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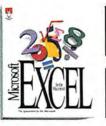
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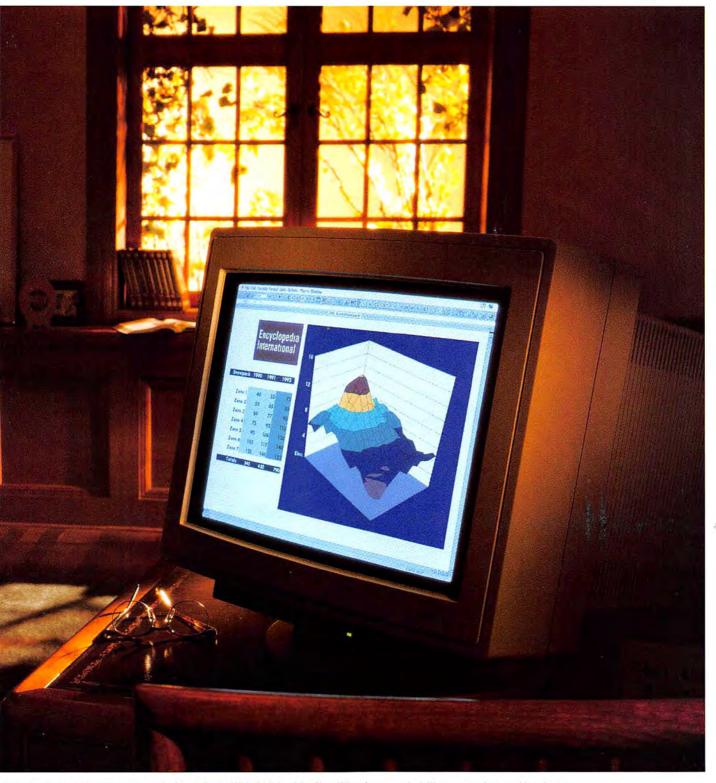
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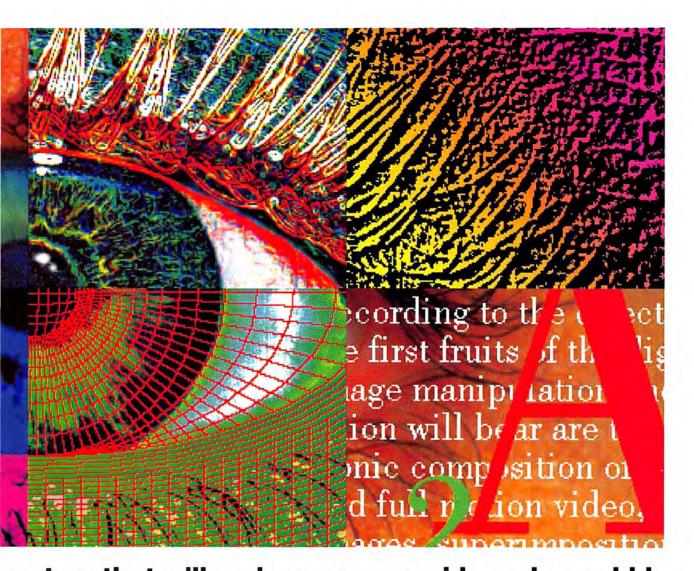
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MAGAZINE SEPTEMBER 1992

SPECIAL ISSUE



Personal Computers in Education

For the last decade, America has invested heavily in programs to place personal computers in schools. We report on what our nation has accomplished so far and where we're headed. The prognosis: not encouraging.

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BY CHARLES PILLER The failure of U.S. public schools to arm students with computing skills means many may never effectively compete in our technological world.



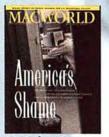
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A BROKEN COMPUTER—
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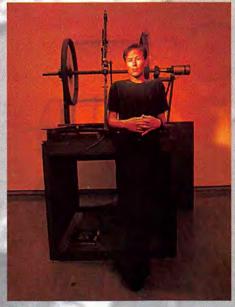
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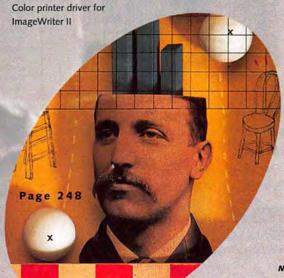
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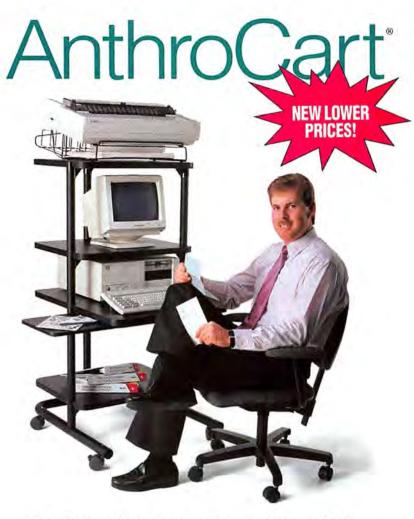
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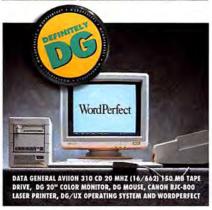
















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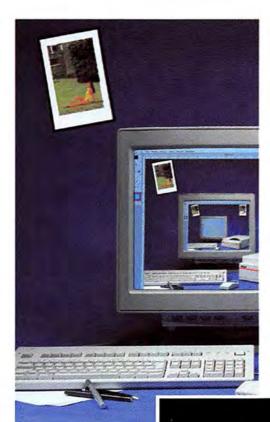
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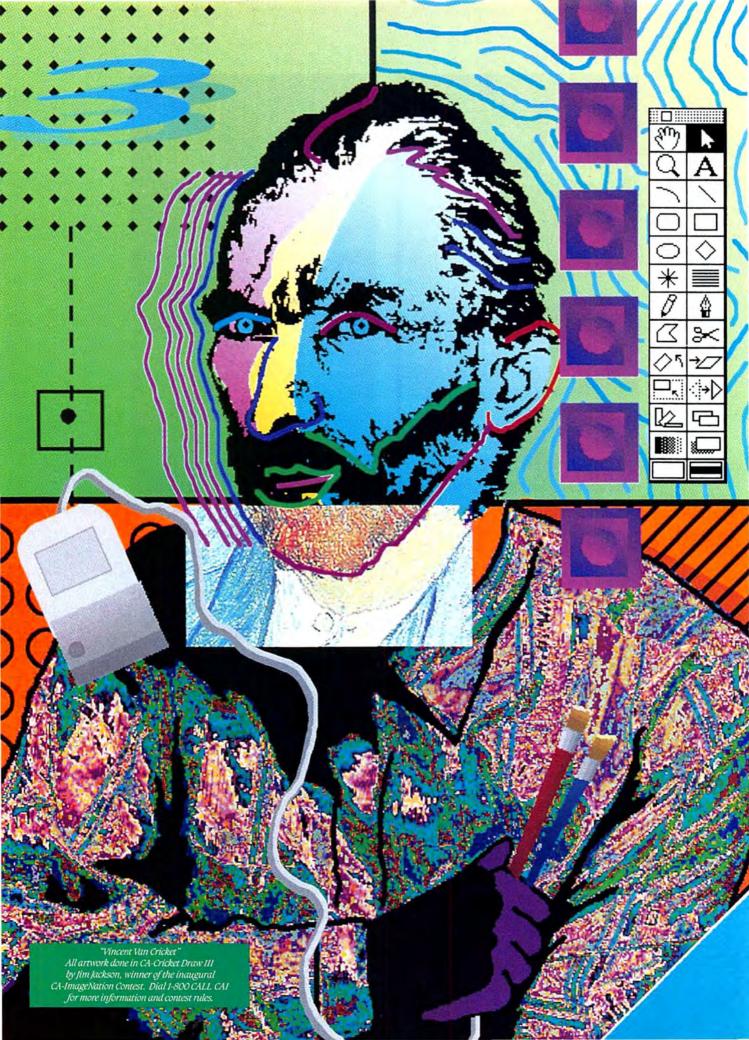
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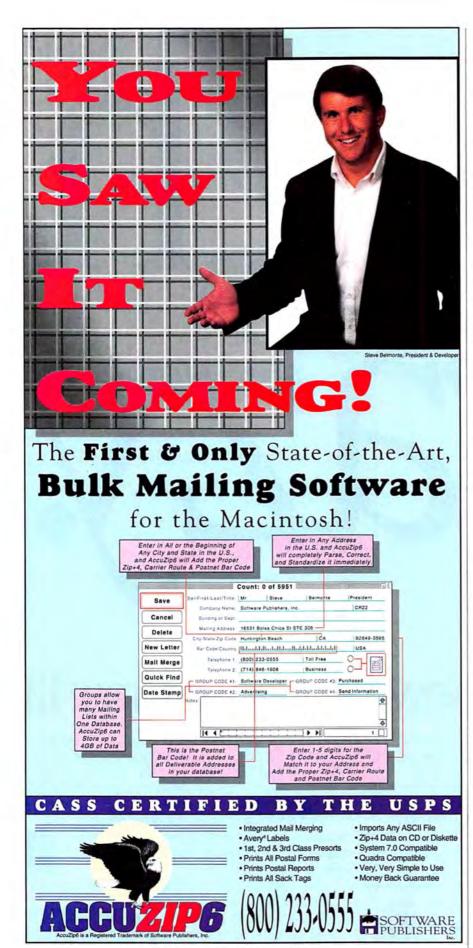
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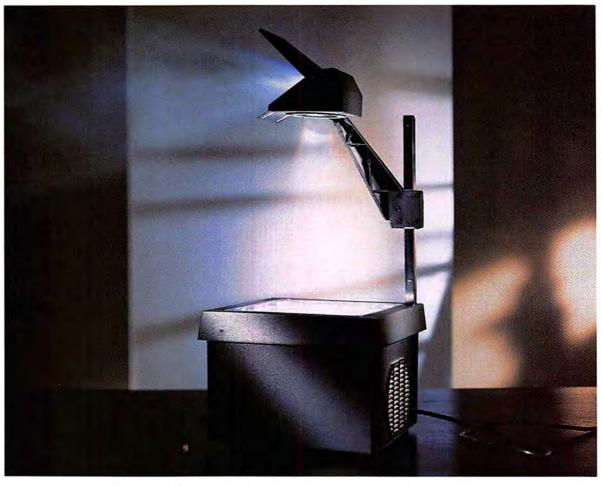
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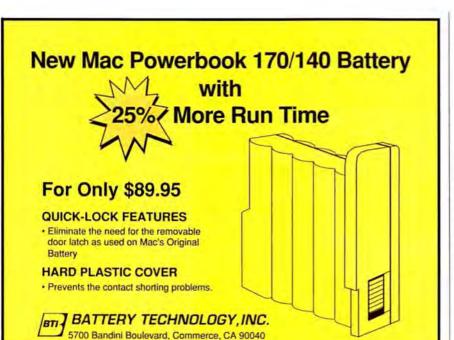
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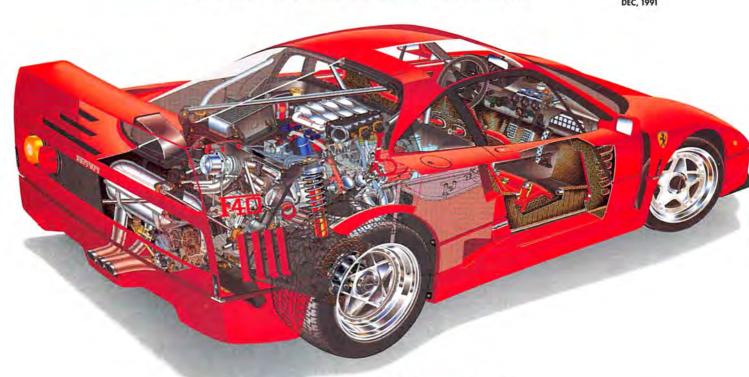
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Apple and Toshiba plan to do multimedia PDA products, including an initial CD ROMbased personal digital assistant that should be available in mid-1993. The PDA will use software technology from Kaleida, the Apple-IBM multimedia joint venture. Apple and Toshiba will sell the PDA under their respective brand names.

A problem with Envisio color adapters for PowerBooks can cause a short circuit. See Reviews, this issue.

Apple chooses retail outlets Office Depot, OfficeMax, and Silo for a pilot program to sell Macs through consumer and office-supply stores. The program began in June and will run through the summer, with Apple planning to announce its final distribution partners this summer.

Nisus Software (formerly Paragon Concepts; 619/481-1477) is developing Nisus XS. The word processor supports QuickTime movies, sound attachments, and Apple events. It lists for \$450 bundled with the table editor Tycho and a version of the math typesetter Expressionist.

PowerMerge from Leader Technologies (714/757-1787) can copy the newest versions of files between disk drives. It is intended for PowerBook users but works in any environment, and provides control over which files and folders are copied. PowerMerge lists for \$129.

Access to Internet: InterCon's (703/709-9890) WorldLink provides software and dial-up access privileges to the Internet. An E-mail account is \$19.95 per month, or \$29.95 with file-transfer support and bulletin board access.

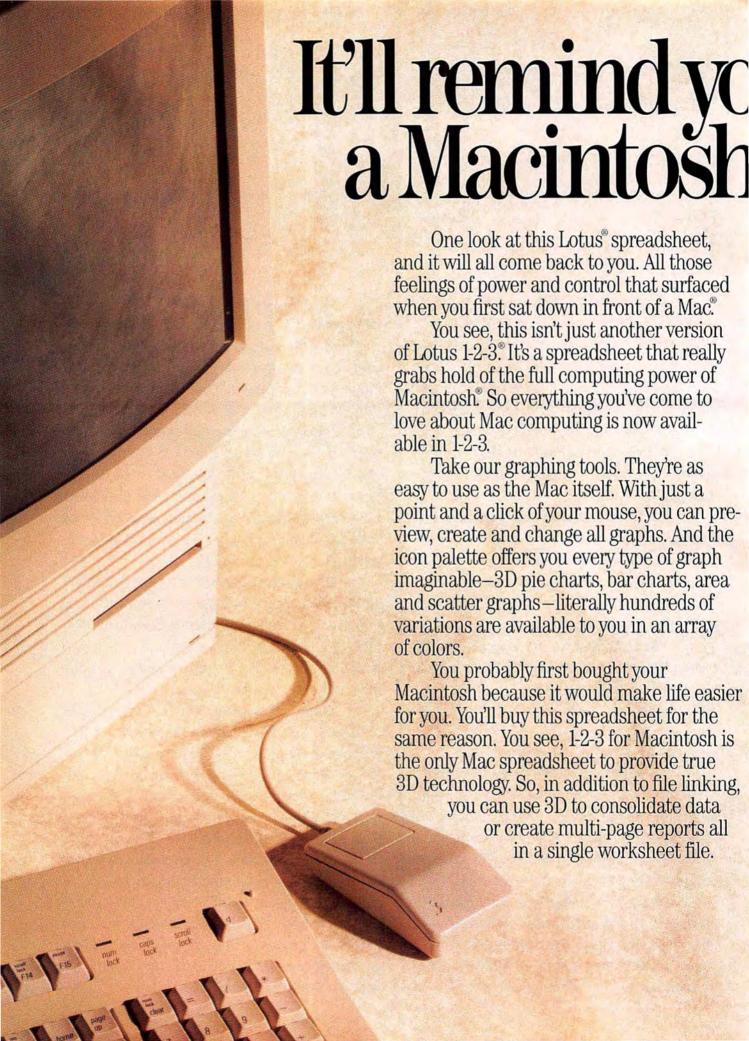
Wide Area QuickMail: CE Software has arranged with Immedia Infomatic (800/361-7252, 514/398-0741 outside the United States) to provide access via QuickMail to a network connecting sites in 30 countries. All connections are made through local phone calls. Cost depends on use.

ThunderStorm speeds Photoshop by ten times or more using two DSP chips, according to SuperMac (408/245-2202). The NuBus board comes with a library of plug-in filter modules and will list for \$999 by itself or \$3999 bundled with SuperMac's Thunder 24 graphics adapter, which usually lists for \$3499.

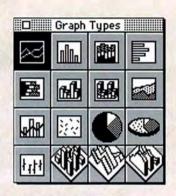
Word Chase: MVP Software (415/599-2704) is shipping the \$129 text-retrieval utility Retrieve It, for finding text inside documents. Retrieve It does not pre-index files, so it runs slower than On Location, but Retrieve It provides a wide range of search operators.

New Shadows: Gizmo Technologies (510/623-7899) is shipping ShadowWriter 2.0, which makes it possible to share stand-alone printers on AppleTalk and Ethernet networks. ShadowWriter lists for \$109 and supports all Apple personal printers, as well as printers from HP, Okidata, Epson, and Canon.

the Mac is on the way from ShareVision (408/428-0656), which hopes to offer document collaboration and teleconferencing capability for less than \$4000, including a low-cost video camera. The company expects to announce the product this fall and ship it shortly thereafter. m



n of why you bought in the first place.



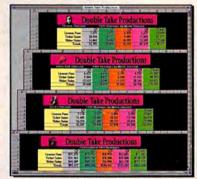
A tear-off palette full of 3D pie, bar, area and scatter graphs will help you make the numbers look good.

You can view and work with up to 256 worksheets simultaneously. In short, 3D makes the job of analyzing and consolidating a snap. And after using it, you'll wonder how you got along so long without it.

1-2-3 for Macintosh also offers in-cell editing, a feature that lets you edit text, formulas and data directly in the cell. So

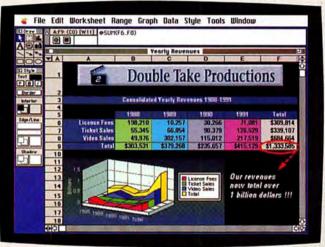
you can focus on the worksheet, instead of the formula bar above. Makes sense, doesn't it?

Because the program captures the true spirit of Macintosh, it has recently earned the Editor's Choice



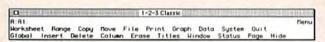
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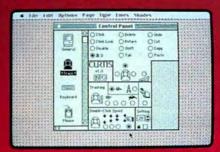
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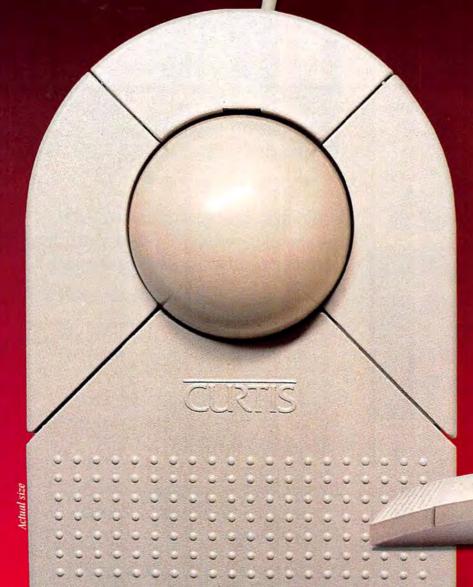
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America's Shame: How We've Abandoned Our Children's Future

WILL THEY BE ABLE TO COMPETE IN A HIGH-TECH WORLD?

BY JERRY BORRELL

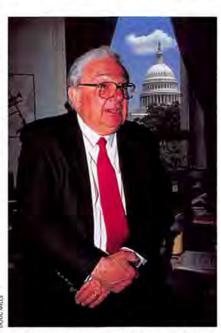
Questions about education are as pervasive as our national doubts about the effective use of tax dollars. Education is discussed endlessly: its cost; its effectiveness; its lack of effectiveness; how we measure effectiveness; what we should teach; what we should not teach; teachers; equality of education. We as a nation spend a great deal of money on education. Primary and secondary education is the singular experience of life in America, perhaps the experience that most unifies and defines our national persona.

Early in his administration, George Bush, the self-declared education president, raised great hopes for improvement in education. Last year President Bush introduced America 2000, a proposal to revitalize the education process in this country. It includes \$535 million to be invested in 535 schools, one in each congressional district, with a goal of redesigning the educational process from the ground up. Two years later the result is nil. The Senate introduced S.2, a bill providing \$800 million and ad- 3 dressing many of the same goals as America 2000. The Bush administration and the Senate are unable to reach an agreement on how to proceed. The discussions about education will have to continue after the election.

Adding to the broad national discourse on education, *Macworld* sheds light on a growing national embarrassment: our record of implementing personal computers in primary and secondary schools. To be certain, everyone can point to glowing examples of success—star schools or demonstration centers where the best equipment, teachers, and other resources are brought to bear. Government officials like to point out that foreign governments look to

America for leadership in the use of computers.

Sadly, our overall record on computer implementation in schools is perhaps most appropriately compared to



"Both [parties] seize upon this issue in an effort to secure political advantages for their party... preventing improvement and creating a stalemate."
—CONGRESSMAN GEORGE BROWN. D-CALIF.

the mismanagement of savings and loans associations over the last decade. No wonder government officials, school administrators, and legislators prefer to cite their public exhortations rather than the realities.

Statistics Lie

DURING THE LATE WINTER OF THIS year several editors and I sat around a

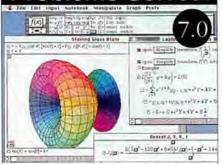
table, talking, arguing, looking at the results of a month's research on this topic. We debated whether we should invest more effort developing a story on how America is using personal computers in schools. Department of Education statistics told us that America made significant progress toward introducing personal computers in primary and secondary schools during the 1980s, that more than 50 percent of all children in grades 1 through 8 use computers at school. Personal computer usage is said to be roughly equivalent among schools regardless of the ethnic composition, income level, or geographic location of the school. Remarkable findings. Too remarkable. "Even if there were one computer per classroom," says Herb Lin of the National Academy of Sciences, "that's less than two minutes per student for a one-hour class." Insufficient for any meaningful training.

So we decided to look further, to visit schools across America, to talk with policymakers in Washington, and to talk with professional associations for teachers and educational administrators. What we found is a false dependence on statistical analysis and a reality so discouraging that it made us question how this situation has remained unremarked on for so long. Antiquated computers; unused computers; computers used for games and not for teaching; schools and teachers unprepared to use computers that they own; mismanaged or misdirected policies; and unknown hundreds of millions of dollars spent over the last decade for little return.

America Lacks Direction

THE EDUCATION ISSUE, LIKE MOST issues of its scope, centers on Washing-continues

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- MacWorld magazine, May 1990.
- Five mice review, MacUser magazine, June 1990. **‡‡‡‡**

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ton, D.C., despite the fact that public education in the United States is run by state governments and local school districts. Current estimates indicate that America has 110,000 schools in 16,000 local school districts. Most of the budget for those schools comes from state and local sources.

While the federal government does not control the budget or curriculum of public schools, it does have a powerful impact on public schools for two reasons. First, funds allocated by dozens of federal programs require that states match federal spending on specific programs and meet federal requirements that funds be allocated in certain ways. Second, the federal government shows leadership by initiating programs, promulgating budgets and legislation, and making policy that sets the course for how education in the United States is conducted.

Policy development with regard to computer usage has a long history. The debates in Washington over the last three years about technology in education (including computers) are hardly new. The call for an Office of Education Research and Improvement (OERI) within the Department of Education, for example, is tragically like the neverimplemented National Institute of Instructional Technology (NIIT) proposed by Congress in 1979. Both sets of proposals noted the need for a specific body within the federal government to coordinate and oversee the use of tech-

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gress first introduced legislation to accomplish what current legislative efforts propose. Earlier proposals failed. The current proposals are doomed as well—by budget constraints, by election fever, by partisan politics, and by what most Americans increasingly think of as ineffective federal government. Congressman George Brown, D-Calif., at 14 terms one of our most experienced legislators and one of the key developers of policy on technology in education, says that "both [parties] seize upon this issue in an effort to secure political advantages

for their party... preventing improvement and creating a stalemate." Little improvement is likely.

Meanwhile we will spend hundreds of millions (perhaps billions in the near future) on computers and technology in education without effectively addressing problems that were first identified more than a decade ago.



"Even if there were one computer per classroom, that's less than two minutes per student for a one-hour class."—HERB LIN, SENIOR STAFF OFFICER, NATIONAL ACADEMY OF SCIENCES

nology in education, the development of instructional materials and demonstration projects, the need to provide teacher training, and the need to involve private industry in the effort to improve education.

Ten years have passed since Con-

Have We Abandoned Our Children's Future?

WE HEAR A LOT ABOUT our children's future these days: about how we are mortgaging their future with our national debt;

about the fact that they will be asked to bear the burden of Social Security for an aging population; about how our children will inherit a destroyed environment; and about their need to lower their expectations of the American continues

The Evolution of CAD

From the beginning of time, we have tried to express ourselves through graphics.

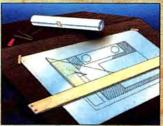
In the beginning of time people had to use primitive design tools for creating any type of graphics.



In the 15th Century design tools were quill ink pens and crude styles of paper.



By the 18th Century we had advanced to the drafting table with T-squares, and the dreaded eraser.



In the 20th Century
the first CAD programs were very
slow and extremely
difficult to use, not
to mention the
expense of
buying them.



As programs became easier to use, people thought they were radical and intelligent, but just lacked real CAD power.



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Circle 56 on reader service card

dream—for example, their expectations of owning a home. If our findings are correct, there is yet another subject for discussion related to America's poor stewardship of our children's future. Our children will be ill-equipped to compete in a global economy in which computer skills are required.

The oral and written records of leadership in Washington are good. But the facts and reality are somehow...different. All of the right words are spoken, sensitivity is expressed toward minorities, sympathy shown to the disadvantaged, economically thought-out policies are articulated. Well-meaning academics and industry experts are invited to write position papers and address congressional hearings. People work hard in Washington, notwithstanding the stereotype. But government has become so unmanageable and intangible that known solutions escape our grasp like fluid seeping between the fingers.

Technology in education has been a prominent topic. In the 1960s the discussion centered on use of general technology, like television, in schools. By the 1970s computers were the primary focus. Today the topic has shifted to the need to connect schools via networks. There may be no better example of the problems of federal leadership than our cover topic. After two decades of discussion in Washington about the role of technology in education, what we find is a mishmash of policy, disarray in the classroom, hordes of sagacious pundits, and disingenuous politicians. Enough to alert the studious observer that there is a discouraging story to be told on how



"If you go to a typical school, you'll see that we're hardly using [computers] at all. We're good at innovation, but where we fall down is [implementation]."—LINDA ROBERTS, PROJECT DIRECTOR OF THE OFFICE OF TECHNOLOGY ASSESSMENT'S STUDY POWER ON

American schools are not using personal computers.

Despite good intentions, the best in-

GEORGE BUSH,

THE

SELF-DECLARED
EDUCATION PRESIDENT.

RAISED

GREAT HOPES. TWO

YEARS LATER

THE RESULT IS NIL.

formation, and the hopes of planners, we have at most established demonstration centers for what might be. Linda Roberts, project director of the Office of Technology Assessment's (OTA) landmark study Power On, confirms this. "We have demonstrations of what's possible, but if you go to a typical school, you will see that we're hardly using [computers] at all. We're good at innovation, but where we fall down is [implementation] because we are not a controlled education system, like foreign educational systems. There is no similar use and implementation of technology here."

And now we're focusing on how to network the nation's schools as if we had implemented some coherent plan over the last 20 years; as if there were some vast system of well-instituted programs

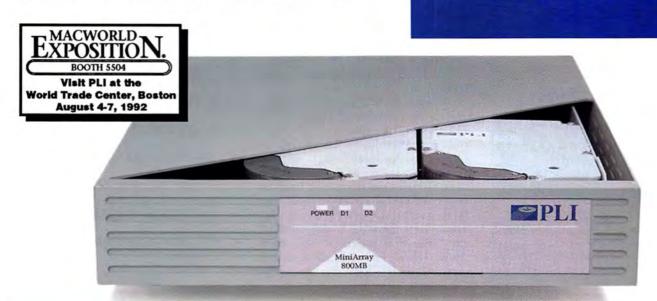
that will benefit from network communications. The truth is that we are groping toward another ill-defined approach to the implementation of technology in the hope that the next effort will be the one that brings order from chaos.

Teachers are caught in the middle. A sad irony of this issue is that those most able to make improvements, the teachers, are the least empowered to make changes. Teachers worry about having current textbooks, about achieving measurable gains in students' test results, about the high ratio of students per teacher, about giving trou-

bled students more attention, about the need to use their personal time to grade continues

You'll love it for the

SPEED



but you'll buy it for the PRICE

If you work with graphics applications, multimedia, databases or any large file, you know the frustration of waiting. Waiting while the hard drive reads, waiting while it writes, waiting for just about anything involving the hard drive.

PLI has the solution. It's called the MiniArray.

Consider this: with the MiniArray, a Mac IIci can duplicate a 100MB file in just one minute, the kind of performance you might get from a \$30,000 RAM Drive. Only this is not a RAM Drive.

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And with all that speed comes the capacity you need. Sizes range from 240MB to 4GB to fit any need, while prices start at less than \$2,000 (so you can update your software, or maybe even your wardrobe, along with your drive). And you can feel secure about your decision with our two-year warranty, which can be extended to give you up to five years of coverage.

As you might expect, there is a catch.

This low price also gets you PLI's QuickSCSI, included with every MiniArray. That means the features of QuickSCSI—disk mirroring* between daisy-chained hard drives, support for an additional seven MiniArrays or hard drives and increased speed for all attached SCSI devices—are a pleasant bonus to an already great deal.

So the next time you're waiting on your hard drive, call and order the new PLI MiniArray.

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Audio formats supported include QuickTime, AIFF, HyperCard, Director, and SND. Record audio using the microphone included with your Mac or any compatible input device, a perfect choice for Mac II LC and PowerBook users.

O P C O D E

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End users circle 280 on reader service card Dealers circle 285 on reader service card papers or tests, and about their dwindling earning power. "Even when personal computers exist, they are used for rote tasks like spelling or sentence-structure study, not creatively," says Congresswoman Joan Kelly Horn, D-Mo., a former teacher at preschool and college levels.

Horn is working informally to provide computer training for teachers in teacher-training colleges in the hope that this will predispose them to use the technology that some schools can provide. Like many of the legislators I met with, Horn decries the current balanced budget efforts, which "make it easier to go to war than to invest in the nation." She reflects upon the worthy goals of the "education president" and upon America 2000, but wonders when such ideas will receive legislative support or funding.

What's the Prognosis? No Change

WASHINGTON IS A CITY OF COMPETing agenda items. Education is one agenda item that, together with health care, military spending, Social Security, the economy, and crime, makes up the substance of our popular media. Topics of debate on the evening news. Frontpage news. Political issues. Budgetary issues. Allocate millions for an important idea in one area, and millions have to be cut elsewhere. Sometimes it becomes clear that these issues are tied together-as in the case of the recent study issued by the World Economic Forum stating that America has slipped another notch lower in the ranks of global economies. America, the study states,



"Our current balanced budget efforts make it easier to go to war than to invest in the nation."—CONGRESSWOMAN JOAN KELLY HORN, D-MO.

has become fifth in the world's competing economies because of, among other things, its education base.

We struggle with this thought, after years of hearing about a return to acBY THE YEAR 2000

WE MAY

CREATE A SCHISM IN

AMERICAN

SOCIETY BETWEEN HAVE

AND HAVE-NOT

GRADUATES OF OUR

OWN

SCHOOL SYSTEMS

countability in education, of a return to focusing on basic skills and a subsequent rise in test scores. As a country we spend more money per student than does any other country in the world. (It is interesting to note that when viewed from the perspective of spending based on our gross national product, we rank much lower—11th in the world.) Yet we are told that education, part of the foundation of our society, is one reason why our economy is falling behind the rest of the world.

Unfortunately, after five months of study, we have no answers and there is no outlook for improvement in sight. If George Bush is reelected in November, and if there is another Democratic Congress, the partisan dickering over policy

and policy implementation is going to continue.

Each year, more millions will be spent acquiring computers for schools. Each year sparkling new programs and demonstrations will appear. And America will march into the future without adequate planning, effective implementation, or a national agenda, while other countries such as Japan and France implement well-coordinated policies. By the year 2000 we may create a schism in American society between have and have-not graduates from our own school systems. If computers

are not successfully and widely integrated into primary and secondary education, our society will stratify into those with the knowledge to succeed and those who cannot. **m**

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In the 1992 hard-drive triplecrown, La Cie™ finished First, First, First. Never before has a single company swept all three Macworld World Class Award fixed-drive categories. And that's not all! La Cie's Silverscanner is also a 1992 Macworld champ. Thanks to all those Macworld readers who named La Cie the best bet in mass storage solutions. You're the reason we work so

The 1992 Macworld World Class Awards

Best Hard Drive!

Best Hard Drive!

Best Hard Drive!

Best Color Scanner!

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MacWeek, February 1991

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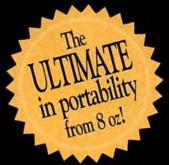
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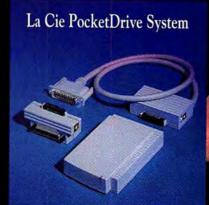
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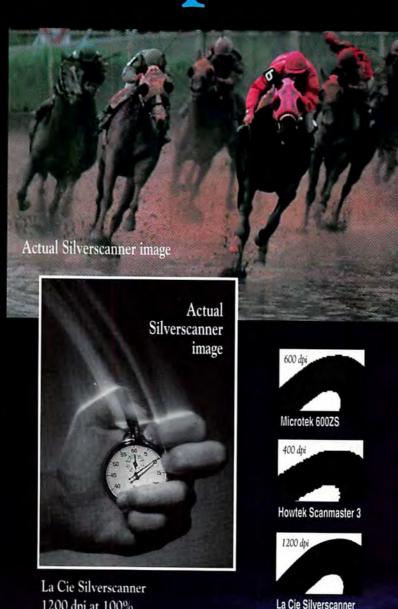
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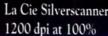
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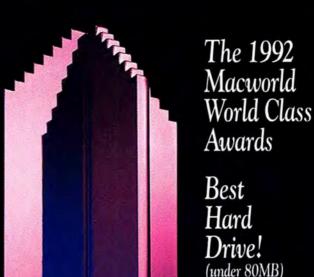
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Macworld, June 1991



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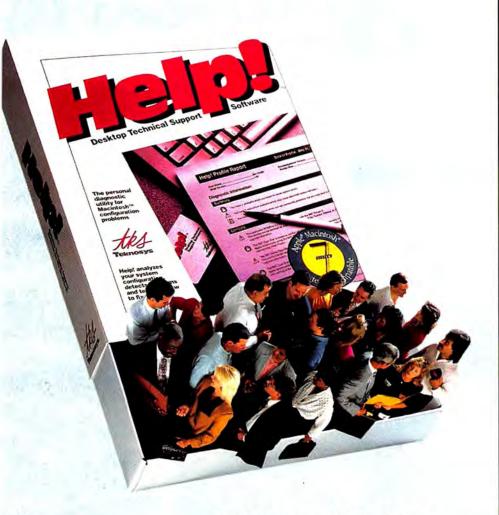
The value of a thoroughbred.

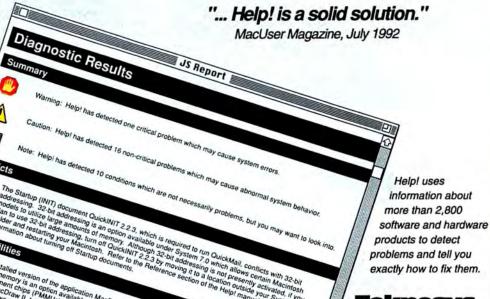


When it comes to world-class speed and performance, nothing eclipses the form and function of a true thoroughbred. At La Cie, our goal is to make each and every product a thoroughbred. From the sleek lines and dainty footprints of our award-winning cases to the power of our technological muscle, La Cie builds champions that leave the competition in the dust. And as a Quantum company, we have the financial strength and staying power to bring you future generations of winners. For unbeatable technology and support, La Cie's the winning pick. You can bet on it.



Puts 2,000 Macintosh Experts At Your Desktop





Help! M is a configuration problem solving utility. With Help! installed on your Mac, you'll benefit from the knowledge of more than 2,000 Macintosh experts. That's because Help! incorporates information provided continuously by Macintosh developers, consultants, service providers, systems engineers, etc. from all over the world. With Help!, you can improve the efficiency of your Macintosh and prevent system crashes

Help! is different from all other diagnostic tools because it uses artificial intelligence to pinpoint configuration problems and recommend solutions. This technical support program not only analyzes your system, but it also tells you exactly how to fix all detected problems. Help! even has a simulation feature which allows you to perform a what if analysis and check in advance for problems prior to making changes.

Help! detects:

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3,000,007 reasons to upgrade to System 7.



MacUser gave System 7 its Editors' Choice Award. Byte, its Award of Excellence. Software Publisbers Association named it a Best New Business Software Product of the Year.

2. One-step installation.

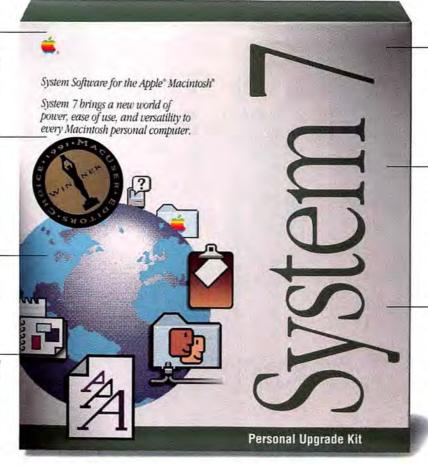
The "Before You Install" disk confirms the compatibility of your software (including INTS). Then, simply click the mouse to install System 7. Any questions? 90 days' foll-free phone assistance included.

3. It's developed quite a following.

Developers have shipped hundreds of applications that take advantage of System 7 power. Microsoft, Claris, Lotus, Aldus, Adobe and many more.

4. Runs on your Macintosh today.

System 7 works on all Macintosh computers. To run multiple programs, four megabytes of memory are recommended. Two megabytes are required.



Powerful software utilities.

System 7 will let you run the latest software utilities from Apple, including Macintosh PC Exchange, QuickTime" and AppleTalk' Remote Access.

6. More power out of the box.

Macworld says, "The new Finder...is worth the cost alone! System 7 improves the way you organize, view and work with your information. Built-in file sharing lets you share files over a network, simply and easily.

7. Keep your investment current.

The best way to keep up with the latest technology is to stay abead with System 7. You'll need it to take full advantage of today's applications, bardware and software. And it will bely you grow with the future as new technology innovations come along.

Macintosh System 7. If the first seven reasons didn't convince you to upgrade, just ask the three million Macintosh users who have already discovered the power of System 7. Call us at a 1-800-538-9696, ext. 185. We'll give you the name of an Apple software reseller near you. And you'll discover the power of System 7. The power to be your best.

Everything in One

N A RECENT REVIEW OF INTEgrated programs, Tom Negrino rates ClarisWorks as the best (in a close tie) mail merge program ("All-in-One Programs," June 1992). On first glance, ClarisWorks would seem to have a capable enough merge facility. And for someone sending form letters to multiple recipients, this is true.

But most small businesses have a greater need to send merged documents to a single recipient. All day long I send faxes, invoices, and letters. I need the ability to do a "one-off" merge easily. With Microsoft Works, one merely selects the database record to merge, and opens the merge document. With ClarisWorks, to merge from a single record, one must first select that record, then choose Hide Unselected, then choose Mail Merge, then select the database to merge from, then print. Not fun.

7eff Kreines Coosada, Alabama

LIKE YOUR MAGAZINE A LOT AND would like to say keep up the good work. In all the reviews for integrated software such as GreatWorks, Works, and so on, I've not seen anyone mention what a good deal they are for the new Macintosh owner who may not be able to afford each of the single programs. Buying one of these packages is a lot cheaper than buying each of the modules separately.

Andrew Manteuffel Duluth, Minnesota

Cooking Classic

HIS LETTER IS FROM A HAPPY MAC Classic user who has installed a Harris Laboratories Classic Performer, In "The Need for Speed" (June 1992), you make a cursory remark that the Harris Performer is the only accelerator that does not exceed the Classic II in speed.

The Harris Performer cost me \$245, took about 30 minutes to install, and effectively doubled my speed. That is a handsome boost for the price. This little Mac Classic with its Harris Performer may not smoke, but it sure is cooking here in North Carolina.

> Robert Simons Fayetteville, North Carolina

Additional Resources

ENJOYED THE JUNE ISSUE OF Macworld, and I found Deborah Branscum's "Special Interests" column especially interesting (Conspicuous Consumer). I would, however, like to know how to get ThePage publication. No phone number or address was mentioned for this.

> Tommy Rupinski New York, New York

We apologize for the omission. Readers may reach PageWorks, the publisher of ThePage, at 312/348-1200, fax 312/404-0717.-Ed.

UR MEMBERS WISH TO THANK Deborah Branscum for mentioning our group's newsletter, FatBits, in her June column. There are some corrections that need to be noted: Our membership dues are now \$35 per year, and that is a family rate. Also, our current address is P.O. Box 7188, Thousand Oaks, CA 91359-7118. More information may be obtained at our number, 805/484-9205.

> Nessa Memberg CVMUG Thousand Oaks, California

WAS INTRIGUED TO READ BOTH Jerry Borrell's Commentary and Deborah Branscum's Conspicuous Consumer column (June 1992). After all, everyone is seemingly interested in more information about the Mac, and what better way to get it than electronically? continues

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Introducing the DayMaker Travel Case Bundle.

 The DayMaker Travel Case: Custom designed for the PowerBook™.

Lets you use your PowerBook without having to take it out of the case. Form-fitted. No slack, straps, or sliding. Ports accessible. Open front for easy

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CORRECTIONS

The correct phone number for Coral Research is 702/588-9690; the correct number for ASD Software is 714/624-2594 (Reviews, July

Charlene Anderson-Shea is a Honolulubased graphic and textile designer ("Home-Office How-To," July

Connectix Corporation's Compact Virtual is not included free with NewLife Computer Corporation's 16MHz and 25MHz accelerators ("The Need for Speed," June 1992); separate versions of the accelerators cost about \$100 more than the versions listed in "Accelerator Details."

Unfortunately, these two columns were disappointing in that neither specifically mentioned TidBits, the two-yearold, free electronic newsletter. It's true that TidBits does not have the electronic sex appeal Borrell ascribes to future electronic magazines, but for the moment, too many people and businesses use clunky 2400-bps modems. We intentionally limit TidBits to straight text so that it can easily traverse any network anywhere in the world. Borrell does understand many of the advantages of electronic publishing, despite the expensive high-end networks and machines necessary for his imagined electronic magazines. Electronic publishing is fast, wastes virtually no natural resources, and can be more focused than traditional publishing.

> Adam Engst Editor, TidBits Redmond, Washington

TidBits can be found in the Macintosh Hardware file libraries on America Online, in the Newsletters folder in the User Groups folder on AppleLink, in the MacClub Magazines library (#8) on CompuServe, and via E-mail to info@tidbits.halcyon.com on Internet.-Ed.

Mathematical Minds

S A LAB TECHNICIAN AND MACINtosh user, I've followed Macworld's features on math, statistics, and scientific uses of the Macintosh-what few there are-with great interest. I must differ with Charles Seiter on a statement he made about MathCAD ("Mathematics Analysis," June 1992). The integration of text, equations, and charts in MathCAD is more than nice, it's vital in today's work environment. On the other hand, only the

PC Windows and workstation versions of MathCAD have presentation-quality output. I can get far better graphs from KaleidaGraph 2.0 and publication-level equations from Expressionist 2.0; Math-Soft has let MathCAD for the Macintosh languish as the company's other packages improve.

With all the Macs I see scientists and engineers use on television and in magazines, I can't help but wonder why technical applications for the Mac get so little attention from Macworld and from Apple Computer. Sure, DTP and multimedia will have some use in labs, as networking already does, but for research and education alike the coverage and attention is seriously low by comparison.

> Joel Alvin Christine Tyrone, Pennsylvania

Artists, Not Typesetters

COULD ALMOST HEAR THE GROANS of graphic artists everywhere as I read Sanjay Sakhuja's dictum "You need to develop skills that parallel those of the craftspeople in traditional prepress work" ("Correct Color," May 1992). Over the last few years, graphic designers have been asked not only to keep up with their own demanding profession, but to become computer experts and typesetters as well. It's time to draw the line.

Stripping is an exacting craft and it varies from shop to shop. Designers trying to save time and money can easily end up doing just the opposite. Stripping functions applied incorrectly are worse than none at all.

Printers and prepress shops can and should maintain responsibility for prepress functions by adopting the new desktop tools. After all, the same tools that are now available to designers are just as available to prepress shops willing to adapt and update.

> Jonathan Ford Richmond, Virginia

More on Input

TAKE EXCEPTION TO FRANKLIN N. Tessler's comments in "Input Alternatives" (June 1992). My Felix is indispensable. It turns what would otherwise be a chore into a pleasure, and has cured my carpal tunnel syndrome. I have been waiting for a fair evaluation to introduce others to the wonderful world of Felix, but Tessler's article certainly is not it.

> Willam Bandes El Cajon, California

continues

The shortest distance between a Macintosh and a PC.

DOS files on Macintosh.

Now you can work with files stored on 3.5- or 5.25-inch DOS and Microsoft Windowsformatted floppies. Just pop lee disk in your Apple SuperDrive disk drive or compatible floppy disk drive. The Macintosh desktop displays the disk's icon automatically. (5.25-inch disks require a third-party drive.)

Macintosh ease of use.

Contents of DOS disks are displayed in a window on the Mac desktop just like any Macintosh disk. Files and subdirectories appear as standard Mac documents and folders. Open, save, rename, move, copy or delete them. You can even format DOS floppy disks.



Double-click and go.

The customizable control panel lets you create links between DOS files and Mac applications. Then, simply double-click on the file's icon to launch the application. (A DOS Lotus 1-2-3 file launches Lotus 1-2-3 for Macintosh, for example.)

Unlimited exchanges.

With Macintosh PC Exchange, any DOS file can be brought into any Macintosh application which reads that DOS file's format. in fact, files created by DOS/Windows applications like Microsoft Word, WordPerfect or Aldus PageMaker convert instantly to their Macintosh counterparts. Likewise, Mac files can be saved to DOS disks for use with compatible DOS/Windows applications.

Macintosh PC Exchange. Finally, moving files between a Mac* and a PC is as easy as moving them between two Macintosh* computers. So if you'd like the name of an Apple software reseller near you, call us at 1-800-538-9696, ext. 180. They'll tell you more about Macintosh PC Exchange and show you how to bring the Macintosh and PC worlds closer together.

NPUT ALTERNATIVES" HAS AN ERror concerning Apple keyboards. You state that the Apple Extended Keyboard II has a "nonadjustable keyboard tilt." Both of my Extended Keyboards very definitely do have provisions for adjusting the keyboard tilt. Look for the sliding tab on the backside (not the bottom) of the keyboard. Move it back and forth and an adjustable support slides in and out of the keyboard body, changing its angle quite nicely.

Dan Mitchell via America Online

Yes, you're right. The latest models of the Extended Keyboard have an added adjustment feature, although the ones we examined were difficult to engage. Older models lack this feature.-Ed.

More Perfect Than Not.

N YOUR REVIEW OF WORDPERFECT 2.1, you quickly skim over some of the program's powerful features and then proceed to spend a third of the article complaining about the upgrade price (Reviews, June 1992).

