release, and you can install to 9999 DOS networked machines that will act as slave renderers to your server system. In this case, only one machine will have the 3D Studio interface, but all of the machines will distribute the rendering work. You may not intend to install to ten thousand systems, but setting up a low-cost LAN is easy, and a few \$2500-\$3000 Pentium-based machines will dramatically increase your rendering speed. You can also tap the power of a PC-based network you may already have in place. The network interface is well thought out and is one of the most impressive features in 3D Studio Release 3.

KEYFRAMER

Beyond still rendering is the studio-level Keyframer, which can generate animations

and render them to disk files and videotape recorders. It has a similar interface to the 3D Editor module, but it also has the ability to plot frames according to specific paths of movement. For example, when you track in with the camera on an object

in the Keyframer, it can plot the path of the track as a series of moves, and then render the frames in the movement. The result is a smooth tracking shot.

Object movement can also be created by picking up an object in the first frame, moving it in 3-D space, and then clicking on the end frame. You can also move lights this way. The Keyframer will generate a smooth series of frames, with a default of thirty, but you can adjust this as well. An advanced feature of this module is the ability to create smooth morphing effects between objects.

The Keyframer also includes a Video Post facility that can sequence effects and model movement, and will allow you to create entire animations in-camera without having to edit them together. An interface to VTR equipment in the Keyframer means you can render frame-by-frame animation directly to videotape without a time-base corrector.

IPAS

3D Studio's most important special feature is the IPAS command structure. These are a series of processes that can be operated on rendered objects and scenes externally. As such, they're a lot like Adobe Photoshop plug-ins, and allow for custom effects work and extensibility. IPAS 3 is the current designation, and refers to special image processing, procedural modeling, animated stand-in, solid patterning, Keyframer, and bitmap routines. The examples included are clear (one generates a star map according to the camera coordinates in your scene; another creates custom gear teeth in an object), and a programming interface allows you to make your own effects and save them as applicable processes.

Among the new features in IPAS 3 Keyframer are processes for including dynamic controls in an animation (like gravity and collision detection), and the ability to load and save bitmap file formats not directly supported in 3D Studio. The

extensible interface means that you can explore options and effects almost infinitely.

MISC.

Support for many SVGA and TARGA cards is included, as well as for frame buffers that can allow you to render scenes on separate monitors, while keeping the 3D Studio interface up and running. This allows for rapid prototyping. Animation support is good, with my only caveat being that the supplied standalone DOS player AAPLAY.EXE does not appear to run .FLC (FLI-8) files which the renderer generates, although you can view them inside the program. The player also doesn't let you load animations into memory for faster playback. I'd suggest you find a copy of AAWIN.EXE, a public domain Windows animation viewer by Autodesk that supports a range of file formats and has options for loading files into memory. The AAWIN player should be available on CompuServe in the Adesk Forum. It's also available on the WELL (415/332-6106, 8-N-1) in the IBM conference library as a .ZIP file (AAWIN.ZIP) which contains the executable, the icon, and the help file. Unzip it to your Windows directory and follow the standard procedure for installing a new program item.

A number of sample models, textures, and bitmaps for the various 3D Studio modules are included, and these work well with the excellent tutorials. I'd suggest installing a CD-ROM drive, if you don't already have one. 3D Studio Release 3 comes with a revised World-Creating Toolkit CD. This will give you access to about 700MB of additional material and model samples, including marvelously complex files (like a Buddha from Viewpoint Engineering with seventy-five thousand faces) that are very inspiring. Also on the CD are incredible animations created in 3D Studio that will get your mind in gear.

CONCLUSIONS

3D Studio is a miracle of DOS programming. This is one of the few programs that takes this workhorse computer and literally squeezes every last drop of CPU potential out of it. With an easy network interface, and Pentium processors on the horizon, this program will go far.

It's truly an enabling software experience, and proves that computers can be used to further the human imagination. ■

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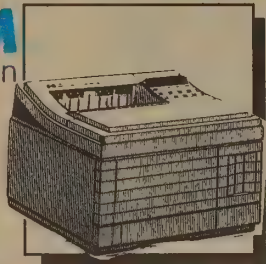
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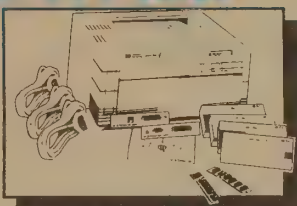
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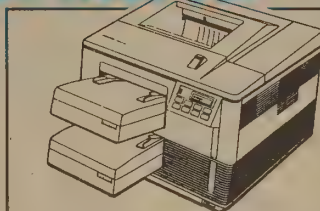
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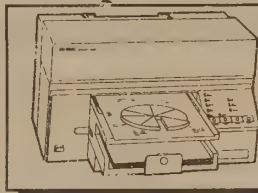
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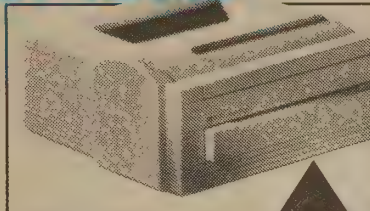
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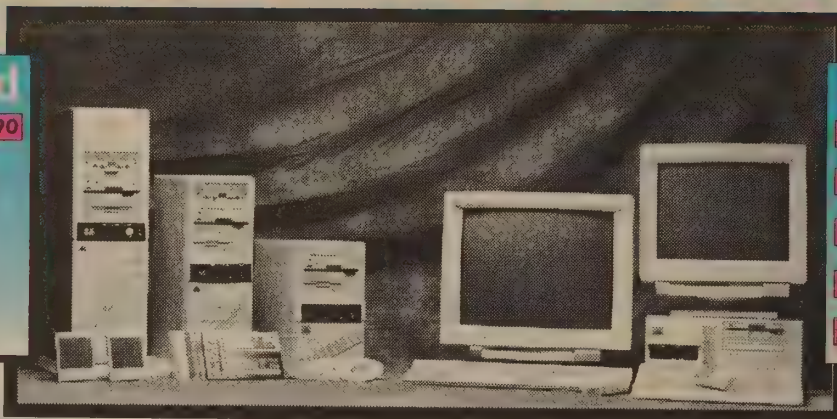
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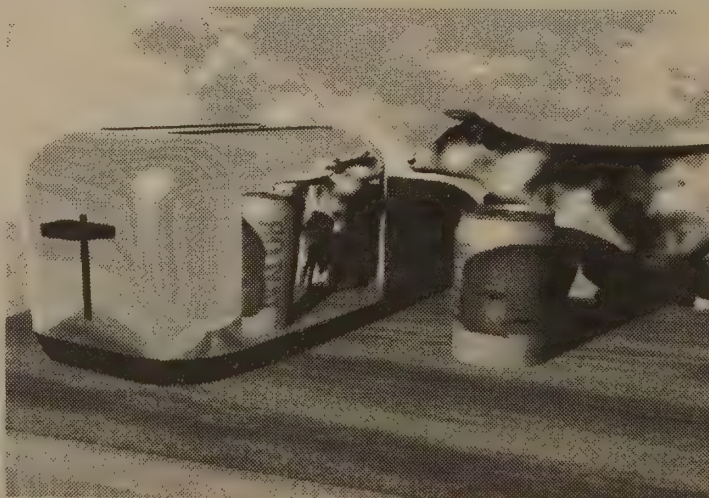
BY DOUGLAS J. NAKAKIHARA

NewTek's Video Toaster is often discussed, but many people don't really understand what it is or what it does—how can a “kitchen appliance” help the professional videographer edit wedding videos and also produce the computer graphics for NBC's *seaQuest DSV*? Also, the fact that the Video Toaster is based on the Commodore Amiga—a non-mainstream computer—contributes greatly to its mystique, and to the confusion.

The following discussion is not a detailed review of the product, but rather an attempt to explain the Video Toaster to those who aren't familiar with its capabilities.

really a card that plugs into the Amiga's special video slot. (For brevity's sake, I'll generally refer to the product as the Toaster, but be aware that the newest version is technically called the Video Toaster 4000.)

The original Toaster was made for the Amiga 2000. When the Amiga 3000 was introduced, it was found that the Toaster would not fit into the new Amiga design without modification. The Toaster 4000's



“Toaster table with milk and soda,” Lightwave rendering by Douglas J. Nakakihara!

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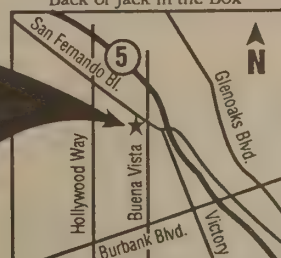
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Toaster 4000 title screen

modular design has solved this form-factor problem, and also takes advantage of the new graphics power available in the Amiga 4000.

A major misconception is that the Toaster is a standalone machine. This originated because NewTek initially sold Amiga 2000s with the Toaster and its software pre-installed, with the result that the purchaser often was unaware of buying an Amiga; the Amiga name plate was covered up with a Video Toaster sticker. Though NewTek has discontinued this practice, the Toaster card still comes with Amiga-masking stickers which many dealers use on Toaster-equipped Amigas.