WordPerfect 2.1 has the features I consider important: powerful and easy macros, complete graphics tools, friendly toll-free support, unmatched compatibility with other platforms, and the ability to play QuickTime movies.

This is not to say the program is without its faults. One issue that you did not raise was the typing speed of the program. At times I notice a lag in the display of text on the screen of my Mac IIx.

Henry Domke New Bloomfield, Missouri

XPENSIVE UPGRADE PRICE?" THE regular upgrade to Word Perfect 2.1 is \$89, or \$39 without documentation; the competitive upgrade from Word is \$139. Compared with the Word 5.0 upgrade price of \$129, and no competitive upgrade option at all, what is Deke McClelland looking at?

McClelland mentions that Word-Perfect 2.1 fails to have a New Folder button in its Save dialog box. However, nothing is mentioned about Microsoft's failure to incorporate some very important, reguired System 7 features in Word.

It would be nice if you would at least get WordPerfect's telephone number correct. The number should be in area code 801, not 901!

> Brian Marantz Palm Springs, California

Thanks for noting the error.-Ed.

Wimpy's Too Kind

AVID POGUE'S ARTICLE IS VERY kind to Microsoft: he used the word wimpy when referring to Word 5.0's thesaurus (The Desktop Critic, June 1992). I upgraded to Word 5.0 shortly after it was released and found out then that the thesaurus is just plain bad. I wrote to Microsoft immediately, explaining that this thesaurus should be replaced, perhaps with Microlytics' Word Finder Plus, as Pogue stated in the article.

Cyrus Gordon Oakland, California

Lefties Want Mouse

WAS EAGER TO READ YOUR REVIEW of various input devices (Reviews, June 1992), since my Apple mouse has very high mileage and soon should be replaced. However, Teresa Nielsen Hayden made one remark that sent me flying off my chair. She said, referring to the Mouse-Man product, "Logitech thoughtfully offers both a right-hander's and a lefthander's mouse." A similar comment appeared in another Mac magazine, too.

This is not the case. They do not of-

continues

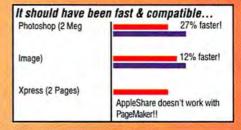
The AppleShare Print Server should have been...

Print Central the most flexible, complete network print server on the market today. Whether you share one laser printer or a series of PostScript devices, Print Central is the product for you. Print Central provides the means for defining up to eight Chooser selectable print queues. Queued jobs can quickly be prioritized or placed on hold, or sent to a different queue. Each queue can be sent to one or several printers on a first available basis. Print Central print queues are never busy, imagine never waiting for a printer again!

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Working with scanned or high resolution images? Color Central is the OPI/DCS Image Print Server, an enhanced version of Print Central. Color Central permits you to place a low resolution image in a page layout, while the high resolution or separated version is stored at the print server. When the Mac prints to Color Central it is freed in seconds rather than the hours associated with printing high resolution graphics. When the job is sent to the printer, Color Central automatically inserts the images on the fly!







We'll show you how to play the media better than Bush, Clinton and Perot put together.

Easy to get rolling.

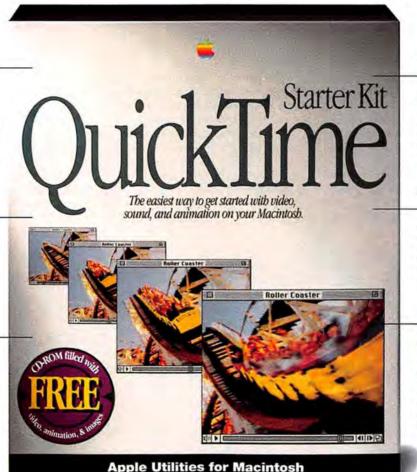
You don't need extra bardware to start working with QuickTime. Simply drag the QuickTime system extension into your System Folder. Now applications designed to support QuickTime can work with digital video sequences, animation movies, sound files and compressed images.

View and edit QuickTime movies.

Play, pause, fast-forward, rewind and advance frame by frame with the MoviePlayer application. Copy video and animation clips, paste them together, create your own movies.

Compress PICT images.

Shrink them to a fraction of their original file size and save valuable space and transmission time with the Picture Compressor application. (Compressed files can be used automatically in any existing application that supports PICT files.)



Convert existing data into movies.

Convert other file formats (AJFF, PCS, PICT, Scrapbook, DOS image formats) to QuickTime movies with the Movie Converter application. Control frames per second, compression scheme and color depth.

One-button movie recording.

Digitize video and sound easily with the Movie Recorder application. View what you've recorded, save it or toss it out and try again. (Requires a video-capture card and sound digitizer.)

The Starter Kit.

Includes the system extension and Scrapbook, MoviePlayer, Movie Recorder, Motie Converter and Picture Compressor applications. Plus QuickClips, a CD-ROM disk with samples of movies and still color images and an electronic catalog of products had support QuickTime.

QuickTime Starter Kit. How well you communicate has never been more important. That's why Apple created QuickTime." The ability to paste digital video, animation and sound into your presentations as easily as pasting graphics into text. So if you'd like the name of an Apple software reseller near you, call us at 1-800-538-9696, ext. 175. They'll tell you more about the QuickTime Starter Kit and show you how to communicate your ideas more powerfully than ever.

fer a left-handed version for the Mac, but do for the PC. If there are any lefties out there who would like to have a great product in a left-handed version, let's see if we can get this product made!

> Maryann McCourt Pembroke, Massachusetts

Our editors were shown both right- and left-handed versions of the MouseMan when Logitech visited our offices. However, Logitech currently has no plans to offer a left-handed MouseMan for the Mac. Readers may write to the MouseMan product manager: Vanessa Torres, Product Manager, Logitech, 6505 Kaiser Dr., Fremont, CA 94555.—Ed.

Dubl-Clicking

T SEEMS INCONCEIVABLE THAT A utility I depend on daily, Dubl-Click Software's MenuFonts 4.0.1, should get such a negative review (*Reviews*, May 1992). Kurt Carlson describes a speed loss I simply have not seen. I am probably operating faster thanks to the alphabetical font-selecting feature. The utility offers a broad array of features that the review labeled "overkill." Any options a program can offer to maximize performance without affecting ease of use should be called nothing less than wonderful. While I did

experience a few of the buggy conflicts the reviewer mentioned, they have all been fixed with version 4.0.3.

Taz Goldstein North Hollywood, California

Junk Food

of Number Munchers (*Reviews*, June 1992) writes, "[it] is one of a trio of programs that combine the thrill of arcade action with solid educational principles. The result: everybody wins." I believe everybody loses.

The student loses because he or she is basically doing a sugarcoated version of drill and practice. Math facts are divorced from any context that would provide meaning for the student.

The parent or teacher loses because George's high rating of the program may direct them away from programs that do provide math concepts in context.

The fun game aspect of this program loses because it is polluted by education. Imagine playing baseball and having to solve an algebra problem in order to proceed to the next base.

Max Schafer Los Angeles, California

Not Happy with HardBall

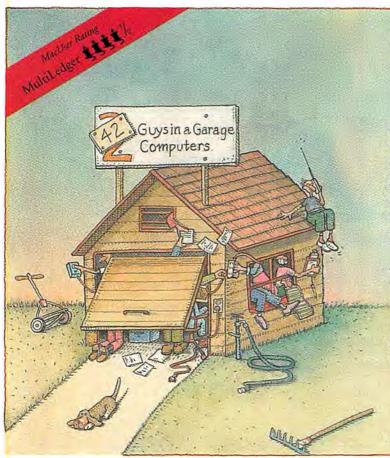
N REFERENCE TO YOUR FOUR-STAR review of Accolade's HardBall II (Reviews, May 1992): Are we talking about the same thing? You fail to mention, among other things: the interface is abysmally un-Mac-like; the color version runs pathetically slow on an LC; the sound effects are so primitive they sound like they were sampled from an early Nintendo game; it takes nothing less than three keystrokes (T, then \(\mathfrak{H}\)-X, then \(\mathfrak{H}\)-Q) just to quit the game; and saved games appear as generic documents on the desktop, so they cannot be opened except from within the program.

Come on, guys. I am tolerant of a few peculiarities in Mac games, but let's save rave reviews for the ones that deserve it.

Andrew Dawson Valley Village, California

Leave Drives On

HE QUESTION OF LEAVING A HARD drive powered on all the time versus turning it off when finished in order to save electricity is one that has confused many end users (*Letters*, June 1992). The *continues*



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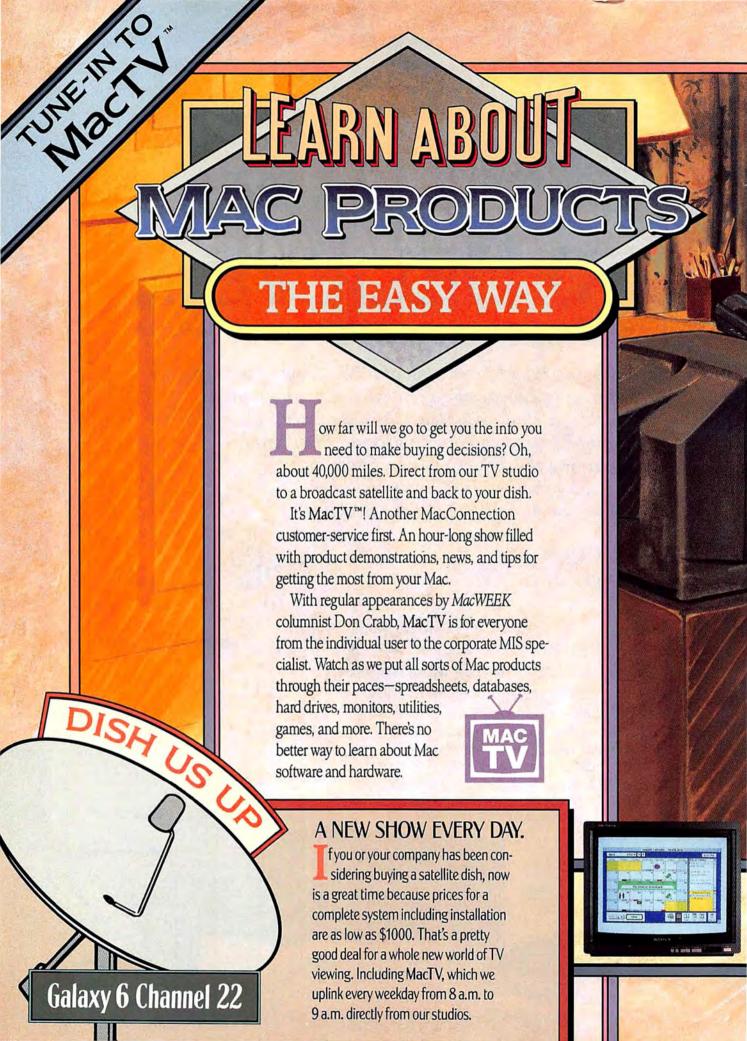
"HiQ is... Creating a Revolution for Engineers & Scientists!" - Macintosh Engineering & Science Report

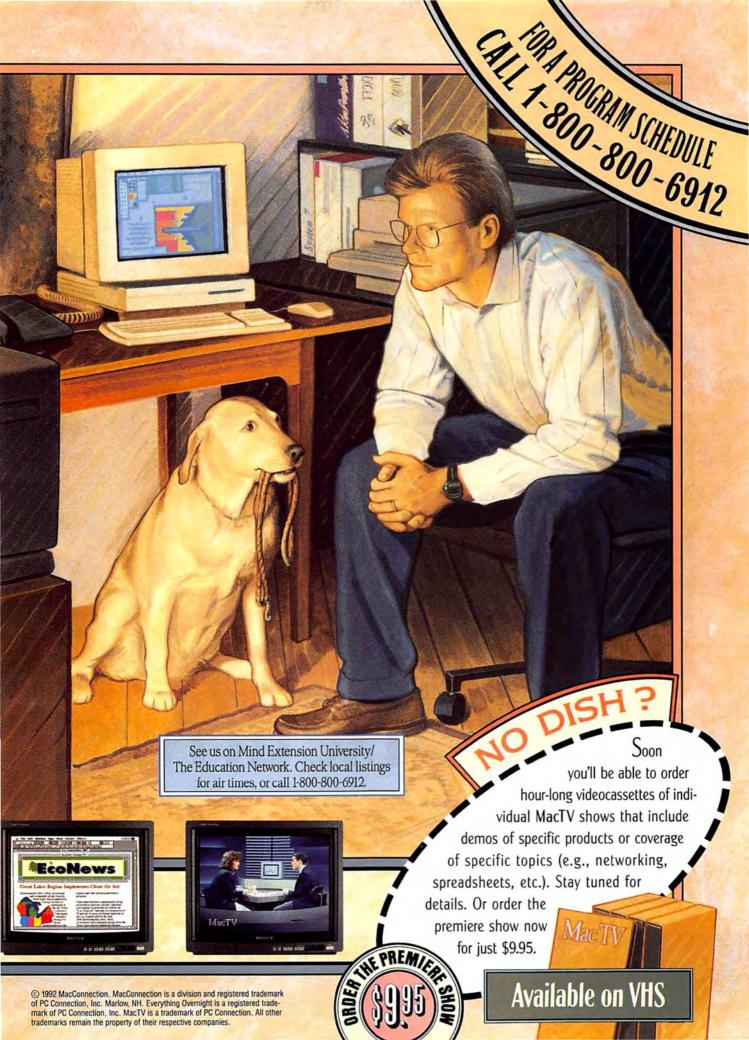
computational programs on the market!"

"It's a flexible environment... HiQ is head and

- Paul Toivonen, Sr. Project Eng., McDonnell Aircraft









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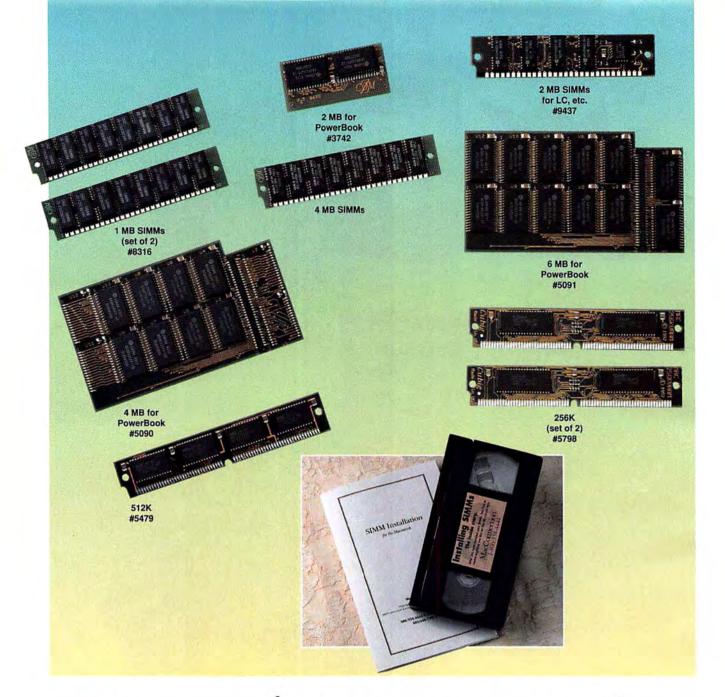
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Want to break the 8 MB barrier?

Our chart shows you which Macs can, and how. You need either System 7 or *Maxima* from Connectix, the RAM enhancement utility for System 6 and 7. In some cases, you'll also need Mode 32/Enhanced 24-Bit Addressing software (free from Apple). We can provide everything else. Including technical details!

MODEL (*=Req.	TOTAL	ноw то		MacConnection SIM (All are 80ns unless			REQ. FOR
toolkit)	SLOTS	UPGRADE	ITEM #	# SIMMs	PRICE	MB AFTER UPGRADE	8 MB+
PLUS*	4	2 at a time	1577	1 x 1 MB/req. 2 (100ns)	\$36.	2 or 4 MB	Not possible.
SE*	4	2 at a time	8316	2 x 1 MB	69.	2 or 4 MB	Not possible.
LC & LC II	2	2 at a time	8316 9437 7437	2 x 1 MB 1 x 2 MB/req. 2 1 x 4 MB/req. 2	69. 65. 125.	4, 6, or 10 MB (Comes w/2 MB soldered on.) Hardware limited to 10 MB.	A, C (LC)
1 MB CLASSIC*	2	Must get Memory Upgrade Brd.	8356 8357	Memory Upgrd. Brd. (1 MB) Memory Upgrade Board (3 MB)	79. 155.	2 or 4 MB (Comes w/1 MB soldered on.)	Not possible.
2 MB CLASSIC	2	2 at a time	8316	2 x 1 MB	69.	4 MB (Has 2 MB total soldered on.)	Not possible.
CLASSIC II*	2	2 at a time	8316 9437 7437	2 x 1 MB 1 x 2 MB/req. 2 1 x 4 MB/req. 2	69. 65. 125.	4, 6, or 10 MB (Comes w/2 MB soldered on.)	А
SE/30*	8	4 at a time	8316 7600	2 x 1 MB/req. 2 sets 4 x 4 MB	69. 479.	4 or 16 MB	B, C
U.,	8	4 at a time	8316	2 x 1 MB/req. 2 sets	69.	4 or 8 MB	B (req. PMMU)
IIX**	8	4 at a time	8316	2 x 1 MB/req. 2 sets	69.	4 or 8 MB	B, C
IICX	8	4 at a time	8316 7600	2 x 1 MB/req. 2 sets 4 x 4 MB	69. 479.	4, 8, 16, or 32 MB	B, C
IICI	8	4 at a time	8316 9437 7600	2 x 1 MB/req. 2 sets 1 x 2 MB/req. 4 4 x 4 MB	69. 65. 479.	4, 8, 16, or 32 MB (Apple recommends using only 1 MB SIMMs in Bank A.)	A, C
IISI	4	4 at a time	8316 9437 7600	2 x 1 MB/req. 2 sets 1 x 2 MB/req. 4 4 x 4 MB	69. 65. 479.	5, 9, or 17 MB (Comes w/1 MB soldered on.)	A, C
IIFX	8	4 at a time	7497 7599	4 x 1 MB 4 x 4 MB	139. 499.	4 or 16 MB (Uses special 64-pin SIMMs.)	A, C
QUADRA	8	4 at a time	8316 7600 5478	2 x 1 MB/req. 2 sets 4 x 4 MB 4 x 16 MB/for 700	69. 479. 2499.	8, 12, 20, 68, or 132 MB (Comes w/4 MB soldered on.)	А
LaserWriter NTX	12	4 at a time	7497	4 x 1 MB	139.	4, 5, 8, 9 or 12 MB (Uses same SIMMs as IIFX.)	Not applicable.
PowerBook	1	1 at a time	3742 5090 5091	1 x 2 MB 1 x 4 MB 1 x 6 MB	139. 249. 349.	Installations should be done by an authorized Apple dealer. Note: PowerBook 100 takes the 2 MB module only.	Not possible.

Memory Selection Guide

(All SIMMs come with FREE video and manual!)

OTHER SIMMS & ACCESSORIES:

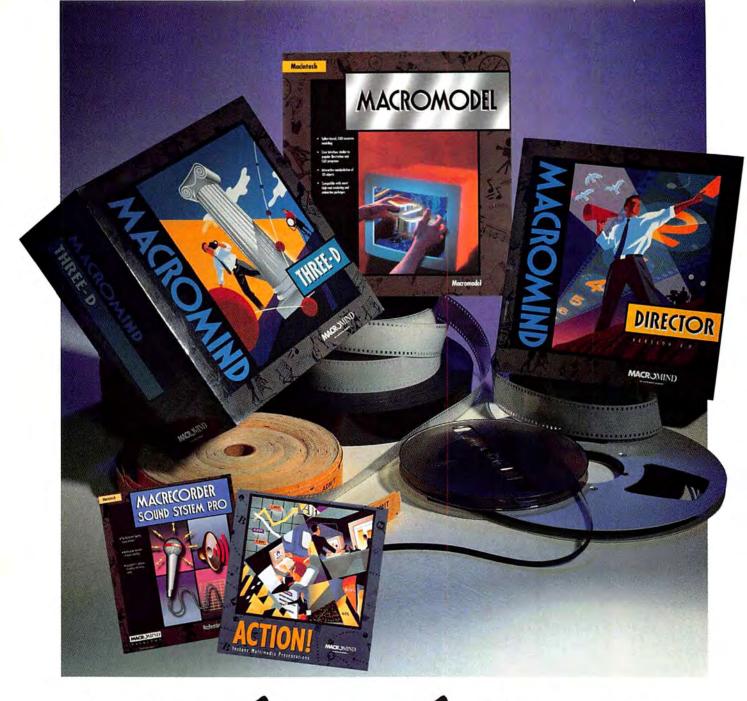
	3-4	•
1107	1 x 1 MB replacement SIMM	J.
5479	512K Video RAM for LC (doesn't incl. video or manual)	59.
5798	2 x 256K Video RAM for Quadra (doesn't incl. video or manual)	59.
1074	System 7 (includes Lon Poole video)	79.
7830	Maxima (memory extension software)	45.
4748	Mac Toolkit	8.
	ALL CIMMS ARE ROSS LINEESS OTHERWISE INDICATED	

LEGEND:

To have more than 8 MB:

- A: Requires System 7 with 32-bit Addressing turned on.
- B: Requires System 7 and Mode 32 with 32-bit Addressing turned on.
- C: System 6 users will need Maxima and will only have a maximum of 14 MB.
- Please call MacConnection Tech Support for more information on upgrading over 8 MB.





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MacEKG II is for everyone who owns a Mac Plus or greater with System 6.0.7 or greater. Once installed, it runs by itself. By logging and comparing test results, MacEKG actually learns your machine and how it should behave, informing you by voice of problems. Is your disk drive slowly dying? In just a few minutes, EKG can

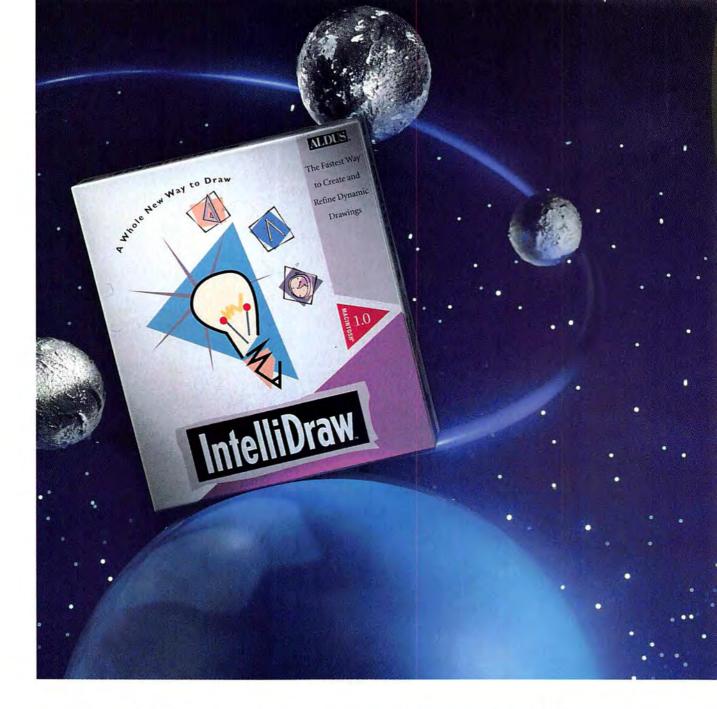
determine the health of your machine.

EKG helps with inventory control by logging NuBus, ADB, and over 250 System configuration parameters. It also includes ReActivator, component-level tests previously available only to Authorized Apple technicians, and a unique "capsule" to export all important System data to technical support personnel for remote

diagnostic analysis.

Roy Zahareciyan of Plymouth, Massachusetts, said, "Thanks to MacEKG, I was forewarned of a computer breakdown before it happened! It's an exceptional product."

MacConnection *



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What makes IntelliDraw so smart? Well, for starters, it lets you create dynamic drawings in which objects can be linked to stay aligned, distributed, or connected automatically. So even non-artists can experiment with all sorts of "what-ifs" with ease.

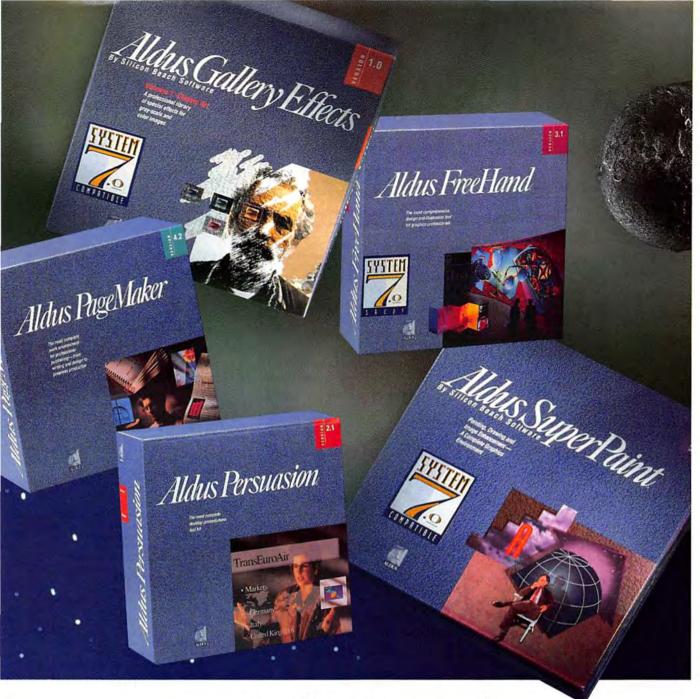
In addition to a complete set of standard

drawing tools, there's also a host of special tools for getting your ideas down quickly and editing just as fast. Like Action Buttons for fast access to shape matching and linking. A Symmetrigon for creating symmetrical shapes. Master Objects for creating unlimited clones you can edit at once. And a Flip Book for grouping objects for rapid browsing or

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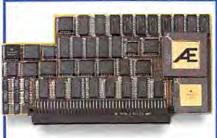
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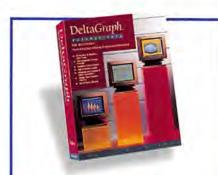
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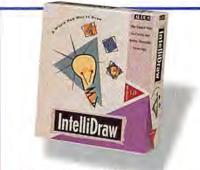
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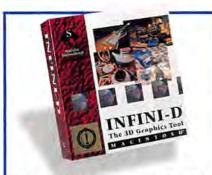
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3559	@SimAnt	35.
8266		40.
4966	SimCity (CP) 29. 5871 @Supreme	47.
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2707	Puzzle Master	26.
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3963	
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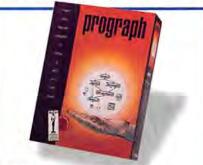


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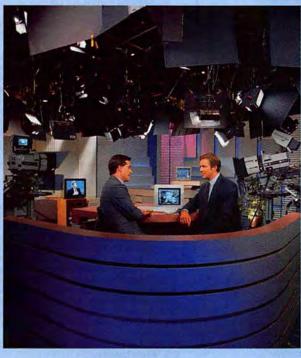


MacConnection

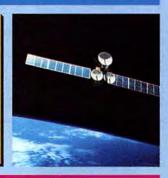
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cost of electricity to power a system for five years is far less than a repair bill.

The editor's reply on improved meantime-between-failure (MTBF) ratings for hard drives is correct. However, most MTBF times are figured with drives that run continuously, in an air-conditioned computer room, with power that is filtered. Turning a drive on and off stresses parts on the controller board. A small part that costs only a few cents can cost \$200 or more to diagnose and replace.

There are good reasons to turn off a system, such as during a lightning storm, or if the air conditioning in the building goes off over weekends allowing room temperature to go to 100 degrees Fahrenheit or more. A good rule to follow is to turn a system on and off as few times as possible. At a minimum I suggest leaving a system on all day and then turning it off at night.

Charles McConathy President, MicroNet Technology Irvine, California

For an environmental perspective, see Conspicuous Consumer, March 1992, and Quick Tips, October 1990.—Ed.

Fair Words on Canvas

N ALL FAIRNESS TO MACWORLD readers, I would like to respond to George Force's letter against Canvas 3.0 (Letters, May 1992). After a careful evaluation of MacDraw Pro and Canvas 3.0, I went with Canvas. After four months of using it, I have found what appear to be a couple of minor bugs. Despite this, I have found Canvas to be everything Deke McClelland described it and more, and I am very satisfied with it.

Norm Ennis Orlando, Florida

Public Correspondence

right that it takes time to master System 7 (Letters, June 1992). My point, though, was that many new features are poorly implemented or awkward to use. Consider the slow screen redraw of True-Type, the Trash that no longer empties automatically, the delay in naming files, the nonactive windows that can't be hidden automatically, the cluttered Apple menu, the huge memory consumption, and how complicated publish and subscribe is compared with Microsoft's one-step paste link.

Lawrence C. Stedman Binghamton, New York

Amateur Radio Talk

S A HAM-RADIO OPERATOR FOR many years, I take offense at the opening of Ann Garrison's discussion of the new product MacHam, which helps people study for ham-radio license exams (News, June 1992). Garrison says ham-radio operators have been "sending messages . . . to talk about religion, sex, politics, car repair, and the latest movies." You imply there are constant controversial conversations on the air. In truth, the first three topics have been on the unspoken forbidden list for years. Because you communicate with someone without ever seeing them, the mike/key/terminal provides an anonymity that shouldn't be abused. The person on the other end could be a retiree in Florida, a student in Sweden, or a youngster in Australia!

So what do we talk about? The weather, new equipment, farming conditions, just about anything under the sun. Ham radio also provides emergency and public-safety communications for public events and disasters. Sensationalizing the hobby to attract new prospects only detracts from this wonderful pastime.

Jim Metzger Philadelphia, Pennsylvania

New Address for Shareware

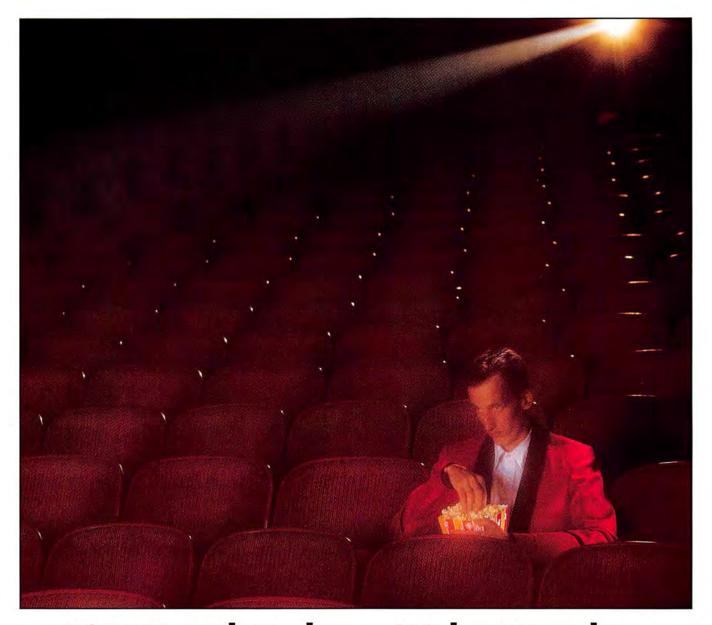
world. In response, you sent me a sampler disk from Educorp. The disk included a solitaire game called Klondike, version 3.6. The material included indicated that this was shareware, and that happy users should send \$10 to Unison Software at 415 Clyde Ave., Mountain View, CA 94043.

I like Klondike, so conscientiously I sent Unison my ten dollars. It has been returned by the post office, marked "forwarding order expired." Do you have a current address?

> Yoshikazu Tomiyasu Richmond, Virginia

Unison Software's address is 675 Almanor Ave., Sunnyvale, CA 94086.—Ed. **m**

Letters should be mailed to Letters, Macworld, 501
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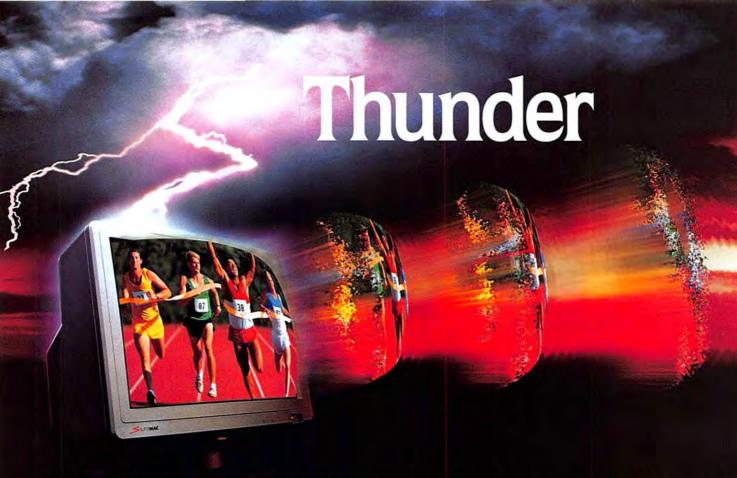
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Behind Macworld's graphics

CATHY ABES

Artist: Andrew Faulkner, a former Macworld designer, is the art director of Electronic Musician, a magazine based in Emeryville, California. He approaches computer graphics in much the same way he would a paper collage-he gathers a variety of images from different sources and combines them as a single illustration. The Mac allows him many more possibilities to colorize, size images, and add special effects.

Hardware: Mac IIci with 8MB of RAM;

100MB MicroNet external hard drive; Seiko CM1445 color 14-inch monitor; Datacopy 730GS gray-scale scanner.

Software: Adobe Photoshop 2.0.

How It Was Done: For the illustration that opens "Understanding Multiple Masters," Faulkner first went hunting for black-and-white photos of lawns and lawn mowers in gardening books. The image of the man's torso Faulkner found in a 1940s magazine, and the pants came from another vintage magazine.

To conserve RAM and storage space -always at a premium—Faulkner limits his files to a maximum of 2MB to 3MB. To do this, he scans all photos in grayscale at a relatively low resolution-usually 300 dots per inch-and then samples them down even further to 150 dpi after they're scanned, to save space. This technique retains resolution that would be lost if he scanned the original at 150 dpi.

After Faulkner scanned in the images for this illustration, he opened the lawn image in Photoshop and used the pen tool to draw and select a kidney shape for the background. Next he colorized all the images. For all the images except the lawn, he chose Adjust Hue/Saturation under Photoshop's Image menu to select the colors one at a time for each part of the image. For example, for the image of the man, he first colorized the hair, then the face, then the jacket-to give the images the look of an old-fashioned handtinted photo instead of the realism of a modern photograph. To create a wider range of evenly gradated colors for the lawn, he selected Indexed Color under the

Mode menu, then Color Table (also under Mode). After selecting the entire range of grays in the table, he clicked on OK to get a colorpicker box. From the box he chose a dark green and then a light yellow. Now he had a wide range of colors-to give the background the textured quality of a real

Faulkner defined a 50-pixel-wide border for the lawn background (choosing Border from the Select menu) and feathered it using a 5-pixel radius. After

feathering the border, he pressed the delete key to remove part of the border and create a halo effect around the image.

Then he selected the large T with the pen tool and chose Brightness/Contrast from the Adjust submenu (under the Image menu), where he used the sliders to darken it and add contrast. Making the T a lot darker than the lawn gave it an illusion of height-so it appeared to stand out above the lawn. He darkened and lightened different edges of the T to create the illusion of shadows and perspective.

Next he was ready to assemble all the continues



The illustration that appears on page 265.

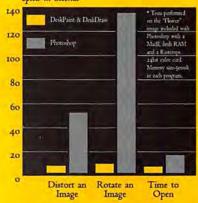
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images. Once the lawn, the mower man, and the lawn-mower files were opened, Faulkner cut and pasted the man and the mower onto the lawn. After scanning in the mower, Faulkner discovered that the mower's handles hadn't scanned clearlypieces of the image were missing and it looked too fragmented to reproduce well. But instead of drawing in the missing parts of the handles as he'd originally intended, he came up with a different approach. Since the article he was illustrating was all about modifiable fonts, why not modify a letter and substitute it for the mower's handles? So he typed in a Y with the type tool, and then used the Distort command (under the Effects menu) to mold the Y into a shape that approximates the shape of a mower's handles.

To create the effect of blades of grass flying out of the lawn mower, Faulkner used Photoshop's paintbrush and spraypaint tools to draw white streaks above the mower and then used the lasso tool to select the path of the grass. He applied the Motion Blur filter at a 35-degree angle following the path of the grass to make it blur in that direction and used the smudge tool to further intensify the illusion of motion. Then he used the type tool to create the letters coming out of the mower and smudged them also to give a subtle suggestion of motion; using Motion Blur would have distorted them too much and made them less recognizable.

Faulkner estimates the image took about 15 hours to create, and the size of the final illustration was 1600K. m



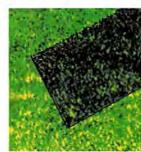






The image of the man was scanned in gray-scale and changed to a CMYK file. Faulkner then used Adjust Hue/Saturation to colorize the jacket, the hair, the face, and the tie.







After using Indexed Color to give the lawn background a wide range of colors, Faulkner used Adjust Brightness/Contrast first to darken the large T and then to add shadows and depth to its edges.







The artist used Photoshop's text tool to create the Y for the lawn mower's handles, then used the Distort command to mold and manipulate it into the proper shape and position.









After he placed the lawn mower on the lawn, Faulkner painted white streaks with the paintbrush and the spray-paint tools, then used the Motion Blur filter to simulate grass spewing out of the mower, and finished up by adding assorted letters with the text tool.

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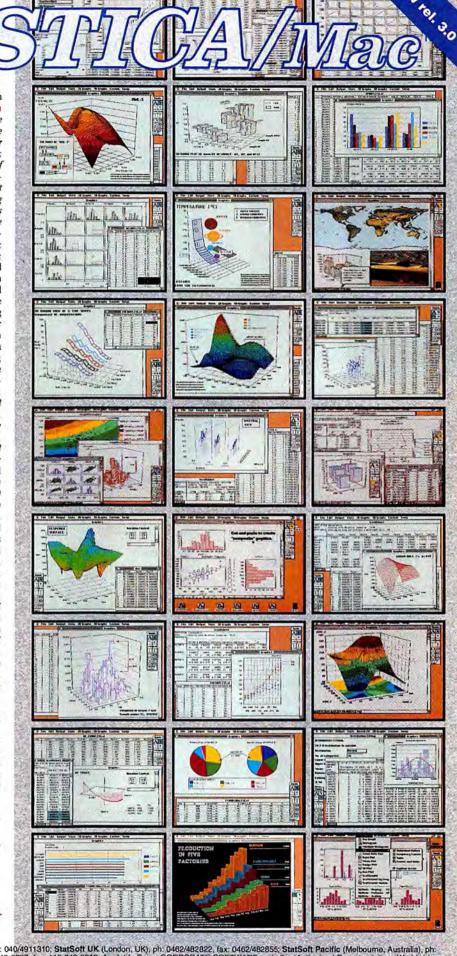
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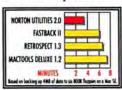
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Talkin' Macintosh Blues

BY STEVEN LEVY

AI FU-LEE SITS BEFORE HIS Mac Quadra. The keyboard is off to the side. In front of him is a flat microphone.

"Casper," he says, "open

The display window of an application recedes to the background. To the fore emerges a window with icons representing files. The menu bar shows the familiar commands of the Mac Finder.

"Casper," says Fu-Lee, "view by date."

The icons disappear, and are replaced by text, listing the files by date. One is highlighted.

"Casper," says Fu-Lee, "open Mac-Write II.

The document is open. Now text fills the page,

"Casper, Palatino." The font changes. "Casper, 36-point."

Bigger type.

"Casper, checkbook."

A new program opens; a mock-up of a bank check is now on screen.

"Casper, pay Macy's \$15.30."

The check fills in the department store name as the recipient, and fills out the proper amount.

'Casper, open my appointment book."

The screen opens a datebook displaying the current week.

'Casper, call Bob Strong at work."

A card with Strong's name on it appears, and we hear the touch-tone beeps of a phone dialing.

Casper, call Kai Fu-Lee at home."

Another card appears, bearing a work number for Fu-Lee, but no home number. Barely a second goes by before the Macintosh itself speaks: "Sorry," it says, in a somewhat slurred, tinny voice. "I cannot find a home number for Kai Fu-Lee."

Don't Tell Me You're Sorry

I HAD REQUESTED THE DEMO OF Casper, Apple's prototype speech-recognition system, as soon as I heard that the company was allowing selected people a peek. As Fu-Lee barked his orders to the Mac, I watched with dazed admiration. It is one thing to concede the inevitability

that we will one day be talking to our machines; it is quite another thing to witness it happening. While impressed, I have been growing increasingly uneasy. I am not experiencing the shock of the new ... more like the indigestion of the new. Now I have identified the source of my discomfort.

The Macintosh said it was sorry. Now, I know and you know and Fu-Lee knows that this hunk of plastic and silicon wasn't sorry. But whoever writes Casper's lines thought it appropriate for the machine to convey regret that it didn't have someone's home telephone number. In the course of a conversation between humans, this might be considered good manners. But in the case of Casper and Kai Fu-Lee, I find the apology to be absurd. After all, being a computer means never saying you're sorry.

When I ask Fu-Lee about this, he diplomatically calls it an "interface question." But to me, the false apology isolates the underlying question of speech technologies. Though there are annoying exceptions, most people reserve their comments for other people. Why should we now

want to talk to machines?

Fu-Lee has heard this question before. He assures me that speech, being a means of communication people feel comfortable with, has great potential as a way to direct our computers. He tells me quite confidently that people are quite eager to talk to their machines. And it is

tough to refute him. Any number of science fiction movies testify to the perception that, inevitably, we will talk to our machines. As far as the Mac is concerned, at least one product, Articulate Systems' Voice Navigator, has been on the market for some time. Casper is proof that Apple itself is exploring the idea in a big way.

Yet speech recognition is one of those technologies that seems perpetually just around the corner. It is easy to simulate in science fiction movies, but a live, useful, and broad implementation has been elusive. The main problem is not getting the computer to speak up. Even a crude system like

the early MacinTalk allowed a human listener to understand a line of text. The real problem is figuring out what we say. Leave aside the question of what we meanthere are enough problems in making computers smart enough to take dictation. When humans speak, they use complex languages, loaded with ambiguities, colored by inflection and tone. And each human speaks differently-there are Rumanian accents, pronounced lisps, street dialects, whiskey voices, and fast-talking city jive. My mother-in-law, a Missourian, can't understand a thing I say-I talk too New York for her. What's a machine going to do?

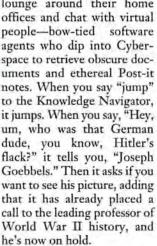
Yet the field abounds with optimists who think that automatic speech recognition is a beast about to be broken. John Oberteuffer, the president of Voice Information Associates, a firm that tracks the technology, informs me that, indeed, computers will soon be able to interpret speech at least as well as humans. We won't type into our computers, but talk to them. "In ten years, people will look at a computer keyboard the way they now look at a slide rule," Oberteuffer predicts. "Anything you do on a keyboard, you will do by speaking. You will have a mouse and a microphone."

No imagination is required to visualize a world where this ideal is realized-Apple has done it for us in its Knowledge Navigator videos. In these fanciful productions, attractive knowledge workers

lounge around their home offices and chat with virtual people-bow-tied software agents who dip into Cyberspace to retrieve obscure documents and ethereal Post-it notes. When you say "jump" to the Knowledge Navigator, it jumps. When you say, "Hey, um, who was that German dude, you know, Hitler's flack?" it tells you, "Joseph Goebbels." Then it asks if you want to see his picture, adding that it has already placed a call to the leading professor of World War II history, and

Casper, the (friendly) ghost in the

machine



OK, I made up that example. But not this one from continues

my favorite Knowledge Navigator video, which features a woman who is constructing a report about disabled kids (in these videos, people never write documents, they construct them, dipping into a multimedia Lego box of images and factoids). Her casual dialogue with the computer ("That one?" "No, the other one . . . that's it.") is interrupted several times by calls—real-time visual E-mail, actually—from her colleagues and her kids. The language, tone, and degree of apparent affection she

uses with these real people are the same as she uses with her computer.

The Turing Test

WHEN A COMPUTER CAN UNDERSTAND you better than your mother-in-law can, you can't really tell the machines from the people. What's really far out about the Knowledge Navigator videos is that they portray a machine that not only recognizes what you say, but also understands you and makes intelligent replies.

Alan Turing, the pioneer of (among other things) artificial intelligence, got it right when he proposed a test to ascertain when computers attained true intelligence. Roughly, Turing's test requires a subject to converse with something behind a curtain. If a computer generates replies from behind a curtain, and a subject can't tell if the replies came from a person or a computer, the machine passes the test. From that point, everybody has to deal with the question of whether the machine deserves the same respect a person does.

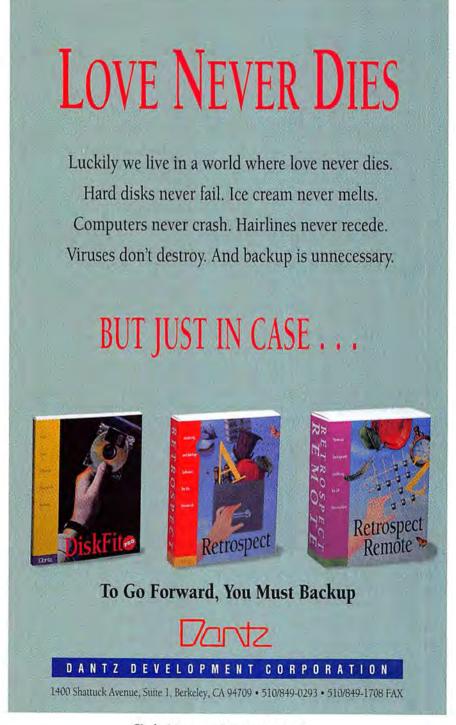
If it ever becomes a real product, the Knowledge Navigator will ace Turing's test. Apple chairman John Sculley, who beams with pride as he shows these videos to auditoriums of astonished nerds, obviously thinks that one day he will build a computer with brainy software homunculi inside. The proof of the pudding will be speech—the machine understands you, and it says the right things back!

But while those videos amuse (and appall), their chief crime is deception. There's simply no evidence to indicate that we are just around the corner from freewheeling conversation with our machines. The current state of the art in computer transcription, I am told, requires the speaker to pause for a quarter second after each word, at which point he or she must check the display to see if the machine made a mistake (at best, a mistake appears in one out of ten wordsnearly every sentence). I'm ready to bet a bundle that in ten years both John Oberteuffer and I will still be banging away at our keyboards. And simple transcription doesn't even address the possibility of computers actually divining meaning from the gibberish we spout. Believe me—if you're thinking of probing 2 a.m. conversations with your Mac about the meaning of life, you're better off adopting a puppy. At least the little mutt will give you soulful looks when you moan about your problems.

Computer Dating

ON THE OTHER HAND, THERE IS plenty that can be done if the lofty goals of speech technology are ratcheted down to the simple constraints of something like Casper. The people in Apple's Advanced Technology Group, who seem more grounded to reality in this matter than their leader is, are hoping to design something that will not supplant the keyboard, but supplement it.