WHAT IT DOES

The Toaster allows you to create broadcast-quality video using relatively inexpensive equipment. The Toaster has several key functions: digital video effects, framegrabbing, chroma effects, character generation, genlocking, luminance keying, image painting, and 3-D animation.

The Toaster's power is really in its software. It was designed this way so that upgrading would be easy and cheap. This philosophy is somewhat imperfectly realized, in light of the need for Toaster 4000; however, the fact remains that most of the Toaster's functionality is not hard-coded into its chips.

The Toaster card has six composite video BNC connectors on the back, four for input and two for output. The BNC connectors are easily adaptable to the more common RCA-type jacks and a few adapters are included.

One output is called the Main output; the other is called Preview. Generally, Main shows what the end viewer will see; Preview displays the upcoming video source. It's best to use two monitors for these outputs, but you can use a switchbox with a single monitor. The monitors can be regular color TVs, if they have a composite video input jack. (Note: a total of three monitors, including the regular Amiga computer monitor, is the most common setup.)

Additionally, there are two digital buffers that can be used as video sources. The digital buffers are conceptually places to "hold" various types of Toaster graphics. A solid color buffer is also available. Any one of the video sources can be individually selected to show on the Main and Preview screens.

DIGITAL VIDEO EFFECTS

The Toaster's Switcher allows you to bring the Preview video to the Main display using a digital video effect (DVE)—this is the heart of the Toaster. The DVEs include nearly every flip, tumble, spin, peel, wipe, and zoom transition you can think of. The ones using the likeness of NewTek spokesperson Kiki Stockhammer and the color 3-D animations are standouts in the hundreds of available transitions, some of which include audio. Three speeds are built in; you can also control a transition manually if you wish.

FRAMEGRABBING

Framegrabbing allows you to capture a still image from moving video. You can framegrab an image from any of the video inputs by simply clicking a button. These images are referred to as "framestores," and can be saved and loaded to and from a digital buffer. Framestores use a proprietary file format, but most Amiga image processing programs now support it.

TIMEBASE CORRECTION

Because the Toaster expects all video signals to be properly synced in order to perform its mixing magic, a device called a timebase corrector (TBC) is normally required. Video tape recorders, for example, spew out very unstable signals due to tape stretching and varying tape speed.

You can use multiple live video cameras without a TBC, if they have the ability to be synced together—a feature most consumer-grade camcorders lack. Also, a single live video camera can be used without problem, though you'll only be able to switch between it and a digital buffer. Note: If timebase correction is necessary, you'll need a separate TBC for each external video source. Both internal and external TBCs are available and priced from under \$1000.

CHROMA EFFECTS

These effects change the color of a video signal based on brightness levels, giving the video a psychedelic 60's look. These types of effects are also used on science fiction programs to depict something unnatural taking place. You can set up your own chroma effect, if none of the ninety-nine predefined ones fit the bill.

CHARACTER GENERATION

This feature allows you to place text and graphics over video. Everyday examples are scrolling TV credits and overlaid sports graphics. The combination of text and 24-bit semi-transparent 3-D graphics is very popular on broadcast TV these days and is easily achievable with the Toaster. PostScript fonts are supported; 275 of them are provided with the Toaster.

GENLOCKING

You can overlay Amiga computer graphics over video using the Toaster's genlock capabilities. The Toaster's genlock features are very basic; however, it's functional and will be adequate for many needs.

LUMINANCE KEYING

Luminance keying is similar to genlocking, except the video source is overlaid on the graphics (or another video source), like a TV weatherman over a map of the US. (However, when you see this on TV, it's usually done by chromakeying rather than luminance keying. With chromakey, a certain color, normally blue, becomes transparent. Luminance keying uses brightness and is more difficult to get right. However, results can be very impressive, as demonstrated in the Toaster's demo tape.)

IMAGE PAINTING

ToasterPaint is a basic paint program and identical in most respects to NewTek's old DigiPaint program. It uses the Amiga's standard HAM mode which provides 4096 display colors at a 320 x 200 resolution, but internally tracks colors using 24 bits. Unless you use the limited 1x mode, you must scroll around a framestore with only about one-quarter of the image visible at any one time. ToasterPaint can be useful for touching up framestores, but doesn't have much to offer in the way of image processing.