The stance is well articulated by the head of the ATG interface team, Joy S. Mountford, who opines that open-ended computer conversation won't happen in continues.





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her lifetime-nor does she want it to. "I talk all day long-do I want to talk, talk, talk to my computer?" she says. "I'm not going to date it-I want [to use voice technology] to expand what I do."

"Speech is not a mouse replacement, but an enhancement," adds Fu-Lee. "It's actually inefficient at things like moving the cursor, but good at things like inputting memo items and doing things difficult to perform by direct manipulationlike 'Place a call to John Sculley.' "

Once those more humble ground rules are set, Casper seems more friendly. In fact, its very protocol reminds us of the limitation of speech recognition-the user must preface each command with the word Casper, so the Mac won't misinterpret a remark directed elsewhere.

All Casper really is intended to do is respond to a given set of keywords-in the first implementation, usually those that are on menu items in a given application. By limiting its potential input to such a

small vocabulary, its success rate at identifying words is fairly high. Once it gets a word right, it executes a prewritten script. In fact, a lot of the really startling stuff in Casper comes not from the computer recognizing a word (you can see in a little box what the program thinks you're saying, and when it guesses right it doesn't seem like a big deal) but the fact that the word triggers a macro that might open a program, find a name, and dial a number.

As it stands, Casper and programs like it will be essential to two types of people: those who have disabilities that limit their manipulation of keyboards, and those whose hands are often busy doing other tasks. That latter category includes most of us at one time or another. And once computing is moved off the desktop, we'll routinely find ourselves in that category. When computers get pocket-size and they are built into cars and telephones and cellular-phone watches and personal digital assistants, most people will want to bark commands into them all the time. I guess that includes me. While I might not feel comfortable telling my car to hang a looie at the Texaco, I surely can get used to saying "turn on the brights" or "switch the station to NPR."

Any way you look at it, our mouths are destined to become input devices. But while it may be more efficient, it will also be more creepy. The very act of speaking to our computers will foster the ongoing anthropomorphization process between us and our machines. A process accelerated as software designers succumb to the temptation of having computers respond in a faux-human manner, as in Casper's undeserved use of the word sorry.

The net result will be a blurring of the line between human and machine at a time when computers still don't deserve that kind of respect. In the service of efficiency, we will behave like good soldiers: doing bank account transfers, phone dialing, and changing fonts, using what was formerly our most intimate means of communication-speech. Call me a Luddite if you will, but I sometimes imagine that every time we find ourselves in an inanely civil conversation with a machine, a tiny chunk of our humanity is lost. All right, a very tiny chunk. But as we approach the twenty-first century and a world where we're bound more closely with machines than with many of our fellow beings, our species would do well to hold on to every ounce of its humanity.

I'd try to explain that to my Macintosh, but it wouldn't understand a word I said. m

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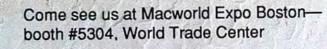
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Educators Need Support to Make Computing Meaningful

IT'S TIME TO WIELD TECHNOLOGY WISELY

BY DEBORAH BRANSCUM

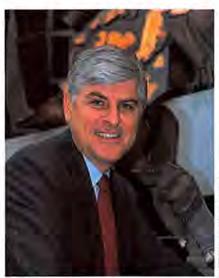
This is not a test. It's real life, and real kids are being shortchanged by our educational system. The idea that public schools are in crisis is nothing new, but what's especially heartbreaking is that the technology Macworld readers take for granted could make a difference to the nation's schoolchildren. Instead, for far too many, computers are out of reach or used in tragically misguided ways.

As Charles Piller so eloquently describes in "Separate Realities," elsewhere in this issue, the inappropriate use of computers in schools tends to broaden the gap between rich and poor rather than bridge it. That's especially ironic, given that computers and related technology have the potential to help unite students of different backgrounds and abilities, and to give every child an opportunity for richer learning experiences.

Many factors have kept computers from being integrated meaningfully in public schools. Plenty of studies and conferences have been devoted to the topic; in my view it all boils down to inadequate or insufficient support, training, research, money, and will-or leadership, if you prefer.

Teachers, for example, need much more support for using computers. Educators often work in isolation, so they could especially benefit from networking with other professionals via computer. But traditionally the students, not the teachers, get computer time. "It seems patently absurd to me to talk about computers and students if you aren't even talking about how you've equipped and supported your professional educators to do the job they've been hired to do," says Cheryl Williams, associate executive director of the Technology Leadership Network for the National School Boards Association. She points out that without computers, teachers spend a great deal of time on repetitive manual labor. That's time away from students.

Moreover, denying teachers access to individual computers "separates the stu-



"Technology doesn't mean a whole lot in the inner city if they don't have the basics and so on. This federal government has reneged on preschool and on day care and on health care, and those are all programs that have been put in place to try to help the poor and the middle class have some kind of an equal chance with George Bush's parents, who were able to send him to Exeter and the greatest private schools in the United States."-KEITH GEIGER, PRESIDENT, NATIONAL EDUCATION ASSOCIATION

dent from the teacher because the student becomes proficient and the teacher uses that time to do planning," says Williams. "It doesn't encourage the teacher to grow, and explore technology." But perhaps it's not surprising that so few teachers have a computer on their desk when very few even have access to a telephone in the classroom.

Training is critical. According to the January/February 1990 CUE Newsletter, for computer-using educators, some school districts "discourage teachers from requesting follow up training; other districts re-assign teachers who initially received the training. Instead of staffing the computer room with teachers trained by software companies, paraprofessionals, who haven't received the training, are hired to staff the computer rooms." Teachers cannot be expected to make up this stuff as they go along. If teachers do not receive appropriate training, computers will continue to be used as electronic baby-sitters. "You can't train teachers when they are 21 years old and then that's it, that's their training," says Monnie Edmunds of the Council of Chief State School Officers, which represents state school officials. "And it also can't be training on computers, it has to be training on teaching history-if you are going to be a history teacher-and in that course you learn how computers can help you in teaching your subject matter. Training on computers or technology alone is ineffective."

Such training, in turn, needs to be based on strong, comprehensive research on the best techniques for using computers effectively. Many efforts to gather such information are under way, but existing studies are often inadequate or flawed. Apple Computer is not a disinterested party, but the developments Apple has noted while researching technology and learning for six years cannot be ignored.

Against the Odds

THE COMPANY HAS INVESTED \$12 MILlion to establish 100 Apple Classrooms of Tomorrow (ACOT) in public schools nationwide. One ACOT site is West High School, in Columbus, Ohio—which serves continues

students from urban, blue-collar families. According to Apple, independent researchers followed 21 ACOT students over their four years at West until graduation in 1991. The students, chosen at random for the program, had remarkably different scholastic records from the non-ACOT students at the school. All of the ACOT students stayed in school for the entire four years and graduated-unlike the student body as a whole, which had a drop-out rate of 30 percent. Moreover, 90 percent of the ACOT students headed for college, while only 15 percent of the non-ACOT graduates sought higher education. Seven of the ACOT students were offered full scholarships to college, and several businesses, impressed with the kids, offered them immediate employment.

Few students get to experience the ACOT program, which stresses more individualized learning. Many are stuck, instead, using computers in the drill-andpractice sessions that, according to the CUE Newsletter, "have assumed mythic proportions in American education. Almost every educational reform proposal stresses the need for increased emphasis on basic skills. Drill and practice is proposed as a means of raising students' level of performance. So software developers have designed drill-and-practice software, schools have purchased the software, and teachers have scheduled students for drill."

That might be acceptable if that kind of classroom computing created thoughtful, problem-solving students. But the author of the CUE Newsletter article, Gail Marshall, says that her team of classroom "anthropologists," other teachers, discovered that many students spent the 10- to 30-minute drill sessions practicing their mistakes, because the computer programs



"There are some bright spots and bright examples where technology is fully integrated into teaching and learning and it's used to help tailor instruction to meet individual kids' needs. But for the most part, I feel we have a long way to go."—MONNIE EDMUNDS, PROJECT ASSOCIATE, COUNCIL OF CHIEF STATE SCHOOL OFFICERS.



"We need the technology to improve communication for educators. Once we have the technology, the number of things you can do with it is dazzling."—JOHN CLEMENT, DIRECTOR OF K-12 NETWORK-ING PROJECT, EDUCOM

provided inappropriate feedback. Marshall and her team found, overall, few links between the computer drill and the rest of the classroom curriculum, and all students worked at the same task on computers regardless of whether they had mastered that skill.

The contrast between such classrooms and the ACOT experiment may make the success at West High School seem unsurprising. But such results can't be taken for granted. The ACOT study examined a small sample of students, and carefully integrated computer use may not explain why these kids did so well. We'll only know for certain with more research—research that takes time and costs money.

Yes, money matters. There is no pretending that schools can do without it. "There's not a business in this country that didn't automate and technologize without dumping huge sums of money in it," says Cheryl Williams. "Schools need funds and it's not a one-shot deal. It's never going to be cheap to have technology, because you've got to buy the equipment, you've got to buy the software, you've got to buy the maintenance, you've got to buy the training, you've got to buy the updating, and you've got to phase it in."

Under the circumstances, critics may wonder why we should spend money on technology at all when it will cost the United States about \$160 billion "just to renovate the public schools in our inner cities that should not even have kids going to them," according to Keith Geiger, president of the National Education Association (NEA), the largest teachers' union in the country. "Technology is terribly important to moving education ahead in this country. But technology before we do some other basic needs assessment for kids doesn't mean a whole lot. Vaccinations and food and a place to

sleep are much more important to millions of children in the United States today than is any technology they could ever have."

Technology Counts Too

THAT MAY BE SO. AND YET, BY RIGHTS, had the ACOT students at West followed the school's normal pattern, 6 of them should have dropped out and only 3 should be going to college instead of 19. While it may be true that computers aren't very appealing to hungry kids, it's also true that empowering students through technology can help prevent their future hunger as adults.

"Fifty years ago, when our job was to prepare students to go work in factories, we weren't preparing students to think,"

"THERE'S NOT A

IN THIS COUNTRY

THAT DIDN'T AUTOMATE

AND TECHNOLOGIZE

WITHOUT

DUMPING HUGE SUMS

OF MONEY IN IT,"

SAYS CHERYL WILLIAMS.

"SCHOOLS NEED

FUNDS AND IT'S NOT

A ONE-SHOT DEAL"

says Gary Watts, senior director of the NEA's National Center for Innovation. "We didn't want them to think." But the world has changed. According to a Department of Labor report, modern workplaces require many skills, including the ability to work with many technologies; to acquire, evaluate, and use information; to organize resources; to collaborate with others; and to understand elaborate systems and relationships. Apple is not alone in asserting that computers, used appropriately, can help foster the kinds of skills employers-and a democratic societyneed the most. ACOT "taught us about the changes that can happen in education as a result of technology," says Apple's Jim Johnson, director of Apple corporate government affairs. "Teachers become continues



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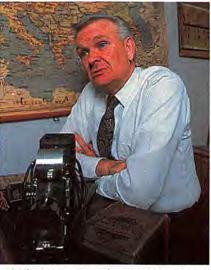
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"The first computer in the school should have gone into the faculty room, not into a classroom. Then the next 20 ought to have gone onto the teachers' desks. Because you can't have computer-using teachers if they're not computer-using people."—GARY WATTS, SENIOR DIRECTOR OF THE NATIONAL CENTER FOR INNOVATION, NATIONAL EDUCATION ASSOCIATION

coaches; there's a lot of interaction. We also learned that kids can be taught things like evaluation and judgment and analysis—all sorts of analytical skills that go well beyond rote memory."

Technology holds great promise for education, but the teachers who use it are just as important. Moreover, technology is not a quick fix or silver bullet. A group of minority students who were in ACOT programs in fifth and sixth grades did no better than other students after they were moved to a conventional seventh-grade setting. "Once they were placed back in a traditional environment, the ACOT students were once again educationally at risk, despite their accomplishments in the innovative program," according to a 1990 Apple report. "These students were returning to the same teacher-directed, rote learning environment that had alienated and failed them in the past." They had no access to the computer equipment they'd used successfully, and no power to change their environment.

But we have that power, if we can muster the collective will as citizens, parents, and businesspeople to press educators and legislators for change. It will not be easy. Change comes slowly to a school system beset by so many problems. "If you don't have the commitment to apply technology in the classroom, it's not going to happen. It's not going to happen with people who are ignorant of the possibilities, who don't recognize the potential," says Thomas Shannon, executive director of the National School

Boards Association. But as West High School suggests, the rewards could be great for schools that respect both teachers and students, giving them what they need to move beyond rote learning.

Moving Forward

THERE'S BEEN A SCANDALOUS LACK OF leadership on the part of the federal government regarding education and technology (see *Commentary* this issue). Educators I interviewed say there is a crying need for a consistent, well-implemented, nationally-led research effort. Help Washington wake up and smell the coffee by lobbying senators, congressional representatives, and the White House. Don't forget state school officials, local school board members, school administrators, and teachers. We need a commitment to:

 Research Educators have some information but need more to use computers as meaningfully as possible.

 Planning Every state, every school district, and every school should develop a plan in consultation with teachers, students, parents, and school administrators to integrate computers and related technology into the curriculum. Each teacher should have a computer and adequate training to use it effectively, and each classroom should have appropriate technology. (Some educators may be interested in Apple's Teaching, Learning & Technology—A Planning Guide, which is designed to help professionals plan their curricula. The guide includes a workbook, templates, and a video. The basic kit costs \$39, plus shipping and handling; a Quick-Time version is due soon for \$149, plus continues



Technology offers "one of the greatest hopes we have for improving the quality and delivery of education."—RICHARD MILLER, EXECUTIVE DIRECTOR, AMERICAN ASSOCIATION OF SCHOOL ADMINISTRATORS

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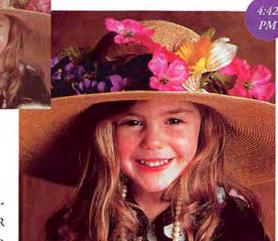
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• Funding Buying computers isn't enough. We need to spend as much on software and training as we do on hardware. Many education organizations are devoting resources to training, but it's not enough. We also need money for implementation. Many model school programs exist and are thriving. When will average kids and average schools get to benefit from what we know already?

Grass roots advocacy matters. We need to make sure local school boards, principals, and teachers know that technology is important, says Monnie Edmunds. "Certainly, reading about the technology and being an advocate on the local level is important. And then making some tough choices... resources are limited. And if you want your kids to be educated for the twenty-first century, then technology should be a priority."

In addition to lobbying for change, computer users can make a difference by volunteering to coach teachers or students in their areas of expertise. Businesses can help by developing partnerships with local schools and donating equipment or training. Or by creating teacher internships, which show educators how and why technology is being used in today's workplace. Educom, a consortium focusing on the use of information technology in higher education, is developing a K-12 network linking teachers and schools nationally and globally. The rest of the computer industry could take a cue from that work. It could also help by listening, really listening, to teachers about what they need, and then offering it to them in an affordable package.

In his paper "To Lead or to Follow: The Role and Influence of Research on Technology," education consultant Saul Rockman writes, "It is the implementation strategy for computer use in the more elite schools that makes it worthwhile and differentiates it from computer use in urban, inner city schools. Only when urban educators feel free to promote independent, active learning and personal responsibility as much as the memorization of discrete facts and improved achievement scores will we see the best practices of computer use in those schools. Educators should ignore calls for technology equity and start exploring ways to achieve equity using technology. That is both a more difficult and a more important challenge." And it's a challenge educators shouldn't face alone. We've got to support them. Standing on the sidelines isn't good enough. m

Research assistance by CAROLYN BICKFORD.

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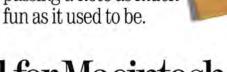
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YOU KNOW ALL THOSE THINGS YOU WISH YOUR MAC DID? LIKE LET YOU GET AT FILES AND APPLICATIONS IMMEDIATELY INSTEAD OF DIGGING THROUGH UMPTEEN DIFFERENT FOLDERS. OR LOAD NEW EXTENSIONS WITHOUT MAKING YOUR ENTIRE SYSTEM BLOW UP. WELL, CONTRARY TO POPULAR BELIEF, IT CAN. WITH NOW UTILITIES 4.0, AN UPDATED VERSION OF THE SOFTWARE COLLECTION AWARDED BEST UTILITY LAST YEAR BY THE EDITORS OF BOTH MACWEEK AND MACUSER.

ITS SEVEN COMPONENTS ARE DESIGNED, TESTED AND GUARANTEED TO WORK TOGETHER. AND IT SIMPLIFIES USING YOUR MAC IN SO MANY WAYS, IT'D BE DOWNRIGHT IMPOSSIBLE TO MENTION THEM ALL IN ONE AD. SO HERE'S THE READER'S DIGEST CONDENSED VERSION.

| NOWMENUS | IS THE ULTIMATE FILE AND APPLICATION LAUNCHING TOOL. IT CREATES SUB-MENUS UP TO FIVE LEVELS DEEP FOR ANYTHING IN YOUR APPLE MENU. IT LETS YOU LAUNCH FILES

AND APPLICATIONS INSTANTLY. IT LETS

TUTE ITEMS ON THE FLY. IT LETS

YOU GROUP APPLICATIONS.

FILES AND FOLDERS INTO WORKSETS, IT EVEN LETS
YOU CHANGE THE FONT AND ORDER OF ITS MENU
ITEMS, IS THERE ANYTHING IT DOESN'T LET YOU DO?

YES, BUT GIVE US A BREAK. THE AD JUST STARTED.

| SUPER BOOMERANG | SAVES YOU TIME AND HASSLES BY KEEPING TRACK OF YOUR MOST FREQUENTLY USED FILES AND FOLDERS. THEN IT PRESENTS THEM TO YOU IN THE 'OPEN' AND

'SAVE' DIALOGS OF EVERY APPLICATION. AND IT FINDS YOUR LOST FILES WITH JUST A PARTIAL NAME OR A SHRED OF CONTENT TO GO ON - EVEN IF THEY'VE BEEN COMPRESSED.

| NOWSAVE | AUTOMATICALLY

FIED NUMBER OF MINUTES, KEYSTROKES OR MOUSE CLICKS. AND IF YOU WANT, IT WILL RECORD EVERY KEYSTROKE IN A SPECIAL BACK-UP FILE, JUST AS YOU TYPED IT. SO EVEN IF YOUR SYSTEM CRASHES, YOUR WORK IS SAVED. AS IS THE HAIR YOU WOULD HAVE TORN OUT.

WYSIWYG MENUS | MEANS WHAT YOU SEE
IS WHAT YOU GET. WILL IT LET YOU SEE FONT
NAMES IN THEIR ACTUAL TYPEFACES? YES. WILL IT
LET YOU CHANGE THE ORDER, SIZE AND COLOR OF
FONTS IN THEIR MENUS? OF COURSE. WILL IT LET
YOU GROUP CERTAIN FONTS WITH CERTAIN
APPLICATIONS AND ASSIGN THEM HOT KEYS?
ABSOLUTELY. WILL IT GROUP FONT FAMILIES

TOGETHER SO YOU DON'T HAVE TO SCROLL ALL

STARTUP MANAGER | CONTROLS THE LOADING OF EXTENSIONS AND CONTROL PANELS. IT HELPS PREVENT CRASHES, IT DISABLES EXTENSIONS THAT DO CRASH. IT EVEN LINKS TOGETHER EXTENSIONS THAT REQUIRE EACH OTHER AND KEEPS DISAGREEABLE EXTENSIONS APART SO THEY WON'T BLOODY EACH OTHERS' PROVERBIAL NOSES.

| NOW SCRAPBOOK | GREW OUT OF THE 5-

ORGANIZE GRAPHICS, TEXT, SOUNDS

AND QUICKTIME MOVIES AND STORES

THEM IN MULTIPLE CATALOGS THAT

CAN ALL BE OPEN SIMULTANEOUSLY.

IT ALSO SHOWS YOU 'THUMBNAIL'

VIEWS AND LETS YOU SORT, ZOOM,

SCALE, RESIZE

AND GROP IMAGES JUST LIKE A REAL, LIVE ART DIRECTOR. EVEN IF YOU DON'T HAVE A PONYTAIL.

NOW PROFILE | IS NOT GLAMOROUS. IT'S NOT EXCITING. BUT IT DOES PROVIDE A DETAILED ANALYSIS OF YOUR SYSTEM, ITS CONFIGURATION, THE WHOLE BALL OF WAX. THAT WAY, IF YOU EVER RUN INTO TROUBLE, ALL THE INFO IS RIGHT THERE. SEXY, NO. SMART, YES.

SO THERE IT IS. NOW UTILITIES 4.0. OR AT LEAST AS MUCH OF IT AS WE CAN FIT IN ONE AD. TO GET THE REST OF THE DETAILS, CALL US AT 1-800-237-3611. OR TALK TO A DEALER. OH, AND JUST IN CASE YOU'RE STILL WONDERING, PALATING LOOKS LIKE THIS.

WHATEVER APPLICATIONS YOU RUN, DAYSTAR CAN MAKE THEM FASTER.

Whether you run Word, PageMaker, Excel or any other application for the Mac, DayStar can speed up your software and improve your performance. We offer 100% compatibility, no risk guarantee, a 3-year warranty, unsurpassed toll-free support and upgrades.

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PowerCache — Work up to three times faster with our award-winning PowerCache accelerator. We use the power and reliability of a 68030 processor (33, 40 or 50 MHz speeds) to offer Quadra-level performance. Our single, universal PDS design

> supports eight different Macs*, including the LC, LC II, SE/30, II, IIx, IIcx, IIsi, and IIci. Guaranteed 100% compatible.

Optional Math Chip — Boosts math functions by up to 500%.

Speed & Slots.

FastCache™ — The low-cost way to put the "zip" back in your applications. Boosts IIsi, IIci and Quadra performance up to 40%. ComboCache IIsi™ — For a few dollars more than Apple's PDS adapter, IIsi users can boost performance up to 40% with a 32K cache and get 2 PDS slots. Optional math chip available! DualPort IIsi™ — Inexpensive way to get a PDS slot, math chip, and another slot for a DayStar accelerator board!

Equalizer LC[™] — Replace your antiquated 68020 processor and get what Apple put in the new LC II — the powerful 68030 processor. The Equalizer offers an



optional math chip (which the LC II does not). It gives you full System 7 compatibility, virtual memory, and faster math performance.

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For the Mac II family and the Quadras, these NuBus boards turbocharge applications that need fast hard drives.

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like today's fast drives. Great for 4-D, Great Plains and Think C users.

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Circle 86 on reader service card

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*For the PowerCache, a sim

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THIS SECTION LISTS
THE LATEST VERSIONS OF SELECTED
MAC APPLICATIONS
THAT WERE SHIPPING BY THE TIME
WE WENT TO PRESS.

PRODUCT	V.	REQ.	*	\$
4TH DIMENSION	2.2	1MB/6.0		\$99
A4	3.1	2MB/6.0.5		\$385
AATRIX CHECKWRITER II	4.0	512K/4.1		*
ACCOUNTANT, INC. PROFESSIONAL	3.0	1MB/6.0.3		*
ACCUTEXT	3.0	4MB/6.0		\$150
ACTA 7	7.0	512KE/6.0.5	2/92	\$33.50
ADDMOTION	2.0	2MB/6.0.5		*
ADDRESS BOOK PLUS	2.0	1MB/6.0.2	2/92	\$25
ADOBE ILLUSTRATOR	3.2	2MB/6.0.3		*
ADOBE PHOTOSHOP	2.0.1	2MB/6.0.2		\$199
ADOBE TYPE MANAGER	2.0.3	1MB/6.0.2		FREE
AFTER DARK	2.0v	512KE/4.1		*
AGENT DA	2.0	1MB/6,0.5	9/92	\$30
AGFATYPE	3.0	2MB/6.0.2		FREE
ALARMING EVENTS	1.0.3	1MB/6.0.2		\$15
ALDUS DIGITAL DARKROOM	2.0	1MB/6.0		*
ALDUS FREEHAND	3.1	1MB/6.0.5	6/92	*
ALDUS PAGEMAKER	4.2	4MB/6.0.5	5/92	*
ALDUS PERSUASION	2.1	4MB/6.0.5		*
ALDUS SUPER 3D	2.5	2MB/6.0.5		*
ALDUS SUPERCARD	1.6	2MB/6.0.4		\$50
ALDUS SUPERPAINT	3.0	1MB/6.0.5	3/92	\$65
ALLIANCE POWER TOOLS	2.42	1MB/6.0.4		*
AMAZING PAINT	1.0.3	512KE/6.0.4		\$15
AME	2.03	1MB/6.0.2		\$49.95
ANTITOXIN	2.0	1MB/6.0		\$15
APPLESHARE FILE SERVER	3.0	512K/3.2		*
ARCHICAD	4.03	5MB/6.0 6	/92 10	% OF LIST
ASHLAR VELLUM	2.10	4MB/6.0.2		*
ASHLAR VELLUM 3D	2.10	4MB/6.0.2		*
ATONCE	1.2	1MB/6.0.5		*
AUDIOMEDIA	2.02	2MB/6.0.7		529
AURACAD	3.1	1MB/4.0		\$90
AUTHORWARE PRO	1.7	2MB/6.0.5		*
AUTOCAD	12	5MB/6.0.5		\$500
AUTOSAVE II	2.0	512KE/4.2		*
A/UX	3.0	4MB/6.0.5		*
AZIMUTH	2.1	1MB/6.0.2		\$45

PRODUCT	٧.	REQ.	*	\$
BACKMATIC	2,0	1MB/4.2	2/92	*
BILL-IT	4.0	1MB/6.0.3		\$29
BUSINESS SENSE	1.6	1MB/6.0.7		\$69
CA-CRICKET PRESENTS	2.0.1	1MB/6.0		*
CALENDAR	1.1.2	512KE/6.0		FREE
CANOPENER	2.0	512K/3.0		\$29
CANVAS	3.0	1M8/6.0.2	1/92	
CAPTURE	4.0	1MB/6.0		\$30
CARBON COPY MAC	2.0	1MB/6.0.5	4/92	*
CAT III	1.2	1MB/6.0		*
CHECKLIST	2.0	1MB/6.0	2/92	*
CHECKMARK PAYROLL	4.6	512K/4.2		\$50
CINEMATION	1.0	4MB/6.07	7/92	NA
CLARIS CAD	2.0v3	2MB/6.0		\$79
CLARIS RESOLVE	1.1	1MB/6.0.5	1/92	\$20
CLARISWORKS	1.0	1MB/6.0.5	3/92	NA
CLICKCHANGE	1.05.2	1M8/6.0.4		\$5
CLICKPASTE	2.1	1MB/6.0		\$20
CMS UTILITIES	7.0	2MB/7.0		\$25
COLOR MACCHEESE	2.08	1MB/6.0.5		\$15
COLORSTUDIO	1,5	4MB/6.0.5	3/92	*
COMPUSERVE INFORMATION MANAGER	1.5.1	1MB/4.1		*
COMPUSERVE NAVIGATOR	3.1	512K/4.1		*
CONCERTWARE+	4.0	512KE/4.2		\$15
CONNECTIONS	2.0	2MB/6.0.5	4/92	NA.
CONTROL CLASSIC	1.1.3	4M8/6.0.5		FREE
CORRECT GRAMMAR	3.0	1MB/4.2	8/92	\$29.95
DATACLUB CLASSIC	2.0	2ME/6.0	8/92	*
DATA SHAPER	1.2	1ME/6.0		\$40
DECK	1.03	2MB/6.0.7		FREE
DELTAGRAPH PROFESSIONAL	2.0	2MB/6.0.5	5/92	\$69.95
DELUXEMUSIC CONSTRUCTION SET	2.5	512K/6.0 2		*
DESCARTES	1.04	2MB/6.0.3		FREE
D.E.S. DOCUMENT EXCHANGE SYSTEM	4.1	1MB/6.0		*
DESIGNCAD	3.0	2MB/6.0.5		*
DESIGNCAD 2D/3D	3.0	2MB/6.0.5		\$50
DESIGNSTUDIO	2.0	1MB/6.0	11/91	*
DESKPAINT	3.07	1MB/6.0.5		\$19.95
DIGITAL DARKROOM	2.0	1MB/6.0.4		\$80
DISKDOUBLER	3.7	1MB/6.0.2		\$15
DISKEXPRESS II	2.10	1M8/6.0		FREE
DISKFIT PRO	1.0	1MB/6.0	4/92	\$32.50

V. = version #. Req. = min. RAM and system software required. ★ = last time (in the past year) this or an earlier version was reviewed. S = cost of update to registered owners. NA = first version, not applicable. ★ = contact your dealer for update policy. Blue = new version. Yellow = reviewed product.

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HAVING TROUBLE FINDING SPACE ON YOUR HARD DISK?

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Circle 94 on reader service card

PRODUCT	V. REQ. * \$
DISKTOP	4.0.2 1MB/6.0 *
DISPLAY ADBUILDER	1.1 1MB/6.0.3 *
DOLLARS & SENSE	5.0 512KE/3.2 *
DOUBLE HELIX	3.5 1MB/6.0 \$99
DREAMS	1.1 1MB/6.0.2 *
DYNAPERSPECTIVE	2.3 2MB/6.0.5 \$14
DYNODEX	2.0 1MB/6.0 2/92 \$25
EASY COLOR PAINT	2.02 1MB/6.0.2 *
EHELP	2.0 1MB/4.1 \$44
EMPOWER II	4.0.7 2MB/42 *
ENCORE	2.5 2MB/6.0.2 *
ENHANCE	2.0 2MB/6.0.3 11/91 \$10
EVOLVE	1.1 2MB/5.3 \$25
EXODUS	4.0 2MB/6.0.3 \$75
EZ VISION	1.0 1MB/6.0.3 NA
FASTBACK PLUS	2.6 1MB/6.0 4/92 *
FAST FORMS	2.0 1MB/6.0 \$25
FASTLABEL	3.1 1MB/6.0 \$10
FASTTRACK	1.5 512KE/5.5 \$20
FILEGUARD	2.7 1MB/4.2 \$18
FILEMAKER PRO	1.02 1MB/4.2 FRE
FILEVISION V	1.1 1MB/6.0.2 *
FILMMAKER	2.5 5MB/6.0.3 *
FINALE	2.6 1MB/6.0.2 FRE
FLEXICAD	2.20 5MB/6.0.4 *
FONTMONGER	1.0.5 2MB/6.0.2 10/91 FRE
FONTOGRAPHER	3.5 1MB/4.2 *
FONTSHARE	2.2 1MB/6.0 FRE
FONTSTUDIO	2.0 1MB/5.0.5 *
FORM Z	2.0 2MB/6.0 *
FOXBASE+/MAC	2.01 1MB/6.0 FRE

PRODUCT	V.	REQ.	*	5
FRAMEMAKER	3.0	1MB/6.0	3/92	*
FREEDOM OF PRESS LIGHT	3.0.3	2MB/6.0.3		\$25
FREEDOM OF PRESS PROFESSIONAL	3.0.24	4MB/6.0.3		\$250
FULL IMPACT	2.0	1MB/6.0		\$50
FULLWRITE PROFESSIONAL	1.5	2MB/6.0.2		*
GENERIC CADD	2.0	2MB/6.0.5		\$100
GEOQUERY	3.02	1MB/6.0		*
GOFER	2.0	1MB/4.1	6/92	\$25
GQL	3.0	2MB/5.0		\$75
GRACELAN	2.0	1MB/6.0.5		*
GRACELAN UPDATE MANAGER	1.0	2MB/6.0.5		NA
GRADE MACHINE	5.0	1MB/6.0.5	50%	OF US
GRAMMATIK MAC	2.05	1MB/6.0		\$15
GREAT GANTT	1.4	1MB/6.0		非
GREAT PLAINS ACCOUNTING SERIES	6.0	1MB/4.2		*
GREATWORKS	1.0	1MB/6.0.2	1/92	NA
GUIDE	2.0	512K/4.1		\$50
HAND-OFF II	2.2.5	2MB/6.0.2		FREE
HELP	1.0.1	1MB/6.0	2/92	FREE
HYPERCARD	2.1	1MB/6.0.3		\$49
HYPERDA	2.1	1MB/6.0		529
ICON-IT	2.1	1MB/6.0.2		*
IF:X FORMS DESIGNER	1.1	1MB/6.0		FREE
IMAGE GRABBER	3.0	1MB/6.0	2/92	\$18
IMAGESTUDIO	1.7	1MB/6.0		\$99
INFINI-D	1.1	4MB/6.0.4		FREE
INFOLOGIC ENVELOPE	1.10	512KE/4.0		\$5
INITPICKER	2.02	1MB/6.0		\$10
INSIDE OUT	II	1MB/6.0.2		*

PRODUCT	V.	REQ.	*	\$
INSIGHT EXPERT ACCOUNTS PAYABLE	2.1.1	1MB/6.0		*
INSIGHT EXPERT ACCOUNTS RECEIVABLE	2.2	1MB/6.0.2		水
INSIGHT EXPERT GENERAL LEDGER	2.2	1MB/4.2		\$99
INSPIRATION	3.0.1	1MB/4.2	12/91	*
INSTANT-EXPERT PLUS	2.0	1MB/5.0		FREE
INTOUCH	1.1.7	512KE/4.2	3/92	FREE
ITHINK	2.0	2MB/6.0.2		\$149
KALEIDAGRAPH	2.1	2MB/6.0.5		\$20
KIWIENVELOPES	3.1	512KE/4.1		*
LABVIEW	2.2	4MB/6.0.5	10/91	*
LANGUAGE SYSTEMS FORTRAM	3.0	2MB/6.0.4		\$100
LAPLINK MAC III	3.2	512K/2.0		FREE
LAPLINK MAC PLUS III	3.0	512K/2.0		*
LASERPAINT COLOR II	1.02	1MB/6.0.3		FREE
LETRASTUDIO	2.0	2MB/6.0		*
LIGHTSPEED COLOR LAYOUT SYSTEM	2.5	1MB/6.0.5		*
MACANALYST	3.1	2MB/6.0		*
MACARCHITRION	5.5	2MB/6.0.3		*
MACBRAIN	3.0	1MB/6.0.5		\$295
MACDRAFT	2.1	1M8/6.0.2		*
MACDRAW II	1.1	1MB/6.0		*
MACDRAW PRO	1.5	2MB/6.0.5	11/91	*
MACENVELOPE	5.1	1MB/4.2		\$29.95
MACENVELOPE PLUS	2.0	512KE/3.2		\$50
MACFLOW	3,7	1MB/6.0		\$30
MACFORTRAN II	3.1	4MB/6.0.3		\$99
MACGLOBE	1.0	1MB/6.0.4	4/92	*

Five reasons to pick a TI



No matter which Macintosh* computer you have, there are strong reasons why there's a perfect microLaser printer to go with it. Personal or shared.

1. It's affordable.

For the value-conscious, take a 9 pagesper-minute laser printer, load it up with 17 scalable outline fonts from the Adobe® PostScript® software library, give it an operating cost of 1.9* cents per page and price it at \$1,499**. Now you've got the best value in the business, for yourself or your business. It's the microLaser PS17.

2. It's upgradeable.

Now take the microLaser we just talked about, double the fonts, have the options of Turbo upgrades for fast graphics, price it at \$1,749** and you've got the microLaser PS35.



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For high-speed PostScript printing with a built-in RISC processor, PostScript Level 2, 35 fonts, and automatic switching between PostScript and HP LaserJet® emulation, try a high-performance microLaser Turbo. Perfect for the power user.

4. It's shareable.

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PRODUCT	v.	REQ.	*	\$
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MACLINKPLUS/PC	6.0	1MB/6.0.3	3/92	*
MACMONEY	3.5	512KE/4.0		\$12
MACPAINT	2.0	512KE/3.2		\$25
MACPALETTE II	2.2	1MB/6.0.5	9/92	*
MACPHONEBOOK	3.0	1MB/6.0		*
MACPLOT PROFESSIONAL	4.0	1MB/6.0.5		*
MACPLOT STANDARD	4.0	1MB/6.0.5		*
MACPROJECT II	2.51	1MB/6.0		\$99
MACRECORDER	2.03	512K/3.2		*
MACRENDERMAN	1,1	5MB/6.0.5		\$75
MACROMIND DIRECTOR	3.1	2MB/6.0.5		\$149
MACSCHEDULE	2.5	1MB/6.0		\$30
MACSCHEDULE PLUS	1.0.5	1MB/6.0		FREE
MACSPIN	3.01	512K/4.3	3/92	*
MACTERMINAL	3.0	512K/3.2		\$65
MACTOOLS	2.0	2MB/6.0		\$55
MACTOPS	3.1	1MB/6.0.5		*
MACVISION	4.1	2MB/6.0.4		*
MACWRITE II	1.1v2	1MB/6.0		FREE
MANAGING YOUR MONEY	4.0	1MB/6.0.3		*
MANAPRO GENERAL LEDGER	3.1	1MB/6.0		NA
MAPLE V		2M8/6,0.7	5/92	*
MARCOPOLO	1.1	1MB/6.0		FREE
MARKET ANALYZER PLUS	2.0	2MB/6.0.2		\$99
MARKETMASTER	3.5	1MB/6.0.3		*
MARKUP	2.0	1MB/6.0		\$30
MASTERFINDER	1.1	1MB/6.0.5		*
MASTERJUGGLER	1.57	512K/6.0		\$15
MASTERPLAN	1.03	512K/6.0.5		FREE
MASTER TRACKS PRO	5.0	1MB/4.1		\$45

PRODUCT	v.	REQ.	*	\$
MATHCAD	2.06	1MB/6.0.2		FREE
MATHEMATICA	2.0	1MB/6.0		*
MATHTYPE	2.1.1	512K/6.0.2		*
MATHWRITER	2.0	2MB/6.0.5		*
MATLAB	4.0	1MB/3.0		*
MEDIATRACKS	1.01	1MB/6.0.2		FREE
MENUFONTS	4.01	1MB/6.0.5	5/92	\$20
METAPICT	2.0	512KE/4.5		\$69
MICHAEL'S DRAW	1.0	1MB/6.0.5	12/91	NA
MICROPHONE II	4.0	2MB/6.0	7/92	a)t
MICRO PLANNER MANAGER	1.0	2MB/6.0		*
MICROSOFT EXCEL	3.A	1MB/6.0.2		*
MICROSOFT FILE	2.0	512K/3.2		*
MICROSOFT MAIL	3.0	1M8/6.0.2		*
THE MICROSOFT OFFICE	1.5	1MB/6.0.2		\$129
MICROSOFT POWERPOINT	2.01	1MB/6.0		FREE
MICROSOFT PROJECT	3.0	2MB/6.0.4	11/91	\$149
MICROSOFT WORD	5.0	512KE/3,2	4/92	\$129
MICROSOFT WORKS	2.0e	512K/6.0		*
MINDLINK	2.0	1MB/6.0		*
MINDWRITE	2.1	512KE/4.2		*
MINICAD+	4.0	1MB/6.0		*
MOCKPACKAGE PLUS UTILITIES	4.4	512KE/3.2		\$15
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	 Send questionnaire out for responses 	Hedium	Delores	1/29/93	
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	· Write report	Low	Andy	2/26/93	
	. Meet with ad agency	High	Judy	2/2/93 10:30am	Heet as soon as they're ready
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Arrange your activities in a simple outline. Then create your own columns to track the details: Priority, Due Date, Status, anything.

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item	Priority	Yhe	Dete	Netes
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Heet with aid agency	High	Judy	2/2/93 10:30am	Heet as soon as they're
Prepare Roll-out plan	Medium	Judy	2/7/93	
Discuss joint venture idea with Ross Assoc.	Hedium	Judy	1/14/93	Consider long-term benefits. Get their suggestions.
Department staff meeting	Medium	Judy	1/19/93 3:00pm	
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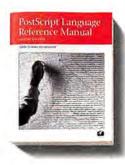












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MacAcademy 2-Day Workshops are offered in nearly every major city in the U.S. The cost to attend a MacAcademy workshop is only \$279, which includes workshops on the Macintosh, Microsoft Word and Excel, Aldus PageMaker, and ClarisWorks, FileMaker Pro, and HyperCard. Your registration fee covers all workshops, training materials and even a subscription to MacWORLD Magazine. Attendees at MacAcademy are given the opportunity to rate our workshops on a scale of 1 to 5. Currently the MacAcademy average rating is an impressive 4.7! In addition, each



Randy Smith, President of MacAcademy, also travels as an instructor enjoying the thrill that comes as one teaches people new skills and new techniques on the Macintosh.

workshop carries a complete moneyback guarantee. MacAcademy is an excellent program and one that is unmatched in quality, price and content. Thousands of references and testimonials from past attendees and companies are available upon request.

The MacAcademy Video Training Series

MacAcademy Video Training Tapes are being used worldwide by tens of thousands of individuals and companies. MacAcademy offers video training for the Macintosh and over 40 Macintosh programs. Training can range from one video to as many as four VHS videos for a program such as Microsoft *Excel*. MacAcademy videotapes are a full 2 hours and are still priced at our low price of only \$49each. Our videos also carry a 30-Day Money Back Guarantee.

Beginning in the fall of 1992 MacAcademy training tapes will also be available in French, Spanish and Japanese.

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Many companies, educational institutions, and governmental agencies have found it profitable to have MacAcademy come to their location for customized training. Featuring some of the top Macintosh trainers in the country, MacAcademy is able to customize exactly the kind of training your company needs, at your site, for an extremely reasonable training investment. Our customers include DuPont, General Electric, Motorola, NASA, Mobil Oil, Northern Telecom, and others who have found our training to be an excellent value.

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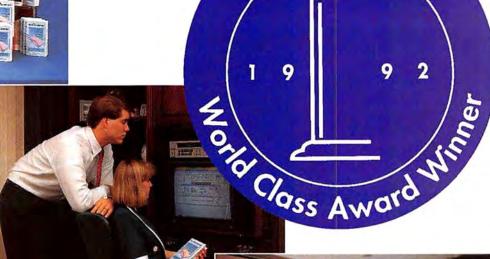
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The Cabling Conundrum

BY TIM WARNER

THE MACINTOSH HAS ALWAYS BEEN known as a plug-and-play computer, easily connected to peripherals, but the recent influx of inexpensive multisync monitors-so called because they're capable of synchronizing to various timing signals to display multiple screen resolutions-is putting that maxim to the test.

When it designed the first modular Mac monitors, Apple devised a system that enables its internal video and its 8.24 and 8.24 GC video boards to recognize an attached monitor. When you use an

Apple Mac display, the system works fine; there's no need to know anything about resolution. But as we found out during our tests for this month's color monitor feature, "The Bigger Picture," when you try to hook up a Mac to a multisync monitor from a DOS PC vendor, the Apple system can become a major headache.

How Monitors Talk to Boards

THREE SPECIAL-PURPOSE PINScalled sense pins-within the Mac video board tell the Mac's video circuitry whether a monitor is attached, and if so, what type of monitor it is. The pattern, or sense key, that correctly identifies a monitor is established by connecting these sense pins to ground pins, to other sense pins, or to nothing at all. More precisely, the sense key sets the board's video circuitry to use the timing signals necessary to drive the monitor at the correct resolution.

Multisync Miscommunications

OUR PROBLEMS BEGAN WHEN WE DIScovered that we were unable to test many of the multisync monitors we receivedincluding those from Relysis, Magnavox, Panasonic, and Seiko-because they could

not display Apple internal video (the video built into the Mac's system board) at the resolutions they claimed to support. For example, when we plugged a 19-inch Relysis monitor into a Quadra using the cable supplied with the monitor, the only screen resolution we could get was the standard Mac II 640 by 480 pixels. We were stuck with a 44-dpi display-great for the visually impaired, but disappointing if you've just shelled out nearly \$2000 to own an enormous display.

Theoretically, all these monitors can

display resolutions greater than the Mac's standard 640 by 480, and Apple's video boards do additionally support a 16-inch monitor resolution-832 by 624. So what was keeping the monitors from realizing their full potential? The lack of a proper cable for switching the Apple video circuitry into a higher resolution.

Specifically, the culprit turned out to be the sense pins

within the cable. Because the sense pin pattern is defined in the cable connecting the monitor to the board-rather than being in the monitor itself-without the right cable or cable adapter, the Mac's video circuitry has no way of knowing what type of monitor is attached to it. In the absence of any sense pin pattern, the video circuitry on the Apple board defaults to the standard Mac resolution.

For example, if the pins in the cable follow the pattern 110 (which corresponds roughly to "on, on, off" for pins 10, 7, and 4, respectively), the board assumes it is connected to an AppleColor High-Resolution RGB Monitor regardless of what monitor is attached. If a generic two-page monitor is connected to the built-in video with the cable for an Apple 13-inch, the continues



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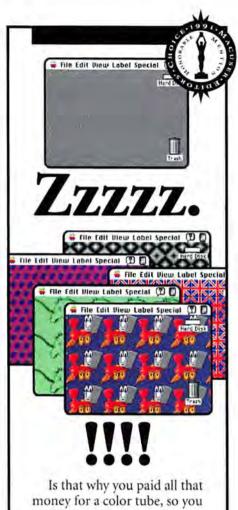
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See us at Macworld Expo Bayside Center - Booth 342 video board displays 640 by 480 pixels because that is what the sense key in the cable is telling the video board-which doesn't know any better.

Entering PC Territory

ADDING TO THE CONFUSION IS THE growing trend of major Mac vendors' selling to Microsoft Windows users, enclosing DOS PC-style high-density 15-pin cables typical of Super VGA (SVGA) in many monitor boxes, (VGA is the 640 by 480 IBM video standard; SVGA extends the screen size to 800 by 600 or more.) This means that to use the monitor with a Mac, you must get an adapter that converts the SVGA cable pinouts to the DB-15 pinouts for Apple internal video.

Many vendors that have sold only Macintosh products in the past have begun shipping monitors constructed for the PC, with cables and all, that they have adapted for the Mac. And if the monitors and cables haven't been adapted, exactly, they've been compromised. Radius now ships a VGA cable in its monitor boxes; the cable for the Mac comes in the box with the Radius PrecisionColor Interface video board.

To make matters worse, Apple has slightly modified the video of the LC and the Quadra. While these changes fix small incompatibilities (and are, from that standpoint, necessary), they further complicate an already confusing issue by requiring additional cable adapters that take up more desk space and prompt the addition of special-case instructions to monitor manuals.

Resolution Switching Gets Easier

BEFORE INTERNAL VIDEO, WHEN THE technology that lets video boards switch resolutions was in its infancy, you needed a vendor-specific combination of monitor and board to get two-page resolutions. SuperMac, one of the first vendors in the Mae market to make a video board that generated many resolutions, used a system of sense keys nearly identical to Apple's to tell the video board what timings (and thereby what resolution) to generate. However, most boards could produce only single, fixed timings for a single monitor.

Now, many vendors offer multiple timings on their video boards, which drive a wide choice of displays. In fact, some boards work with nearly any widely available monitor—a blessing if you're in the market for an inexpensive monitor. But the money saved on the monitor is quickly spent on a third-party video board that displays multiple resolutions.

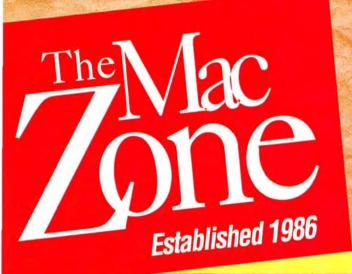
You'd have even more flexibility if you could switch resolutions through software—and many third-party video boards already offer this feature. For instance, the software included with Radius's and NEC's video boards lets you choose the desired monitor and resolution from a list, and lets you change resolutions as you work, without quitting applications or restarting. E-Machines' software and video boards also let you switch resolutions on the fly. SuperMac and RasterOps support multiple resolutions but require you to restart the Mac.