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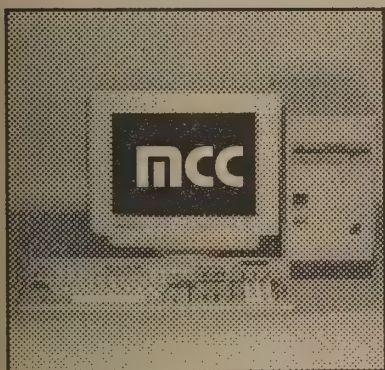
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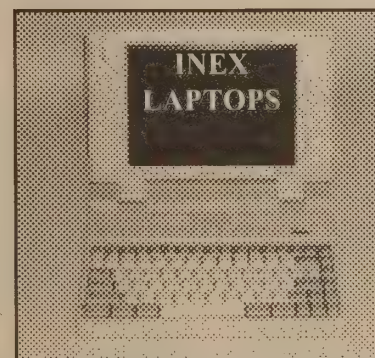
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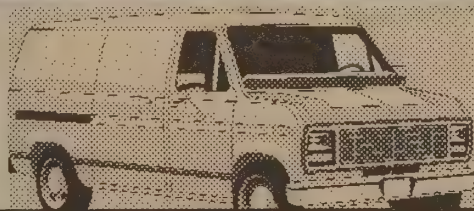
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3-D ANIMATION

The Toaster's 3-D animation feature is really a separate program called Lightwave. This feature is nearly totally independent of the Toaster's video editing capabilities—some people never use the Toaster's video capabilities and only use it for 3-D animation, and vice versa.

With the original Toaster it was difficult to play a Lightwave animation at 30 frames per second without using an expensive single-frame recorder. A feature only available with the Amiga 4000 is the ability to play back 256,000-color animations at thirty frames per second. Playback time is limited by available RAM, and you'll only get a few seconds on a 18MB machine. This should be enough, though, for many

4000 is the

ability to play

back

256,000-color

animations at

30 frames per

second.

applications.

Lightwave's broadcast television credits are numerous. Most notably, it is used to generate all of the computer-generated images (CGI) for NBC's *seaQuest DSV* and the upcoming *Babylon 5* series. It was also heavily used in pre-production work for *Jurassic Park*. One major reason for Lightwave's tremendous popularity is its interface, the best I've ever used or seen for any 3-D ani-

mation program.

To capitalize on the Amiga's low cost and make up for its consumer-level computing power, some companies have networked several Amigas (each with its own Toaster) together to render animation frames simultaneously. NewTek's new product, the Screamer, a Lightwave peripheral capable of rendering frames forty times faster than previously possible, will make this less of a necessity.

INSTALLATION

Installation is fairly easy using the step-by-step instructions provided in the manual. The card comes preconfigured for an Amiga 4000 and requires disassembly for installation in a 2000 or 3000. This is not a minor task; I'd definitely recommend seeking help from a knowledgeable dealer or friend, if you are not comfortable with doing such things. Note: When mounted in an Amiga 4000, the Toaster card covers a



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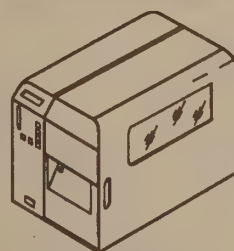
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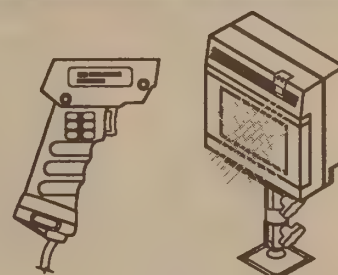
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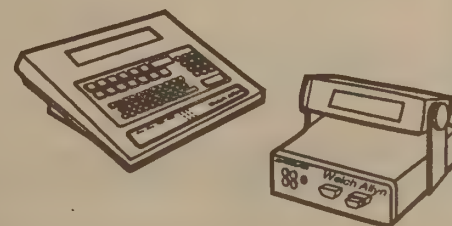
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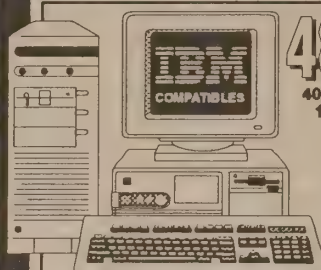


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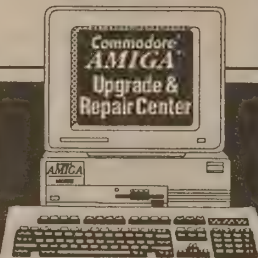
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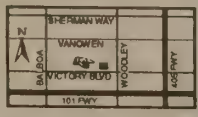
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second slot, leaving only two open. This does not occur in the 2000 and 3000 due to their different slot arrangements.

The Toaster 4000 software ships on forty-five floppy disks and takes a good hour to install. Sixteen of these disks are high-density and are only used for the Amiga 4000. Nine megabytes of RAM and 90MB of disk space are required when installed on an Amiga 2000 or 3000; 10MB of RAM and 110MB of disk space on a model 4000. If heavy use of Lightwave is anticipated, an '030 or better processor is recommended, along with additional RAM.

Once I'd installed the software, I was ready to connect my camcorder and monitors. It was then that I ran into my first stumbling block: except for a tiny loose sticker naming the connectors, whose orientation is left up to interpretation, the manual never indicates which connectors do what. Fortunately, a quick call to a friend of mine cleared this up and I was soon off and running in button-clicking Toaster-heaven.

If you're a Toaster novice like myself, you'll probably find the numerous tutorials to be exercises in futility and frustration. They don't begin to provide enough detail to learn this complex beast. I spent most of my time trying to figure out what button I was suppose to select to carry out the tutorial's instruction. Now I understand why there are so many "how-to" products available for the Toaster—essentially, you have to already know the software to successfully finish the tutorials. I suggest you go through the reference section first before attempting the tutorials. For humorous reading, note that the limited lifetime warranty is for a period of one year. (Life is so short...)

WHO NEEDS IT

Though the initial investment for the Toaster is affordable for the average consumer, the sky is the limit from there. TBCs, VCRs, monitors, video cameras, lights, computer hardware and software, and all of the other peripherals and accessories can easily push the price tag to the tens of thousands.

However, the weekend videographer can still have lots of fun with just a basic Toaster setup, though you'll probably want at least one TBC—it all depends on how serious you want to get.

An average person with a camcorder can have lots of fun with the Toaster. Professional videographers have been making money with the Toaster since its release. The Toaster is used at TV stations, cable companies, animation houses, video production houses, and sports stadiums across the country.

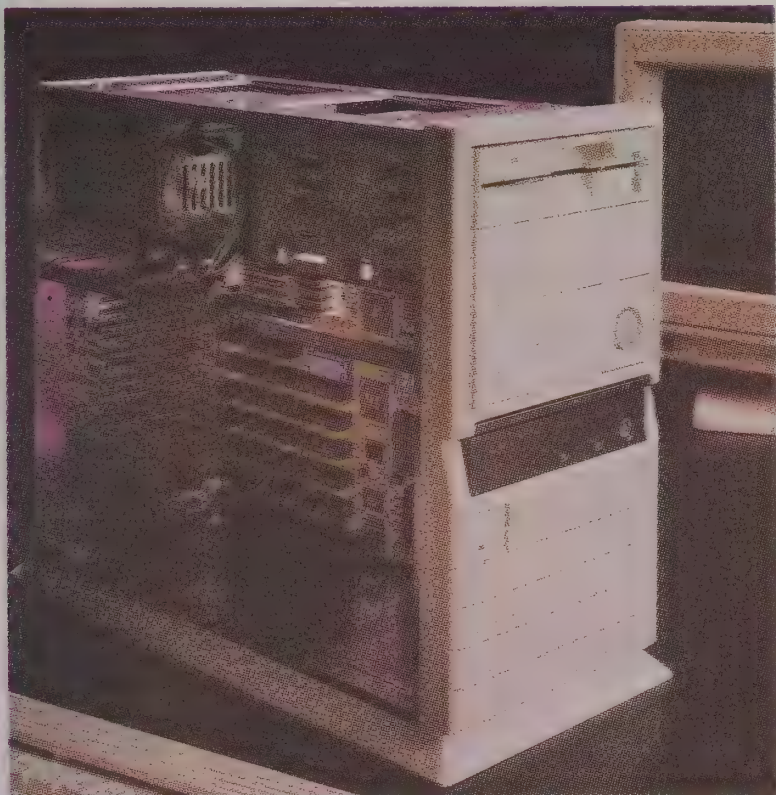
If 3-D animation interests you, Lightwave is a proven network-quality professional tool.

Admittedly, there are a few would-be Toaster products for the PC and Mac, as well as the Amiga, with some features that out-perform the Toaster. However, considering all that it has to offer, the Toaster is still king of the hill—it even won an Emmy! Furthermore, the one thing you can bank on is that NewTek is not resting on its laurels—the Toaster will continue to get better and better. ■

Correction

In issue 115, it was incorrectly reported that Allen Hastings, the author of Light wave, works for Amblin Imaging. He works for NewTek, the makers of the Video Toaster.