But currently such conveniences don't exist for multisync monitors running off internal video. Switching resolutions means crawling behind the CPU and changing the cables. An ideal solution for multisync owners who have a built-in (internal) or an Apple video board would be a piece of software that switches the Mac's built-in video into a higher resolution regardless of what sense key the attached cable has.

And such software now exists. We saw a working version of a program from NEC that enables you to change the resolution of a monitor connected to the Mac's internal video from the Monitors control panel, without ever reaching behind the Mac. This program, called DPI-OnTheFly Software, due to ship in July, will enable you to choose among the various resolutions supported by Apple internal video, and to switch the monitor to the chosen resolution without having to restart the Macintosh. Unfortunately, the software will initially be available only with NEC monitors. Apple has also suggested, but will not confirm, that it's working on a software solution to internal video woes.

Incidentally, Apple has recently backed away from its original standard of putting sense keys in the cables; it's now putting the sense keys in the monitors themselves for all its new models (except the 13-inch monitor, which is the video board's default mode) so that any straightthrough 15-pin cable that fits a Macintosh will work.

So it's not such a bleak picture. Companies are working hard to ease the problems inherent in connecting a multisync monitor to Apple internal video. However, in the next year adapters will remain all too common, and compatibility will be confusing for some time. Before you buy, investigate the vendor selling you a non-Mac multisync monitor; make sure you get the resolution you need in a largescreen monitor with as little inconvenience as possible. Finding a good color monitor that fits all your needs is tough enough without worrying about configuring compatible cabling once you get the monster home. m



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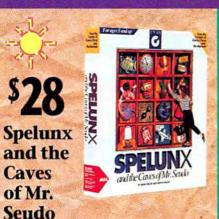


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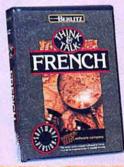
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#05352 Automobile Power Adapter \$98 #05355 Auxillary Power Pack \$188



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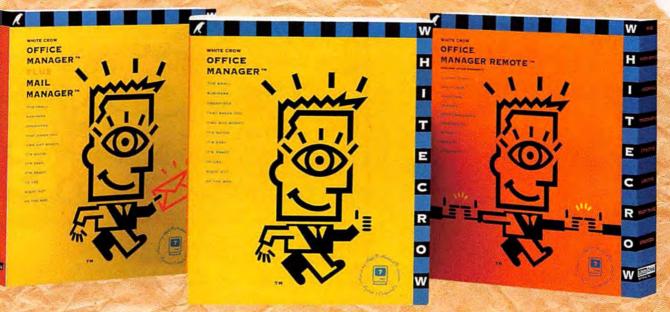
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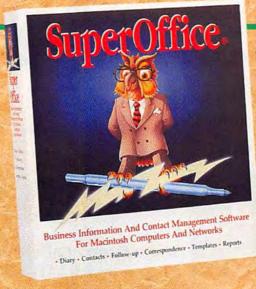


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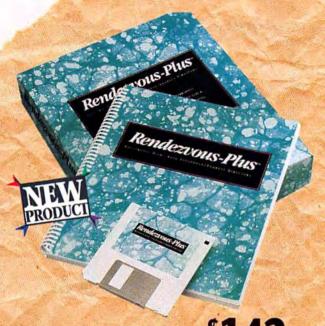
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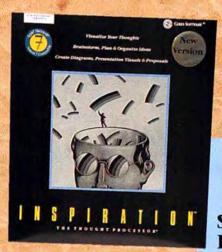
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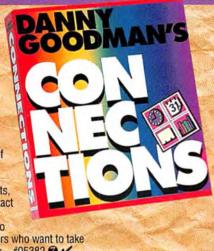
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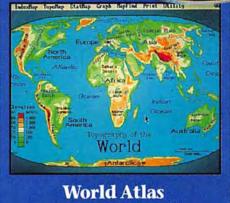


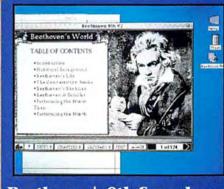


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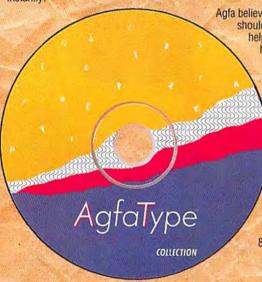
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This seamless multimedia extension for HyperCard brings 24-bit color paint animation and sound editing to HyperCard 2.1 ADDmotion II's ease of use and price make animation and multimedia available to Mac enthusiasts and HyperCard users. Exports QuickTime movies and includes HyperCard 2.1. Motion Works #00194

PROmotion II w/PrimeTime

With PROmotion's 24-bit color paint, animation and sound editor you can make QuickTime movies, storyboards and presentations quickly and easily-even if you can't draw. It's the perfect choice for business and artistic professionals. Includes extensive System 7 support, Sony Print to Video and PrimeTime CD-ROM. Motion Works #01039

PrimeTime

PrimeTime CD is a collection of medial and clips for use with PROmotion and ADDmotion II. The CD includes a media browser containing over 100 actors (in both color and black-and-white), background props and over 120 sound clips covering business, education and entertainment. Motion Works #01038



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Multi-Ad Creator is

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pers, ad agencies, graphic designers, retailers, Yellow Page advertisers and others. The program's ad makeup capabilities include free rotation of grouped graphics and text, copy fitting, suggested layouts, advanced object drawing and manipulations, controlled duplication of objects, customizable ad layout environments, high-resolution PICT borders and more. Multi-Ad Services, Inc. #4774

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Getting Started QuickTime Kit

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MacSpeaker

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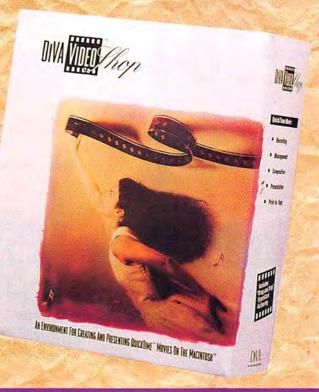
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PACo Producer \$148

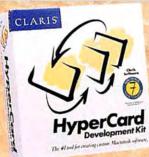
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Regular price of book #05239 HyperCard 2.0 QuickStart



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Intuitive user interface displays video clips in "filmstrip" style

Multiple windows provide rapid access to any editing function.

Animated icons simplify selection of digital effects.

Video windows enable quick preview of source material, digital effects and assembled video

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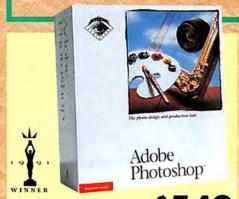
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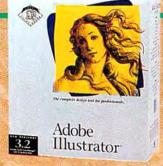
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Improve the quality of your graphics with Illustrator 3.2. This easy-to-use software program offers powerful illustrations, page design and color separation capabilities. Adobe Type Manager solves the problems of jagged edges—no more 24-point headlines that look like brick piles. The entire PostScript font library works with ATM. It also supports Bitstream fonts and the Hewlett Packard laser printer. Adobe #03558 © V

Streamline 2.0

Make your graphics stand out in the crowd with Streamline,

the free-standing autotrace application derived from Illustrator 88. It works in either Outline or Centerline mode, or a combination of both. The Centerline mode traces lines down the center, not

around the edges.
Streamline reads TIFF files from scanners, along with PICT and MacPaint files and it can output to an EPS file for either Macintosh or PC compatibles. Adobe

#03971 0 /



Adobe Streamline



FONTS & FONT UTILITIES



EPS Exchange

EPS Exchange™ 2.0 is an exciting add-on utility which extends the functionality of Aldus FreeHand® 3 by providing the ability to open, as well as generate Adobe Illustrator® 3 and Adobe Illustrator 88® files. You can also export your FreeHand documents for use in Adobe Photoshop™, LetraStudio™, or other programs which support these file formats! Altsys #05036 **@**

FontMonger 1.5 FontMonger bridges competing font technologies by letting

desktop publishers easily convert outline fonts between

Adobe Postscript 1, Type 3 and True Type Formats. Extend your font library by creating small caps, subscript, superscript, rotated or obliqued fonts from existing fonts. Ares Software Corporation

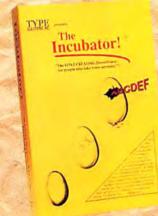


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The Incubator!

The Incubator! by Type Solutions, Inc. allows you to create fully hinted TrueType fonts quickly and easily from your existing TrueType library. There are four powerful typographical controls-color (light or dark), width, contrast (thick and thin strokes) and slant (right or left). These can be used separately or in tandem to create high quality, unique TrueType typefaces for use in any application. Type Solutions #00490 @ ~



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Great display typefaces for only 40 cents each! This collection of 250 Type 1 PostScript display typefaces handles most of your needs. Includes traditional, novelty and many other faces! Includes printer and screen fonts. Compatible with all Macintosh programs that support PostScript FontBank #04986 @

Type Essentials



The right font can make a big difference in the effectiveness of your documents. Bitstream offers typeface solution sets in 4 easy-to-use categories: the Headlines pack comes with 7 faces, the Newsletters, Brochures & Announcements (13 faces), the Spreadsheets, Graphs & Presentations (13 faces), and the Letters, Memos & Faxes package (13 faces). Each set comes in TrueType and PostScript Type 1 formats so you can use them with almost any

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Graphs &

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Plus Pack For Type Manager 2.0

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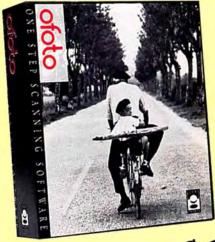








SCANNERS

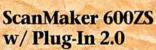




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#00370 ScanMaker 1850\$1898

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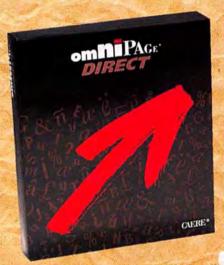
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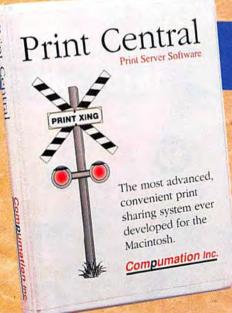
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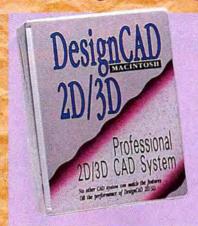


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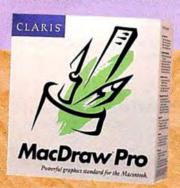
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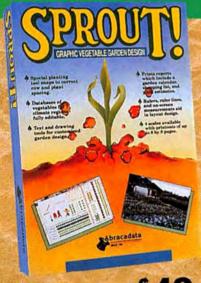
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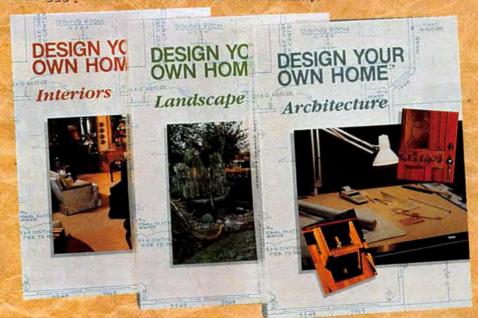
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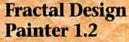


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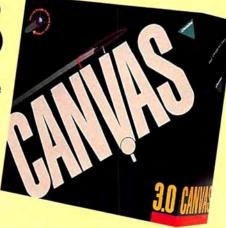
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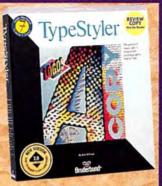


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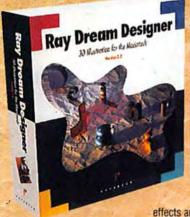
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#05038 MacVision Serial Grayscale Video Digitizer 4.1\$248



Designer 2.0

With Ray Dream Designer, you don't have to settle for flat illustrations. The program's drawing and text tools are virtually the same as those in most 2D illustration programs. The only difference is, now your objects have the realistic look of three dimensions. You can also import paint or scanned images, wrap them around an object or text for instant dimension. What's more, special

effects and perspective are all handled automatically. So you can make changes without starting over. Ray Dream #00441 @

Expert Color Paint

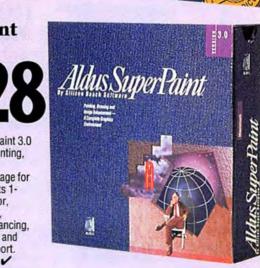
The latest in professional, yet easy-to-use painting tools-at an incredible price. Expert Color Paint is a fully-equipped desktop art studio that gives you true 32-bit color (that's 16.9 million colors and grayscale), fully customized tools, virtual memory, multiple undo's and System 7 support. Want more? Included is a free clip art disk (a \$24.95 value).

Softsync, Inc. #00954 @ V



Aldus **SuperPaint** 3.0

New Aldus SuperPaint 3.0 is the complete painting, drawing & image enhancement package for the Mac. It supports 1through 24-bit color, textures, gradients. masking, color balancing, AutoTrace, Beziers and EPS graphics support. Aldus #04190 @ V





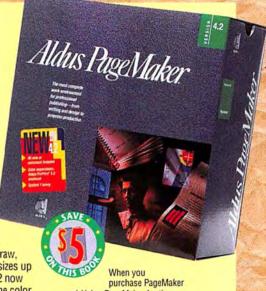
DESKTOP PUBLISHING

Aldus PageMaker 4.2 with FREE **PrePrint**

This is it. The one and only PageMaker desk top publishing powerhouse from Aldus. The new System 7 Savvy version 4.2 is packed full of enhancements and features. There's a control palette for precise numeric placement and scaling of objects, a new user-interruptible screen redraw, baseline-to-baseline leading, page sizes up to 42"x42" and much more. And 4.2 now comes FREE with Aldus PrePrint, the color separations software that's easy to use and compatible with all Aldus products.

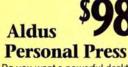
Aldus #04573 @ / 1111

Aldus Personal Press



and Using PageMaker for the Macintosh (#05235) receive the book for only \$19.

Regular price of book #05096 Using PageMaker for the Macintosh \$24



Do you want a powerful desktop publishing package that requires a minimum investment of your time and money? Take a good look at Aldus Personal Press. This easy and effective desktop publishing program has all the features you need, including page layout, full-featured word processor and powerful graphics capabilities everything you need

to produce flyers, newsletters, brochures, reports and manuscripts. Aldus

OuarkXPress 3.1

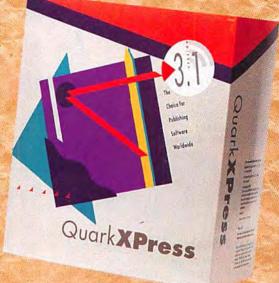
You will find that no matter how you use the new QuarkXPress 3.1, the program's ability to perform virtually all layout and production tasks will make the publishing process easier. A library stores frequently used items, and a pasteboard provides a work area next to each page. You can group text and graphics as a single element, and rotate them incrementally a full 360 degrees.

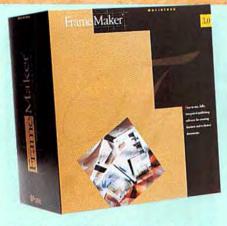
Quark #04736 @ 1111/



When you purchase QuarkXpress 3.1 and QuarkXpress 3.1 Quick Reference Guide (#05236) receive the book for FREE! Regular price of book #04736 QuarkXpress 3.1

Quick Reference Guide \$9

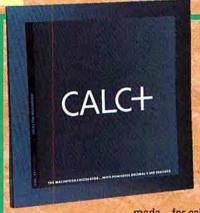




tttt1/2 FrameMaker

The leading document publishing software for creating business and technical documents, FrameMaker 3.0 combines full-featured WYSIWYG word processing, graphics, page layout, equations

editing, HyperText and document tools in a single, easy-to-use application. Multilingual documents are easy with 13 international language dictionaries and user interfaces in French, English, German and Swedish. Frame Technology #3582 @



CALC+

CALC+ is a major upgrade from the standard Macintosh calculator. Some of its unusual and productive features include: Desktop publishing

mode-for calculations in inches, centimeters, picas and ciceros, plus instant conversions, paper tape—for printing a complete hard copy audit trail, "Minimize" button-for reducing CALC+ to a small icon, so you can keep it

"parked" on your desktop for instant use. Abbott Systems #04074 @ V



C.O.D.'S ACCEPTED ON ORDERS UNDER \$1,000

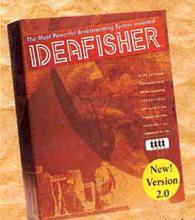
PRESENTING YOUR IDEAS

More 3.1

More 3.1 is your key to creating professional presentations. Start by organizing your thoughts with the outliner. Want to add some graphics? With More 3.1, it's easy to import clip art to illustrate your work or create your own. Add some of More's dazzling charts and graphs and your work comes to life. When you're finished, More 3.1 will print out

overhead transparencies, 35mm slides (overnight through Autograph Service Center), and professional-looking audience handouts. Symantec #04464 @ 🗸 🙏 👢 👢

MORE



IdeaFisher 2.0

IdeaFisher comes complete with two powerful databases. QBank has almost 6,000 thoughtprovoking questions organized into 35 categories, including marketing, new product development, naming, idea modification and idea evaluation. IdeaBank is a vast ideathesaurus, with more than 705,000 links, designed to help you quickly gather large

The Work Processor That Works The Way You Do.

Fair Witness

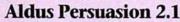
amounts of relevant information, unearth new avenues of thought, and expeditiously think through all aspects of a creative problem. IdeaFisher greatly increases the productive output of your brainstorming. Fisher Idea Systems #00897 @ V

Fair Witness 1.1

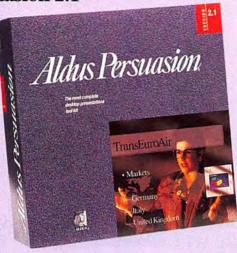
Fair Witness is an ingenious way to integrate the things you do as part of a group or as an individual. It's an information spreadsheet that combines the best of an outliner, a database, and a project manager into one slick, easy-to-use program. So you spend more time using information and less time manipulating software. Only

with Fair Witness-winner of the 1991 MacUser Editor's Choice Award for Best Organizational tool. 1.2 upgrade shipping June 15th-FREE to

registered user's! Chena Software #00334



Need to develop presentation graphics? Let Aldus Persuasion 2.1 do all the work. Just select one of the predefined templates (or create your own), and type your ideas into the outliner. Persuasion automatically prepares your slides from the outline. Its **Auto Template** function enables you



to preview, combine or change template designs at will. It provides a variety of predefined charts and graphs (or you can create your own) and automatically generates speakers' notes and handouts. In the slide show mode you can choose from 5 different wipe and dissolve effects. Persuasion includes drivers for the most popular printer and film recorders. New Version 2.1 incorporates powerful new features such as: full System 7 compatibility, a larger template library, a RunTimePlayer that allows finished presentations to run on systems without Persuasion installed, and



Microsoft PowerPoint 2.01

Now you don't have to rely on outside sources to produce slides and overheads for your presentations. Microsoft PowerPoint for the Macintosh allows you to make slides and overheads directly on your Mac! The built-in graphing tool helps you create high-impact business charts. WYSIWYG (what-you-see-is-what-you-get) technology makes design easy and fast. This amazing desktop presentation

software lets you create the most unforgettable presentations you - or they - will ever see. Microsoft #01220 @ V



Black Laser Pointer Pen

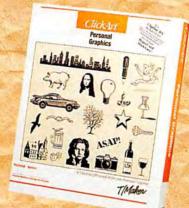
Laser Pointer is a stylish, low-cost hand-held laser pointing device. It projects a red laser beam up to 300 feet, enabling you to work the room while conducting presentations or training sessions. It's safe, durable, lightweight and uses only 2 AAA batteries (included), and sells for less than half the cost of competing products. Really Great Products #04349



WINNER

CLIP ART





Uncle Milty's ClipArt Collection \$34

Use Uncle Milty's Clip Art and your newsletters, ads, flyers, invitations, brochures, memos, etc. will be more effective and inviting. It includes 100 high-resolution 300dpi, illustrations on three disks. All illustrations have been meticulously hand-drawn by Uncle Milty and friends. Use them with PageMaker®, QuarkXpress®, MS Word 5.0 and other popular page layout programs that import compressed TIFF. Now compatible with MS Word 5.0®. Digital fun for kids and adults! Uncle Milty #04273 ?

ClickArt Personal Graphics

ClickArt Personal Graphics contains more than 130 images including animals, arrows, billboards, borders, sports, houses, cartoons, famous people and more. They can be used with virtually all page layout, word processing and paint applications including: PageMaker, WriteNow, and Microsoft Word. You can modify ClickArt bitmapped images and add color to them with MacPaint, SuperPaint, or any other software program that accepts MacPaint files. T/Maker #00749 • V

\$26 MacGallery for HyperCard/MacPaint

You'll enjoy using this light-hearted collection of well over 400 hand-drawn images. Use MacGallery with any program that accepts PAINT format files, and also in HyperCard. You'll find a wide variety of great-looking images that are easy to use and also easy to change. Perfect for all kinds of projects, and all types of printers. Dream Maker #04775



Cliptures: For All Your Clip Art Needs

Outstanding artwork at only pennies per drawing! Each Cliptures volume gives you a wealth of dynamic illustrations perfect for all kinds of projects. Versatile, ready-to-use artwork that's faster and easier than creating your own graphics from scratch. High resolution EPS images look great even when they're enlarged, reduced or stretched. Cliptures works with any software program that accepts EPS (Encapsulated PostScript) files. A PostScript compatible printer or interpreter program is recommended for best results.

Volume 1: Business Images

Volume 1: Business Images gives you 148 business illustrations, including a wide selection of male and female executives and a variety of tantalizing business cartoons, graphics and symbols. Dream Maker #03998 ?

Volume 3: Sports

Volume 3: Sports Puts 228 fantastic sports images at your fingertips. Includes lots of men and women athletes and a rich collection of other outstanding sports graphics, symbols, icons and more. Dream Maker #04000 @









YOUR \$67

Volume 2: Business Images 2

Volume 2: Business Images gives you another 206 powerful business illustrations of men and women at work, plus people silhouettes, business cartoons, aircraft, money, telephones and lots of computers. Dream Maker #03999 ©

Volume 4: World Flags

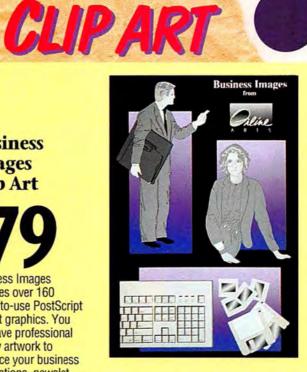
Volume 4: World Flags Contains exquisitely detailed national and civil flag illustrations from all the independent and dependent countries of the world, plus various international, organization and code flags. Dream Maker #04282 ?





Business **Images** Clip Art

Business Images includes over 160 ready-to-use PostScript clip art graphics. You can have professional quality artwork to enhance your business publications, newslet-



ters, brochures, advertisements, memos or any printed piece. This package includes images most requested by professional artists, including: people, computers, equipment, symbols, hands, phrases, backgrounds and much more. Online Arts #00178 @

Newsletter Cartoons

ClickArt Newsletter Cartoons includes 100 fun and imaginative cartoons by award-winning artist Phil Frank. This an ideal collection for enhancing reports, invitations, newsletters, memos, letters, fliers and many other types of publications. The image categories include: politics, travel, education, announcements, ecology, money and leisure. T/Maker #04900

Make it Memorable with Award Winning **Clip Art from 3G Graphics**



Enhance your publishing and design projects with high-quality, versatile illustrations and symbols. Because they're Encapsulated PostScript, you can import them directly into page design and presentation software. Just ungroup images in compatible draw programs and the possibilities are endless

People 1

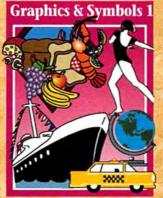
Some of People 1's image categories include: business (some humorous), industry (with 75 occupational symbols), health care (hospital and clinical settings), fitness sports, arts and entertainment. 3G Graphics #00421 @ /

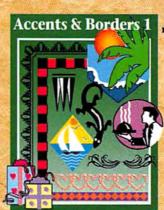
Graphics & Symbols 1

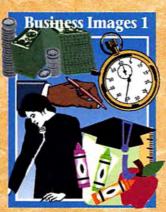
Many useful categories including people, cartoons, food, travel, symbols and frames. 3G Graphics #01617 @ >













Accents & Borders 1

Accents & Borders is an essential addition to any clip art library. It gives you dozens of high-quality borders, designer sets, labels, symbols of food, holidays, people and more. You'll use this one often. 3G Graphics #03192 @ V

Business Images 1

One of 3G's most popular collections, Business Images I gives you detailed art of computers, occupational and public symbols, people, phrases and more. All are superbly drawn and hold their integrity well when stretched or shrunk. 3G Graphics #02085



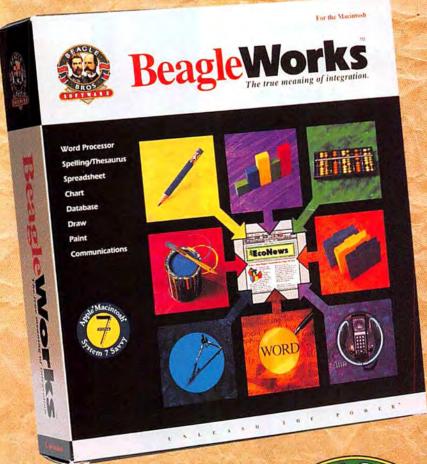






INTEGRATED

Get It All Together With BeagleWORKS



Word Processor

- · Automatically wrap text around objects
- · Format in multiple columns
- Graphic ruler with tool bar for quick formatting
- Multiple headers and footers, custom styles and more
- Microlytics® spelling checker and thesaurus

Spreadsheet

- · Apply a different type style to any cell.
- Create up to 256 columns and 16,385 rows
- Tool bar allows easy access to formatting, alignment, borders, shading and charting
- Incorporates powerful and time-saving natural order minimum recalc

Charting

- Chart types include Line, Bar, Column, Area, Scatter, Exploded Pie and more
- ◆ 256 custom colors



Database

- Manage databases with more then 16,000 records per file and 256 fields per record
- Mail merge with word processor
- 64 built-in functions
- Up to 32 report formats for your data
- Tool bar provides easy access to formatting and alignment, borders, shading, sorting, and summation

BeagleWORKS

\$184

This award-winning software sets new standards for the term "integration." BeagleWORKS combines a full-function word processor (complete with spelling checker and thesaurus), a spreadsheet, a charting program, a database, a painting program, a drawing program and communications modules into one harmonious package. This truly integrated program, lets you combine data from all other modules into a single document and makes changes (edit in context), all without leaving your document! Beagle Brothers #04327 •

BeagleWORKS Competitive Upgrade

\$94

Switch to BeagleWORKS and save! To qualify for the BeagleWORKS upgrade offer, your order must include the first page of your user manual from any one of the following products:

AppleWorks 3.0, AppleWorks GS, Microsoft Works, Desk, Ragtime, GreatWorks or Claris Works. Once you have your new BeagleWORKS, send in a copy of the front cover of your manual with the Beagle Brothers registration card and you'll become a registered owner, eligible for updates and technical support. Nothing needs to be sent to MacZone.

Beagle Brothers #04583

Draw

- Tear-off menus for tools, colors, patterns and line widths
- Drawing tools include line, arc, rectangles, freehand, polygon, oval and more
- 256 custom colors and 128 patterns

Paint

- Paint tools include paintbrush, spray can, paint bucket, pencil, line, arc, freehand shape and more
- Tear-off menus for tools, colors, patterns and line widths
- Special effects
- Color images using 256 custom colors and 128 patterns

Communications

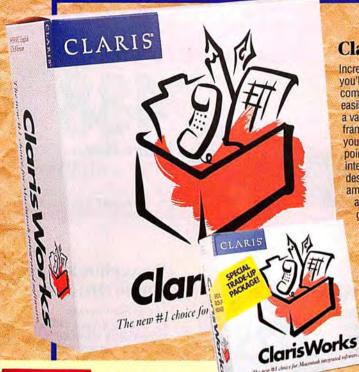
- Stores commonly-used phone numbers with settings
- Auto dial and auto answer
- Uses Apple's Communications tool box



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INTEGRATED





ClarisWorks

\$196

Increase your office productivity. ClarisWorks just might be all the Mac software you'll ever need: word processing, graphics, spreadsheet, charting, database and communications—all in one, tightly integrated package. With ClarisWorks you can easily create professional-looking documents that combine colorful graphics with a variety of page layout options, including multiple columns and linked text frames. ClarisWorks' environments are interactive and seamlessly integrated, so you can add text, graphics, calculations and charts to your documents at any point. Each of ClarisWorks' environments are designed to mirror the easy-to-use interface of other Claris products. It's compact and speedy, too, so it's idea for desktop and portable Macs. ClarisWorks' import and export capabilities are among the best available, making it easy to exchange data between products and across platforms. The comprehensive guided tour, tutorial and on-line help you get productive right away. Claris #04466 7

ClarisWorks Trade-Up

Switch over from a competing works product (Microsoft Works, Ragtime, GreatWorks, AppleWorks or AppleWorks GS) and you'll receive ClarisWorks at this super-low trade-up price! Unleash the power of your Macintosh with the fully integrated software package that has all the tools you need to get your work done quickly and efficiently. Imagine the possibilities. Start with some text, then add a spreadsheet—in one simple move. Draw a graphic or logo in a flash. Another easy stop and you can finish with a dazzling chart. All without ever leaving your original document. Now stop imagining and start doing! It's easy with ClarisWorks, and the trade-up price makes it affordable. Claris #04651 🕶 🗸

FreatWorks

GreatWorks offers the functionality of eight

feature-rich applications in a single easyto-use, fully-integrated program. You'll get
started fast, and more importantly, keep on
working fast, because, with GreatWorks,
everything you do builds upon what you already
know. The result: you spend less time spinning
your wheels and more time getting things done.
Few other Mac products offer the new Macintosh
owner so much for so little. Requires less than
one megabyte of RAM to run.
Symantec #00458 •

\$86
GreatWorks
Competitive
Upgrade



Any owner of Microsoft Works, ClarisWorks, Ragtime or AppleWorks can now cross over to the versatility and power of GreatWorks at an attractive competitive upgrade price. This feature-rich application combines six powerful programs (word processing, database, spreadsheet, charting, drawing, painting, outlining and communications) into a single, easy-to-use and fully-integrated program. Symantec #00582 • ✓



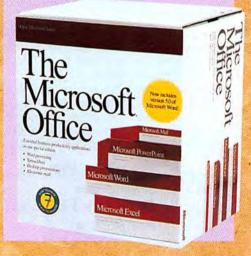
\$92

WordPerfect Office

WordPerfect Office™ for the Macintosh® is a collection of office automation programs for Macintosh networks. Some of Office's amenities include mail, calendar, notebook, file manager and forms maker. These desk accessories allow you to send electronic mail, schedule events and resources for people on the network, create databases and organize your desktop. The Forms Maker application lets you create forms for use in mail, calendar and notebook. In addition, Office includes gateway services to communicate with other WordPerfect Office platforms and third-party electronic mail systems. You'll soon wonder how you survived without it! WordPerfect #04170 ♥ ✓

\$474 Microsoft Office 2.0

Four essential Microsoft businessproductivity applications in one special edition! Microsoft Word, Microsoft Excel, Microsoft PowerPoint and Microsoft Mail. New version 2.0 includes the exciting new MS Word 5.0. Microsoft Microsoft Corp. #00427 • ✓







COMMUNICATIONS

Data + Fax + Voice = Your Complete **Communications Solution**

Prometheus Home Office

Turn your Mac into a complete communications system. Home Office adds voice capability to a combination data/fax modem to turn your computer into a fully-featured answering machine. Plus, with it's ability to detect whether incoming calls are fax, voice or data, it also functions as a line switching device. It's like having 4 separate communication products all sharing one phone line! Offered as a complete package with all the necessary software and cables, Home Office is a low-cost solution for all your communication needs. @ /

Major Features:

- 2,400bps or 14,400bps data modem versions
- V.42bis/MNP-5 data compression/error correction
- 9600bps send/receive Group III fax
- Voice messaging system



Ultima Home Office with Voice

14,400bps (V.32bis) data modem with V.42bis/MNP-5, 9600bps s/r Group III fax, voice and more. Prometheus #00877 @ /

Home Office 24/96 with Voice

2,400bps data modem with V.42bis/MNP-5, 9600bps s/r Group III fax, voice and more. Prometheus #00907 @ /

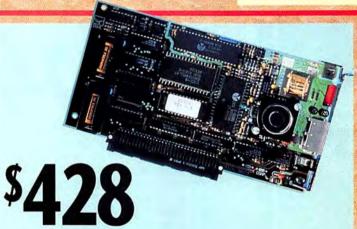


PowerBook Home Office

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Internal version for Mac PowerBooks, includes 2400bps modem with V.42bis/MNP-5, 9600bps s/r fax and voice. Prometheus #00331 @ /

M/0/D



DoveFax LAN

DoveFax Lan combines a 9600 baud fax & 2400-baud Hayes-compatible data modem. CCITT Group III compatibility provides access to over 95% of fax machines worldwide. Group III-compatible external or internal models are available.

The included software features: multiple user faxing via network server, full background send and receive capabilities, auto receive and retry, customizable cover pages, automatic report logs fax activity, on-screen display of faxes with magnification option, a fax preview option and more. Does not require a dedicated server. Dove #04757 @



DoveFax PB\$168

Dove, #05170 @

DoveFax LE\$134

Dove, #05171 @

Smart One MacFax Modem

The Smart One MacFax is a full-featured 2400bps data

compatible, operates in background mode and is covered by the manufacturer's two year-warranty. Includes data and fax communication software and



L BEST DATA



MicroPhone II 4.0

Communicating online has never been easier, especially now that MicroPhone II is Apple System 7 Savvy. MicroPhone II has some of the best scripting tools in the business, friendly front ends to remote services, new

VT320 and VT220 terminal emulation, faster screen speed and Apple PowerBook support. Said MacWEEK: "MicroPhone II 4.0 is a robust telecommunications product, with plenty of features and an interface that just keeps getting better. It is as simple or complex as your needs demand. and it comes at a reasonable price." Winner of MacWEEK's Target Award for telecommunications and consecutive World Class Awards from MacWorld. Now Apple System 7 Savvy! Software Ventures #04893 ♥ ✓



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COMMUNICATIONS

Communicate with Logicode

Quicktel Xeba 2400bps Data Modem

\$94

With the Quicktel Xeba 2400bps Modem you get unique styling and rock-solid engineering at a great price. It features multiple positions and icons and comes with everything you need to get up and running including data communications software and cable. Works with Mac Plus and up machines. Logicode #00852 •



9624 Quicktel Xeba Send/Receive Fax Modem w/ V.42bis

\$188

- 9600bps with fallback to 7200, 4800 and 2400 for send/receive fax
- Standard 2400, 1200 and 300bps V.32 modem
- Up to 9600bps modern throughput with V.42bis; 4800bps with MNP 5 Logicode #04644 -Black #04674- Platinum @

Quicktel Xeba 14400 Send/Receive Fax Modem

§448

- 14,400bps with fallback to 9600, 7200, 4800 and 2400 for send and receive fax
- 14,400, 12,000, 9600, 4800, 2400, 1200 and 300bps V.32bis modem

Quicktel Xeba 9696 Fax/Modem w/ V.42bis

\$394

- 9600bps with fall back to 7200, 4800 and 2400 for send and receive fax
- 9600bps, 4800, 2400, 1200 and 300bps V.32 modem



\$154

PacerTerm

PacerTerm combines today's standards—Apple Comm Toolbox and HyperTalk scripting—with the best collection of file transfer (FTP, Kermit, XMODEM, ZMODEM) and connection protocols (TCP/IP, LAT, Modem and Serial). Flexible, easy-to-use

PacerForum

Macintral

features like keyboard remapping, on-screen softkeys and multiple VT320 terminal windows, allow you to create powerful front-ends to host applications and on-line services. Apple calls it "Macintosh networking at its best!" Pacer Software #04163 ?

\$348

PacerForum 1.0

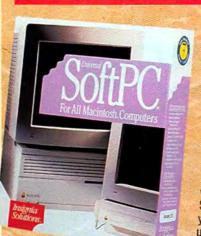
PacerForum makes it easier than ever for your work group to collaborate and communicate.

MacWEEK calls PacerForum "a very useful tool that will greatly facilitate office communication." PacerForum provides easy and efficient distribution of information on any AppleTalk network. Its interactive bulletin

board lets you attach files, pictures and sounds to create messages that get results. Eddy Award nominee. Pacer Software #04473 •

PacerForum 25 User\$1248

Pacer Software #04767 @



SoftPC \$194 Universal

Universal SoftPC 2.5 (update from SoftPC 1.3) is the midrange member of the Insignia's SoftPC family. It lets your Mac emulate a basic IBM/AT and is ideal for text based applications with limited graphics interaction. It runs on all Mac platforms, and when used with Insignia's SoftNode, Universal SoftPC lets you execute IBM PC applications, utilizing Novell Netware/PC in an Ethernet environment. Insignia #04541 @ V





THE LAN ZONE TECHWORKS

Networking Solutions

Making the Ethernet Connection with the TechWork's Ethernet Product Line

Ethernet is fast becoming the preferred alternative to LocalTalk. It offers a much higher transmission rate and compatibility with many other types of computer systems. TechWorks' Ethernet product line is a complete line of Ethernet cards and hubs to satisfy your Ethernet Network needs. There are TechWorks Ethernet cards for most every Mac, including the Mac II family, the Mac LC and the Mac IIsi. With the Mac LC and Mac IIsi Ethernet cards, you can even add an optional floating point unit math coprocessor.

With TechWorks you'll never have to worry again about your Ethernet network again!

TechWorks Ethernet cards and hubs were designed to be worry free. Installing Ethernet products is a breeze. And they've made their cards with the future in mind. By having 64K of static RAM and 32-bit addressing, their cards are compatible with systems like A/UX 3.0. All TechWorks Ethernet products are compatible with System 7 and with most popular Mac network software, including AppleShare, TOPS, Novell NetWare, TCP/IP, DECnet, A/UX and others.

The TechWorks Competitive Advantage

- Commitment to Customer Satisfaction
- TechWorks Lifetime Warranty
- Unlimited Toll-Free Technical Support
- Totally System 7 Compatible
- AAUI (Apple's Attachment Unit Interface) Provided
- . Comprehensive Support Software
- A/UX Driver Software FREE
- 24-Hour Replacement Policy

The Hottest New Ethernet Products From Tech Works!

#0623 LC 10Base-T /Thin EN w/FPU @	\$248
#0625 Ilsi 10Base-T/Thin EN w/FPU @	\$288
#0626 Ilsi 10Base-T/Thin EN @	\$228
#0627 SE/30 10Base-T/Thin EN @	\$224
#0629 SE/30 10Base-T/Thin EN w/ FPU @	\$184
#0630 Mac Nubus Thin EN-AAUI @	\$174
#0631 Mac Nubus 10Base-T EN-AAUI @	\$174
#0633 Mac Nuhus 10Base-T/Thin/AAIII FN @	\$198





Manage Your Entire Network Right From Your Desktop With GraceLAN!

GraceLAN Update Manager, Single Zone

Now network managers don't have to manually update software on each and every machine on their network. GraceLAN is a flexible tool for updating software across an entire AppleTalk network. More than just a file-transfer utility, Update Manager lets network administrators build intelligent file packages.

GraceLAN Network Manager

With GraceLAN Network Manager you have a complete profile of each person's system details and applications (documents and data files omitted) in a single screen. • ✓

GraceLAN Asset Manager

GraceLAN Asset Manager stores asset information in 11 different categories. Information entered or updated once automatically appears in related categories.

0

#04945	GraceLAN	Unl. Net. Mngr. Corp	\$668
		Update Manager single	\$164
		Update Manager, multi	\$278
#00871	GraceLAN	Asset Manager	\$498
#04029	GraceLAN	2.0 50 User Pk	.\$278

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THE LAN ZONE



RunPC Network

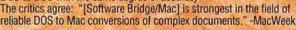
RunPC Network allows up to 10-users to connect their Macs to an IBM compatible via an AppleTalk network or modem. DOS programs run on the PC, but are operated and viewed on the users' Macs. Each user can run PC programs at full speed, with full access to PC peripherals, extended memory and VGA graphics. Includes Software

Bridge/Mac to transfer and translate files, and MountPC to mount DOS disks, Argosy Software #04241 @

#04240 RunPC Remote (licensed for one PC and one Macintosh) @\$138

Software Bridge Macintosh

With Software Bridge/Mac, just insert a DOS disk into your Mac's disk drive and double-click. Your DOS document will be automatically recognized. translated and loaded into your favorite Mac word processor ready to edit. Documents are translated accurately, with virtually all of the original formatting retained. From indents to fonts, styles to footnotes, it will all be there. You can also translate from Mac to DOS, Mac to Mac and even DOS to DOS with the same degree of accuracy.



Argosy #03894 @



DISTRIBUTOR

NetDistributor 100 User

Make network management easier, so you can spend more time improving network efficiency. Update and install software across LocalTalk, EtherTalk or TokenTalk, and assemble software packages with specific instructions for each unit. Net Distributor lets you install new software by

group, zone or individual. You can even install software off hours and unattended. NetDistributor's built-in database lets you see and update users even if their Macintosh is powered down or off the network-the store and forward capabilities update them when they reconnect. Trik #05043 @ /

#05044 Net Distributor Unlimited User @ 🗸



Nok Nok

If you're using System 7 File Sharing, Nok Nok tells you when someone is logging on and lets you know who it is. Never again will you discover than anonymous

"guests" have logged onto the system. It keeps a detailed log of all activity which you can access or print at any time. Nok Nok reports login attempts in four ways: it will display a dialog box, show a flashing icon in the menu bar, play a sound, open the file sharing monitor, or any combination of the four. With Nok Nok you can define maximum connect time, and set the system to disconnect idle sessions after a predefined period of inactivity. Package includes 800k 3.5" diskette. Trik #05042 @ 🗸

Asanté has a Card for Every Mac

With the Asante' 10T Hub 8. network managers can connect local area networks with inexpensive twisted-pair telephone wire instead of expensive coaxial cable. Supports the IEEE specifications for 10Base-T Ethernet, Asante' #0404

#00348 10T Hub/12 \$528

MacCon3 Ethernet Card

Asante has an Ethernet card for every Mac. All MacCon3 Ethernet cards feature: thick, thin and 10BASE-T; auto-sensing Ethernet ports; full System 7 compatibility: strict adherence to the IEEE specifications for Ethernet networking; 5-year no-hassle warranty; FREE technical support, a PDS pass-thru slot, removable AUI port and more. Asante' #00511 @



MacCon+30iF

The MacCon+ 30iE is a 32-bit Ethernet card that easily plugs into a Mac IIsi or SE/ 30. This card

includes a PDS pass-thru slot for connecting additional expansion cards, and an FPU socket for adding an optional math co-processor. Like all Asante products, the MacCon+ 30iE is 100% tested before shipping and is backed by FREE technical support. 5vear warranty. Asante' #00020 @

#03646 MacCon & 30iET\$164

FOR THE **POWERBOOK**

EN/SC PB

The Asante EN/SC PB is an external SCSI adapter for connecting the new Macintosh PowerBook computers, to Ethernet networks. The EN/SC includes ports for all three types of Ethernet media-thick, thin and 10 BASE-T. Asante' #00847





THE LAN ZONE

Network More Effectively with Shiva

Shiva LanRover/L

LanRover/L

LanRoverTM/L is a stand-alone communications server for Apple

Computer's AppleTalk Remote Access. It allows PowerBook users and users of desktop Macintoshes running AppleTalk Remote Access software to call and connect to an AppleTalk network over standard telephone lines. Once dialed into LanRover/L, you can take advantage of network services—for example, email, databases and groupware—as if you were directly connected to the network. LanRover/L also provides network Macintoshes with a shared modem for dial-out to remote information services, bulletin boards, or hosts. LanRover/L offers network administrators several unique advantages for managing dial-in and dial-out. The package includes Shiva Net Manager which provides easy centralized management and security features. LanRover/L is a reliable, dedicated device that can be installed in a location where there is no risk of accidental shut-off or tampering.

\$338

NetModem V2400

NetModem V2400 is a communications device designed to meet two LAN communications needs. It allows remote Macintosh users to dial in and have access to network services, and it lets Macintoshes dial out to remote information services or hosts. NetModem V2400 consists of a Hayes-compatible modem with V.22 and V.22bis support and a built-in LocalTalk interface. NetModem V2400 supports Macintosh computers and PCs on LocalTalk networks. It Connects directly to the network without dedicated computers and can be shared by an unlimited number of users, one user at a time. Shiva #01615 @ <

NetModem V.32 9600

\$1038

Net Modem

The NetModem V.32 is a 9600bps modem that is designed to be shared over AppleTalk. The NetModem also includes dial-in Network access software which allows a remote Mac or PC to dial into the network and use electronic mail, printers and other network resources. Shiva Corporation #03251 •



Shiva Product Line

#01405 Shiva NetBridge @\$408
#01406 Shiva NetSerial @\$274
#02542 Shiva TeleBridge @\$408
#02700 Shiva EtherPort II @
#02985 Shiva EtherGate @\$1294
#04038 Shiva Fast Path V (thick/thin) @\$1898
#04129 Shiva NetModem/E 10BaseT @\$1484
#04491 Shiva NetModem/E Thin @\$1484
#04758 Shiva NetModem/E Thick @\$1484
#04759 Shiva NetModem/E AUI @\$1484

FAX YOUR INTERNATIONAL ORDER FAX: 1-206-881-3421

THE LAN ZONE



The Complete Ethernet Solution



DaynaSTAR \$238 MiniHub

MiniHub is a non-intelligent hub for connecting network devices using twisted-pair (10BASE-T) Ethernet wiring. With it you can communicate between various types of computers, printers and servers.

Dayna Communications, Inc. #04911 @

Ethernet Adaptor Cards

Based on premium Ethernet controller chips from National Semiconductor, DaynaPORT cards are the fastest in their class. They come with diagnostic software and an easy installer that automatically selects the driver for the Macintosh model and version of system software you are running. Dayna Communications, Inc.

#04718 DaynaPort E/II @	\$148
#00806 DaynaPort E/LC @	\$148
#00805 DaynaPort E/Si @	\$148
#04717 DaynaPort E/30 @	\$148

EtherPrint \$598 Plus

EtherPrint Plus goes beyond the basic EtherPrint capabilities, letting you connect multiple, LocalTalk devices directly to an Ethernet cable system. Not limited to printers, EtherPrint Plus supports up to four LocalTalk devices of any sort (except routers). Dayna Communications, Inc. #00321

EtherPrint

EtherPrint offers an easy "plug and print" Ethernet connection for LocalTalk printers, at a much lower cost than a hardware router. Provides direct Ethernet connection for up to four Local Talk devices of any sort. All models support AppleTalk Phase 1 and 2 protocols over thick, thin and 10BASE-T or fiber-optic Ethernet cable systems. #03546 •



DaynaPORT SCSI/Link

\$294

DaynaPORT SCSI/Link is a small Ethernet connector box with a compact, portable design, ideal for Macintosh PowerBooks and Portables. Both 10BASE-T and thin-Ethernet cable systems are supported. Dayna Communications, Inc. #05188 ©

#05189	DaynaPort SCSI/Link T PB @	\$294
#05190	DaynaPort SCSI/Link 3 PB @	\$338

NetMounter

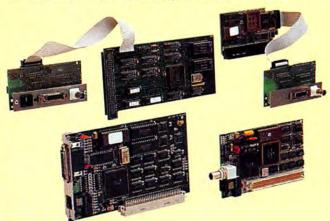
\$54

With NetMounter, you can easily access NetWare from your Mac. This innovative utility lets a Macintosh log into any NetWare file server, with no need for NetWare for Macintosh. Once logged in, you can copy files to and from the server, and edit MS-DOS files with Macintosh applications. Dayna Communications, Inc. #05184 (single user)

#05185 NetMounter 5 User @	\$224	L
#05186 NetMounter 10 User &	\$334	

Farallon®Your Source for Macintosh Networking

Farallon EtherMac cards provide a choice of Ethernet interfaces for any Macintosh. They're available with connections on-board for up to 3 different media—10 Base T, ThickNet, and ThinNet.



#00676 Farallon EtherMac II-TN @ 🗸	\$158
#00677 Farallon EtherMac II-10T@ /	\$158
#00678 Farallon EtherMac II-C 🕡 🗸	\$208
#00679 Farallon EtherMac LC-TN @ /	
#00680 Farallon EtherMac LC-TN+FPU @ 🗸	\$248
#00681 Farallon EtherMac LC-10T @ /	
#00682 Farallon EtherMac LC-10T+FPU @ /	
#00683 Farallon EtherMac LC-C @ 🗸	
#00684 Farallon EtherMac LC-C+FPU @ 🗸	
#00685 Farallon EtherMac 30i-TN @ 🗸	
#00686 Farallon EtherMac 30i-TN+FPU @ 🗸	
#00691 Farallon EtherMac 30i-10T @ 🗸	\$188
#00692 Farallon EtherMac 30i-10T+FPU @ /	
#00693 Farallon EtherMac 30i-C @ 🗸	The second secon
#00695 Farallon EtherMac 30i-C+FPU @ 🗸	The state of the s
#00696 Farallon EtherMac SE-C @ 🗸	



Send Express 3 Pack ++++

...\$56

Communicate more effectively! Send Express is a desk accessory that lets you transfer files, folders, personal notes and clipboard selections directly from your Mac to others in your AppleTalk network. You don't need to set up a network server, or publish or mount anything—just send files and notes right to your co-worker's desks!. Gizmo Technologies #00959 @





STORAGE DRIVES

DPI Drives & MacTurbo Modems: Don't Settle For Less! Top-Quality At Amazing Prices

High-quality, low-priced DPI hard drives represent one of the best hard drive values available. Our DPI removable was given top honors by BMUG (Berkeley Macintosh User's Group). All DPI drives are built using only the finest components and drive mechanisms. Each drive is carefully tested for over 24 hours to assure your complete satisfaction. You will not find a better drive for the money.

> Money-Back Guarantee



The Best For Less!

- · Compact, space-saving chassis: Connor, Fujitsu & Quantum externals
- 2-Year limited warranty: Quantum & Syquest
- · Top-quality components manufactured by PLI, the leading manufacturer of after-market hard drives
- · Driven by award-winning software
- · All DPI drives are covered with a complete 60-day money back guarantee. If, for any reason, you are not completely satisfied with your drive, call us for an RMA number and return it to us for a full refund.

52MB Quantum External

Our 52Mb Quantum is not only fast and reliable, but attractive and ergonomically pleasing as well. Some of its features include: 3.5° LPS drive type, an average access time of less than 17 milliseconds and a throughput speed of 2 to 4Mb per second. DPI #4880 @

\$358





Part#	Formatted Mb	Driva Type	Drive Mechanism	Access Time	Throughput Mb/Sec	ZONE PRICE	Cost/Mb
04880	52	3.5°LPS	Quantum	17	2.0-4.0	\$359	\$6
04874	240	3.5'	Quantum	16	5.0-10.0	968	4
04881	105	3.5"LPS	Quantum	17	2.0-4.0	498	5
04451	44	5.25*	Syquest	19	1.2	548	12
04886	88	5.25*	Syquest	19	1.2	698	8
05367	330	3.5	Fujitsu	12	4.0-5.0	1358	3.2
05366	520	3.5	Fujitsu	12	4.0-5.0	1584	4.3



44Mb Syquest Removable

This is the ideal drive for those whose storage needs are continually expanding. When you find you need more space you simply purchase another inexpensive 44Mb removable cartridge. DPI #04451 0/

#04886 DPI 88Mb Removable Syguest Drive \$698





MACTURBO MODEMS & SIMMS



FREE!
"Guide to
Installing
Memory"

Upgrade Your Mac... Inexpensively, Safely and Easily

Multi-tasking with today's memory-hungry applications eats up memory—lots of memory. System 7 alone consumes almost 2Mb! Aldus PageMaker blocks out well over 2Mb. Limited memory means limited efficiency. Increase your multi-tasking capabilities today by installing our nigh-quality SIMMs (Single Inline Memory Modules) and you'll never again have to quit from your spreadsheet to pluck a single fact from your database.

Plug-and-Play Installation

Best of all, SIMMs are easy to install—simply open up your Mac case and plug them in. All you need is a couple of special tools (we sell them for a nominal charge) and a few minutes. Our installation guide (the guide is FREE with every SIMMs purchase) walks you through the process step-by-step. You'll have your Mac upgraded and running again in a matter of minutes!

Top-Quality SIMMs

Unlike many direct marketers of SIMMs, here at the Mac Zone we do not carry the slower 100 and 120 nanosecond (ns) SIMMs. We carry only the ultra-fast 80 nanosecond models.

Lifetime Guarantee

We offer a complete lifetime guarantee on all our SIMMs

Request our \$3 overnight delivery and you can have your SIMMs and your installation kit in your hands tomorrow.

	СРИ	#OF SLOTS	NS	MB AFTER UPGRADE	ORDER Part #	MB/ Module	PRICE/ Module
PLUS /SE	Plus/SE	4	80	4	03428	1	\$34.00
CLASSIC with adapter	Classic	2*	80	4	03428	1	\$34.00
MAC II, IIx, IIcx, IIci	Mac II, IIx,IIcx, IIci Mac II, IIx,IIcx, IIci Mac II, IIx,IIcx, IIci Mac II, Iix,IIcx, IIci	8 8 8 8	80 80 80 80	8 32 64 128	03428 03584 00848 00849	1 4 8 16	\$34.00 \$137.00 \$499.00 \$799.00
MAC II FX	Mac IIFX Mac IIFX Mac IIFX	8 8 8	70 70 70	8 32 128	03579 03585 00849	1 4 16	\$42.00 \$189.00 \$698.00
QUADRA 700,900	Quadra 700 Quadra 700 Quadra 900 Quadra 900 Quadra 900 Quadra 900	4 16 16 16 16	70 70 70 70 70 70 70	8 20 16 64 128 256	03579 03583 03428 03583 00848 05338	1 4 1 4 8 16	\$42.00 \$124.00 \$34.00 \$124.00 \$498.00 \$698.00
POWER BOOK	PB 100/140/170 PB 140/170 PB 140/170	1 1-	80 80 80	4 6 8	05391 05392 05393	2 4 6	\$148.00 \$268.00 \$398.00
LASERWRITER	LaserWriter NTX	12	70	12	03586	1	\$49.00
SE/30, IIsi	SE/30 SE/30 Mac IIsi Mac IIsi Mac IIsi	8 8 4 4 4	80 80 80 80 80	8 32 5 9 17	03428 03583 03428 03936 03583	1 4 1 2 4	\$34.00 \$137.00 \$34.00 \$274.00 \$124.00
LC/LC II Classic II	Mac LC/LC II/Classic II Mac LC/LC II/Classic II Mac LC/LC II/Classic II	2 2 2	80 80 80	4 6 10	.03428 00014 03976	1 2 4	\$34.00 \$68.00 \$158.50

MacTurbo 24/ 96 Fax Modem

\$149

Send faxes without leaving your desk! Our MacTurbo 24/96 Group III Fax Modem gives you both fax and modem for the price of most data-only modems. The 24/96 features 9600bps send rate, full-featured 2400bps data modem, full Hayes compatibility and compact design. Includes all the necessary communications and fax software.

MacTurbo #00977 @/

MacTurbo Plus Modem

89 lem \$89

Our MacTurbo modem has all the features you would expect to find on modems twice the price—and at 6" by 4" it's compact enough to easily tuck away in a briefcase. An eight-light status panel keeps you informed as to the status, the nonvolatile memory stores phone numbers even when the modem is turned off.

MacTurbo #00408 ••







BUSINESS ESSENTIALS



you the features you need anytime, anywhere.

Microsoft Excel version 4.0 was designed with you in mind. The number-one selling spreadsheet for the Macintosh now gives you more power and makes everyday

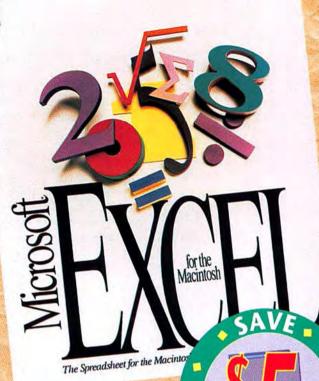
And, the new version 4.0 is even more powerful than ever. Let's take a look:

spreadsheet tasks easier than ever before. Microsoft Excel version 4.0 for the Mac gives

- New customizable toolbars give you instant access to the right set of tools for your work
- Autosum™ lets you automatically sum rows of numbers with a click on the toolbar.
- . Wizards are interactive outline tutorials that walk you through tasks, including chart creation, to give you instant access to the most common options.
- Autofill recognizes trends in your data and intelligently extends them as far as you'd
- . Drag and Drop lets you quickly move data with your mouse from one area of your spreadsheet to another.
- . Best Fit automatically re-sizes column widths to fit the longest string of text or numbers.

Plus, you get all the traditional Excel tools you've come to expect and rely on:

- . Scenario Manager lets you change multiple assumptions to examine different scenarios of the same model and review a summary of these multiple scenarios.
- · Analysis ToolPak includes the most extensive financial, statistical, engineering; and scientific functions of any spreadsheet, including ANOVA, regressions, histograms, Bessell functions and many more.
- . Crosstabs lets you easily create reports from your databases. A Crosstab Report Wizard helps automate the creation of these reports so you can understand relationships in your data.
- . Workbooks lets you group and store related files together, which makes it easy for you to retrieve all of your related worksheets.
- Data Consolidation enables you to combine data from an unlimited number of worksheets into a summary report.
- Outlining allows you to look at your worksheet in any level of detail. Microsoft #00227 0 /



Microsoft Excel 4.0

When you purchase Excel 4.0 and Using

Regular price of book (#05107) Using Excel 4.0 for the Mac-\$24

Excel for the Mac (#05049) receive the

book for only \$19.

The leading spreadsheet for the Macintosh just got even better. Microsoft Excel version 4.0 for the Apple Macintosh was designed with you in mind. It gives you access to more powerful features and makes everyday spreadsheet tasks easier than you ever dreamed possible. Microsoft Excel is designed to work the way you do.

Just look at some of the new features Microsoft Excel 4.0 offers:

- Even easier to use: Produce a spreadsheet in just 60 seconds using features like Drag and Drop to move information, or Autofill to intelligently project trends.
- . Move power than ever: Create multiple "what if" scenarios and use the Scenario Manager to view them all at the same time. Plus, check out the extensive financial, statistical, engineering and
- Unrivaled Presentation tools: Now you can have one-stop access to 16 professionally designed spreadsheet formats. And you can check the spelling of your spreadsheets, text boxes and graphs with just a single mouse click.

Now, Mac Zone makes it easy to move up to the unprecedented new power and ease that Microsoft Excel version 4.0 offers you. Simply mail or fax us page 1 of your Microsoft Excel User's Guide or disk 1 of Microsoft Excel for the Mac and you can upgrade to Microsoft Excel version 4.0 today! Then you'll see for yourself just how easy power can be. Microsoft #04545 • ✓

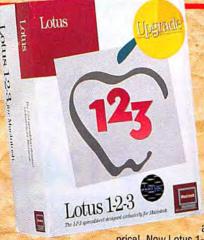




SPREADSHEETS

Claris

Resolve



Lotus 1-2-3 for the Mac Competitive Upgrade

Upgrade from a competing spreadsheet software product and receive the exciting new Lotus 1-2-3 at an enticing competitive upgrade

price! Now Lotus 1-2-3 is even more powerful and easy to use than ever! You'll find new innovative spreadsheet capabilities that provide intuitive access to commonly used functions. It even allows you to customize your desktop to fit your individual work style. Competitive upgrade price requires proof of ownership of a competing software product. Lotus Development #00518 0

Lotus 1-2-3 for the Mac\$328

Lotus Development #00507



DeltaGraph Professional

DeltaGraph Professional is one of the most powerful tools available for designing dynamic and memorable charts for your business and presentation needs. Every aspect of your charts and presentations is under your control: formatting options, built-in custom chart templates, a complete set of integrated drawing tools, text outlining, bullet charts and more. Import/export clip art and

graphics. DeltaPoint #04805 @/



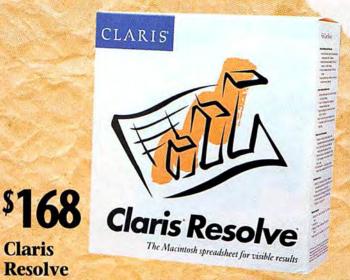
DataPivot is a dramatic new report builder with a twist. Its dynamic data "frame" allows you to interchange rows and columns, define groups, totals and sub-totals, and build reusable templates that reveal the structure and meaning of your data. DataPivot supports System 7.0 (Publish and

Subscribe) IAC and DDE and accepts data from virtually any source. Brio Technology #05057 0

DataPrism

DataPrism is a graphical query tool that lets you retrieve data from remote databases into individual applications without programming. Using System 7's Publish and Subscribe features, DataPrism links data to applications for rapid updating. It also comes with a custom data preview mode, list of valid constraint choices, full color and font control and more. Brio Technology #05058 @





Whether you're simply tracking expenses or creating sophisticated business models, Claris Resolve gives you the analytical tools you need to make informed financial decisions. Get started quickly using the accessible menus and on-line help. Visualize the results of your calculations with a full set of charts. Present your final analysis with integrated graphics and text for expressive, persuasive reports. Resolve gets you noticed! It comes with the same powerful and easy-to-use interface you've come to expect from Claris. Claris #04306 @/

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- 6 -	#05233 Using Word 5 for the Mac	
CAN THIS EOOS	When you purchase Lotus 123 and Using 123 for the M (#05050) receive the book for only \$19. Regular price of book (#05092) Using 123 for the Mac-\$2	
/ ****		



* Price shown is for book only, when purchased with applicable software (priced separately)





BUSINESS ESSENTIALS

Powerful Business Tools To Get The Job Done



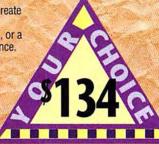
CA-Cricket Presents

CA-Cricket Presents is an easy-to-use, powerful application used to create professional-quality graphic presentations on the Mac. It provides versatile tools to create a quick presentation for a meeting in minutes, or a full-blown presentation that will win over even the most critical audience. Computer Associates #01475 @ 🗸

Simply Accounting

Looking for a complete entry level accounting package? Simply Accounting contains everything you need to get up and running in a flash: a primer that walks you through basic accounting principles, understandable documentation and a complete tutorial.

Computer Associates #04553 @ <



CA-Cricket Draw III 1.1

CA-Cricket Draw is the fully-featured drawing program for producing professionalquality graphics on the Mac. It features high-end drawing power with its Bezierbased tool palette, flexible color interface, comprehensive text processing, powerful PostScript special effects and more. Computer Associates #04414 @V

§198

CA-Cricket Graph 1.3.2

Designed for scientists, engineers and business people, CA-Cricket Graph offers all the powerful features you need. Computer Associates #00203 ♥ ✓

\$84

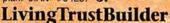
DacEasy

CHECKBOOK ACCOUNTING

Do It Yourself With JIAN

BizPlan \$78 Builder

Easily edit this 70+ page business plan with your wordprocessor and spreadsheet program. Pre-written text jump-starts your thinking—hints guide you through the process. Type your numbers into preformatted worksheets. Includes information guide plus sample plan. JIAN #04257 @



Protect your heirs and your inheritance from the ravages of the legal system. Avoid the cost, inconvenience and publicity of probate and maximize the value of your estate. The kit includes all the documents you need to prepare and effective and complete living trust, JIAN #04996 • ✓



LivingTrustBuilder

Light \$19 Checkbook Accounting 2.0

DacEasy, the leader in accounting software, brings you the perfect personal and small business accounting system. At home you can manage your checks, credit cards and bank accounts. At work you can track customers, vendors, manage AP/AR, track cash flow and more! Easily prints out checks, invoices and statements, too. Mac Light sets up predefined charts of accounts for both home and business. Computerizes your books and makes your life easier. DacEasy #04312 6



Employee Manual Maker

State your company's position clearly and up-front—avoid costly problems later. Employee Manual Maker helps you write a company employee manual that can improve moral, prevent disagreements and even keep you and your company out of court. More than 125 policies and 30 benefits are included for your review. Edit the text on hard-copy print outs, or use your word processor. JIAN #1045 @



MacMoney 3.5 \$58

MacMoney is a full double-entry personal and small business bookkeeping system and financial planning tool. MacMoney tracks expenses, bank accounts, credit cards, assets, liabilities, cash and income. You can create up to 250 accounting categories and divide transactions among as many as 8 categories. Survivor Software #01582 @





MAJOR CORPORATE PO'S ACCEPTED

ACCOUNTING & FINANCE





CheckWriter II 3.2

Completely rewritten, CheckWriter II 3.2 is one of the most versatile finance programs in its class! It automatically reminds you when bills are due, and it's easy to start—just tear a check out of your checkbook. Version 3.2 offers complete budgeting with over-budget warning, graphing, an address database with envelope/mailing label printing, tax summaries, cash projections, income vs. expense reports, importing/exporting of text files and more. Links with Aatrix Payroll and most popular accounting software. Aatrix Software #00192 0 /

Payroll 4.0

Do your company payroll in a fraction of the time with Payroll 4.0. This easy-to-use program walks you through all the steps! Federal, state and many local taxes are included. The incredible power allows eight customizable deductions, salary or hourly pay and calculation of FUTA, SUTA, Social Security and Medicare. With the built-in reports generator you can print 941s, W-2s and other custom reports. Aatrix Software #01871 @ /



Business **Plan Tool** Kit 4.0

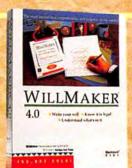
If you are an entrepreneur attempting to raise capital or secure a loan, this package is for you. Business Plan Toolkit is a practical guide for preparing a professional business plan with complete financial analysis, charts, sales forecasts and winning text. A complete sample plan is included on paper and on disk. Palo Alto Software #03910 0 /



ShopKeeper

Take care of your inventory and point-of-sale records with

ShopKeeper Plus. This powerful program is so easy to use, clerks will learn it in minutes. Track your order entry, accounts receivable, bar code & cash drawer control, auto billing, customer records, price schedules, 5 inventory modes, reports, mail labels, mix and match custom features & forms, promos, auto vendor orders, gen. ledger links, and dozens of other features. Useful for over 300 different types of businesses, from retailers, wholesalers and manufacturers, to schools and local government. With the largest installed Macintosh base in North America, this program is one that gets used. ShopKeeper Publishing #00439 @ /

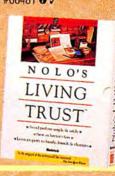


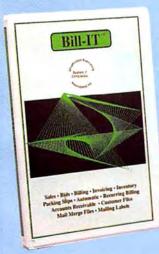
WillMaker 4.0

Write your own valid will without ever calling a lawyer. Just answer the questions that WillMaker asks and the program constructs a personalized will with full legal standing. NOLO Press #00481 @ /

NOLO's Living Trust

Make sure that your wishes are followed. Write your own living trust! Easyto-use question and answer format walks you through the process step-bystep. Use it for individually or jointly-owned property. You can change or revoke the trust any time. NOLO Press #04720 0 /





Bill-IT 4

Why waste your time wading through an inefficient billing system. Bill-IT 4 consolidates your invoicing, sales, billing and accounts receivable functions. It handles up to 32,000 inventory and customer records, supports drawers, discounts, packing slips, layaways, mailings and reports. Designed especially for service businesses. professionals, clubs and associations with simple, unstructured inventory needs. ShopKeeper #04599 € ✓



Accountant Inc. 3.0

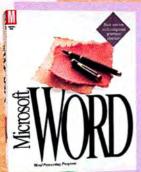
Accountant, Inc. 3.0 is the fullyintegrated accounting system that's perfect for any type of businessretail, manufacturing, service or professional. It provides reports and performs analysis like no

other software, so you can do what you

do best and stop worrying about the accounting chores. 1991 MacUser's Editor's Choice - The Best Accounting Package. Softsync/Bloc #00344 @ /



WORD PROCESSING



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When you purchase Microsoft Word and Using Word Special Edition (#05133) receive the book for only \$19. Regular price of book (#05233) Using Word Special Edition-\$24 \$294

\$\$\$\$

Microsoft Word 5.0

Microsoft Word provides depth of function and ease-of-use like no other word processor on the market today. The all new version 5.0 makes it even easier than ever to apply the full power of Word to the chores you do every day. New onscreen buttons reduce even complex chores to a simple point and click, so now you can adjust format, change your number of columns or even

start a drawing at the click of a mouse! Other handy new features include a file finder and a built-in grammar checker. Microsoft #04898 @/
Some of Microsoft Word's many useful features include:

- Built-in grammar checker, spelling checker and thesaurus
- Built-in drawing tools
- Equation Editor for easy creation and formatting of equations
- · Full placing and wrapping options
- Print Merge Helper for generating form letters and labels
- Drop and Drag features make page formatting and layout a snap



MacQuill

\$98

MacQuill combines word processing and page layout in one easy-to-use program that anyone can afford. With it you can spell-check documents, do frame-based page design, auto text wrap, set up user-defined paragraph style sheets and design color graphics, You also get a

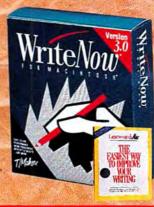
spell-checker with dictionary and many other sophisticated features found in programs costing hundreds of dollars more. It's so easy to use that you'll be creating newsletters, brochures or stationery in minutes!

Nest Software #05051

\$148

Write Now 3.0

A two-time winner of MacUser's "Best New Word Processor" award, WriteNow 3.0 is one of the fastest word processors for the Mac. WriteNow 3.0 includes a lightening-fast 135,000-word spelling checker, a 1.4 million-word thesaurus DA, Microsoft Word compatibility and a FREE full version of GrammatikMac 2.0 the best-selling grammar/style checker (a \$99 value!). T/Maker #00641 🖸 🗸





tttt/2 \$88 Claris MacWrite II

Get the job done faster, with better results. MacWrite II® software gives you all the tools you need for a wide range of writing tasks, from simple memos and reports to sophisticated

business proposals, multi-column newsletters and 1,000 page manuscripts. Check your spelling with the built-in 100,000-word dictionary. Or find just the right word with the 220,000-word desk-accessory thesaurus. Read, edit or insert files created in other word processors like MS Word or WriteNow. Open a file in MacWrite II and start typing—then save it back to its original format. Claris #04703 6/



When you purchase WordPerfect and Using WordPerfect (#05109) receive the book for only \$19. Regular price of book (#05234) Using WordPerfect-\$24 Value 1.1 WordPerfect 2.1

The new WordPerfect 2.1 is System 7 Savvy! Using System 7's publish and subscribe, WordPerfect will automatically keep track of changes that you (or someone else) make to imported files and it will automati-

cally update your WP documents accordingly.
WordPerfect 2.1 also gives you full
placement of graphics in your text and a
color drawing program for modifying
imported artwork without ever leaving the
program. You also get dozens of border
styles and fill patterns, QuickTime
compatibility, a powerful macro editor and

WordPerfect Corporation #03972 @ /



Using Word for the Mac, Special Edition

The complete and practical resource for one of the best-selling Macintosh word processing programs ever developed. Using Word for the Mac painlessly teaches you everything you need to know to tap into the power of Microsoft Word. Quick Start tutorials get you up and running fast. The package includes tips for desktop publishing

in Word and provides examples for working with columns and tables. Que #05133

Using WordPerfect for the Mac

The quintessential guide for those who wish to learn how to make the most of WordPerfect. Using WordPerfect for the Mac provides you with a comprehensive tutorial and reference guide to this feature-packed program. The guide covers all WordPerfect fundamentals and functions and gives you expert word processing advice, tips and performance hints. Quick Start lessons and easy

WORDPERFECT 2.1 MAC

start ups get you started fast. Que #05109



BUSINESS ESSENTIALS

SALES LetterWorks

Increase your sales effectiveness with SALES LetterWorks. The package includes 300 powerful sales letters which cover all aspects of selling, from attracting new customers to overcoming sales resistance to closing sales. You also get forms for sales proposals, customer relations, faxes that sell and much more. Round Lake Publishing #05054 •



LEGAL LetterWorks

Customize any of these 165 legal forms for personal and business use. The topics covered include wills, living wills, leases, buying and selling real estate, corporate forms, contracts for buying and selling goods and many more. Round Lake Publishing #05055 € ✓

LetterWorks

Save time and increase the effectiveness of your written materials with LetterWorks' 400 customizable letters and memos. They cover all aspects of business including personnel relations, dealing with suppliers, handling complaints, internal memos, credit and collections, personal letters and much more. Round Lake Publishing



PROFESSIONAL \$51 LetterWorks

Attention physicians, dentists, lawyers and CPA's!
PROFESSIONAL LetterWorks gives you 250 customizable
form documents which cover every phase of marketing
your professional practice, including brochures and
newsletters, ads, speeches, press releases, special
events, marketing plans, letters to clients/patients and
much more. Round Lake Publishing #05053 •

RightWriter

RightWriter proofreads documents for errors in grammar, style, word usage and punctuation. Using more than 4,500 rules to proofread documents, it inserts comments and

It also analyzes documents for strength and readability, and helps you target your writing to specific audiences. Works with most major Macintosh word processors.



\$54 EACH



Sensible Grammar

2.1

Grammar check your document without leaving your word

processor. Sensible Grammar includes nine user-selectable writing styles and checks for grammar and punctuation errors. Version 2.1 (with System 7 or MultiFinder) lets you check the whole document, or only parts you select. Sensible Software #00483 6

#00640 Bookends

This HyperCard stack supports fonts and styles, scans, sorts, finds, formats, imports, and

searches. Sensible Software



#05052 0 /

34 Last Resort

Never lose your text again. Last resort helps you recover anything you've typed, even if you've never saved it. Those perfect words you deleted an hour, or

even a month ago, are now fully recoverable. Have a sense of security when you work. Never fear system crashes or power surges again. Last Resort sits in the background while you work and saves your keystrokes in a special Last Resort file. It's simple to use, and to install. Just run the enclosed install program, and feel safe that your work is retrievable from any worst-case scenario.

Working Software #04061

\$39 \$\$\$\$\frac{1}{2}\$

GrammatikMac 2.0



With over 1.5 million users, Grammatik is one of the most popular grammar utilities available. It helps you write clear, concise, persuasive reports, letters, manuscripts, etc.. Grammatik Mac 2.0 finds thousands of errors and gives you

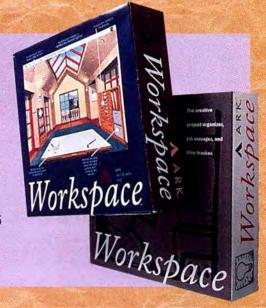
instant, complete advice. Customizable modules allow you to choose your writing style, add your own rules and help screens and much more!

Reference Software #03143 @

Workspace \$78

Concentrate on your work, not on your computer. Workspace is a visual project manager that runs on top of the finder. It keeps the documents and applications you're working on together in one place. Workspace also automatically tracks time spent on each project creating daily, weekly or monthly timesheets on request. Requires System 6.05 or later with MultiFinder.

Ark Interface, Inc. #05024 @ /







PERSONAL PRODUCTIVITY

Word Processing Tools



ResumExpert

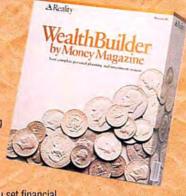
Make your resume more eye-catching, and get an edge on the competition with ResumExpert. Choose from 42 templates to redesign your resume for a more professional and effective self-presentation. The templates cover a wide variety of fields, both typical and unusual career categories. Looking for that perfect word? You can use ResumExpert in with the most popular word processors. MS

Word, MacWrite II and WriteNow's powerful features of cut & paste, spellchecking; thesaurus, and unlimited use of fonts, sizes and styles are always at your disposal. ResumExpert has been used effectively by people in all careers and at all levels, from students to CEOs. A Lasting Impression

WealthBuilder

Earn more, invest wisely and save effectively with the Award Winning WealthBuilder, your complete personal planning and investment system. Designed for the individual investor, WealthBuilder is easy to use no matter what

your level of expertise. It helps you set financial goals, provides investment guidance and tracks your progress. The program includes objective information on up to 1200 mutual funds and 10,000 stocks and bonds. Reality Technologies #03769





Report Ideas DA

Report Ideas DA gives you the power to create persuasive, hard-hitting reports, yet it's as intuitive as the Mac itself. The program walks you step-by-step through the writing process. Intelligence

Active Software #4176 @



The Phrase Thesaurus

Letter Ideas DA

Letter Ideas DA provides an extensive thesaurus of phrases organized under 19 topics ranging from accounts receivable to testimonial. Thousands of letter combinations to choose from. Intelligence







First Things First

This easy-to-use desk accessory helps you stay focused on your priorities Floating reminders help you manage multiple projects. Awarded "Utility of the Year" by MUG. Visionary Software # 04448

Facilitator

The Facilitator makes meetings efficient and effective. All aspects of meeting management are provided; electronic agenda with timekeeper, brainstorming and other quality tools. DiscTech Corporation #04550

calenDAr 1.1.3

This full-color, DA calendar keeps track of all the things you want to be reminded about: meetings, birthdays, anniversaries, things to do, etc. And it works no matter what applications you are in. Psybron #00288 @ /

#00285 calenDAr 1.1.3 (3 User pack) \$104 #00264 calenDAr 1.1.3 (6 User pack) \$189

Contact! 1.0

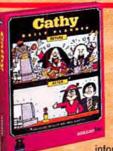
Contact! just might be the ultimate name and address DA for the Mac. Lightning fast search gets you what you want fast. Psybron #00200 🗸

#00317 Six User Pack. \$299

In Control

Get organized fast get In Control; the to-do list manager. MacWEEK calls it, "undeniably the product of choice." Track and manage the details of your daily activities: deadlines, priorities, status, staff assignments, anything you want. It's powerful multi-column outline lets you organize - and reorganize - lists instantly. Macworld says "If you make lists and mercy on you if you don't - get this program." Attain #04949





Cathy Calendar

Amaze introduces the Cathy Daily Planner. No other cartoon can take everyday traumas and make them funny. This perpetual calendar includes 365 cartoons, enough laughs to last the entire year. Plus, you get a full-function day organizer with four views: day, week, month and year. Animated icons give you a graphic overview of your day. Edit time, date and meeting

information and print the views in different sizes. Program in events by the week, month or year. And watch for visits by animated Cathy throughout the day. Amaze Inc. #05072 /



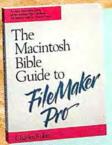
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DATABASE

tttt/,

Claris FileMaker Pro

Take control of your computer files with FileMaker Pro. the extended flat file manager that makes file management easy. Its look-up function lets you extract information from other files. A host of graphical tools gives you access to powerful layout and organization features, making your reports and forms more appealing. With customizable scripts and buttons, you don't have to understand advanced database concepts to use it. And as your needs grow, FileMaker Pro can grow right along with you, into a comprehensive, file-sharing, workgroup environment. Claris #03478 @ /



Mac Bible Guide To FileMaker Pro

No FileMaker reference guide covers FileMaker like the Mac Bible Guide To FileMaker Pro. This comprehensive guide presents information in an easy-to-read and systematic format. It's virtually the only book written for both database experts and the average FileMaker user. Goldstein & Blair #04093



Personal Bibliographic Software



Pro-Cite is a powerful database program that saves you hours of time by enabling you to manage and format bibliographic and text information automatically. New features include instant searching, expanded word processing support and increased record capacity.
Personal Bibliographic Software #04532 @

Bibio-Links Package

Includes all three Mac Biblio-Links works programs-BRS, Dialog, and Medlars for one low price. With it you can automatically transfer various bibliographic data elements (author, title and publication data, for example) from popular on-line services and CD-ROM products directly into Pro-Cite. You can then merge the records with existing databases or store them in separate Pro-Cite databases. Purchased separately each program sells for \$98. Personal Bibliographic Software, Inc. #09878 @

#00583 Pro-Cite/Biblio Links Bundle

Pro-Cite

Pro-Search is a specialized front-end software program that simplifies the process of searching DIALOG databases. ProSearch's unique, menu-driven interface helps you select the most useful database to search by providing blue sheet data on disk. Save time and money by constructing and storing search strategies off-line. A built-in accounting feature tracks on-line charges automatically. Personal Bibliographic Software #04266 @

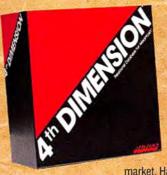
#00585 Searcher's ToolKit (Contains all three packages shown here)...\$359

*** Double Helix 3.5

Fast, powerful and reliable, Double Helix uses the Macintosh interface to its fullest and is one of the only completely object-oriented, non-procedural database for the Macintosh. Unlike file servers, which slow your system down, the Double Helix client/server

architecture keeps network traffic down and productivity up. In addition to speed, Double Helix provides full referential integrity, giving each user immediate on-screen updated information. With Double Helix 3.5 you can create customized applications quickly, and you don't have to be a computer genius. Helix Technologies #00609 @





4th Dimension

4th Dimension is the ideal database for novices, intermediates and power users. It provides power and ease of use like no other product on the market. Handy features like automatic button

scripting, multi-page layouts, superior relational strategies, streamlined data management and easy-to-use procedures will make this an indispensable tool for home, hobby or office.

Acius #02648 @ /





PER LETS YOU FIND THE PROBLEM Snooper #05025 @ / Snooper w/NuBus Card #05026 @ / Diagnostic Software for Macintosh The next time you see a 'sad Mac' on your screen or your Mac's performance isn't up to par, DIAGNOSE FROM YOUR DESK with SNOOPER, the revolutionary new standard for Mac diagnostic and testing tools. SNOOPER performs a comprehensive suite of tests, CHECKS ALL YOUR HARDWARE and identifies any problems. And the same SNOOPER software runs on all Macs. SNOOPER is easy to use and saves time and money. If you already own Norton Utilities, complete your Mac utilities with the hardware diagnostic. VIDEO TESTS • BENCHMARKS • LOOPBACK CONNECTORS RAM TEST • SYSTEM TESTING • SCSI TESTS • I/O TESTING AUDIO TESTS • ERROR LOGGING ONE STOP SOURCE FOR ALL YOUR MAC NEEDS

ENERGIZE YOUR MAC



The 90Mb Transportable is a full-power Bernoulli system. With all the data growth, hard-disk performance, reliability and security which made Bernoulli famous. The Bernoulli is so well built it can withstand 1000Gs of pressure (approximately the number of Gs generated by an 8-foot drop). It runs on both Mac and PC systems, and with optional software, data can be moved between Mac and PC formats. I/ Omega #09728 @

Bernoulli Mac Adapter

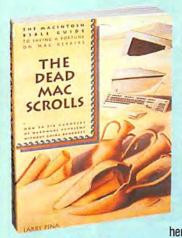
The unique Bernoulli Transfer Drive runs on both Mac and PC systems. Simply purchase the appropriate adapter.

I/Omega Mac Adapter #04052 @



The Radius Rocket

The Radius Rocket dramatically boosts your Macintosh application performance, increasing both graphics and calculations by up to 10 times! Offering you the first multi-processing NuBus system optimized for high-speed data transfer, Radius Rocket's 68040-based acceleration engine launches your Macintosh beyond the speed performance of a Macintosh Ilfx! Radius #04207 @



Dead Mac Scrolls

Goldstein & Blair, publisher of the world's best-selling Mac book, The Macintosh Bible, has just released Dead Mac Scrolls, the most comprehensive, up-to-date

guide to Mac hardware repairs on the market. Goldstein & Blair #04934

Quantum Hard Drives: A Solution for Every System

Quantum Hard Drives All drives come with format

All drives come with formatting software manuals and cables. Internal drives come with universal mounting brackets. External drives come mounted in zero footprint external box. @

CAPACITY	SEEK TIME	CACHE TIME	INTERNAL	SKU	EXTERNAL	SKU	WARRANTY
52MB	17MS	64KB	\$358	05247	\$394	00405	2 YEAR
105MB	17MS	64KB	\$428	00019	\$498	04992	2 YEAR
120MB	16MS	256KB	\$474	05248	\$558	05244	2 YEAR
- 240MB	16MS	256KB	\$822	00589	\$874	05245	2 YEAR
425MB	14MS	256KB	\$1348	05249	\$1438	05246	2 YEAR





ACCELERATORS

Get More Work Done With Applied Engineering



AE Plus Drive 1.44/800K FD

The new 1.44Mb floppy "plus drive" is one of the finest drives available for the Mac. Some of its many features include: SuperDrive capability with the Mac Plus, SE and Mac II family; MS-DOS compatibility; two color read/write activity light; auto, touch & paper clip eject; die-cast Apple "platinum" case; and the manufacturer's full oneyear warranty. Applied Engineering #04956 @ /

#05315 Cable for Mac II\$14



TransWarp Classic

This 16MHz 68030 accelerator upgrade quadruples the performance of a standard Macintosh Classic. TransWarp Classic is available with optional 68882 math chip (FPU) and optional support for up to 16Mb of memory. Applied Engineering #05363



OuadraLink with Shadow

QuadraLink gives your Mac II four additional serial ports. No more reaching behind your computer to unplug one printer and plug in another. No more shorting-out serial devices by connecting them while your computer is on. QuadraLink works as an electronic switch box, allowing you to easily switch between any devices connected to one of its ports or your computer's printer and modem ports. Applications that use System 7's Communications Toolbox can automatically recognize any switch between QuadraLink's ports-they can even use all 6 ports (4 QL + 2 Mac) simultaneously! The shadow feature increases your network flexibility. Applied Engineering #03673 @ /



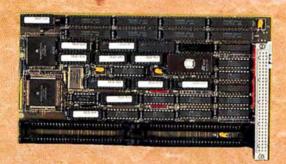
TransWarp LC™

This is a perfect 16MHz 68030 CPU upgrade for your Macintosh LC. Available with optional 25MHz math co-processor, the TransWarp LC doubles the performance of your Macintosh LC. It is also available with 33MHz, 40MHz and 50MHz clock speeds. Applied Engineering #05380 @ /

#00873 TransWarp 040\$1788

QuickSilver IIsi w/FPU

Quicksilver II gives your IIsi a slot extender, cache card and math coprocessor (optional). The extender enables cards created for the SE/30 to fit neatly inside the IIsi case. 25ns static RAM cache provides quicker screen refresh, faster scrolling and rapid image manipulation. The 6882-20MHz FPU option greatly increases speed of mathintensive applications. Five-year manufacturer's warranty. Applied Engineering #04154 @ /



New Life 25 MHz w/FPU (SE)

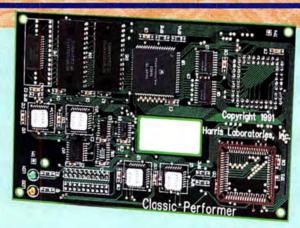
Tired of waiting for your SE to catch up with you? With the New Life 25 MHz accelerator card, windows snap open at the click of a mouse, complex documents/graphics scroll effortlessly, and intricate spreadsheets update in an instant. It's five-times faster than a standard SE (significantly improves StyleWriter speed and performance) and comes with an install kit. Fully compatible with System 7. New Life Computer Corp. #04920 @ /

16MHZ w/FPU & Video Plus & 512...\$719

New Life Computer Corp. #04925 @ /

SE Video for Radius FPD......\$289

New Life Computer Corp. #04926 @ /



The Classic Performer

The Classic Performer is designed to turn your Mac Classic into a serious business tool. With its 16MHz architecture and 96K cache it doubles your processing power, accelerates program loading and increases file sorting speed. With it you can run your favorite applications such as PageMaker, MS Word, Excel and others. It installs in under 15 minutes and carries a manufacturer's lifetime warranty. Harris Laboratories #04646 @

#04647 68881 Math Coprocessor Upgrade for The Classic Performer\$74



OPEN 24 HOURS EVERY DAY

ACCELERATORS

DayStar High-Performance Acceleration

Spend more time working, less time waiting



Accelerate everything your Mac does with award-winning high-performance accelerator cards from DayStar!









33 MHz PowerCache

#04634 with 68882 \$863 @ / #04323 without 68882 \$643 @ /

40 MHz PowerCache

#04320 without 68882 \$858 @ / #04319 with 68882 \$1078 @ /

50 MHz PowerCache

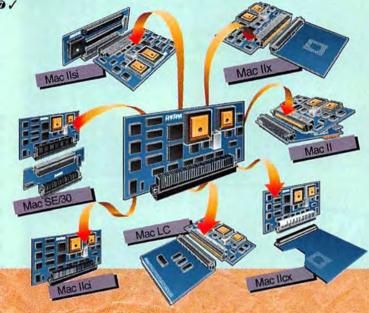
#04322 with 68882 \$1638 @ / #04321 without 68882 \$1348 @ /

Universal PowerCache Accelerators

When you feel the need for speed, DayStar's PowerCache gives you the best combination of blazingfast speeds (up to three times faster) and cost-effective prices. Rated as the Best Accelerator by MacUser, MacWorld and MacWEEK, it's guaranteed 100% compatible with ALL your software and hardware, while running at full speed. The same board fits eight different Macs (simple adapter required for non-lici installations). @ /

Cache Adapters \$38

#04708 Cache Adapter SE/30 @ 🗸 #04709 Cache Adapter II @ / #04710 Cache Adapter IIx @ / #04711 Cache Adapter Ilcx* @ / #04549 Cache Adapter LC @ / #04707 Cache Adapter Ilsi @ / (no adapter needed for IIci) *Ilcx price includes socket installation





FastCache

Boost the efficiency of everything you do on your Mac. The FastCache family of high-speed cache cards are available for the Mac IIci, IIsi and the Quadra 700/900. Performance gains on your Quadra range from 4 to 40% and performance gains on other Macs up to 45%, depending on the application. Includes PowerMath software.

- #05006 FastCache Ilci (32K) \$184 € ✓
- #02877 FastCache Ilci (64K) \$278 € ✓
- #04181 FastCache Ilsi \$309 € ✓
- #00561 FastCache 040 (Quadra) \$374 € ✓

ComboCache IIsi

This 4-in-1 upgrade boosts the performance and expands the capabilities of your Mac Ilsi for the price of a single card! It



speeds up the Ilsi with a 32K cache.

adds a

PDS slot for a video/Ethernet card, provides a 68882 socket for an optional 20MHz math chip, and has an additional PDS connector for future expansion. Plus, DayStar's ComboCache is fully upgradable to our PowerCache IIsi! 3 year warranty.

#05004 ComboCache with Math Chip \$334 #05005 ComboCache w/o Math Chip . \$258

Get More From Your Mac LC With DayStar

Equalizer LC

Upgrade your LC to the capability of Apple's new LCII with our economical 68030 upgrade. Now you can have all the virtual memory you need...10, 20, 100 Mb or more, by running Apple's own System 7 virtual memory for the first time! This 16MHz 68030 processor upgrade for your 68020) based Mac LC is available with an optional 16MHz 68882 math chip. The math chip is great for spreadsheet recalcs and math/science programs. Special PowerMath software adds even more of a boost to many other math functions. Buy today, and you can always upgrade to the faster PowerCache

#00560 W/o math chip \$259 #00579 With math chip \$336

PowerMath LC

Put a math chip card in your Mac LC or LCII. Great for spreadsheet recalcs and math/science programs. Includes PowerMath software to provide even greater math performance, #05003

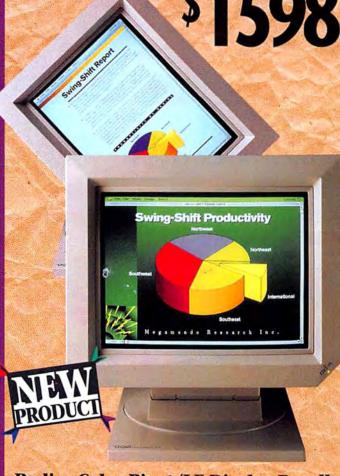






VIDEO HARDWARE

Low Cost Color Productivity



Radius Color Pivot/LE Display Bundle Includes color pivot interface card

Announcing the new lower priced Color Pivot/LE display for your Mac. It provides nearly all the same features and functionality as original, best-selling Radius Color Pivot, but at a lower cost. The Color Pivot/LE is a great color solution when you need full 8-bit, 256 color. Requires a Color Pivot interface card, which you get with the bundle.

- · Affordable Color
- Portrait and Landscape Orientations
- 256 Brilliant Colors
- 16" Resolution
- Supports Quadra, II Series (NuBus), SE/30, LC and LC II

Requires one of the following interface cards:

#05384 Radius Color Pivot/LE w/Pivot Ilsi INT

#05385 Radius Color Pivot/LE w/Pivot IIsi INT

#05386 Radius Color Pivot/LE w/Pivot LC INT

#05387 Radius Color Pivot/LE w/Pivot SE/30 INT

NEC Multisync Monitors



Multi Sync 3FGx

This 15" perfectly flat screen is packed with state-of-the-art extras like the new NEC FullScan capabilities which allow you to see up to 36% more active screen display. It turns out the fastest refresh rate in the industry which means crisper, deeper, truer colors than you've ever seen before, NEC #07144 @

Scott Delote. INLO #01 144 0	
MultiSync 4FG 15"	\$778
NEC #07143 @	
MultiSync 5FG 17"	\$1398
NEC #07399 @	
MultiSync 6FG 21"	\$2898
	MultiSync 4FG 15" NEC #07143 @ MultiSync 5FG 17" NEC #07399 @

NEC #07182 @

Xceed MacroColor \$468 II 24-bit

Based on Xceed's exclusive enhanced NuBus architecture, the MacroColor II achieves nearly twice the performance of the leading 24-bit card without the need for additional (and costly) acceleration. Made for your standard 13° or 14' monitor, the MacroColor II will display 16.7 million colors at 640 x 480 resolution. Fully compatible with System 6 and System 7, it includes the Virtual Video desktop expansion utility and 8/24-bit MacroPaint software, plus a five-year registered warranty and unlimited, toll-free technical support.