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W/1MB
DTC 2270 VESA IDE W/2S, 1P, 1G
340MB IDE DRIVE
TOSHIBA 3401 SCSI-2 CD-ROM
TEAC 1.44 MB DRIVE
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TEAC 1.2MB DRIVE...ADD 48

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TEAC 1.2 MB DRIVE...ADD 48

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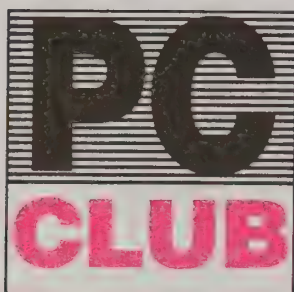
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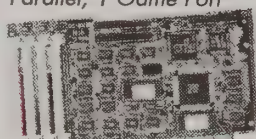


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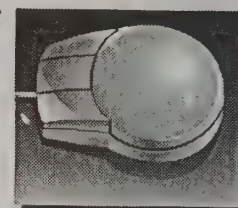
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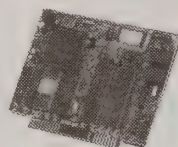
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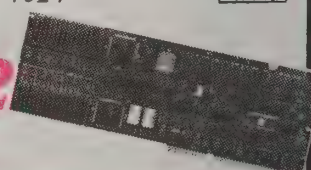
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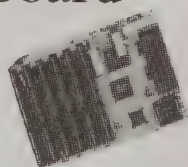
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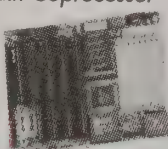
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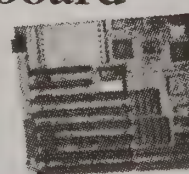
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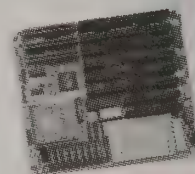
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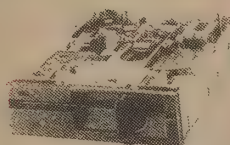
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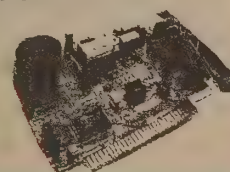
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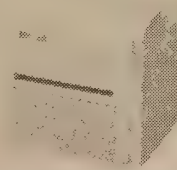


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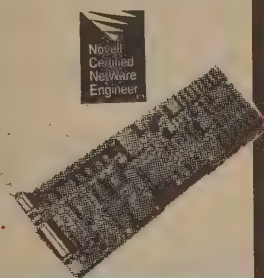
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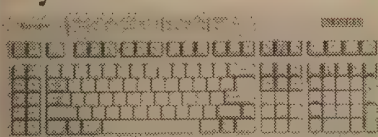
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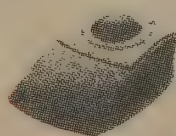
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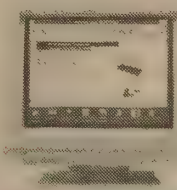
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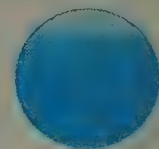


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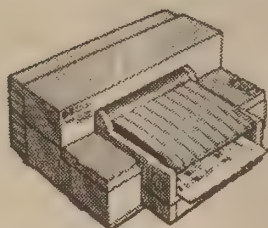
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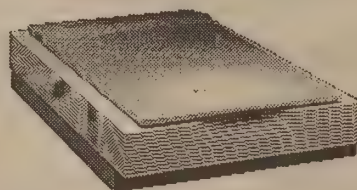


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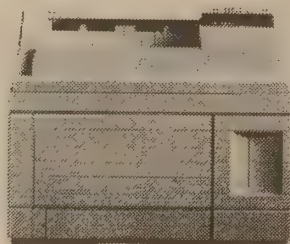
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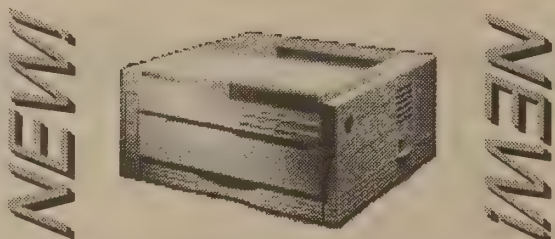
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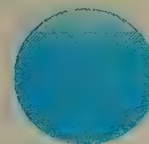
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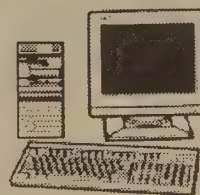


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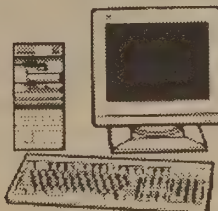