Xceed Technology #00608 @



Xceed Mac II 8-bit 13"/14"	\$204
Xceed Technology #02885 7 Xceed MacroColor 30 24-bit	
Xceed Technology #00607 @	



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VIDEO HARDWARE

NEC Multisync Mac Cards





Color Display Thereface Cards MacFG 8X

Boost your display productivity, increase your resolution and accelerate your graphics performance with a MacFG Color Display Interface Card. They complement the entire MultiSync FG monitor line and are offered in 8-bit and 24-bit models with QuickDraw acceleration. MacFG cards give you multiple display modes to choose from, including 72dpi WYSIWYG mode, condensed modes and expanded modes. Select the display mode that best fits the application you are using. Switching display modes is as easy as pointing and clicking, without a system reboot. The MacFG 8X and 24X Color Display Interface Cards support the entire Macintosh II family and the new Mac Quadra 700 and 900 systems. NEC #00578 ©

#04985 NEC 24-Bit interface card @\$1598

\$778

RasterOps 24STV

The 24STV is a new-generation 24-bit true-color display board capable of displaying real-time video in a screen window. The 24STV drives a 13" monitor in 1, 2, 4, 8 or 24-bit color modes at 640x480 resolution. It features a 2X and 4X pan/zoom and extended desktop, a 1-bit mask plane for overlaying windows or buttons over live video windows. MediaGrabber software (included) provides extensive control over the display and capture of a single video game or a sequence of frames for use as an animation file. RasterOps #00005 ©

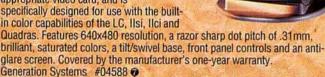


Generation Systems

\$498

14" Color Display

Not only is the Generation Systems 14" Color Display priced far less than Apple's standard 12" monitor, it also offers 56% more work space. The 14" Color Display can be used with any Mac model with an appropriate video card, and is specifically designed for use with the bin color capabilities of the LC, Ilsi, Ilci a





\$698

15" Full Page Display w/card

The Generation Systems 15" full-page display provides a crisp monochrome view of an entire page for plenty of additional work space for layout, graphics or manuscript work, it features crisp, paper-like display quality, anti-glare coating, tilt/swivel base, 80dpi, 75Hz refresh rate, 640x870 resolution and the manufacturer's one-year warranty.

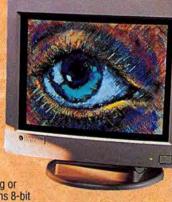
Generation Systems #05417@

Generation Systems 20" Color Monitor System w/card

§1998

The Generation Systems 8-bit-color monitor system for Mac
Ils and SE/30s displays 256
colors or shades of gray to bring
your creations to life. For
illustration, design, photo scanning or
retouching, the Generation Systems 8-bit
system helps you work smarter. Features

system helps you work smarter. Features 72dpi resolution (a must for desktop publishers), flicker-free 75Hz refresh rate and 1024x768 resolution. Generation Systems #05418







HARDDRIVE UTILITIES



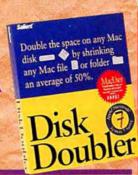
Autodoubler

Autodoubler is one of the easiest ways to increase your hard disk capacity. It automatically keeps your hard disk compressed. It's lightning quick and completely transparent, so it won't interrupt your work. Salient Software #04955 @



DiskDoubler 3.7

Make your disk drive more efficient. DiskDoubler effectively doubles or triples your storage capacity Salient Software #03515 0 /





Drive 7 Universal Formatter 2.0

The most versatile and affordable formatter available. Includes Drive7Rem for Syquest, Bernoulli, Optical and CD-ROMs. Drive7 formats and updates most third party and Apple drives, freeing you from taking chances on 7.0 compatibility. Provides customized partitions, VM on Macs and Syquest, passwords, locking and more. If you have multiple hard drives, you need Drive7. Casa Blanca Works #00858 @ /



DiskFit saves you time by providing fast, easy efficient backup to disks, cartridges, or optical devices. It copies only new versions of files to the backup, keeping backup sets compact and backups fast. Files are stored in Finder format for easy retrieval. Compatible with both System 6 and 7, DiskFit Pro is the ideal backup solution for any Macintosh. Dantz #04722 @ /







More **Disk Space**

With More Disk Space you can double the effective capacity of your hard disk-without giving up performance, convenience or compatibility. Unlike other popular compression utilities, More Disk Space does not change icons or Finder information and there is no delay in accessing compressed files, so you can use your files as you would normally. You don't have to decompress every time you want to open a file and you can even run More Disk Space files in their compressed form on other Macs that do not have More Disk Space installed.

 Resource Compression: More Disk Space is the only disk-expansion software that uses Apple's own resource compression technology, the very technology Apple used to compress System 7, the Finder, Resedit

and TechText. Alysis #00598 7

SuperDisk

SuperDisk is a system enhancement which frees up hard disk space by ultrahigh-speed data compression. Once it's installed, SuperDisk compresses and decompresses applications and data files automatically. It's the ONLY compression product that works with programs like Disinfectant Virex™, On-Location™ and with files like control panels, INIT's and desk accessories. It creates auto-expanding files and secures compressed files with two levels of password protection. SuperDisk offers one of the highest throughput speeds and compatibility of any compression option available for the Macintosh. Alysis #00512 0 /





Retrospect

Retrospect is automatic, unattended backup for a single Macintosh to tape, cartridge or optical. Set it up once, and a calendar backs you up again and again. Retrospect also saves hard disk space by archiving seldom used files to the backup media for future retrieval. Retrospect Remote brings the power of Retrospect to an entire AppleTalk network. Dantz #02586





NightWatch II

Protect your hard disk from unauthorized access with NightWatch II. Its instant screen privacy feature thwarts snooping and well-intended rummaging through your desktop. Features a multitude of protection & timedlocking options, animated screen-saving images and entertaining sounds. Provides rigorous protection at its friendliest. Kent Marsh Ltd. #04981 @ /

FolderBolt\$72

Create locked folders, read-only folders or drop folders. They can't be opened, duplicated, deleted or moved without a password. Kent Marsh #00258 @ /



COD'S ACCEPTED ON ORDERS UNDER \$1000 (CASHIER'S CHECK OR MONEY ORDER ONLY)

STORAGE DRIVES

Trust your data to quality PLI drives

\$799

Infinity Turbo 88

When you need reliable, flexible storage, you need the Infinity Turbo 88 from PLI. The Infinity is a true work horse, tough enough to take the punishment of constant use. The electrical engineering is top-notch, as are the internal components. Each PLI drive is rigoriously tested to meet standards which far exceed industry requirements. The mechanism carries an incredible 60,000-hour MTBF rating. It's virtually impossible to damage the unit by inserting the cartridge incorrectly. Best of all, the Infinity 88 Turbo removable hard drive gives you infinite storage potential. Relatively inexpensive 88Mb removable cartridges are easy to switch and store. Includes Turbo Optimizer, Turbo Cache and disk accelerator software. PLI #00182 @

\$372





QuickSCSI Card offers a simple, yet powerful way to eliminate the Macintosh SCSI bottleneck. It lets your hard drive work at its maximum possible performance level by supporting highspeed data transfer rates. The disk mirroring option lets you copy the exact contents of an entire drive to another. Run up to 14 SCSI devices simultaneously. PLI #00811 ♥

Infinity 40 Turbo

PLI's Infinity 40 Turbo provides you with all the storage flexibility you need, and the transfer speed you are looking for. With PLI's TurboCache disk accelerator software, you can achieve near zero effective average access times. One cartridge and all the necessary cables are included. PLI #02181



PLI CD-ROM

The PLI CD-ROM is one of the most fully-featured CD-ROM drives available. It has a self-cleaning objective lens which eliminates bothersome dust problems. It offers audio output through a 1/8" headphone jack and two RCA jacks. Volume control for the headphones is provided by a convenient dial on the front panel. PLI software is compatible with virtually every CD-ROM drive on the market, and supports all of the HyperCard audio XCMD's. It also allows channel control on supporting drives. PLI #03691 @

"We recommend the PLI CD Rom drive..."

MacUser Magazine

Infinity 40Mb/88Mb Drives for the IIci Chassis

The PLI Infinity 40 and the Infinity 88 have now been specially designed to fit the Ilci footprint! Infinity drives have one of the industry's highest tolerances to nonoperating shock—they're designed to endure rugged use and keep on providing reliable service. The package comes with PLI's Turbo Cache drive acceleration software that substantially increases the speed of all your SCSI drives and Turbo Optimizer which keeps your drive running at peak efficiency. The Infinity 40/88 for the Ilci come standard with external switches for termination and SCSI address, an external fuse and more. Unlike many drives, Infinity drives include all the necessary cables and documentation. PLI



PLI Infinity 3.5" Optical Drive

The next phase of optical technology has arrived. The PLI Infinity Optical read/write drives redefine high-capacity data storage. You can store up to 128 MB of data on a single cartridge that is almost indestructible, and weighs less than five diskettes. Backed by the manufacturer's 1-year warranty with support provided toll-FREE. PLI #04698 @



HARD DRIVES

§3628

hammerDisk600S



Rated as the fastest optical drive available by both MacWorld and MacUser, the hammerDisk600S delivers fast, reliable storage, backup and archiving With support for both 512 and 1024 byte 5.25" optical media, and intelligent driver software that maps out bad blocks on-the-fly, FWB's hammerDisk600S sets the standard for optical storage on the Macintosh. #00846 @

PocketHammer100

Meet the speed champ! FWB's PocketHammer SCSI hard drives have been rated the fastest, and best engineered by both MacWorld and MacUser. Weighing barely 4 pounds, the easily portable PocketHammer is built like a rock to ensure maximum reliability. They're all backed by a no-compromise 2-year warranty and Hammer PremiumService™. FWB's Hard Disk ToolKit software is included. You will not find a better value in low canacity drives #00506 @

Total capacity and an account	
#04891 PocketHammer200 @	\$1198
#00845 PocketHammer425 @	\$1988
#00505 PocketHammer 50 @	\$524



200

hammer1000FMF

With an average seek time of just 9.5ms the handsome hammer1000FMF (Fast Media Format) delivers incomparable capacity, performance and legendary Hammer reliability. Like all Hammer drives, the 1000FMF comes in a rugged aluminum enclosure, uses only the finest components and construction techniques available, and includes an auto-switching universal power supply for plug-and-play operation anywhere in the world. #05422 @

\$754

hammerDisk44

FWB's hammerDisk44 and hammerDisk88 have been rated the fastest and best designed SyQuest removable

drives by both MacWorld and MacUser. FWB backs its engineering excellence with a 2-year warranty and Hammer PremiumService™. Includes Hard Disk ToolKit software with powerful professional features for formatting, partitioning, password protection, data encryption, benchmarking, comprehensive diagnostics and more. Features full compatibility with any SyQuest cartridge. hammerDisk44 - 4.5 mice in MacUser (Feb. 1991). #04965 €

#04964 hammerDisk88 @ \$\$\$\$\\



hammerDAT5000

Advanced hardware compression technology allows you to store up to 5 gigabytes of backup files onto a single DAT cartridge with FWB's hammerDAT5000. With transfer rates as high as 22Mb per minute, the hammerDAT5000 provides fast and reliable backup for your network or for large color graphics files. Includes Retrospect Remote backup software and FWB's own HammerBackup utility. #01000 @

#00822 hammer300 External @ \$\$\$\$\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	\$1784
#0840 hammer600 External @	
#00842 hammer1000 External @	
#00843 hammer1400 External @	\$3678
#05421 hammerDisk130 @	64004



Hard Disk

Hard Disk ToolKit is a System 7 savvy utility that supports hard

drives, removables and opticals with complete formatting, partitioning, password protection, encryption and benchmarking. Includes a 300 page manual that sets a new standard for utility documentation. Powerful, professional features like high-speed SCSI copy, microcode control, SCSI-2 support and comprehensive diagnostics make Hard Disk ToolKit a "must have" utility for all users. "ToolKit belongs on the software shelf of every Mac manager and power user... Mac WEEK #00555 @





NO SALES TAX (EXCEPT WA STATE ADD 8.2%)

HARD DRIVES





DataPak 45Mb Removable Drive

\$598

Removable cartridges are an inexpensive way to add storage capacity, and they're actually faster than many fixed hard drives!

MASS Microsystems' critically acclaimed removable cartridge drives come with dual SCSI ports, SCSI cable, external terminator, auxiliary AC power outlets and external fuse and surge protection. Each drive is carefully constructed with high-quality compo-

nents and fully tested before it leaves the factory. PadLok utility software (included) provides password protection and volume partitioning. Each DataPak also comes bundled with a full-scale version of Salient's DiskDoubler data compression utility. All DataPak drives are covered by manufacturers two-year limited warranty. Product support is provided by manufacturer's toll-free technical support line. MASS Microsystems #00175

\$798

DataPak 88 Removable

Industry critics have called MASS
Microsystems' 88Mb one of the best
removable cartridge drives available.
DataPak removable drives come with dual
SCSI ports, SCSI cable, external terminator, auxiliary AC power outlets and
external fuse and surge protection.
MASS Microsystems #04062



\$478

40Mb Hitchhiker

Featuring the latest in high performance 2.5-inch hard drive technology, the HitchHiker 40Mb drive is small enough to fit in your hand. It measures only 1" X 3" X 5" and weighs less than 10 ounces! MASS Microsystems #00899





\$598

MASS

DiamondDrive 120

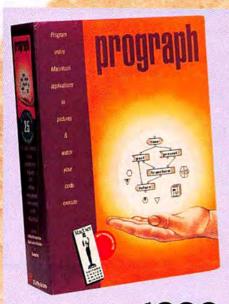
Offering high capacity and high performance at an affordable price, the DiamondDrive 120 boasts access times as low as 12ms. It comes with software that provides easy-to-use formatting, volume partitioning and test diagnostics. All DiamondDrives are preformatted, and covered with a two-year warranty and a Toll-free support line.

MASS Microsystems #04612



SEVERY DAY

PROGRAMMING



Prograph 2.5

Eddy Award winning Prograph is the standard for building Mac apps fast, without writing a line of code! Prograph combines ease of use with programming power. Includes visual OOP language, GUI builder, interpreter, compiler and more. Ability to include C/Pascal libraries make it a great tool for THINK and MPW users. TGS #04253 • ✓



THINK Reference

\$69

THINK™ Reference is an essential tool for all Macintosh programmers. This convenient reference provides a comprehensive guide to the critical system information that you need to program your Macintosh. Professional programmers and hackers alike will save time and effort as they quickly locate information using extensive hypertext search and cross-reference capabilities. Novices will learn faster and understand more through detailed descriptions of toolbox routines, data types, system globals and informative graphics. Symantec #04066♥ ✓



THINK Pascal V.4.0 1111

\$164

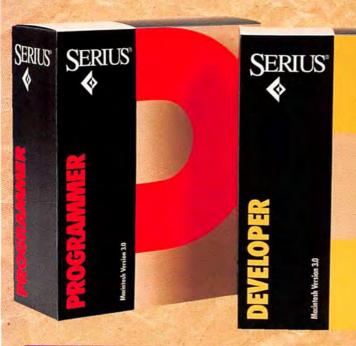
The THINK Pascal development environment makes programming clean and easy. It's a full Pascal implementation package with all the features you need to write Pascal applications on modern Macs. The multi-pass compiler generates tight, optimized code that's 32-bit clean. It supports Object Pascal, SANE, the 68881 math coprocessor and the 68020. It's also compatible with MPW and can use MPW object files without conversion. This is must-have software for Pascal programmers. Symantec #04178



THINK C 5.0 \$\$\$\$\\\\^2

\$198

Here's the integrated C development environment you've been looking for. THINK C integrates the editor, linker, and compiler to form a complete C language development package. Many major Mac applications have been developed in THINK C, including Quark Xpress. New version 4.0 supports object oriented programming (OOP) with a number of compiler enhancements and a full class library. It provides complete source-level debugging and produces tight, highly-optimized codes. Symantec #04095 •



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Serius Developer 3.0

Serius Developer 3.0 offers all of the easy-touse software development features of Serius Programmer, and adds the ability to design custom objects using any of several lowerlevel development tools, including THINK C, THINK Pascal, or any of the MPW environments. Serius Corporation #00902 @

\$279

Serius Programmer 3.0

Serius Programmer 3.0 is an application development tool which enables non-programmers to construct stand-alone, custom software. Programmer 3.0 uses a comprehensive library of over 50 pre-compiled object components which can be configured and combined to create fast, efficient databases, communications packages, multimedia programs, and more. HyperCard extension available. Serius Corporation #0903 ©

INTERNATIONAL ORDERS WELCOME! CALL 1-206-883-3088

UTILITIES & ACCESSORIES



CanOpener \$6

Think of your Macintosh as one huge database, containing files that can be opened from within any application. With CanOpener you can open any file and extract text, pictures (MacPaint, EPSF and PICT formats) and sounds, without leaving your current application. And by building CanOpener libraries, you create a powerful resource for much easier access than your typical scrapbook. Includes powerful search and find features as well.

Abbott Systems #02895

Teak Disk Holders

These finely finished teakwood disk holders from EID have great looks and full function. Feel secure about your Compact Disc or 3.5" disk protection with every model. EID.





Targus Universal Powerbook Case

The Targus Universal Powerbook Case is made of an innovative new material that is stylish and durable, with two padded compartments, 11'x13'x2.5'. The computer compartment has extra padding and two velcro straps for security. The other compartment has velcro-adjustable dividers that fit power-supplies, A.C. adaptors, external disk drives or keypads. Remove the dividers to fit a printer or to use the Targus Universal as a briefcase. It also features a detachable shoulder strap, disk pockets, pen and business card holders, and two external pockets that hold 8.5'x11' file folders. Targus #07454

\$84 *****

Now Utilities

According to MacUser, "Now Utilities is a must-have for experienced users and novice users alike." Included in the collection are: Super Boomerang, rated as the best of the Open & Save dialog box enhancers; StartUp Manager, a powerful extension manager; and WYSIWYG Menus, which groups font families

together by typeface. Plus you get: NowSave, Screen Locker, AlarmsClock, Profiler, MultiMaster, DeskPicture, and NowMenus! All components are System 7 compatible.

#00580 Now Up To Date @ 🗸	\$66
#00572 Now Up To Date 5 User 🛛 🗸	.\$264
#00569 Now Up To Date 10 User 👽 🗸	\$399



ALsoft Power Utilities

Enhance the performance of your Mac with 7 powerful utilities. DiskExpress II intelligently optimizes your hard disk. There's also a disk partitioner, a System 7 Apple menu enhancer, a disk and directory diagnostic, a screen saver, a disk activity indicator and MasterJuggler,

for managing font suitcases and applications. ALSoft #00628 0 /

MasterJuggler

If you want access to more fonts, DAs, FKeys and sounds than your system can hold, you need MasterJuggler. With MasterJuggler you can easily use your files containing fonts, DAs and more, even if they are being shared across most networks. Open applications or documents from a list or popup menu, assign sounds to seven different system functions and save valuable disk space by compressing font and sound files. System 7.0 compatible. ALSoft, Inc. #04543 @ \(\sqrt{} \)





being the average. Stufflt Deluxe comes with a handy Magic Menu Finder Extension utility which makes compression as simple as clicking on any file, folder, or disk icon. Compressed files can be manipulated as needed. Awarded 5 mice by MacUser magazine. Aladdin Systems #03458 • ✓





ACCESSORIES



Pamper Your Mac, In Style!



ScanMan Model 32 and Digital Darkroom

ScanMan and Aldus Digital Darkroom together provide high-level functionality at a great price. Scanning has never been this easy. In minutes, you can insert a picture (b&w or gray) into any word processing file or page layout. Some of the ScanMan Model 32's many features are: 32 gray scale and advanced halftone for superior image quality; true 400dpi scanning resolution; half-page scanning width; advanced output controls for adjustable size, resolution, and rendering of image for optimal quality on any screen or printer; tear-off tool palette for easy editing at any zoom level; works with all applications, including HyperCard. With CatchWord OCR software you'll capture text with high-level accuracy. ScanMan makes quality scanning affordable. Logitech #025616

ScanMan Model 32 and Catchword Pro

\$378

Ultimate Carrying Cases

Put your Macintosh into an Ultimate carrying case from I/O Design and you can take it anywhere. These premium-quality cases pamper and protect your Mac with high-density foam padding. The sturdy DuPont Cordura® Plus nylon exterior looks great and minimizes weight. Inside, you'll find a padded compartment for your keyboard (any model), mouse, external hard drive and cables. Two exterior pockets hold everything from manuals and floppy disks to sweaters and umbrellas. Available in Black/Navy. I/O Design #04686

\$68
\$74
\$94
\$62

Protect Your Computer Investment From Dust and Damage

Nylon Dust Cover Series

Cover your system and protect it from clogging dust and accidents. We have a complete line of Basic Needs Mac covers. Call our helpful sales advisors for the one that fits your system. Basic Needs



00044	OUVE INICO OIGOSIC WILD ROU	
00058	Cover Mac Plus w/ Plus kbd	16
00089	Cover Mac Ilcx/ci w/ext kbd	17
00100	Cover Mac II/X/fx mon ext kbd	17
00102	Cover Mac IIsi mon ext kbd	17
00103	Cover Apple Imagewriter II	11
00104	Cover Mac LC mon LC kbd	17
00106	Cover Laserwriter IISC/NT/NTX	17
	Cover HP Deskjet/Deskwriter	
00108	Cover HP Laserprinter II/III	15
00132	Cover Mac SE ext kbd	16
00130	Cover Mac SE std kbd	16
00931	Cover Mac LC/12 mon/LC kbd	17
00933	Mac Ilcx/ci port display ext kbd	17
00934	Cover Mac II si12 mon ext kbd	17
	Cover Mac II si12 mon std kbd	
00936	Cover Mac II si13 mon std kbd	.17
	Cover Stylewriter Printer	
	Cover Personal Laserwriter SC/NT	
	Cover Mac 13 Monitor	
	Cover Mac 12 Monitor	
05453	Cover Mac Plus w/Plus kbd	16

00044 Cover Mac Classic w/I C khd



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UTILITIES & ACCESSORIES



SpeedyCD



SpeedyCD

CD-ROM drives may be getting faster, but they're still about 10 times slower than conventional hard

drives. SpeedyCD is a control panel that speeds up access to CD-ROMs, making directory access to CD-ROMs respond as quickly as your hard disk. Finder operations such as opening windows or finding files are sped up by up to 700%. MacWEEK says, 'SpeedyCD's best feature...is the way it can make a CD-ROM seem like a hard drive rather than a locked

volume." ShirtPocket Software #05158 @ /



Wallpaper

Are you tired of staring day after day at the same old desktop. Redecorate with Wallpaper, the software that allows

you to display, create, edit and save any number of large desktop patterns using artwork made in Wallpaper or artwork imported from your favorite paint or draw program. Thought I Could #04762 @ /



System 7 Book/ Disk Set

Take full advantage of your System 7 savvy. This bestselling System

7 reference is now further enhanced with a two diskette set. The disks contain 6 commercial TrueType fonts from Bitstream, Letraset, and Linotype, tools for colorizing icons, and utilities. With more than 70,000 copies in print, the System 7 Book is the most widely used reference for the Apple operating system software. Ventana Press #05084



Value Pak

Microcom Value Pak™ (MVP) is a collection of the complete Microcom family of essential utilities for the Macintosh. All the utilities a Macintosh user needs are now available in MVP at one great price. MVP includes Virex, 911 Utilities, Complete Undelete, Citadel with Shredder and Carbon Copy for the Mac. Microcom #05046 @ /

Tempo 2 Plus

The maximum macro capabilities of Tempo II Plus can save you hours of work by reducing even complex commands to a single keystroke. It records as you work to capture your keystrokes, menu selections, button clicks, window drags-and automates repetitive functions. Customize and label the macros you create for easy access, then play it only the amount you specify. MacWorld says Tempo "Can do almost anything. By far the most powerful, intelligent, limitless macro program."

Affinity Microsystems #03804



BERKELEY After Dark

More After Dark (M.A.D.) & After Dark Bundle

It's M.A.D.! It's More After Darkover 25 incredible new displays for After Dark, the ultimate screen saver. Features contest winner Mowin' Man, Tunnel, GraphStat, and many

beautiful new Fish! Crazy Kittens, Art Museum and Lunatic

Fringe game module all help save your screen from phosphor burn-in. Requires original After Dark. Berkeley Systems #04046 @ /

Tripp Lite Means Protection



4 outlet, 220 volt with universal computer interface receptacles. #05254

LS 600 Line Conditioner\$95 Maintains safety with a constant voltage level, even during brownouts, #07928

Data Sheild MacDirector\$89

This power protection console matches the look of your Mac. PC Magazine Editor's Choice Award. #04607

Isobar 4 Surge Protector\$48

"Cascade" circuitry provides surge, spike and noise protection. Includes Gold Seal Warranty. #04605

BC 250 UPS System, 250 VA\$114

The backup power source for timely protection against blackouts. #04742

BC 400 UPS System, 400 VA\$174

Feel secure with a backup power supply that lasts longer. #04743





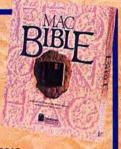


EDUCATION & GAMES

MacBible King James Version

This series presents several versions of the Bible, helping you to understand its meaning more clearly. Quickly locate passages with internal indexing. Open up to five text windows and one special purpose window at once. It has three search modes; wordand-phrase search mode, verse mode, and count mode locate and display information. Zondervan #00016

#00018 MacBible New Revised Standard Version	\$78
#00021 MacBible Greek	\$109
#00023 MacBible Hebrew	\$109



Macintosh C Programming Primer Vol. 1

328

This best-selfing package has been completely updated and reworked to reflect changes in the new software (System 7, THINK C and ResEdit) and the new Macs.

Addison-Wesley #05163

#03200 Mac C Programming Primer Vol. 2	\$21
#05162 Mac Pascal Programming Primer	\$18
#05164 Learn C on the Macintosh	\$24

Mathematica Enhanced V.2.0

\$798

This interactive calculation tool and programming language can do numerical, symbolic and graphical computation.

Advanced math made easy. Wolfram Research #04107

Headline Harry

In this game it's your job to get accurate news stories on the front page first. A fun way to learn.

Davidson and Associates #05210 @ <

Turbo Math Facts

Teaching math to kids can be a chore, but not with Turbo Math Facts. It's the math education program that kids of all ages enjoy playing day after day. Nordic #01931











Oregon Trail

Load up, you're heading west! In this award-winning learning simulation, you and your fellow pioneers experience the life on the American frontier.

MECC #00074 @ <

Number Munchers

Number Munchers is the painless way to teach math to children ages 8 and up. The object is to "munch" numbers and expressions that meet a specific criterion.

MECC #00872

✓

Relax & Enjoy Quality Games from Casady & Greene

Mission: THUNDERBOLT™

You must capture an Anti-matter bomb from hostile aliens who are trying to annihilate the human race. Venture into the depths of an abandoned underground research complex, battle aliens and wage combat using hi-tech weaponry. A 7+Mb, thinker's game! Casady & Greene #05047

\$44

Mission: Starlight ™ ‡‡‡‡

Your starfighter awaits to take you into hyperactive arcade madness! The evil leader of the Aalgezy empire has enslaved the people of your own Procyon solar system and only you can stop him. You'll be blown away by the realistic flight action of this game. Casady & Greene #03463

\$59

Fun Bundle

This Fun Bundle includes three award-winning games for one low price. It includes Crystal Quest With CritterEditor (5-mice rating, MacUser), the star-dodging Sky Shadow (5-mice rating, MacUser), and the exhilarating Mission: Starlight (4-mice rating, MacUser). Casady & Greene #04582



Glider™ 4.0

Can you pilot your glider through the rooms of the eerie mansion without crashing? Varied obstacles attempt to impede your progress. You'll encounter electric wall sockets, paper shredders, fish jumping out of bowls and other hazards. MacWorld Game Hall of Fame Winner. Casady & Greene, Inc. #04580

\$28

Sky Shadow™ \$\$\$\$\$

Bloodthirsty Razoropers have all but destroyed your city.
Only bombing raids over enemy territory can save it. Hear
audible responses—you'll even hear your heart rate soar as
you enter Mega-Mode. Warning: uncontrollable cravings for
more Sky Shadow may result! MacWorld Game Hall of Fame
Winner.Casady & Greene #03462

\$29

Aqua Blooper Piper™ ‡‡‡‡

How fast can you fit together the weirdest pipe fittings you've ever seen and reconnect the basement pipes? One false move will wash you up. Select pipes from the conveyor belt and fit them together without making a blooper!

Casady & Greene #04581

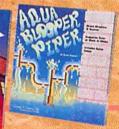














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MIDI •

Band-In-A-Box

Band-In-A-Box automatically generates a complete professional-quality arrangement of piano, bass, drums, guitar and strings in a wide variety of popular styles. You'll find yourself transposing songs instantly and using chord inversions in any variety of tempos and styles. PC Magazine says, "This amazing little program creates 'music-minus-one' accompaniments for virtually any song, any style... Band-In-A-Box understands repeats, choruses and verses and even varies the accompaniment, just as human musicians would. Band-In-A-Box is software that repeatedly surprises and delights you." PG Music



#03453

SOUNDWARS SO
ARACHTOSH CON

STRR TRE



Star Trek Sound Effects

Set your Mac on stun with these exciting new Star Trek sound effects from Sound Source. These high-quality

digital recordings are the ultimate tool for creating cutting-edge multimedia presentations. You get classic Star Trek dialog, sound effects and music cues. All effects are compatible with SoundMaster (a special version is included with each package, and no shareware fee is necessary), and with most other popular multimedia programs like MacroMind Director. Beware: once you've entered this new dimension in interactive multimedia you'll never settle for a silent Mac again! Sound Source, Inc.

#04672 Star Trek Sound Effects 1 #04687 Star Trek Sound Effects 2



Whether you're transcribing a MIDI sequence, scoring your first musical or transposing individual parts for your band, Encore can easily and efficiently handle the task. Encore 2.5 will notate and print your music, as a complete score or extract one or more staves as individual parts, transposed for different instruments. Passport Designs #00313



Master Tracks Pro 5 combines professional tools for recording, editing and playing back music with the most accessible user interface in the industry. Works with MIDI instruments and the Miracle PianoTM.

Passport Designs #05264



Passport's MusicTime is a desktop music composing and notation program for use with MIDI instruments and sound cards. Record your own performances. The flexible, easy-to-use interface allows you to enter music with your mouse, play one note at a time from your MIDI keyboard or automatically create a score from any Master Tracks Pro, Trax or standard MIDI file. Passport #05518





Miracle Piano

For the price of only 10 conventional music lessons, your entire family can experience the joy of learning and playing music. The Miracle Piano is a revolutionary musical instrument that interfaces with any Macintosh computer to actually teach you how to play, thanks to an ingenious interactive keyboard that's unlike anything you've ever laid eyes, or fingers on.

Each lesson starts off easy. Then, step by step, the program gets more challenging as the Miracle's artificial intelligence system customizes every lesson to meet the player's individual needs. The Miracle Piano creates its lessons by drawing from its own extensive library of classical, pop and show tunes—all carefully selected to maintain anyone's interest and enthusiasm. The high-quality Miracle keyboard, even without its amazing software, rivals piano keyboards that cost twice as much. It has a sustain pedal, full-sized velocity-sensitive keys, an output jack that you can plug into a stereo for even bigger sound and stereo earphones.

Add the software to this astounding keyboard and you have a remarkable music teaching system. It patiently teaches children and adults alike how to read notes, understand rhythm and, best of all, make music. The exciting Shooting Gallery game, for example, will teach you to tell a C-sharp from a B-



flat. Players must hit the correct key on their keyboard to identify the note each duck represents. Other games teach fingering, rhythm and timing, using flying saucers and robots. Flash cards will even appear on the screen for testing music theory.

And, during all this, Miracle Piano is constantly modifying and personalizing the program to fit the player's individual needs. So the better you and your children get at playing these games, the better you'll get at reading notes, keeping rhythm, creating harmony, and ultimately, playing the piano. MIDI compatible. Software Toolworks #00577





ACCESSORIES

Take Your Mac Anywhere With I/O Design Cases



Ultimate Carrying Cases

Put your Macintosh into an Ultimate carrying case from I/O Design and you can take it anywhere. These premium-quality cases pamper and protect your Mac with high-density foam padding. The sturdy DuPont Cordura® Plus nylon exterior looks great and minimizes weight. Inside, you'll find a padded compartment for your keyboard (any model), mouse, external hard drive and cables. Two exterior pockets hold everything from manuals and floppy disks to sweaters and umbrellas. Available in Black or Navy. I/O Design

#05546 Ultimate Classic/SE Case	\$68
#05545 Ultimate Classic/SE Extended Case	\$74
#05547 Ultimate LC w/12" RGB Monitor	\$94
#05548 Ultimate StyleWriter	\$62

Mac PowerBook Cases from I/O Design

The Ultimate SL (Right) is a custom case designed to carry any Macintosh PowerBook, floppies, pens, business bards, manual and AC adapter. The Ultimate EX (Left) has the same features as the SL with additional space for a floppy drive, batteries, printer and cables in a lower compartment. Both cases are available in black, navy and teal colors. I/O Design

#05539	Ultimate	Notebook SL	Cases	\$58
#05538	Ultimate	NoteBook EX	Cases	\$64



MacBible **King James Version**

\$78 This series presents several versions of the Bible, helping you to understand its meaning more clearly. You'll quickly locate passages with internal indexing and open up to five text windows and one special purpose window at once. It has three search modes;

word-and-phrase search mode, verse mode, and count

mode to locate and display information. Zondervan #00016

#00018 MacBible New Revised Standard Version	\$78
#00021 MacBible Greek	\$109
#00023 MacBible Hebrew	\$109





Mac ShareWare 500

This book/disk set is an all-in-one collection of information on the world of Macintosh shareware. The top 500 programs are analyzed with info on how to obtain them. The four companion diskettes include the top-rated programs, plus an America Online membership diskette with five hours

FREE online time for new and existing members. Ventana

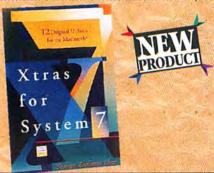
Xtras for System 7: 12 Original Utilities for the Mac

Xtras for System 7 includes twelve original programs on disk, designed and written exclusively for this package, that make it easier to use your Macintosh,

- The Big Apple—a hierarchial Apple menu with the capability of launching an entire sub-menu of items.
- IconEditor —a pop-up paint program that allows you to edit desktop icons.
- Publishist—a scrapbook-like utility that enables you to "Publish" items with programs that don't contain a Publish command, a key feature in System 7. Addison-Wesley #05526

Additional titles for programmers:

	m 7 Reveal	E SECTION OF STREET	 C18
NAME OF STREET		The same of the same of the same of	
Addis	on-Wesley	#00250	
Progr	amming for	System 7	 \$18
Addis	on-Wesley	#01040	





GAMES



Moriarty's Revenge

The infamous Dr. Moriarty is now leader of a world-wide crime organization. Only you can track him down and bring him to justice. Mysterium Tremendum #03290 🐨 🗸

PGA **Tour Golf**

Tee off against 60 top PGA Tour pros. Most of the major tournament courses are masterfully replicated to scale. Electronic Arts #00473

#04887 PGA Golf Tournament Disk\$16

MouseStick \$ Joystick 512

When it comes to Mac joy sticks, it's tough to beat Advanced Gravis' highscoring MouseStick. Advanced Gravis #2740 0

#02741 MouseStick ADB @ \$58

4-D Boxing Bash away with the

advanced animation of Tru-Motion. View from 9 camera angles and slo-mo video replay. Train your own boxers and be the next champ! Electronic Arts #05064

Nemesis Go Master®

Nemesis Go Master provides one of the best teaching and playing programs available anywhere. Toyogo #04495 @ V

#04493 Go Master Junior 4.0 \$19

Minotaur,

Labyrinths of Crete

Minotaur is sold as a two-pack, so you can battle real opponents over a modem, AppleTalk or serial cable in real time action. Create your own character, find weapons, magical items and more. Bungie Software (2pk.) #00639 @ 🗸

Operation: Desert

Join the forces in the gulf in this realistic full-color battle simulation! Command your M1A1 abrams tank on a series of missions. Bungie Software #04106 @ V



Secret of Monkey Island

Enter the great stone monkey and explore it's many secrets. This fun-filled interactive adventure runs with full-color 3D graphics. Electronic Arts #05065

Battle Chess **CD-ROM**

Now, the ever-popular computer chess game Battle Chess is available on CD-ROM. The chessboard comes to life with Battle Chess, the first animated chess game. Interplay #05537 @

Spectre

Climb into your BattleCraft, a fully outfitted sci-fi tank, and start taking out those Enemy Robot Craft! Fully networkable. Velocity Development # 04816 @

#05551 Spectre LAN Pak\$58

OIDS

Only you can rescue the OIDS from the fiendish Biocretes who are turning them into vending machines and household appliances! FTL #00240 @

Cyberblast

You have been elected to save the trans-universe.

They fit you with powerful cybernetics and launch you on your way. Innerprise Software #04189 @

BOMBER2.5

You and your 10-man crew pilot your flying fortress "Naked Lady" on 25 missions over Hitler's Germany. Fully System 7 compatible. Deadly Games#05040@ V

The Battle Of Britain II

Buckle-up, you are about to assume the awesome responsibility of defending England against Germany's legendary Luftwaffe. Recreates the greatest air battle in history. Deadly Games #050410 ~

Nemesis® Deluxe Toolkit™ 5.0

The Nemesis Toolkit enhances Go study with improved tutorials. Teamed with Go Master, it's one of the most complete Go playing & tutorial systems available. Toyogo #04494 @ V



EDUCATION & GAMES

Casino Master (Full Color)

Feel the suspense-filled action of casino gambling, on your Mac, Learn and practice at your own pace without risk You get 5 games: Craps Master, Roulette Master and more. Centron #02470

#02471 Casino Master

(Black & White)\$38

Puzzle Master

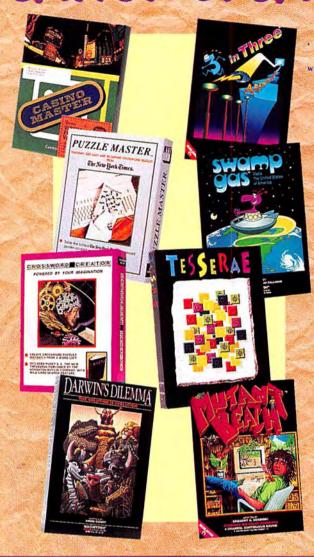
Use your Mac to solve crossword puzzles, or create your own puzzles for fun or profit. Puzzle Master includes 250 of the classic The New York Times puzzles, 200 Daily puzzles and more. Centron #04554

Crossword Creator

Create crossword puzzles quickly and easily on your computer. Simply type in the words and Crossword Creator will instantly generate the puzzle. Includes Roget's New Thesaurus, Centron #05071

Darwin's Dilemma

Darwin's Dilemma is an addictive color puzzle game in which you move and merge life-form icons to work your way up the evolution tree. INLINE DESIGN #03494



The latest game from legendary Mac game author, Cliff Johnson, 3 in Three gives you over 80 animated word and logic puzzles. Elected to Game Hall of Fame and picked as "Best Game of the Year" by MacWorld. INLINE DESIGN #03599 @

Swamp **Gas Visits**

the U.S.

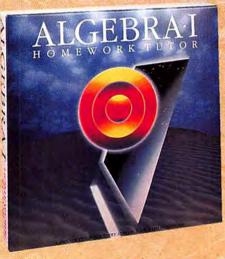
You're an alien cruising over the United States in a flying saucer. You visit all the states, major cities and landmarks. Awarded Honorable Mention 1991 MacUser Eddy award for "Best Children's Program." INLINE DESIGN #04251 7

Tesserae

Named "Best Brain Game MacWorld Game Hall of Fame, January, 1992, Tesserae is a color puzzle game in which you eliminate tiles from the "board" according to color and texture. There are 9 different boards and 3 levels of difficulty. INLINE DESIGN #03934 @

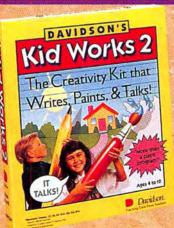
Mutant Beach

Mutant Beach is a fully-animated, fullcolor interactive action adventure game starring Native Nick, a laid-back islander. Nick must overcome amusingly mutated creatures and more to return the stolen nose to his island's idol. 'The coolest animated action-adventure/ arcade game of the year "-MacUser Magazine INLINE DESIGN #04252 @



Algebra I Homework Tutor

Algebra can be tough! With Algebra I Homework Tutor you have your own private tutor at your side. Enter your own math problems into the "smart" editor and the program walks you through the process. Missing Link Software #05379 @ V



Kid Works 2

With Kid Works children create and hear their very own illustrated

stories. Davidson's Kid Works uniquely combines an easyto-use word processor, paint program, and text-to-speech all in one! With the ability to convert text to pictures and pictures to text, children learn to express their thoughts both visually and in writing. Davidson & Associates



UTILITIES



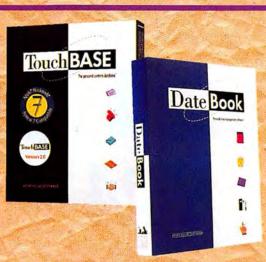


TouchBASE 2.0

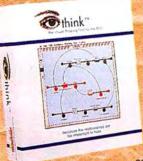
TouchBASE 2.0 just might become the most functional piece of Mac software you'll ever purchase. TouchBASE is a database which keeps track of personal and business contacts. It remains handy all the time—no matter what application you're using. The intuitive interface makes it a breeze to learn and use. Afterhours Software #03908 @ V

DateBook

Keep your professional life running smoothly with DateBook, the Macintosh personal organizer that enables you to enter and keep track of appointments, schedules and things-to-do DateBook prints monthly, weekly and daily schedules as well as fILOFAX and DayTimer formats. After Hours Software #05209 0 /



Buy **DateBook** for \$48 when purchased with TouchBASE!



think

Get on top of the learning curve with think, the

amazing software package that

accelerates both individual and organizational learning. The user-friendly graphical interface enables you to map, model and simulate business and organizational processes. High Performance Systems, Inc. #03837

DiskExpress II

DiskExpress II monitors your file usage to determine the optimal location for files on your hard disk. It works transparently, keeping

your hard disk

running at maximum speed and efficiency. Alsoft #00618

Help!TM

With Help! from Teknosys you can improve the efficiency of your Macintosh and avoid disastrous system crashes. Help! is the only

Macintosh utility which uses artificial intelligence to pinpoint system configuration problems and help you solve them. Help! detects conflicts, incompatibilities, improperly installed files, environmental problems, damaged files and more. Teknosys, Inc. #00867 @ V



The Essential Solution for Data Recovery,



Norton Utilities 2.0

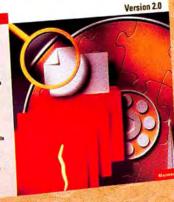
Norton Utilities-the essential solution for data recovery, protection and backup-now comes with SUM! You get two award-winning products for one low price! The fusion of these two products results in the first utility software package that fully integrates advanced disk repair and data recovery, automatic backup, data security and productivity enhancements all rolled into one informative, easy-to-use product. Just look at what you get:

- Disk Repair
 - -Norton Disk Doctor—Automatically diagnoses and repairs damaged hard disks, floppies and data
 - -Norton Disk Editor-Lets experienced users explore and edit the structure and content of files and disks.
- - -Volume Recover-Restores accidentally erased or crashed hard disks, even if precautions have not been taken.
 - -UnErase—Searches for and recovers trashed or lost files.
 - FileSaver—Maintains a record of critical disk information for fast and easy data recovery.

Symantec #04890 @ 🗸

Protection, and Backup









MULTIMEDIA VALUES



Spectra For The Mac \$624

Give your pre-press and multi-media projects high-impact 24-bit color! Spectra For the Mac scans 16 million colors in one 4-inch by 6-inch scan pass, at resolutions of 50 to 400dpi. Simply place the small-format scanner over the image you wish to scan and you are off and rolling! This scanner does it all: 16 million colors, 256 8-bit gray-scale, line art, transparencies and more. It's also ideal for image capturing and image database archiving. ScanDo/DA software (included) lets you run Spectra under Finder and MultiFinder. It's easy to set up and use and it's compatible with the Macintosh SE, SE/30 and all Mac It's and higher machines. Nisca #04260

\$54

ClickChange

Toss ClickChange in the system folder and tailor the appearance of your Mac to suit you. Custom color schemes accompany your choice of button, window and

of button, window and scrollbar styles. Drab old cursors are replaced with

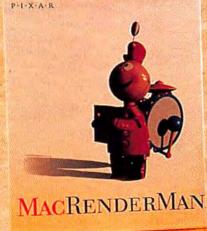
scrollbar styles. Drab old cursors are replaced with exciting, animated, color alternatives. Your Mac responds with exotic sounds when and where you choose. Rated 4 1/2 mice by MacUser, and MacWorld says ClickChange "...is a comprehensive collection of fun goodies executed in an extremely professional package." Dubl-Click Software #03616



Personalize the Look & Feel of your Macintosh

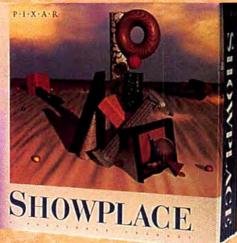
Your Mac comes alwer Colorful, 3-demensional windows, buttons, scrolbarn, and cursors are all just a cick away. With Clek/Change in the control panel, the User in master of the "User Interface". You'll have control over your Mac's: Buttons, Color Cursons, Scrolbars, Sounds, and Windows.

MOURL-CLICK



MACRENDERMAN





CD Showplace/ MacRenderMan—Bundle

\$348

Now you can use the same RenderMan power that helped create the stunning visual effects seen in *Terminator2* and *Beauty and the Beast*.

CD Showplace lets you create realistic, high-impact 3D graphics without having to learn complex modeling and rendering technology. Using your mouse, you can easily arrange 3D objects into scenes which you view from any angle by looking through various cameras. Any 3D object or collection of objects can be given a wide variety of realistic appearances or looks (visual material characteristics) by simply selecting the appropriate look from a palette. To create your own appearance, you can import and wrap a TIFF or PICT image onto an object or use any of your favorite Postscript fonts.

After creating your picture in CD Showplace, MacRenderMan

will create a photorealistic rendering of your design. Pixar's MacRenderMan gives you the ultimate in visual dynamics with intricate detail and exquisite color. CD Showplace/MacRenderMan images can be saved as PICT, TIFF or EPS files. CD Showplace/MacRenderMan requires a Macintosh II family computer with a floating-point coprocessor (included with all but the LC and IIsi, which can be upgraded), at least 5Mb of RAM (8Mb is strongly recommended), 32-bit QuickDraw and a color display. While an 8-bit/256-color display may be adequate, a 24-bit card is recommended for full appreciation of RenderMan output. MacRenderman is also available on 3.5° floppy disks. Pixar #04063

#00030 Showplace/ MacrenderMan disk version\$548



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BACK TO SCHOOL VALUES



Turbo Mouse® 4.0

Operate your computer at turbo Speed! Kensington's original Turbo Mouse has won more awards for Best Macintosh Input Device than any other. New Turbo Mouse® 4.0 features significant advancements in trackball technology Introducing Brilliant Cursor™ technology so you can automatically jump to user-defined areas on screen with virtually no

The Turbo Mouse 4.0 trackball also features an improved hardware design with a large ball for greater control and smoother movement, and comfortably positioned buttons that have a light, easy-to-click feel. Two Apple Desktop Bus (ADB) connectors let you chain other input devices-even use your Turbo Mouse trackball and your standard Apple mouse at the same time!

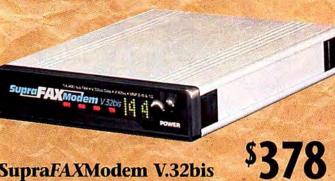
Other new software features include: acceleration, "enhanced mouse button" cursor and key commands, plus other user-programmable features. It's fully System 7 and A/ UX-compatible. Measuring only 4.5"x5.75," Turbo Mouse is constructed of durable ABS plastic and designed to match Macintosh computers. Comes with the Kensington's limited lifetime warranty. Kensington #05176 @ V

\$108





Macintosh computers. The package includes modem cable, communications software, free sign-on kits for America On-line and Compuserve Information Manager, 5-year warranty, Supra #04351



SupraFAXModem V.32bis With Mac Cable/Software

The Supra FAX Modem V.32 bis offers a complete 14,400 bps data/fax modem solution for the Macintosh family of computers. The package includes modem cable, Microphone 1.6 data communications software, FaxSTF fax software, free sign-on kits for America On-line and Compuserve Information Manager. Manufacturer's 5-year warranty. Supra #00413

02003 Supra 2400 Baud Modem	\$74
00065 Supra Modem 2400 Plus	\$118
MM24 SupraFAYModem V 32 Without Mac Cable/Software	\$258

CompuServe \$/ Navigator 3.1

On CompuServe, time is money. CompuServe Navigator can help you save both. Navigator gives you investment portfolio review capabilities, terminal mode operation option, error-free file transfers, MultiFinder compatibility and much more! CompuServe #00564

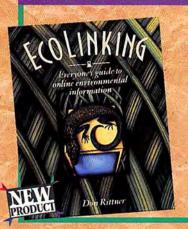
CompuServe Macintosh Membership Kit

Begin exploring the world of CompuServe, the largest on-line interactive database service available. You'll get instant access to more than 400 information and communications databases and much, much more. CompuServe #00213





Join Forces and Save Our Planet!



EcoLinking

Join forces with others who are battling to save our environment! EcoLinking is the first guide to the rapidly growing phenomenon of activists and researchers using personal computers and modems to link up with each other. The book covers four major resources: Global Networks, Electronic Bulletin Boards, Commercial Online Services and Libraries That Never Close, With resources like these you can make a difference! Peachpit Press #05549





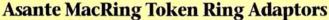
Asante Has An Ethernet Card for Every Mac

AsanteHub 1012 Intelligent 12-Port 10Base-T Hub

The AsanteHub 1012 is a 12-port, intelligent 10Base-T hub that combines the power and flexibility of chassis-based concentrators with the ease-of-use and low cost of pre-configured hubs. Just as personal computers have brought mini-computer power to the desktop, the AsanteHub 1012 brings enterprise-level

networking power to the department level. For an even more potent

connectivity solution, you can manage your AsanteHub(s) with Asante's full-featured AsanteView network management software. With the in-band and out-of-band versions for both Mac and Windows, AsanteView is ideal for multi-platform departments and companies that desire the diagnostic capabilities of enterprise management systems you have peer-to-peer-size budgets. Asante #05506 10T 8Hub and 10T 12Hub Not included



With the Asante MacRing Token Ring cards, you can connect any Macintosh with an internal expansion slot directly to an IBM industry-standard Token Ring network. Now your Macs can have immediate access to PCs, other Macs, Novell file servers and IBM mainframe and midrange systems at Token Ring high speeds! In a recent issue of PC Week, Asante MacRing cards were rated as the most compatible in the industry, working with the broadest range of network programs. Asante

#05502 MacRing 4/16 MBS Token Ring Card MacII	524
#05503 MacRing 4 MBS Token Ring Card Mac SE	394
#05504 MacRing 4/16 MBS Token Ring Card LC/LC II	394
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Place Your Order Between 12-2a.m. E.T.

FriendlyNet Adaptors

Asante's FriendlyNet family of products supports the new Apple Ethernet Cabling System_a plug-n-play networking system that makes Ethernet connectivity as simple and easy as LocalTalk. Once a FriendlyNet or Apple Ethernet card is installed in a Mac, you need only attach an inexpensive media adapter to connect all three types of Ethernet media thick, thin and 10Base-T. Asante #05544 ©







THE WORLD'S MOST POPULAR TELECOMMUNICATIONS PROGRAM FOR THE APPLE MACINTOSHI!

White Knight is the successor to the legendary Red Ryder telecommunications program, and the winner of 11 major awards domestically and internationally. The 270+ page user manual is geared to all levels of experience. There are many tutorials and step-by-steps for beginners and plenty of "meat" for more experienced users. This is the program that everyone is raving about, and for good reason.

"White Knight is probably the best communications program on the market, combining technical sophistication, flexibility, user-friendliness and a bargain basement price - \$139. It deserves more than an unqualified recommendation. It should be a mandatory buy for anyone with a Macintosh and a modem. Watson is a former writer-editor and the manual is the best read I've seen in computer documentation."

COMPUTER COMMENT, UNITED PRESS INT'L. White Knight has been designed with one ultimate goal - to get the job done with a minimum of fiddling. It offers the kind of power associated with products costing hundreds of dollars more, but is easier to learn and more flexible. Even the user interface is customizable to an extraordinary degree. There's no more searching for the "perfect" program because you set it up the way you want it. A FREE copy of Okyto (a revolutionary Mac-to-Mac file transfer program) is included with each White Knight package.

White Knight is the perfect, low-cost solution to your telecommunication needs.

Write or call us for a free brochure and dealer referrals.

The FreeSoft Company

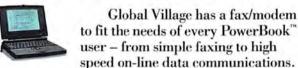
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PowerPort/Bronze™ is ideal for frequent faxing and use of on-line services. PowerPort/Silver and PowerPort/Gold", with their incredible data transfer speed, are the best products for use with AppleTalk® Remote Access (ARA).

Using ARA, you can check your E-Mail,

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THE POWERPORT SERIES POWERPORT/BRONZE 2400 BPS \$295. POWERPORT/SILVER 9600 BPS \$595. POWERPORT/GOLD 14,400 BPS \$795.

All our fax/modems come equipped | File Edit with our GlobalFax™ software, making it simple to send and receive faxes at 9600* bps from any application.

If you own a PowerBook, you need a PowerPort. The only question is: which one is right for you?

For more information on our full line of products, or for details on upgrades for existing PowerPort owners, call 1-800-736-4821. Or

visit us at MACWORLD Boston, booth 5804. in the World Trade Center.



GLOBAL VILLAGE COMMUNICATION

An Interview with Eric Harslem

BY JERRY BORRELL

ric Harslem, the vice president of desktop computing at Apple Computer, grew up in Shaker Heights, a suburb of Cleveland. He graduated from the California Institute of Technology with a B.S. in engineering in 1967, then a year later earned an M.S. from the University of Wisconsin at Madison in computer science. After graduate school he began working at the Rand Corporation in Santa Monica, California, where he was involved for eight years with projects such as the initial implementation of the ARPANet and helped develop video graphics systems on IBM mainframes. In 1976 Harslem began seven years of work for Xerox designing the user interface and parts of the operating system toolbox of the Star, a predecessor of Apple's Lisa and Macintosh. He joined Apple in 1983. In between high-intensity assignments, Harslem has trekked through remote regions of Nepal.

MW What was your first job at Apple? HARSLEM I managed the Lisa software group. Ed Birss, Rich Page, Bill Atkinson, Larry Tesler all "worked" for me. A high-powered group.

MW But the Lisa failed.

HARSLEM Not for lack of trying. It was a great research project and the basis for the Mac, but it probably should have never shipped. Four months after starting the software group, Lisa was shut down. Lisa was announced in January of 1983 and shipped in June. I started in July, in a fairly unstructured organization. In three months we did the international release—7/7 was Lisa's third and final software release. It had seven integrated applications. By November the Lisa division had been combined by Steve [Jobs] with the Mac division and called the Apple 32 division. Later it reverted back to the Mac division.

MW What was your last job with the Lisa group?

HARSLEM I laid off 35 people in my group. That was the first time we lost money at Apple. I brought part of my former group into the Mac division. And I started on the Apple file server with Gursharan Sidhu. It was announced at the

Apple shareholder meeting before it was done. We built a logic board using Mac ROMs. We started to work on Apple Talk. We chose SCSI as a disk interface, which was later added to the Mac Plus.

MW What happened to the file server? HARSLEM At that time, the Mac had no hard disk. My bosses saw what I was working on and said go do an external hard drive for the Mac. So I started what became the HD-20. And once the Mac had a hard drive, they said why do we need a file server? So that stopped, and Sidhu moved on to do AppleTalk. Once the HD-20 was done, I went on to start up the Mac Plus project, in June of 1985.

MW The Plus is reputed to have been a risky project for Apple at that time.

HARSLEM It turned out that Jerome Coonen and Larry Kenyon were already working on the next-generation Mac software. We pulled the ROM project together with a crash hardware effort from

July 1985 to January of 1986 to add IMB of memory and SCSI to the system board, along with a new floppy drive and extended keyboard. We launched on January 26, 1986. Jean-Louis [Gassée said, Ericwe're introducing whether it's ready or not. I remember that in early December we

stopped the manufacturing line on the Mac 512. Although the Apple IIe was still producing the bulk of the company revenues, Macintosh sales were pretty much a do-or-die situation. In its first year the Plus reestablished the credibility of the Macintosh.

Then I went to New Zealand for a month, and when I came back it was to run the Mac software group.

MW Were you rewarded for your work on the Plus?

HARSLEM I don't remember. There was some cash. I took a month off. For the

next 13 months my group's primary accomplishment was to do the system software for the SE, the Macintosh II, and MultiFinder (a project of Erich Ringewald and Phil Goldman). Also for the new architecture that ultimately became Pink. By February of 1987 we had done the SE, in April the Mac II. I took a month off after that, and when I came back in June of 1987, Jean-Louis said, Go run CPU engineering.

MW How many people were working for you?

HARSLEM About 200. At first I was the director of CPU engineering. The former director, Steve Sakoman, went off to start up Newton. In the first 15 months we did the Mac IIx. After the drive to get out the SE and the II, there was real exhaustion in both the hardware and the software groups. There was a debate on where to go with product strategy.

The following February we did the SE/30; then the cx; then the Portable and

the ci; then the fx; then the Classic, si, and LC. Then the Classic II, Quadras...eight computers in two years. All but one of which was a hit. The Portable was another great learning experience.

MW Then came the great reorganization of 1990. What are your responsibilities now

as the vice president of the desktop computing division?

HARSLEM Everything that plugs into the wall and doesn't require batteries. Portables left my group. Now that we have business units, like Randy Battat's [for portables] and John Moon's [for imaging], in addition to hardware engineering, I have marketing and hardware-dependent system software device drivers and system software. Roger Heinen's group [Macintosh software architecture division] does the Mac reference releases such as System 7.

continues



MW How many people are in your group now?

HARSLEM About 500. We just did some restructuring; we were about 100 more earlier.

MW How do you manage a group that size, given your complex mandate?

HARSLEM With great difficulty. I guess I had better give you a serious answer to that. We emphasize pushing decision-making down to the lowest levels, the project teams, to run their own businesses. For example, Steve Manser is responsible for 68000 modular hardware and dedicated software; Hi Chung does the same for integrated Macs. They each have largely autonomous project teams working for them.

MW What happened to Motorola's processors?

HARSLEM They seem to have run out of juice. Early in the PC era, they were ahead of the pack with the 68000. Now the x86 is a bit better positioned. Motorola was too ambitious on the 68040. It took a longer time to bring it to market, and it is more complex than the 80486. Arguably it performs better.

With three architectures—the Power-PC, the 68000, and the 88000—Motorola has been, at times, spread too thin. Intel has all of its weight behind the x86 architecture. Motorola tried to get into the RISC business and put resources behind the 88000 while still doing 68000 development. This has cost the 68000 in terms of competitiveness.

In adding PowerPC to the equation, we are working with Motorola and IBM to balance future deliveries for the 68000. We're working with Motorola to keep the 68000 on track in price performance. We're the major consumers of that processor outside of the automotive world.

MW What's next?

HARSLEM There are a number of future directions for the 68040—for cost, for performance, and for lower power consumption. The follow-on architecture for the 68000 is for dual-instruction issue, similar to the 80586. Two instructions are executed at once. Ultimately, RISC architectures with fewer transistors per MIP, hence lower power requirements, and less cost is probably the best direction.

MW What happened with Motorola's 88100 RISC product line?

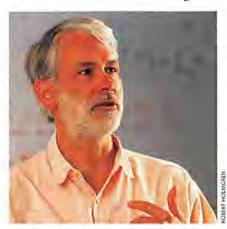
HARSLEM The 100 and the 110, which we helped design, are rumored to be the basis of future Next machines. We used the 100 for some prototypes, but for us, the PowerPC is the future.

MW What's the PowerPC concept?

HARSLEM It's an outgrowth of the Apple-IBM alliance. The RS 6000, processor mother of the PowerPC, evolved from the original IBM RISC processor developed in the early 1980s. That

evolved into the Power architecture at IBM, which became widely used for workstations. It's an architecture that is relatively complex.

As part of the arrangements in the Apple-IBM deal, we participate in the codevelopment and evolution of a subset of the Power architecture called Power-PC. We are focused on the more gener-



ally applicable aspects of the Power architecture. We made functions to run COBOL optional and evolved the [Power] concept closer to classical RISC ideas. That's important because we want the PowerPC to become a high-volume, low-cost processor.

MW How do you rank the sales of Macintosh computers?

HARSLEM In broad terms, the Mac LC is by far the most popular single model. The IIsi was recognized by Datamation as the most popular PC in business. In fact if you evaluate sales by our four markets—education, large business, small business, and consumer—you'll get different answers. The LC and Classic in K–12. The si and ci in most business markets. Higher ed is a blend.

MW The Classic doesn't sell the most? HARSLEM This year the sum of Classic and IIsi sales is roughly the same as LC sales.

MW What about the fx?

HARSLEM The fx is still popular with some people. We've gotten over compatibility problems with Quadras from nonsanctioned programming practices, practices that cause incompatibilities with the 040 processors. Applications with self-modifying code didn't work with 040

caches turned on. Quadra acceptance was slow as a result. The fx sold for some time due to that and to the fact that the fx is still on government lists. But new versions of applications have long since been on the market. The Quadra compatibility problems have long since been solved.

MW Why isn't there a color Classic yet?

HARSLEM It's something we're hard at work on. Over the years we've faced a number of challenges from product design and an engineering view, such as how we retain the look and feel of a Classic with larger color CRTs, larger power supplies. We think that we have to refine a color Classic's appearance at a cost that can get it into the line in a way that will make sense.

We also have to look at what we already have with the LC and a color monitor. How do they compare? With the Classic, the form factor was simple; it was plug and play, other than the keyboard and the mouse. We want some of the advantages of the all-in-one, the small footprint. And not just add color but make it multimedia-ready and expandable.

MW That sounds like the LC with the CD ROM that John Sculley has announced.

HARSLEM That's one thing. The point I was making was for the complete family, not just, say, the color Classic. Color is an area where the Classic is behind. We want new products to be CD ROM-ready. To have speech recognition, sound in and out—speakers and microphones are important. Out of that set of things, you can imagine products that would make sense.

MW CD ROMs would be built into all machines?

HARSLEM I think the direction is to have products designed with flexibility. Products configured for flexibility as well as for special-purpose designs. The LC is an important product in some markets; its size and cost are important to maintain without turning the CPU into a big ugly PC clone. We want flexible storage, slots, and other features for customers who want to add in disk drives; this way Apple or others could configure Macs with a CD ROM drive. There will be a better market as CD ROMs take off. It's not clear that it makes sense yet to put the \$200 cost of a CD ROM into all machines for all people.

MW How long will it be before low-end Macs have video built in? continues **SAVE** \$2340 12 Issues for \$24! When you subscribe today

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HARSLEM We've had on-board display video since the Apple II on through the LC. What you probably mean is video in and video out and a frame-grab capability. In QuickTime we have a good architecture to support various video in and video out and compression capabilities. We want to incorporate NTSC video in the Mac as quickly as technology and cost will allow, and as usage patterns dictate. Prices are prohibitive in products like the LC. For example, MPEG [motion picture ex-

perts group] chips are available but expensive. A new video system architecture must be available to allow the optional use of an MPEG chip. It might need to be a future architecture, which would incorporate video support on the system board.

QuickTime helps answer the question of digital video but requires no hardware. Before QuickTime, there was the no-software, no-content, no-customers conundrum. QuickTime is device independent; it breaks the logjam. So now we'll be able to determine whether video is a desktop publishing-size or a desktop presentationsize opportunity.

MW What can you do to increase lowend CPU performance?

HARSLEM A two-part answer: in the 68000 world and in RISC.

In the 68000 world, by using our special relationship with Motorola. In terms of price and value, we would like to get a faster-clock-rate 68030 and low-cost 68040s to bring 68040 power to a system with a street price ultimately well under \$2000.

The big performance opportunity is the RISC PowerPC. Working with IBM and Motorola to define the PowerPC architecture, we are gaining commitments from both companies to get a scalable architecture in order to take RISC under a \$2000 street price.

MW How do you measure what's important? MIPS?

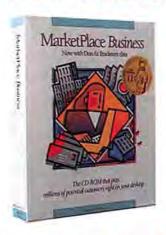
HARSLEM What does that mean to users? We're now in a performance glut. People in the PC DOS world are buying 80486 because it's there. They can afford it—it's not driven by new applications requiring more horsepower. We are out of phase between applications and end-user needs. We are plateaued on a standard set of applications—graphics, desktop publishing. But performance is increasing even though there are no hot new applications that demand performance.

Persuasion 2.1 is a power hog compared to PowerPoint. Unless they are into high-end usage, people use the simpler applications and hence don't need the horsepower. Personal computers are starting to offer lots of system performance most people don't need. Most applications need 80386 and 68030 processors; it's not clear yet that either applications or customers really need 486s or 040s. Personally, I'm a MacWrite user, for which an 030 is fine.

But we're focusing on RISC because we can see next-generation applications that will require greatly increased performance. Examples are QuickTime and digital video applications for technology like speech recognition. Most speech-recognition systems require substantial processor power as well as a DSP [digital single processor]. The PowerPC gets us to a point where a single high-performance, low-cost processor can do both speech and video. In the context of these breakthrough applications, MIPS will be more important than they are today.

MW The Quadra 950 has 24 bits of continues

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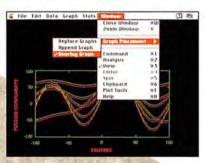
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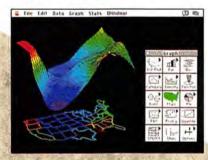
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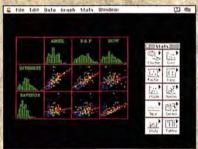
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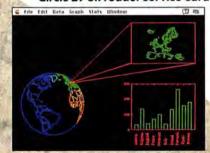
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video memory on the system board. Is that the trend?

HARSLEM In terms of functionality, the LC was our evaluation of what should be on the system board and what should not, the first major rethink since the original Mac. The LC II DRAM original plan was for 2MB on the system board and 2MB in SIMM slots to get to 4MB. But the market and System 7 combined to make us put 4MB on the system board. So we want the LC II ready to run and ready

for expansion. We put 4MB on the system board and left the SIMM slots open.

What you put on a system board is a crystal-ball-gazing exercise. One thing we did in following up how we did with the LC and si was to call people and get a feeling for how they like them and what they want instead, so that we have the right things built in. The video card is an example. We asked how much color we should have, how much customers need. On the ci some say, well, I use black and

white. On the Quadra, for business 8 bits is enough. If it's for QuickTime, then 16 bits is better.

MW Describe Apple's hardware upgrade philosophy.

HARSLEM We do logic board upgrades. Mac Plus for the 128K Mac, SE/30 for the SE, ci for the cx, Quadra for the ci and cx, fx for the Mac II and IIx. Lots of logic board upgrades, which allow our customers to recycle their CPU investment. The DRAM, box, disk, and so on.

Another thing we are looking at is modularity-aside from the system board, ways in which computers can be upgraded. It's similar to the Intel approach that you see advertised, which is great for Intel but not for system sellers. We've included PDS [Processor Direct Slots] on several CPUs. We let companies like Daystar Digital provide upgrades and derive revenues from that. The ci product has seen modular upgrades like cache cards and processor cards, something that we are considering for the future. The logic board upgrades have been moderately successful, but are usually not very high-volume products.

MW The Radius license was the first real release of system code outside of Apple, wasn't it?

HARSLEM For all practical purposes, the Rocket is a license of our ROM. The first license deal we have done, compared with subsets of system software like AppleTalk, which has been licensed for some time.

MW Why?

continues

HARSLEM For a couple of reasons. First is that the Radius Rocket, and the notion of a compute server, is an innovative concept, and we're happy to see the Mac first with it—it doesn't exist in the PC world. Most PC activity is confined to someone doing work on one's own CPU. Servers are specialized: for databases, and so on. The Rocket gives one Mac more CPUs—Rockets are virtual Macs on the desktop—so you can do multiple things at once. It's built on the IAC [interapplication communication] features of System 7.

MW What does that mean for Apple's future policy about licensing its operating system?

HARSLEM For deals that make sense, we're open to licensing. We have been approached by several companies in the desktop publishing business who would like to address high-end needs. There are a lot of interesting things that we'll never get to at Apple.

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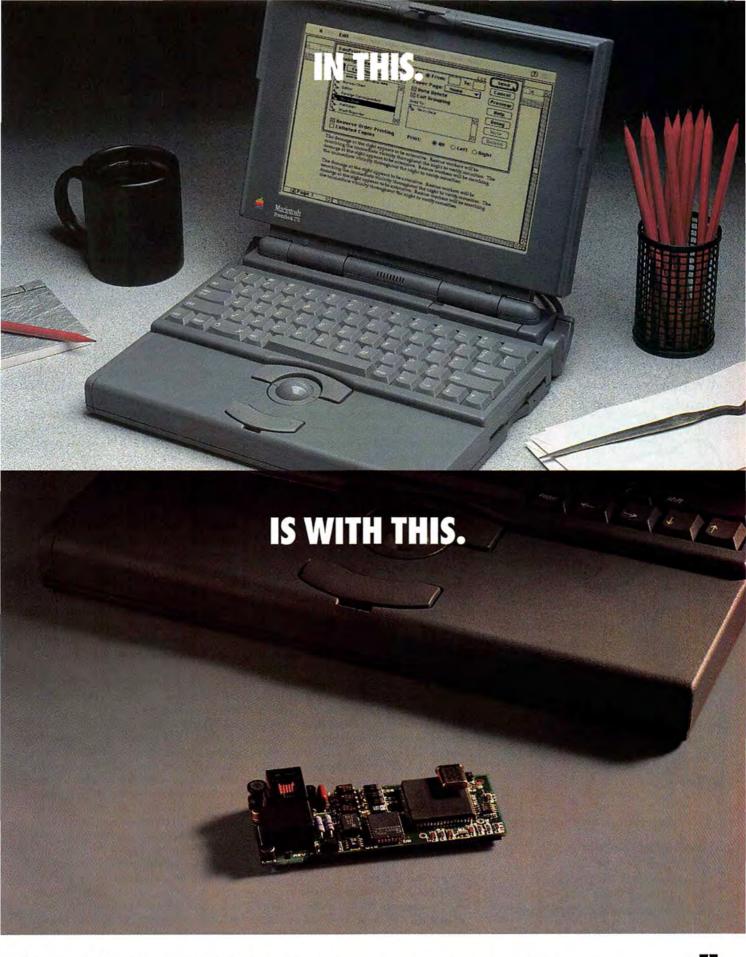


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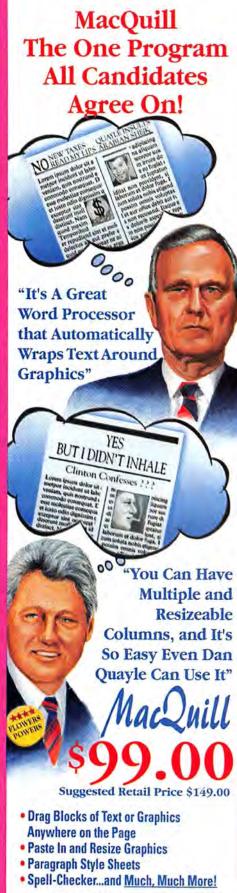
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Nest Software Inc. 2107 North First Street, Ste. 400, San Jose, CA 95131 Ph 408-441-1944 FAX 408-441-0724 **MW** How many CPU prototypes do you have under way at any one time?

HARSLEM Including portables, about a dozen. The number has been increasing. Remember 1986, when you could have any Mac you wanted as long as it was a Mac Plus? The same was true for IBM in 1986—you could have any PC you wanted as long as it was an AT. Today you can go out and buy any of ten different Macs. Customers want a broader range of choices.

The difference and the driving factor now is the number of markets. For example, K-12 in the U.S. We have sold a generic product into that market with K-12-oriented add-ons. Today they might be interested in the LC with a He card as a bundle. As we go forward, it may make sense to build a K-12-specific product, with different plastics or colors. The same sort of thing is coming from companies like IBM, which has the same product architecture but different form factors for different markets, such as the PS/1 and PS/2. In the consumer market it makes sense for there to be more product variants than we have now. Now we need to identify the sweet spots in the market. We have a limit on the number of dollars we have to invest, and we have to avoid the pursuit of products that won't sell in volume.

MW How many products that you evaluate or prototype actually make it into the market?

HARSLEM We have formalized our development into something called ANPP, Apple new product process. We want to preserve the freedom for entrepreneurial efforts and yet provide a loose framework for product development. We've established points of review and development for products. We want to start a lot of products, and we expect to see maybe 40 percent of them get killed in the first or second month. When we get to the prototype stage, where we're validating a product's specifications against a market segment, we'd like our fatality rate to be 10 percent or less. Otherwise, you burn people out and spend too much money. ANPP gives people an opportunity to get a lot of product ideas started, and the best make it out the door.

I remember [helping to develop the] Xerox Star. It was a great idea. We went underground for five years to get it done, but there was not enough reality-checking against the real world. Xerox sold a closed system at a time when the Apple II was already out—a completely open system.

MW How do you design a computer to match what customers want?

HARSLEM Historically, both our corporate and development philosophies were focused on building products that are more universal: the Mac Plus, the SE/30, the cx/ci—not just a K-12 or just a business product. We wanted to build products with appeal across broad markets. The 1980s were characterized by that approach by both IBM and Apple. Now we intend to address more vertical markets since more consumers have expectations for specialized systems rather than for lowest-common-denominator systems. Just like the auto business.

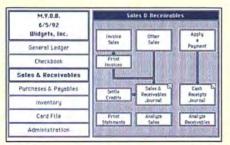
MW It seems like there has been less emphasis on the industrial design of Macintosh, since about the time of the cx. HARSLEM I disagree. In terms of inhouse people and then in terms of contracts with outside designers, we've increased the investment at Apple. In general the value of industrial design is significant and highly valued because it is part of what we want our products to be, in order to differentiate them from the world of [IBM] PCs and PC clones. At the same time, it's important that we have flexibility and reusability of industrial designs, the CPU boxes, so that we don't just get one CPU out of each design print.

MW What about the Quadra 900? HARSLEM It's somewhat in that category. Some of the issues considered when we designed the Quadra 900 were that we wanted a machine that would never be short of power, cooling, expansion, or board space. A machine that could be configured as wanted and at the same time a CPU that has more than a plain tower-workstation look.

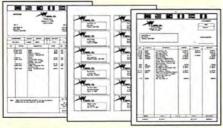
MW The Classic is going into Sears and other consumer outlets. What does that change portend for Apple?

HARSLEM Sears, CompUSA, and others are a kind of halfway house in the change of sales channels for Apple. Sears runs computer sales as a computer store within the store, so that is rather like our retail channel at present. Other examples are places that offer a 30-day money-back guarantee like Macy's or Circuit City, where the consumer can return the product to the store. That's different from Apple's conventional retail outlets. It's illegal to offer the same product with two different terms and conditions of sale. The exact same product can't be sold in two different ways. So as we move into the heart of the consumer channel-Good Guys, Circuit City, Office Club, Sams's, et cetera-we have to produce different products because those stores will have continues

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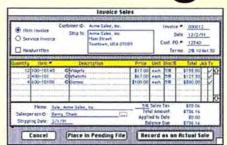
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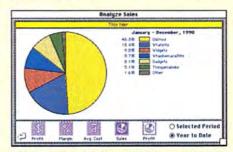
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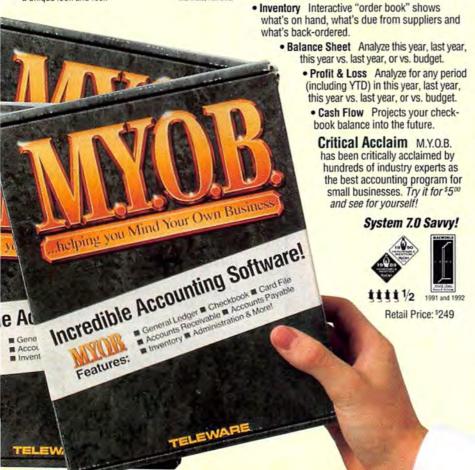
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Current Version 3.0– Macintosh System Requirements: Mac Plus with at least 1 megabyte of memory; System 6.0 or later; hard drive with 2 megabytes of free space.

Circle 87 on reader service card



different terms and conditions. Sears and CompUSA don't fall into that category.

There are several phases to what we want to do. First, meet the legal requirements. The second is address the different philosophies of the two channels. In one you buy a CPU and monitor, and configure the system you want. In the other, the consumer mass market, you pick out one thing, all packaged as a bundle. It's for less-sophisticated customers, and less training and sophistication is needed for the salesperson.

The third phase is addressing these new and different customers—what can we do to make the customer pick out our product? Price is one thing. An all-in-one machine like the Classic is another. Going beyond what the clones do.

Ever been to Circuit City? There are two kinds of display racks for computers, one with accessories and another with CPUs side by side. That's different from Businessland and CompUSA. At Circuit City, CPUs are on racks between boom boxes and appliances.

MW What are your thoughts on the original Mac Portable?

HARSLEM What did we do wrong? There were a couple of problems. We were rookies, just not experienced enough in terms of portability. Earlier, companies like Compaq did portables that were luggable—that was state of the art then. When we got in, in a catch-up mode, we didn't do the right thing in terms of capability, size, and price.

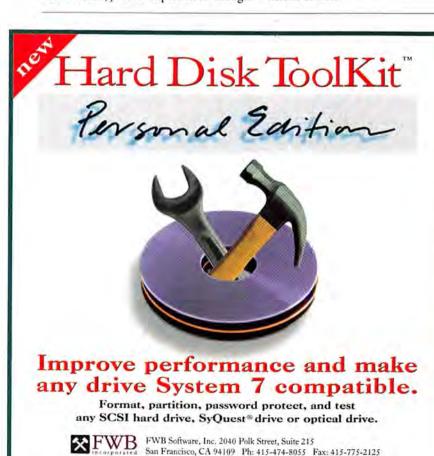
The other big area, a problem for most companies, is institutional memory. We did the design in the way we always had-that stifled new product ideas. For example, we wanted to leverage existing technology like our disk drive, floppy drive, and system board. We had always done single-board computers. The portable had everything on one system board rather than several daughterboards stuffed in little nooks and crannies. We also wanted to reduce our labor costs. All that drove the technology to be bigger than it had to be, and conspired to make the Portable mediocre. Since then, on projects such as the PDA [personal digital assistant], rather than try to do the project in an existing group where institutional memory could be debilitating, we have new groups, such as the Advanced Products Group, where there are fewer rules. That's a way to solve the problem. But we can't start a new division whenever we want to do a different product, so we need to be able to break the rules in the core divisions as well.

MW How did you make the decision to bring out the Quadra 950?

HARSLEM The 950 and the LC II are in the same category of looking for key opportunities to get a quick product update from existing products for a high return on investments. The original 68020based LC was a hot product. There was concern from some customers about the lack of a 68030. It took five months from the idea of adding a 68030 to the intro date, and there was a big customer impact. Same on the 950-we derived it from the 900. Initially there would have been more differentiation between the Quadra 700 and 900, but when we announced, Motorola had problems with the 33-megahertz 040. We said fine, we'll use a 25-megahertz part, but we want to move the stake ahead as quickly as we can.

If you do a return-on-investment calculation, 12 months' revenue from the product divided by the product development cost, you can understand what we try to do. The Mac II was a bunch of new things, which meant a lower return on investment. The cx was the product that people really wanted, and it was, in many ways, a revision of the Mac II, so the cx had a higher return on investment. Likewise, the 950 is a rev of the 900.

continues





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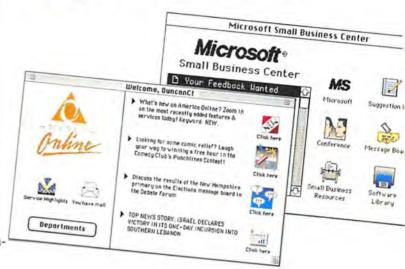
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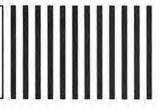
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MW How do you decide on implementing new technology?

HARSLEM It's very subjective, based on what we want to do in terms of technology, what we want on the logic board, whether something will cost zero, whether we're adding features that everyone will use. Free things are easy to decide. Hardware things cost. So we look at usage patterns, what percentage of the time users or applications would use a new feature. We felt that because of engineering and desktop publishing applications for the Quadra, networking was important and built-in Ethernet would pay off for buyers. The rough threshold for hardware is \$25 for adding a feature. If something costs \$10, but only 10 percent of owners will use it, we might throw out that idea.

MW What future technologies will appear in Macs?

HARSLEM Multimedia enablers. Higher-quality sound input and output. More video integration. Communications in terms of both local area and wide area networks. Local networks include Ethernet, FDDI, token ring. Wide area is hooking up to the phone system, PBXs, ISDN.

MW When will Apple offer optical technology?

HARSLEM A few years ago people felt that magnetic recording would be history by now, that optical technology would take over. But magnetic technology has advanced faster than people expected and optical technology more slowly. Optical has the disadvantages of not having the low cost of a floppy or the performance of a hard drive. So at present it is a niche technology; it's difficult to view as mainstream technology yet.

On the horizon there is cheaper and faster technology. Sony has announced minidisks for audio-two-inch technology. Pitted against Philips, which has announced DCC tapes. If Sony is successful at the consumer audio level, that would be a factor in lowering the cost of optical technology. CD ROMs are derived from mass-market CD audio technology, which helps drive the cost down. Read-write magneto-optical technology has no consumer equivalent and is expensive. If minidisks take off and become 10-million-[unit]-per-year consumer products, that would lower the price for magneto-optical technology for personal computers.

MW It has been said that people don't retire from Apple. Is that still the case? HARSLEM In antiquity, many people retired from the company after the IPO

[initial public offering] or with money from stock. Then there was a period from, say, 1983 to 1989 when Apple was a place people came to on their way to other companies. Now there are a lot of us who've been here for a long time and plan to stay. Apple has changed a lot in its last three years, in terms of human resources and retirement. We're not conventional in terms of our retirement like "mother" IBM, but with Apple's contributions to our 401(k) plan and profit sharing, the opportunity exists for an Apple employee who wants to retire. The question is one of philosophy also. Now it's possible to lead a high-energy but normal existence at Apple and not burn out in the process.

MW What is your favorite Apple story? HARSLEM When we were doing the Mac Plus, the company was up in the air. It was not clear who worked for whom. We needed a thermal test of the new Mac Plus design, and the testing facility was fully booked. We didn't have time to negotiate! So one weekend another guy and I blocked out all of the vents in a lab area room that was about 10 by 20 feet. We went to K mart and bought heaters and fans and did the testing there. We brought the room up to 104 degrees to test the product that saved the company. m

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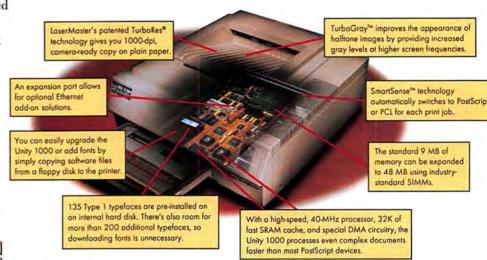
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Sigma High-Res Monitors

For high-end desktop publishing and similar gray-scale applications, Sigma Designs has introduced two high-resolution monitors. The MultiMode 120 is a 19-inch analog monitor that displays up to 1664-by-1200 resolution with 256 shades of gray. Software provided by Sigma with the MultiMode 120 can change resolutions or re-size the Mac desktop (both without restarting) to ensure that the desktop is not too large or too small at the lowest or highest resolutions. The monitor is expected to list for around \$3000. It should be available beginning in August.

The second monitor is the SilverView Pro, a two-page gray-scale monitor with high resolution. The 21-inch display shows up to 1152 by 870 pixels at 72 dpi and a refresh rate of 75Hz. The SilverView Pro



SIGMA DESIGNS' SILVERVIEW PRO (LEFT) AND MULTIMODE 120, BOTH HIGH-RESOLUTION GRAY-SCALE MONITORS.

works with the built-in video on the Quadras, or with Sigma's \$595 256-gray-scale adapter for Macintosh II's, or with Sigma's \$395 monochrome adapter for Mac II's. Neither adapter works with the IIsi, however. The IIsi and the

SE/30 can drive the Silver-View Pro using a different \$395 monochrome adapter, also from Sigma. The monitor itself is expected to list for \$1395. It was slated to begin shipping in early July. Sigma, 510/770-0100.—T.M.

TREND

Apple's QuickRing to Speed Macs

Apple has announced a technology called QuickRing that will permit file transfers at up to 200MB per second inside Macs with multiple NuBus slots. Developed in conjunction with Beta Phase, Molex, and National Semiconductor, the first components should go to third-party developers in the

beginning of 1993, which products are probyear away. Once arrive, however, possible for signers, multiand other consive computing erably speed up

means end-user ably at least a these products it will be graphic demedia users, sumers of maspower to considtheir Macs.

QuickRing is essentially a separate I/O bus, not a command bus like NuBus. QuickRing consists of a series of very-high-speed connections between third-party NuBus boards, each of which must have a QuickRing connector at its top edge, the edge opposite from the NuBus connector. A high-speed chip developed by National Semiconductor controls the flow of data across the QuickRing connectors and cables, which were designed by Beta Phase and Molex to produce very little electrical interference. QuickRing will make it possible to quickly send HDTV video signals, very large graphics files, and so forth, between the memory blocks of a RAM board and a graphics adapter, for example, or to a coprocessor board. Apple expects QuickRing to add about 10 percent to the cost of producing current Nu-Bus board designs .- T.M.



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Off-Broadway Info

Performances in small, funky theaters and clubs say much about a city's sensibilities, but out-of-town visitors usually need a local insider to steer them toward the offbeat. To make it easier for San Francisco visitors, earwax productions has created the microPlayhouse, a videodisc showing short clips of 15 solo performers, accessed with MacroMind Director on a Mac. The microPlayhouse will be housed in a kiosk at the San Francisco airport. earwax is negotiating to produce electronic introductions to other cities' finest and funkiest, earwax, 415/ 775-8561.—ANN GARRISON

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20 MASON • IRVINE, CA 92718 • TEL: (714) 837-6033 • FAX: (714) 837-1164 AppleLink: MICRONET.SLS • Compuserve: 76004,1611 monitors up to 16 inches and lists for \$549. Designed for NuBus Macs including the Quadras, it supports resolutions up to 832 by 624. Users can switch resolutions without restarting the computer.

The PrecisionColor 24Xp works with Apple 13-inch monitors, VGA monitors, 16-inch monitors from Apple and other vendors, and Radius's 15-inch ColorPivot/LE (in landscape mode only). The board began shipping in June. Radius, 408/ 434-1010.-T.M.

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version 2 and will have an addon programming module for creating map-based vertical applications. Significant changes include support for Apple events (but not for standard publish and subscribe); 18 map projections and the ability to change projections even when a map is open; many coordinate systems; "buffer zones," that is, the ability to search for objects on or near a point, line, or polygon; support for intersecting or joining polygons; and a layout window for arranging

Its 15-to-20- minute video episodes challenge students to solve problems like does Jasper have enough fuel and time to get home in his boat before nightfall? The disc was developed by a Vanderbilt University team after several years of cognitive science research. For pricing, call Optical Data Corporation, 906/668-0022.-ANN GARRISON

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IGOR GENERATING CONTOUR PLOTS FROM RANDOM POINTS (LEFT), AND GRAPHING **FUNCTIONS (RIGHT).**

generated with its own mathematical functions. Igor provides curve fitting, has a macro language that doubles as a template generator, and provides DTP tools for preparing graphs for scientific journals.

Version 1.25 reads Excel 3.0 files and adds contour plot ca-

TREND Spreadbase: **New Paradigm?**



HALF DATABASE, HALF SPREADSHEET: SPREADBASE'S 3-D TABLE WITH SUMMARY FIELDS AS PARENT ROWS IN AN OUTLINE.

A farsighted new company with ambitious goals plans to ring the death knell for the spreadsheet as we know it. Objective Software argues that a spreadsheet is too unstructured for managing complex data sets, while a database is too rigid to manipulate them. Objective's solution? Spreadbase, which puts a spreadsheet's flexible interface on an underlying database structure.

Spreadbase is impressive. It is three-dimensional; it maintains a hierarchical outline that can be manipulated to perform cross-tabulations; and it has a full-featured command language, a graphing module, and a report designer. A later version will have a complete application generator.

The company expects Spreadbase's street price to be about \$700, roughly double that of Excel or Lotus 1-2-3. Objective Software, 415/324-3333.-D.L.

pability. Igor lists for \$295; a programming tool kit and a filter-design tool kit each list for \$150. WaveMetrics, 503/620-3001.-D.L.

Microsoft Word 5.0 Limited to 250 fonts; incompatible with Adobe Type Reunion; sometimes sets all formatting, including style sheets, to default font. Microsoft says these bugs will be fixed soon, but ship date, possible new features, and pricing not set.

· Appears to hang Mac when opening large custom dictionaries. Microsoft says nothing is wrong, but sorting a large dictionary can take a half-hour or longer; to be fixed in revised spelling-checker module shipped in June. Free to registered users on request.

· Grammar checker crashes on 68000-based Macs (Plus, SE, Classic); to be fixed in revised grammar-checker module shipped in June. Free to registered users on request.

BeagleWorks 1.0 Frequent crashes and out-of-memory errors. Beagle Bros says problems fixed in version 1.0.1, which it has shipped to all registered users.

ClarisWorks 1.0v2 Doesn't support Faster Printing on Image-Writer II. Claris says version 1.0v3 fixes this problem; available at no charge to registered users on request.

Norton Utilities 2.0 Incompatible with some accelerator boards. Symantec says bug-fix will soon be available on request to registered users at no charge.

MACWORLD WILL SEND YOU A BUG REPORT T-SHIRT IF YOU ARE THE FIRST PERSON TO INFORM US OF A SERIOUS, REPRODUCIBLE BUG THAT WE REPORT IN THIS COLUMN. SEE HOW TO CONTACT MACWORLD.



The trouble with most 24-bit color products is that they do the job

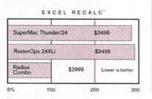
exactly as their name implies, bit by bit by bit by bit.

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TREND

RAIDs: Secure Storage for the Mac

Drive makers FWB and PLI have each begun offering RAID (redundant array of inexpensive drives) systems for the Macintosh. RAID systems, which come in

six levels from RAID Level 0 to RAID Level 5, are designed to offer greater security or speed, or more inexpensive capacity than large single hard drives can. PLI's RAID Level 0 device, called the MiniArray, comes with a QuickSCSI adapter and ranges in price from \$1999 for a 240MB array to \$15,999 for a 4.26GB array. Level 0 provides data striping, a way of increasing data-transfer speeds. The MiniArray has sustained data-transfer rates of either 3.4MB or 5MB per second, according to PLI.

FWB's SledgeHammer Array series comes with SCSI-2 controllers. The series can do drive spanning (also considered RAID Level 0), disk mirroring (RAID Level 1 for higher security), or data striping (Raid Level 0, for faster transfers). FWB also includes software called MatrixArray, which lets different partitions do striping and mirroring inside the same array. FWB is offering a wide range of shapes, and capacities from 100MB to 4GB, at prices from \$899 to \$14,098. FWB, 415/474-8055; PLI, 510/657-2211.—T.M.



THE CONCENTRATOR (REAR), AND THE STAR ROUTER AND INTERROUTE/5 FROM FARALLON.

Farallon Introduces Mac Concentrator

To meet the needs of growing Mac networks, Farallon has introduced the first Mac-specific network concentrator and announced two router/gateway products designed to operate by themselves or fit inside the new Concentrator. The first router/ gateway, called the StarRouter, has 12 ports for connecting 12 LocalTalk devices to Ethernet as a group. The second router/gateway, called the InterRoute/5, can join 4 different LocalTalk nets to an Ethernet backbone, link to TCP/IP, and tunnel Apple-Talk through a TCP/IP enterprise network. The Concentrator has 10 slots for plugging in existing StarController hubs (most of which already have the appropriate connector), or the new router/gateways. Multiple buses inside the Concentrator enable it to link many LocalTalk and Ethernet networks.

The new router/gateway products support SNMP and provide in-band and out-of-band network management. Prices for the StarRouter and the InterRoute/5 were not set at press time. The StarRouter was expected to ship in August, with

Mixing Paint

Olduvai is about to publish ArtMixer, which was written by the developers of VideoPaint and GraphistPaint. ArtMixer is designed to complement Adobe Photoshop with paint features that Photoshop lacks, but Art-Mixer also is a full-featured package with some highly unusual qualities of its own.

In ArtMixer an object, say a blob of paint, can be modified until the object is deselected—useful for drawing quickly with a simple brush, then applying complex special effects. Curves can be modified, for example, by adding points. Text can be modified with any effect Art-



SQUEEZE A FEW TUBES OF OIL PAINT INTO YOUR FOOD PROCESSOR, MIX IT UP A BIT, AND TRANSFER TO CANVAS.

the InterRoute/5 to follow in September. The Concentrator was slated to ship in August at a list price of \$2990. Farallon, 510/596-9100.—T.M.

Atex Enters Macintosh Market

Kodak subsidiary Atex is known for its mainframe-based newspaper-publishing systems, but its first Mac product, Renaissance, is a hybrid desktop publishing—illustration program.

Renaissance provides more drawing tools than any page-layout program: Bézier curves; color blends; and the ability to align text along a curve, create masks, and add drop shadows.

Body copy in Renaissance is laid out in linked QuarkXPresslike boxes, with dummy text that passes its formatting to the final text when imported. Renaissance doesn't support page number-



ATEX RENAISSANCE FALLS SOMEWHERE BETWEEN AN ILLUSTRATION PACKAGE AND A DESKTOP PUBLISHING PROGRAM.

ing, headers and footers, style sheets, or other long-document features, but its libraries can store complex templates that format imported text.