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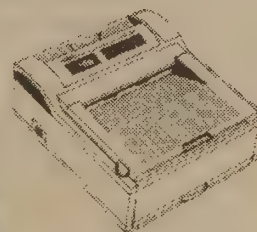
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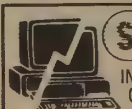
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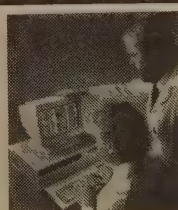
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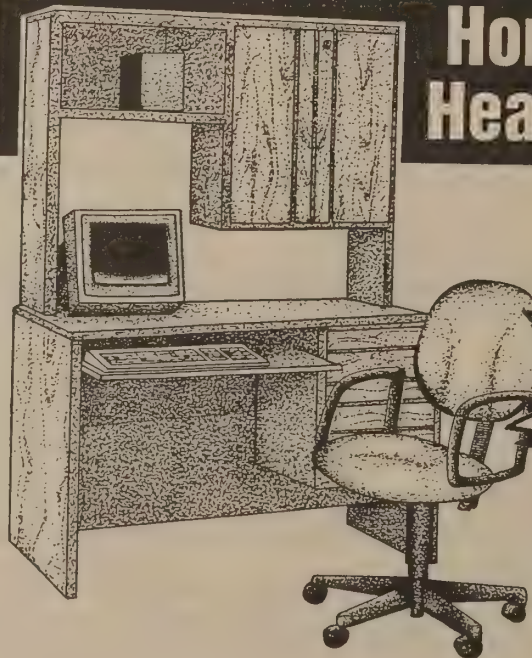
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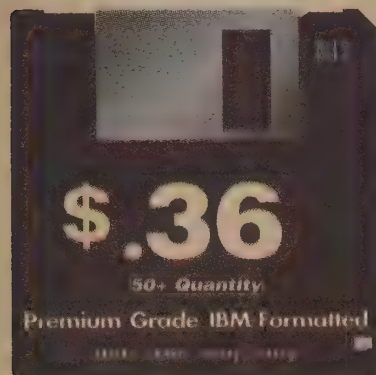
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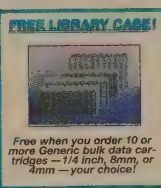
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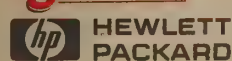


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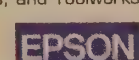
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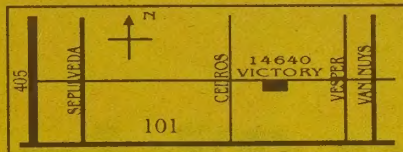
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The More Things Change...

Net Traffic Of The Future

BY JOHN C. DVORAK

I finally got my download from the year 2043 from the Federal Office of Reverse Galactic Studies. Apparently some time in the future a time mirror was placed in orbit around the earth; it has the ability to capture electronic transmission from the future. I've been on a waiting list for two years.

While others wasted their energy getting the winners of the Kentucky Derby, I asked for a simple Internet feed to see what people would be talking about in fifty years.

It looks as if nothing has changed!

Date: 17-Aug-43 16:51 PDT

From: spence@macro.lotus.univ.golub.mega.org

Subj: RRNT or Dresden?

Microsoft is already five years late on RRNT [ed note: RRNT stands for really, really new technology] and I suspect Dresden (aka Windows 40.0) will ship before RRNT ships.

DVORAK'S LAST COLUMN

The joke going around the office is that RRNT means really, really *not* there! Hahahahaha!

Date: 18-Aug-43:

TO: Multiple recipients of list OS/19

From: Mesa@corncob.TexasA&M.edu

Subject: Re: Windows RRNT

>> BTW, have you looked at RRNT?

Too much memory, too much disk space, too much money, the box is too heavy, networking features I don't need. I suspect Microsoft told everyone to develop for RRNT so that they could work on Dresden applications and then dump RRNT (like they did Desktop OS).

RRNT apparently has this "network security" feature which allows the system administrator to monitor *everything* you do, including what you do at home away from the computer. If its GA is anything like the last beta, it's a proprietary mu-Unix with the Win29 interface. Slow, resource hungry, and incapable of running on most of the

current Win29 machines out there.

As for why Dresden is taking so long—they actually have to develop the code themselves. They don't have a technology partner (Nintendo) and there doesn't seem to be a company out there with a meta-OS that they can buy and claim as their own.

TO: Multiple recipients of list OS/19

FROM: bluebell@random.number.com

Subject: InfoWorld about Windows RRNT

This week's *InfoWorld* has a cover story about Windows RRNT—the gist of it is that it makes a good uber-server, but a "poor" uber-operating system. Some of the criticisms:

1) System resources (12 gigabytes RAM (16 recommended), 70GB disk space support features like CPO security that are not really needed on most PCs.

2) Performance running DOS and 256-bit Windows apps was described as "abysmal." Loading some Windows apps was as much as 75% slower than under Windows 29 (that compares to 10% slower under OS/19). That was in a 16GB config—the performance with 12GB was even worse.

3) Based on stats from a download in the background, they stated that OS/19 is a better multidimensional tasker than Windows RRNT.

4) There was a gripe about Dresden "next year," and how Microsoft is downplaying RRNT for the desktop and pushing Dresden.

5) The article basically said that OS/19 has a golden opportunity as a higher-end desktop OS, since Dresden is a good year off. Wouldn't surprise me to see 19.1 come out at the same time or before Dresden.

Date: 26-Aug-43

TO: Newswatch list

From: Gogetter@archives.dusty.old.books.org

Subject: HAYES OFFERS PCMCIA UNIT Modem maker Hayes Microcomputer

Products, Inc. has released its Blastmaster ISDN/X8 gigabit modem for PCMCIA, a high-speed, internal data/fax modem that provides both asynchronous and synchronous data communications.

Date: 24-Aug-43 3:33 am EDT

To: everyone concerned

From: Lockness@crumbcake.cartoon.dog-ear.cal.edu

Subject: In-depth review

For once, there is an in-depth review of OS/19 in one of the UK computer magazines. The review covers fourteen pages, rather more than the usual page or two. The front cover headline is slightly amusing "Buy it now or wait for Windows RRNT?" Aren't we all going to rush out and spend four thousand pounds on RRNT and two thousand pounds or more for the RAM to get it to run in order to *downgrade*? Hahaha.

Date: 29-Aug-43 06:21:34

To: Dreamers

Fm: Zachmeister@hydrogen.peroxide.com

sb: RRNT still means really, really not there Dreamers.

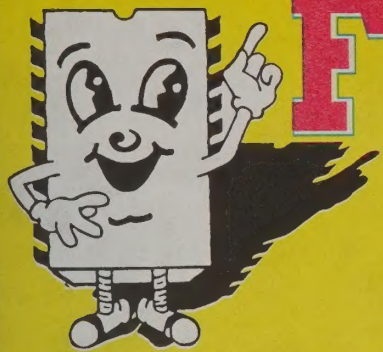
Yes, Microsoft has said that both Windows RRNT and RRNT/AS4000 have been "released to manufacturing" as of this Monday. That "thirty days ahead of schedule" might just be taken with a grain of salt, though, since the promises for AS4000 have always been keyed to delivery of the base version of RRNT. Had RRNT shipped by the end of last year as originally promised, AS4000 would now be over six months late.

There is still a curious lack of enthusiasm for the whole business on the part of the Microsoft folks over on WIN512 and WINRRNT, though. Some of the hard-core RRNT enthusiasts did some initial jumping up and down and shouting mildly but even that faded rather quickly.

OK, so these are just today's online memos dressed up to look like something from the future. Any bets that these notes won't be *much* different? ■



Copyright © 1994 by John C. Dvorak. All rights reserved. John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine and MacUser, and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.



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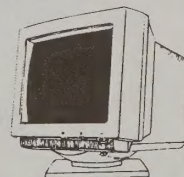


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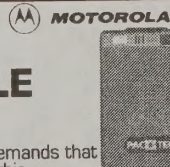
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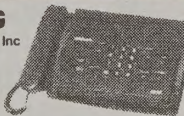


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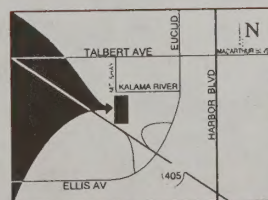
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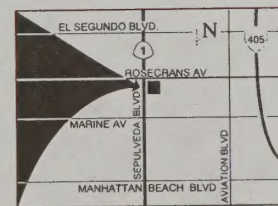
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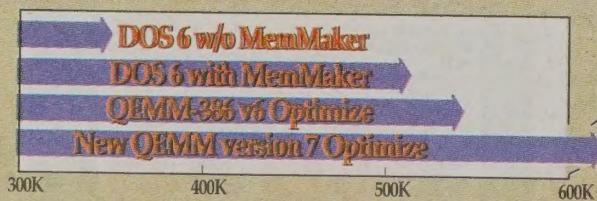
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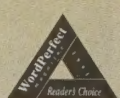
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How we got the chart numbers: CPU—486/33 ALR Power/business VESA machine equipped with 16 megs of RAM and running MS-DOS 6. Comparisons were done using the following memory managers: QEMM 7, QEMM 6.02, MS-DOS 6 MemMaker. In addition to the driver (or drivers) required by each memory manager, the following drivers, DOS resources and programs were loaded for all comparisons: in the CONFIG.SYS file: SETVER.EXE, DOS=HIGH, FILES=20, BUFFERS=10, STACKS=0, MVSOUND.SYS, SNDOK12.SYS, SLCD.SYS. DOS SHELL—statement in the AUTOEXEC.BAT file: VSAFE, MSD, DEL, UNDELETE, LSL.COM, NE2000.COM, IPXODI.COM, NETX OR EMSNETX, MOUSE.COM, SMARTDRV.COM, PRINCCAP.COM.

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