Renaissance's production tools include knock-out support (but not choking or trapping) and color separation of elements created in Renaissance (but not of imported images).

Renaissance lists for \$895. Atex, 508/670-3430.—D.L.

News

Mixer supports, including incrustation, erasing through one image to reveal another beneath it.

Future plans call for Art-Mixer to be able to reconvert parts of a painting into objects, or even run backward step-by-step through a painting. ArtMixer will list for \$695; VideoPaint owners will be able to upgrade for \$149. Olduvai, 305/665-4665.—D.L.



VIRUS WATCH

CURRENT VIRUSES, TROJAN HORSES, AND WORMS



TYPE: Virus
FIRST LISTED IN VIRUS
WATCH: 8/92

INFO: Infects INITs; becomes active only on Friday the 13ths IMPACT: Destroys files and changes file and folder names and attributes to random garbage

Code 252

TYPE: Virus
FIRST LISTED IN VIRUS
WATCH: 8/92

INFO: Displays a message telling user it is destroying contents of hard drive IMPACT: After displaying message, it deletes itself without causing damage; infected Macs may behave erratically

MBDF

TYPE: Virus
FIRST LISTED IN VIRUS
WATCH: 6/92

INFO: Initially distributed via Trojan horse program called Tetricycle, but can spread like other viruses IMPACT: Does not destroy

data; may disable applications

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TURKEY SHOOT

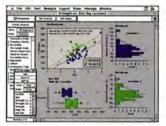
DESIGN FLAWS NOTED

Claris and Apple Apple is promoting Power-Books with a free copy of your choice of ClarisWorks, Microsoft Works, or Symantec's GreatWorks, but Apple's software subsidiary Claris charges extra (\$29) for the manual.

WriteNow 3.0 T/Maker was always the kind of thoughtful company that would notice and fix details—for example, adding extra space after italics because, in the old days, italicized letters would overlap neighboring roman letters. But today's fonts handle that on their own—and WriteNow still adds the extra space.

Lotus 1-2-3 Won't run with more than 256 fonts installed. Lotus says this isn't a bug, it's a "limitation." To be changed in an upcoming revision, but ship date and pricing have not been set.

Macworld will send you a Turkey Shoot T-shirt if we shoot your turkey in this column. See How to Contact Macworld.



A STATVIEW 4 ANALYSIS OF THE STRENGTHS OF SEA URCHIN SHELLS AT DIFFERENT PACIFIC COAST LOCATIONS.

StatView's New Look

Most people doing statistics get stuck using several programs: a spreadsheet, the stat package itself, maybe graphing software, and maybe something to make slides or flip charts. Now Abacus Concepts brings it all under one roof with StatView 4.

StatView 4 looks like a drawing environment. Browsers allow users to look through data for use in an analysis; to choose a statistical procedure; and to scan graphs, tables, and other elements in a file. You can save any element as a template and pour new numbers into it later.

StatView 4 is based on an object-oriented programming environment that Abacus developed. Programmers can build StatView extensions; Abacus also plans to market extensions. StatView lists for \$595. Abacus Concepts, 510/540-1949.—D.L.

The Book of Days

ProAct is a new company developing TimeBook, a personal scheduler. In TimeBook, events are set by dragging out a space on the calendar and typing in an event. Unscheduled tasks appear in a list and can be dragged from the list onto the calendar (events can also be dragged from the calendar into the task list).

TimeBook provides 32 task and event categories (only one category per task or event); the

TIMEBOOK SHOWING A LIST OF TODAY'S TASKS AND AN HOUR-BY-HOUR SCHEDULE WITH NOTES PASTED ON TOP.

ability to paste notes on top of the calendar; an alarm feature; and precise controls for modifying recurring events.

TimeBook requires System 7 and supports Apple events, which ProAct plans to use in a series of add-on modules. Time-Book will list for \$109. ProAct, 415/853-8463.—D.L.

Microtech's Upgrade Kit for PowerBooks

Microtech has announced the Ultimate Power Upgrade, a combination of a hard drive, RAM, and software designed to beef up PowerBooks. The hard drive is Microtech's RoadRunner 120i, a 120MB, 2½-inch internal device. The board is the Coyote 6, which has 6MB of RAM. Microtech ships the hard drive with System 7 installed, along with Symantec's SAM utilities and

News

Pastel's DayMaker PIM.

The list price for the Ultimate Power Upgrade is \$1579. Microtech hoped to ship the upgrade in July. The drive and the board should also be available separately. Microtech, 203/468-6223.—T.M.



SONATA FOR THREE CHAIRS: THE AUDIENCE IS THE ORCHESTRA IN THESE CHAIRS WIRED AS MIDI INSTRUMENTS.

Electromusical Chairs

It's not the electric chair, but it is electric. When you grasp the armrests, your body completes an electrical circuit and things happen-a razor might start buzzing and you might hear a MIDI piano. If people sit in the other chairs, more sound-makers join in-maybe a kitchen mixer or a MIDI guitar. The completed circuits send MIDI commands to Opcode Systems' MIDI package Max, running on a Mac IIfx. Custom-written Max objects then activate a tone generator, a sampler, and appliances. This interactive sound sculpture was created by Jocelyn Robert, artist-in-residence at The Banff Centre in Banff, Alberta, Canada. It will be installed at the Glenn Gould Conference in Toronto, September 23 through 27. For information about the Glenn Gould conference call 416/962-6200.—ANN GARRISON

TREND

Architecture in Context

Yerba Buena Center is a massive civic project in the heart of San Francisco that will eventually include a modern art museum, a performing arts center, a theater, a public garden, hotels, and maybe an office complex. Each structure is being designed

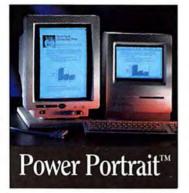
by a different architect—and until recently, nobody had a clue what it would all look like together.

Now an architectural firm called View By View has modeled the entire Yerba Buena proposal using Turbo 3-D, a very fast modeler imported from France, to produce photo-realistic images and fly-throughs of the complex, back-dropped by the San Francisco skyline. View By View founder Matthew Boryslawski says some of the architects have modified their designs after seeing them in context. View By View plans to market Turbo 3-D in the United States for \$2995, 415/775-6926.—D.L.



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Mechanical Orchestra

Despite winning a sculpture award, Matt Heckert claims he thinks only of function while building instruments for his mechanical sound orchestra performances. He controls his machines from a Mac Plus running Opcode Systems' Vision sequencing software, sending signals that direct the metal to roll, clang, and scrape against other pieces of metal; make piano wires stroke one another; and set resonators to filling the air with audible and palpable vibrations.

Heckert designs his computer/
motor interfaces with help from electronics engineer Eric Holland
and software engineer Mike Morasky. From September 16 to
November 22, Heckert will give an installation and performance
series at the University of California at Berkeley's art museum. In
1993, he will tour Europe. A videotape of his 1990 performance
at San Francisco's Artspace is available for \$14 from We Never
Sleep, P.O. Box 92, Denver, CO, 80201.—ANN GARRISON



AN EARLY LOOK AT A FEW TOOLS AND THE INTERFACE FOR THE MACINTOSH VERSION OF COREL DRAW.

Corel Draw for the Mac

Corel Draw is one of the Windows world's successful drawing packages, and Corel plans to announce a Mac product next winter.

The Corel Draw package will contain the drawing program with separate charting, presentation, and photo-retouching programs; all the programs will be linkable through publish and subscribe.

The drawing program itself will be able to manipulate 2-D objects in a 3-D space—for example, rotating objects off the page or extruding them—with some basic lighting and shading features. Corel Draw will also be able to impose true perspective on objects in the 2-D world. The program will have color blends; the ability to bind ob-



MATT HECKERT WITH A MAC-DRIVEN MIDI INSTRUMENT— AN ASSEMBLY OF ELEC-TRONICS, MOTORS, AND MACHINERY.

jects (including text) to a path; layers; distortion effects, somewhat like LetraStudio's, for display type; and some color-production tools. Pricing was not set at press time. Corel Systems, 613/728-8200.—D.L.



Long-awaited products

Long-awaited products

ACIUS's 4D Server

Shown publicly January 1991. Current ship date projected: end of summer 1992.

FoxPro/Mac

Discussed publicly winter 1990/91; not in beta as of May 1992; Fox says will ship in 1992.

Interleaf 5

Discussed publicly October 1990. No ship date projected.

AEC's FilePower

Announced August 1991; planned to ship winter 1991/92. Ship date not set; may be ready to show August 1992.

CA/Cricket Graph 2.0

Announced in January 1992; current ship date projected: August 1992.

Claris's MacWrite Pro

Announced spring 1991. Current ship date projected: late summer 1992

New Power

Engineered Software is revising its CAD package PowerDraw to version 4.0. The biggest change is 4.0's Pascal-like programming interface, which programmers can use to add new file translators and tools.

The new PowerDraw also supports global replacement of symbols—for example, it can convert all 3-foot-wide doors to 2½-foot-wide doors. It can select objects through layers; convert TrueType into Béziers (which, unlike normal fonts, can print on plotters); and has improved layer controls. Pricing was not set at press time. Engineered Software is also developing a CAM module for PowerDraw. Engineered Software, 919/299-4843.—D.L.



A POWERDRAW 4.0 DRAWING SHOWING A COMPLETE BUILDING SIDE BY SIDE WITH A DETAILED BLUEPRINT.

PLI Removables for Quadra 900

Peripheral Land Inc. (PLI) has designed four removable-storage drives that fit inside the Quadra 900. The Infinity Optical 3.5" is a 128MB erasable optical drive that uses a Sony mechanism. The Infinity Floptical 21MB, based on a drive from Insite, is a combination optical-magnetic device that stores 21MB. PLI has also created internal Quadra 900 versions of its existing Infinity 40 and Infinity 88 removable-car-



THE INTERNAL QUADRA 900 VERSION OF PLI'S INFINITY 40 REMOVABLE-CARTRIDGE DRIVE.

News



Information-Age

Flea Market

Do you have information to sell? Are you looking for someone to buy information from? An Autodesk subsidiary called AMIX (American Information Exchange) may soon be the place to start.

AMIX is an online system geared toward writers, consultants, programmers, analysts—anyone who buys and sells ideas and information. AMIX provides a structured process to negotiate and pay for deals, accounting services, and a place for customers to post remarks about service providers,

AMIX collects a small sign-up fee and hourly charges but makes its real money from a commission on sales arranged online. The system is operating now, though AMIX is still focusing mostly on finding sellers. AMIX, 415/903-1000.—D.L.

tridge hard drives, which are based on SyQuest mechanisms that store 44MB and 88MB, respectively.

The Infinity Optical 3.5" lists for \$1899, and the 128MB cartridges list for \$99. The Infinity Floptical 21MB internal drive lists for \$549, and its floptical disks list for \$49. The Infinity 40 for the Quadra 900 lists for \$699, while the Infinity 88 lists for \$799. Media for the two drives sell for \$129 and \$279, respectively. All the products are currently available. PLI, 510/657-2211.—T.M.

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Generation Systems' 20-Inch Color Monitor

Generation Systems has begun offering the Generation Systems 20-inch Color Display, a 20-inch color monitor that comes with either an 8-bit or a 24-bit graphics adapter. The two-page display incorporates a Hitachi tube with a maximum resolution of 1024 by 768 pixels, a refresh rate of 75Hz, and an antiglare screen.

The 8-bit model comes in versions for the SE/30, the LC, and NuBus Macs. The 24-bit model works with Mac II's and Quadras only. The 8-bit version lists for \$3195 including monitor and adapter, while the 24-bit subsystem lists for \$3995. Generation Systems, 612/633-5222.—T.M.



THE GENERATION SYSTEMS 20-INCH COLOR DISPLAY HAS A MAXIMUM RESOLUTION OF 1024 BY 768.

8-bit color

Don't know No answer

Multiple responses were allowed.

JUST FOR FUN

Headline Harry and the Great Paper Race

In this amusing game from Davidson & Associates, you are cast as a cub reporter who must get the scoop, beating your dishonest competitor Marvin Muckracker and striking a blow for honest journalism. Reminiscent in

some ways of one of Brøderbund's Carmen Sandiego games, Headline Harry requires more analysis than Carmen does of the information presented as you try to piece together the right story from various clues, despite red herrings and blind alleys.

The game includes QuickTime video clips and animations, including actual foot-



age of historical events. You investigate events in America's recent past (1950 to 1990), as well as stories on the arts, sports, science, and entertainment. It was fun for me, but being a news dude and all, I could be prejudiced. Headline Harry and the Great Paper Race began shipping in May at a list price of \$59.95. Davidson & Associates, 310/793-0600.—T.M.

Utilizing System 7

The first product expected from a new company called Atticus is Super 7 Utilities, a collection of seven utilities designed for System 7.

The collection includes SuperMenus, which supports tear-off menus in any application (they reappear where you left them when you relaunch); Printer Picker, which lets you choose any available printer from a menu instead of the Chooser (each application can be assigned to use a specific printer); and Comment Manager, which lets you edit the contents of the Get Info box while in the Save or Open dialog box and protects them

when rebuilding the desktop.

Super 7 Utilities will come with an envelope for returning its packaging to Atticus for reuse. It will list for \$129. Atticus, 203/324-1142.—p.t.



THE PHASER IISD DYE-SUB-LIMATION PRINTER PRODUCES PHOTO-REALISTIC OUTPUT.

Tektronix Dye-Sub Printer

Tektronix has introduced a dyesublimation printer that offers 16MB of RAM, PostScript Level 2, and photo-realistic color quality for less than \$10,000. Called the Phaser IISD, the printer includes PhotoFine, a new set of image-rendering algorithms that improve the appearance of fine lines in text and of color shading in graphics. PhotoFine will also be included in a new version of the company's Phaser III PXi, a phase-change, color inkjet printer that uses plain paper. The new version of the Phaser III PXi will have the same name, the same \$9995 price, and will replace the previous version.

The Phaser IISD comes with serial, parallel, and AppleTalk ports, and a \$495 EtherTalk interface is optional. The base 16MB of RAM can be expanded up to 64MB. The printer includes

36%

16%

News



MICROSOFT PROJECT 3.0 WITH USER-CUSTOMIZABLE TOOL BAR. THIS HISTOGRAM SHOWS MONTHLY COSTS.

Microsoft's New Project

Microsoft is jumping Project from version 1.1 to 3.0 and adding a better interface, Apple events support, a macro language, a calendar view, and improved presentation features.

Project's macro language is not a watch-me recorder but a scripting language for customizing the program. Project can trade information with Excel and trigger macros (it will include Excel macros for some tasks, such as adjusting resource costs for inflation). Savvy users can create dialog boxes; modify the tool bar, as in Excel 4.0; and redefine menu items.

Project's outliner is now ten levels deep and automatically assigns numeric (WBS and OBS) codes; you can collapse and expand outlines in Gantt chart view. Version 3.0 has new resource histograms and improved resource leveling; new predefined reports; page preview; and—yes!—a Microsoft spelling checker. Project lists for \$695. Microsoft, 206/882-8080.—D.L.

a 24MHz 29000 RISC chip. The IISD requires special paper that Tektronix estimates will cost between 50 cents and \$1 per page. The Phaser IISD lists for \$9995 and was expected to begin shipping in late July. Tektronix, 503/682-7377.—T.M.

Survey: Monitor Systems Used Type of Monitor All monochrome and gray-scale monitors 42% 9% 19-inch or larger 5% Full page 14-inch 3% 13-inch or smaller 30% All color monitors 68% 19-inch or larger 10% 16-inch 15-inch or smaller 51% Type of Color Monitor System 24-bit color 46%

Figures are based on 596 respondents to a 1992 Macworld mail-in subscriber News survey.

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Five Claris Titles. One Sleek Container.

Introducing ClarisWorks, The Only Software Package You'll Ever Need.

ClarisWorks has redefined the concept of integration. In the past, other products have been assembled under a menu system and labeled "integrated." They were in the same box, but they didn't really work together. These packages were often fat, requiring too much memory; and slow, because moving between them meant closing one and opening another.

Why Bother? ClarisWorks has developed the ultimate integrated environment, wherein all six programs live and work together. Create great-looking newsletters, brochures, reports and more. Just click the tool you need and the menus and commands change automatically. You get a WYSIWYG display, so you can see what your document will look like when it's printed — and an on-line spell checker and 660,000-synonym thesaurus. This sleek integration means students and novice users can experience new uses for their computers.

Engineered elegantly into just 580K, ClarisWorks is a must for PowerBook users, and the perfect package for new users. Creating a document with text, graphics and charts is truly simple, and you'll do it as if you were working in one program. The ingenious integration makes it very comfortable. And of course, there's context-sensitive and balloon help for just about everything.

The programs themselves are not trimmed-down, also ran programs. They are from Claris, a leader in the Macintosh market. These programs feature the same proven interface you'll see in dedicated Claris applications like MacWrite II, MacDraw Pro, Claris Resolve and FileMaker Pro.

Word Processing. The Heart Of ClarisWorks. The heart and soul of your system. Your word processor. ClarisWorks features one of the best in the business. Bring it up and format a page in no time flat — set up custom tabs, margins, indents, line spacing and justification. Use your choice of fonts for just the right look. Quickly create pro-quality mail merged letters, using the database, and send them to everyone on your mailing list.

Ready to get fancy? It's easy with ClarisWorks' multiple columns, headers and footers, link frames so type flows smooth as silk between columns, around graphics and more. Hey — you can also rotate type sideways if you want, great for charts and special effects.

Spreadsheet Power. Would you believe there's over 90 built-in functions? You can construct sophisticated models using the mathematical, statistical and financial features. You'll answer tough questions fast with ClarisWorks' powerful time, date and logic capabilities. You also get complete formatting control to create vari-



ous column widths, row sizes, character formats and borders. Formulas are extremely easy to create and use — to unleash the power that you need for nested complex functions.

You'll also love the ability to perform manual and automatic recalculations and the ability to control the execution of calculations locally and globally.

Charting: It's A Snap! Pictures speak louder than numbers, and your spreadsheets will sing with great looking charts. Just highlight the data you want to chart—then a couple of clicks and you've created a sleek, visual display of the information. And you can choose from seven different chart types—with 280 possible combinations of colors, grids and legends. Whenever you change the data, your chart will be automatically updated. Plus other powerful features.

Database Magic! ClarisWorks features a full-blown database with pro-quality reports and management features. Searching and sorting functions are world-class. You can isolate the data you need by quickly specifying the search parameters. Quickly organize information with automatic sorting. If you've never used a database before, you'll love how easy ClarisWorks makes organizing your data. If you're a seasoned database veteran, there's plenty of power under the hood to satisfy even the most demanding tasks.

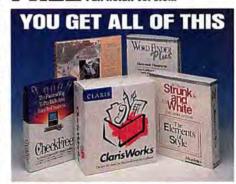
You can easily create mailing labels, using any one of the standard layouts that included in the package, or customize them as needed.

Create Grand-totals and sub-totals quickly and summarize your information, highlight key results to present an accurate analysis with plenty of impact. The visual record selection enables you to select specific records without using formal search criteria — just point and click!

Graphics Tools For Everyone. Speed and flexibility — that's what it takes to make your documents look good

on paper. And that's what you get with ClarisWorks. Select from a great design palette: create lines, circles, ovals, polygons and more. Reshape, resize and redesign to produce precise, polished graphics. Then position text and graphics any way you want to achieve the perfect effect.

Word Finder Plus, Elements of Style, Dynodex and CheckFree when you buy ClarisWorks Full Retail Version.



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REVIEWER'S NOTEBOOK:

REVIEWER'S NOTEBOOK: If you're ready to get into CD-ROM, Tiger has a spectacular offer on the fastest reader in the business. The NEC CDR-73, with a remarkable 350 millisecond response time — for just \$399! Compare — you won't find a CD-ROM reader with this much muscle with a pricetag this modest.

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desktop.

We've also assembled a low-cost bundle of the most popular CD-ROM titles into what we call the Tiger Reference Pack. It includes: The CIA World Fact Book, TIME's Desert Storm on CD, Toolworks Illus-trated Encyclopedia, World Atlas, US History, TimeTable of History: Science and Innovation and Family Doctor. Plus, we'll throw in a pair of Persona Micro Speakers for the Mac so you can hear the sounds of these great CDs. That's over \$1400 worth of current CD-ROM software and accessories for just - are you ready for this? - Just \$179!

There's simply NEVER been a better deal on CD-ROM. Don't even bother looking anywhere else. You've always trusted Tiger to do the shopping for you

and get the best price.

If you add the whole thing together — the CDR-73, Reference Kit and Interface, you've got the hottest bun-dle in the business for just \$657. Retail on these items is over \$2000!

The Toolworks Illustrated Encyclopedia. Critically

Toolworks Illustrated Encyclopedia features the entire text of a 21-volume encyclopedia stored on a single compact disc! The Toolworks Illustrated Encyclopedia allows searches by title, word, or phrase of the latest information on science, contemporary life, law, sports, and much more. More than 30,000 articles enrich this highly regarded reference.

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economic history. In addition, the disc includes 1,000 photographs, maps and tables relating to historical events.

Persona Speakers. All The Extras For Sound And Motion CD-ROM. The Persona speakers are designed to compliment the look of your Mac. The Persona Micros are compact dynamos, churning out rich, vivid sound. Your CD can produce sound that good. The Persona Micros match your Mac perfectly, and take up just a touch of space on your desktop. They're small enough (and powerful enough) to put on a shelf - or out of the way completely behind a plant!

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Terminator, Software and Earphone \$79.00 BCD8399 Tiger Reference Kit \$179.00



REVIEWER'S NOTEBOOK: The Mac used to be a simple machine. It was a 128K write-and-paintwonderland, the system folder was just a boot-up utility and the applications were limited. It was a computer for the rest of us ...

People who bought Macs way back when, circa 1984, paid more than they would have for a stodgy DOS machine, but they didn't mind - they knew the potential of the fun-loving box with the monitor built in

and the cute little icons.

They were right. The Mac has grown up, becoming a powerful and mature business tool in its own



MacEKG tests individual hardware components to seek out possible faults — before they become major problems. The VIA (Versatile Interface Adaptor) chips handle all user input like the mouse and keyboard. A faulty VIA can cause inconsistent cursor movement, and if allowed to get worse, complete system shutdown,

right. Today, the Mac enjoys a starting role in a variety of businesses, from graphic designers, to CEOs to television producers. The Mac can run spreadsheets with the big boys, produce pro-quality type, 3-D animation and more.

With this amazing growth, the Mac now has some serious responsibilities. It must handle CDEVs, extensions, scanners, viruses, magabyte drives, virtual memory and voice recognition.

That means your Mac must be modified for the way you work - and what type of work you do. And

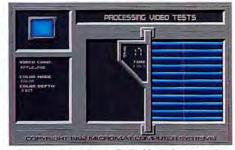


If EKG detects a substantial decrease in performance, it displays a warning and directs you to the offending part. This is precisely what any technician needs to know to repair a Mac.

that opens the door for possible problems. Drop an extension into your Mac's system folder and watch the fireworks!.

MacEKG is the most advanced, easiest-to-use system diagnostic program we've seen, helping you prevent problems before they even think about occurring. You can run a series of tests and get immediate, understandable results on what's going on and what's going wrong. MacEKG watches your system with a set of fea-tures that used to be available only to Authorized Apple technicians. Moreover, some of the routines included in MacEKG are not available anywhere else.

Apple has served up a tempting curveball with System 7. It's advantages fulfill many of the promises that the Mac made in the early days. But there's a funny



One of the greatest factors affecting Mac performance is the video processing. With full-color monitors, there's over 7 million addresses for the processor to track. This 25 step test measures video performance in any monitor setting, even 24-bit color.

spin, and if you use System 7, you know what we mean.

Let MacEKG handle the technical stuff. It quickly learns your system and performs a carload of testseverything from logic performance, RAM stability, software compatibility, inventory control, video processing, integrated circuit integrity, media verification and overall system health. It analyzes what it finds and provides you with a "dashboard" of your system,



RAM is vitally important to the speed of your applications. Not only does MacEKG check that your RAM works, it checks the rate of it's performance — then compares it to previous tests. If your RAM is getting slower over time, you know to replace it before it's too late.

with helpful suggestions on how to improve performance while eliminating the possibility of intermittent system failure.

Unless you're still running a vintage 128K Mac, you need the advanced, automatic diagnostics of MacEKG.

An Examination Of Your Mac's Unique Personality. While there are great products available for many of your system's possible problems, nothing provides you with a concise, complete and understandable view of everything that's going on under the hood. Only MacEKG learns your system inside and out, exploring all possible aspects of your work. MacEKG is the only product available that can tell you if everything is OK.

It can also tell you how to squeeze every bit of performance out of your Mac. For example, did you know that a Mac Plus can outrun a Mac II? It can if the Mac II is loaded with extensions arranged inefficiently. The Mac Plus contains an accelerator and lean system folder. Try it and see...

You'll learn how INITs can degrade your system's performance by up to 2% per extension, and if you're running 3 Or 4 of them...well, it adds up.

MacEKG knows about performance vs. functionality. It knows the difference between a hardware problem and a software problem. Often, a seemingly unsolvable problem is hidden in some unusual or whiz-bang code in a program, although it shows signs

of being a hardware problem. MacEKG could tell you in a second.

Another great MacEKG feature is its ability to "road test" RAM before you actually unleash it on your system.

MacEKG is like having a highly trained technician on a diskette. Although you won't need to know the



You don't need to be a technician to look at the Histogram and tell if your system is loosing performance or not. Each test is summa-rized in a bar, and the Histogram is like a month at a glance health report for your Mac.

inner workings of your Mac to get the most from it, you'll find yourself becoming a Mac expert in just a few short sessions. MacEKG is a must for the Mac user who wants a trouble-free, high performance system.



For intermittent failures, you need to Reactivator. If continually tests, powers down and retests until the problem surfaces. This is a heaven-sent tool for anyone trying to find heat-related problems.



EKG BCD2920 Mac EKG\$98.90



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Bone-crushing Radius Rocket Speed!

the lips of art directors, designers and studio producers who use Macs. For years, the creative community has turned to Radius to speed their work and enhance their creativity. As an authorized Radius dealer, Tiger presents The Rockets: advanced Motorola 68040 processing power at a new lower price.

The revolutionary Radius Color Pivot Display is the only monitor that works the way you do - in both portrait and landscape modes. See a full page without

scrolling, A spectacular value!

ACCELERATORS: The Rocket 25i provides lightning quick speed for Mac page layout and publishing applications. The Rocket 25 straps on 25MHz processing capabilities and includes floating point instructions. Then there's the Rocket 33 - featuring the fiery rage of Motorola's 33MHz 68040 processor. The Rocket 33 clocks in at over 32% faster than the 25MHz "040" (COMPARE VALUE! The Rocket 33 is 30% faster than the Quadra 700 upgrade and is hundreds of dollars less!) The Rocket 33 is the right board for 3-D modeling, like Pixar's MacRenderman, popular animation applications, publishing and image processing programs and more

THE RADIUS ROCKET 251

This is hot new Motorola '040 speed technology at an unbelievably low price. Built to dramatically speed up QuarkXPress, Adobe Illustrator and Microsoft Word. Growling 25MHz '040 processing performance for the Mac II, IIx, IIcx and IIci. At just \$1,395, the Rocket 25i is less than HALF THE PRICE of the Quadra 700 Upgrade (Apple charges you \$3,495 for it ouch!). One of the industry's hottest boards at a great price. Full support of System 7, NuBus slot design for effortless installation. Great for speeding up RIPs! We were impressed with the software that is included with the Rockets. It allows your system to selectively

ing the Rocket more compatible with existing Macintosh software than the Quadras themselves!

Color Portrait And Landscape Display In One!

The immortal Radius Color Pivot. The only monitor in the world that can display a full page in color and pivot to display a full page landscape too! Ask a pro how much easier that makes his life. Now your Mac can have this freedom, along with resolution up to 640 x 870. And the Color Pivot can provide full 16 color support (4-bit color) from onboard video in the Ilsi or - so you don't need an interface card.

The Color Pivot is perfect for design professionals

and advanced desktop publishers, but it's also an ideal upgrade for everyday especially if use. you're "in and out" of a variety of applications. Just pivot to see as much of the screen as you need. an excellent



radus

value. Consider this - the only other way to see a full page in actual size without scrolling would be to buy a or larger display - many hundreds of dollars more than the Color Pivot!

NEW VIDEOVISION!

High-quality video directly from your Macintosh!

his one amazing board drops a bomb on the Mac market with a new dimension in multimedia. Integrate high-quality Mac audio, video and graphics and output them to videotape, playable on any VCR — with absolutely NO flicker! Compatible with all applications that support QuickTime, so you can also capture digital video information as QuickTime movies or still images.

Introducing the new VideoVision NuBus card from Radius. Its 24-bit technology delivers 16.8 million colors and crisp image resolution. Produce anything from QuickTime slide presentations to sophisticated multimedia presentations with full motion video.

VideoVision supports S-video along with multiple timings and resolutions. Sounds technical, but it means that your video output is compatible with a wide range

of Radius, Apple and other computer displays and video formats.

h e professional presenter will he born again with the unmatched quality and resolution of the Vi-

deoVision NuBus card.

It is a giant leap in multimedia technology.



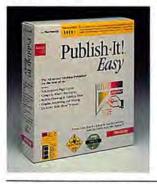
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REVIEWER'S NOTEBOOK: If you're about to enter the world of Macintosh desktop publishing, or if you're an experienced user who wants fast, pro-quality results without dredging through hundred-page-manuals, Publish-It! Easy is the award-winning, System-7 Savvy product that MacWorld magazine calls "... the Swiss Army Knife of desktop publishers". Now for a limited time, you'll be able to switch or upgrade to this 4-and-ahalf mice rated package for only \$99 - if you currently own a desktop publisher or word processing program. This is a \$150 savings off the suggested retail price of \$249.95. Simply send us the title page of the DTP or word processing manual you are currently using, and you'll own Publish-It! Easy Version 2.1 for only \$99. Publish-It! Easy is also available in the new Corporate Network File Server Version.

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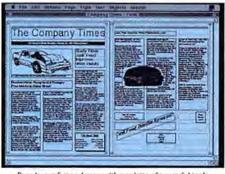






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Unique "What-If" Features. And Publish-It! Easy's unique "What-If" design features makes new and exciting layouts come to life with "Libraries" and "Proxies" that take the mystery and legwork out of the design process. Change type styles or sizes and the text automatically reflows. Headlines instantly fit into the area they're supposed to and subheads tuck cleanly into proper position. Indents are done for you, page numbering and book binding margins are automatically added and more. Publish-It! Easy even handles vertical text justification, aligning text with the top, center or bottom - or any way you like it - with just a mouse click. You can quickly import text from your favorite word processor (including Microsoft Word/Works, WordPerfect, MacWrite I and II, WriteNow and others) with all type styles and fonts intact! Touch up scanned images with extensive professional tools and import graphics from Adobe Illustrator, MacPaint, Su-



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hen you feel the need for speed, DayStar is the hen you leet the fleed for speed, but a property company to turn to for Macintosh list upgrades. From the award winning PowerCache to the inexpensive DualPort, DayStar has what you need.

DualPort IIsi DayStar's DualPort provides twice the benefit of Apple's standard Processor Direct Slot (PDS) adapter.

· Provides a 20 MHz math clip to supercharge math functions

· Offers a standard PDS slot for adding video and Ether-

net expansion cards

· Provides a Ilci style cache connector for adding FastCache or even the blazing fast PowerCache

FastCache IIsi The Fast-Cache is the leading cache card for the Mac. It's for users who demand a low price without compromise in quality. The ideal

cache card for all applications. FastCache even boosts

performance of programs with numerical calculations that use the math chip.

By storing data and instructions in superfast Static RAM, the FastCache enables your Mac to run 20-40% faster. Includes the DayStar DualPort with a passthrough PDS slot and a math chip.

Award Winning PowerCache DayStar's PowerCache allows Mac IIsi owners to transform their machines

into Quadra class Macs. proprietary DayStar's technology combines blazing fast processors with a superfast RAM cache. The PowerCache accelerates virtually every function in all applications, including graph-



ics, publishing and spreadsheets. It saves you time all day long.

The PowerCache's innovative design allows for complete transportability from one machine to another. The same card fits almost any Mac, including the LC, LC II, SE/30, II, IIx, IIcx, IIsi and IIci, If your machine changes, simply call DayStar to swap adaptors at no charge.

Also, the Mac IIsi adapter provides a pass-through PDS connector for adding additional expansion cards.

Choose the speed you need:

- . The 33 MHz PowerCache offers near IIfx speeds.
- . The 40 MHz PowerCache provides IIfx class performance
- . The 50 MHz PowerCache boosts your Mac to near Quadra speeds

ComboCache IIsi DayStar's Combo Cache is more

than just a fast card. Not only will the ComboCache give a boost to everything your Mac does, but this 4-inl upgrade expands the capabilities of your Mac IIsi for the price of a single cache card!

ComboCache IIsi provides:

- · A 32K Static RAM cache that speeds up everything you do from 20% to 40%
- · A PDS expansion slot for adding video, Ethernet or other cards
- An optional 20 MHz math chip to turbocharge math functions on the IIsi, which doesn't have a motherboard math chip

The DayStar Advantage All DayStar IIsi upgrades include PowerMath software to speed up SANE math calculations up to 400%. And, when your need for speed increases, you can take advantage of DayStar's Swamp-Up program and upgrade to the 50 MHz PowerCache.

	DayStar	
BCD2831A	PowerCache IIsi 33MHz	. \$749.90
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BCD2905	ComboCache IIsi w/Coprocessor	. \$339.00

st, Easy Charts For Absolutely Any Purpose!

REVIEWER'S NOTEBOOK: Three exceptionally well designed charting programs from Kaetron: TopDown, FlowChart Express and OrgChart Express (it's brand new). Each product provides the most extensive feature set we've ever seen for their particular task. Each is beautifully designed - anyone can use them without even looking at the manual. Kaetron has engineered clean, snappy Mac interfaces into these programs, and they are actually fun to use.

TopDown enables you to create corporate charts, system designs, training materials and procedure charts in a snap. FlowChart Express puts the most sophisticated tools for any type of flow chart (using ANSI standards) right at your fingertips. You'll whip out work flows, paper flows, office procedures, chains-ofcommand, business plans and more.

New OrgChart Express continues the tradition

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with powerful, simple Organizational Chart tools.

TopDown, The SuperCharged Design Tool, Charts and diagrams with minimal effort. Just open TopDown and you have the fastest, easiest, most convenient charting tools just a click away. Create anything from a simple procedure chart to complex system definition. TopDown contains 36 standard symbols — just click and it's positioned in place in your chart (you can also create your own custom symbols). Connecting lines are simple, just two clicks does it. And if you rearrange your charts or resize boxes, TopDown automatically redraws the lines.

Save Time, Save Effort. Charts and diagrams used to be a lot of work. TopDown takes the labor out of the process with a host of great features. Choose from ANSI and other standard symbols, place lines, add cap-

tions and patterns, structure chart symbols as a custom font, colorize

your charts and more.

TopDown makes use of the Mac's familiar click-and-drag drawing method, and features a revolving palette that keeps your workspace uncluttered. There's plenty of on-line help (although you probably won't need it) and you can keep the details hidden until you need them.

TopDown Moving through couldn't be easier, just pop up a menu and select to move between drawings. Insert anchor points into drawings to act as bookmarks. Split your screen horizontally or vertically so you can see more than one drawing at once. Handy Offscreen connectors

connect charts that run off the page. Import and export drawings as PICT files.

NEW! OrgChart Express

REVIEWER'S NOTEBOOK: The fastest, easiest way to create organizational charts on your Mac. So powerful, it makes drawing downright simple. So flexible and feature-rich, that it becomes an important personnel management tool.

Create color-coded org charts, move employees, revise structures and more - all with sleek drag-anddrop ease. A powerful database keeps track of all your essential employee information like job description, office phone number, salary and more. OrgChart Express' search and sort capabilities can find just the right person for any assignment.

OrgChart Express is System 7 savvy and offers definable styles, zoom in and out, one time data entry, aliases (a person occupying more than one position), password protection, auto alignment and more.

- · Personnel vs. Position Information: When creating a field, you can specify whether the fields pertain to the position or the person.

 • Sort in a List View: Personnel window is sorted us-
- ing the same criteria. Provides an easy way to make mailing or phone lists.
- Occupying Multiple Positions: Allows you to create org charts that are grouped by function rather than by person.

KAETRON

BCD2909	FlowChart Express	. \$94.90
BCD2910	TopDown	\$215.90
	TopDown Upgrade	\$129.95
	OrgChart Express	



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Upgrade to 1-2-3: Just \$9995 After Wire Transfer Rebate From CheckFree

REVIEWER'S NOTEBOOK: The thoroughbred of Macintosh spreadsheets. Not a step-child of the original DOS product, Lotus 1-2-3 for the Mac has been designed from the ground up to exploit the power and flexibility of the Mac. Revolutionizing financial software with true 3-D worksheet capabilities: Excel doesn't have it, Claris Resolve doesn't have it. Fully featured, with System 7 support; completely customizatured, with desktop tear-off menus, most functions require just a mouse click. Excel users will be surprised at the power and grace engineered into Lotus 1-2-3 for the Mac. You also get a \$30 rebate on the Live version.

otus' deep understanding of advanced spreadsheet and financial modeling technology is present here. True 3-D worksheet management, incredibly nimble relational database power and easy-to-use formulas. Over 14 million people rely on the Lotus concept to create budgets, perform precise forecasting and instant analysis. Proposals and presentations ring with clarity

data right Apple Dar full Control of the Control of

with Lotus' financial graphs and tables. It's easy to edit cells, create graphs, and import data, using the same menus, tools and file formats across worksheets, graphs and macros.

Using 1-2-3 for the Mac is fast and simple. It embraces new System 7 and provides the classic 1-2-3 menu for complete keystroke compatibility. We love the use of floating toolboxes and palettes, allowing customization of your workspace. Moving around is silky and streamlined, allowing you to quickly select ranges (before or after starting commands). You get in-cell editing and the ability to directly manipulate chart elements. You also get 256 colors, 49 different fill patterns and 230 line styles and thicknesses for use in your spreadsheets.

Along with the brutal power of 3-D worksheets, you can easily customize database forms for automatics fill-in and printing, perform a host of advanced relational capabilities, including swift queries (a particularly useful feature), an ever-active macro recorder (an incredible time saver!), and automatic compression routines for any printer. By the way, Lotus throws in a free copy of Adobe Type Manager.

With 1-2-3 for the Mac, complicated tasks, like consolidations, don't require tedious linking or endless dialog box activity, just a couple of mouse clicks is all it takes. Easily bring remote data right into 1-2-3 through DataLens and the Apple Data Access Language. Read FoxBase and dBASE files directly.

Lotus 1-2-3 for the Mac towers over the capabilities of Excel in a host of areas. Its ability to perform true 3-D functions is an enormous advantage. And the spectacular range of colors and graphic devices available within the worksheet. Excel doesn't allow pop-up functions or range names, Excel doesn't allow you to directly manipulate elements in charts, or perform in-cell editing Lotus 1-2-3 for the Mac does. Excel doesn't include relational capabilities, floating toolboxes or palettes, you can't customize your workspace or have your macro recorder on all the time. 1-2-3 does.

When it comes to spreadsheet features, no one even comes close to 1-2-3 for the Mac. That's because

only Lotus has engineered true 3-D worksheet power into 1-2-3. Excel users are converting in droves to the newest, hottest spreadsheet product, finding features like relational joins and queries, the 1-2-3 Classic menu for 100% keystroke compatibility, vast color and graphics support and a dozen other advantages. In fact, we've compiled a feature-by-feature comparison for your review. But there's an intangible difference: The proven 1-2-3 approach to the worksheet, Just the feel of the incell editor, pop-up functions and macros display the refined Lotus functionality. John Sculley, CEO of Apple says "...This is a spectacular product." And MacWeek raves: "The most impressive aspect of the program is its implementation of the Macintosh interface. Mac aficionados will have no problems with the program — 1-2-3 Mac is a Mac application to the core." The numbers have never looked so good...

More Powerful Than A Locomotive. True 3-D worksheet management lets you tackle complex tasks, without complicated linking or dialog boxes. Bring remote data right into Lotus 1-2-3 through DataLens® and the Apple Data Access Language. Then work with it using full relational database power and custom data-

base forms. No matter what you're doing, you'll see only one set of menus, tools and file formats. You'll get so much done with so little to learn.

No Mac Is An Island. Share files, macros and applications with Excel users? With PC users? Yes. You heard right. 1-2-3 for Macintosh directly reads and writes Microsoft® Excel for Macintosh files. So you can make the switch to 1-2-3 and never look back. What's more, 1-2-3 for Macintosh is fully compatible with all 1-2-3 files and macros, including PC versions. More than

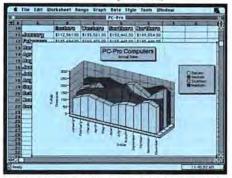
fourteen million people already rely on Lotus 1-2-3 for accounting, budgeting, forecasting, analysis, proposals, presentations and much more.

See How The Newest Macintosh Spreadsheet Stacks Up.

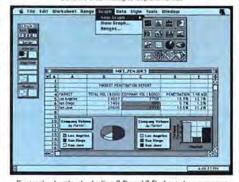
Features	Lotus 1-2-3 for Macintosh	Microsoft Excel 3.0
Optimized for Macintosh		
· Supports system 7 features	Yes	Yes
 Floating toolboxes and palettes for custom workspace 	Yes	No
 Directly manipulate chart elements 	Yes	No
In-cell editing	Yes	No
· Context-sensitive, graphical help	Yes	No
 Select ranges before or after starting commands 	Yes	No
 Supported colors/fill patterns/ line styles and thicknesses 	256/49/230	16/18/32
Powerful Spreadsheet Features		
True 3-D worksheets	Yes	No
 Pop-up functions and range names 	Yes	No
Menu promotion	Yes	No
 Same menus, tools, and file formats across worksheets, graphs, and macros 	Yes	No
 Adobe Type Manager included 	Yes	No
Automatic compression on all printers	Yes	No
 Macro recorder always active 	Yes	No
 Customizable database forms 	Yes	No
Relational joins and queries	Yes	No
Directly reads FoxBase and dBASE files (.DBF)	Yes	No
Compatibility		
 Reads and writes all 1-2-3 files 	Yes	Yes
 Runs all 1-2-3 macros without translation 	Yes	No
 Reads and writes Excel files 	Yes	Yes



"Classic" 1-2-3 menus work the same as the 1-2-3 everyone knows and loves. |Or use the standard Mac menus — your choice.|



Only 1-2-3 has true 3D-Worksheets. Perfect for linking Profit Centers and multiple departments.



Fantastic charting including 2-D and 3-D charts in numerous styles and types — all available with the click of the mouse. And only 1-2-3 has floating toolboxes for ease-of-use.

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1-2-3 Classic Menu provides

No

The 400 DPI, PostScript Level 2, Risc-Based Laser Printer That You Can Afford!

REVIEWER'S NOTEBOOK: If we had room for a larger headline, we would have also told you that the Generation Systems 415 Laser Printer has 4Mb of memory, 35 resident fonts and can print 8.5" × 11" and 11"×17" pages — up to 15 of them per minute! The reproduction quality is amazing: crisp images, consistent blacks and reliable performance for any job.

The fact is, this is a great laser printer that is priced to absolutely fly! Compare the Generation Systems 415 vs. lasers from ATI,

DEC, LaserMaster, OMS and Fujitsu. The Generations Systems is the lowest cost performer in the category! The Generation Systems 415 has a SCSI port, so you can easily plug in any standard SCSI hard disk to download fonts, images, logos, your letterhead and more, making it a great network printer. By the way, there's also parallel, serial and AppleTalk ports so you can plug in PCs, Macs and other types of computers and have them all running jobs to the printer at the same time!

Sure, we were skeptical when the crate arrived. Inside, we were told, was a fire-breathing laser printer that could turn the industry on its ear. With RISC (Reduced Instructional Set Computing) and PostScript Level 2, you'll see unparalleled speed. PostScript Level 2 offers enhanced capabilities and great output.



And as PostScript Level 2 continues to develop, you'll see innovations like file compression/decompressio, advanced caching, memory management technology and more.

With ultra-fine 400 dpi resolution, the Generation Systems 415 breaks the 300 dpi barrier, offering sharper, richer grayscale images. Compare: a 300 dpi printer lays down 90,000 dots per square inch — 400 dpi delivers shattering realism with 160,000 dots per square inch! It is the ideal machine for word processing, desktop publishing, large spreadsheets — and just about any printing task. Even small type prints with incredible clarity.

GENERATION SYSTEMS

BCD2906 415 Laser Printers \$4999.00

The 32-Bit, 16.8 Million-Color Paint Program That Costs Just \$29.95!

REVIEWER'S NOTEBOOK:

It's hard to imagine that a propaint with gram true 32-bit color and a palette of 16.8 million colors, plus an extensive toolbox of creative features can sell for just \$27.95. But a few min utes with Ex-Color pert

Paint and you'll know that it's true. Expert Color Paint brings professionalquality paint and photo preparation down to earth with one of the most feature-rich, easy-to-use products we've ever seen. This one is fast, fun and loaded with all the extras — including System 7 support.

rankly, the high-priced paint products are a little embarrassed. They've been telling customers that a paint system has to be expensive to be good. And while that may have been true in the past, the wall has come down. Expert Color Paint is a powerful, yet simple-to-use product that produces

great looking images, just like the price

great looking images, just like the pricey packages, and adds a studio-full of advanced toolbox features, such as lasso and magic wand, gradient tools, dropper, air brush, paint can, patterns and more. For image editing, there's blurand sharpen, distort, skew, brightness filters, contrast control, image scaling, paint dithering, antialiasing (smoothing), rotate, flip, stretch and slant.

EXPERT COLOR PAINT

Two "Must Have" Mac Utilities.

REVIEWER'S NOTEBOOK:

Here's two additions to any Mac you'll use everyday: a file browser that quickly lets you view any file, even when you don't have the original application, and a super calculator that's a must for every desktop publisher.

CanOpener

MacUser Magazine called it
"A Must—Have Utility". It's the ultimate file browser and text searcher
we've ever seen. You can search an entire folder for any occurrence of text.



You can view the contents of any file, including application files. You can even extract pictures of icons and tools from application files! Who needs the original application? You can quickly look at the contents of virtually any file — text, pictures, sounds, whatever — and copy



them to the Clipboard or to a new file.

Calc +

Quick. What's 6 picas 9 points + 10 picas 9.25 points? With the fantastic

Calc+ you'd instantly know it's 17 picas 6.25 points. And then with one click you'd know that's 2.92 inches, or 7.417 centimeters, or you could convert to the European standard of ciceros. Instantly and always available at your fingertips. Scroll up and down the paper tape, zoom full-size, copy just one line or all lines to the Clipboard. All this and more from this ingenious,

easy to use calculator. Calc+ is a must for anyone doing page layout, graphics or desktop publishing.

ABBOT

BCD2907 Calc + \$39.00 BCD2908 Can Opener 2.0 . . . \$59.00

When Your List Of Things To-Do Gets Too Big To Keep In Your Head.

REVIEWER'S NOTEBOOK: The remarkable thing about In Control is its uncanny ability to do things the way you want. To organize its functionality the way you work and get going right out of the box.

n Control combines the flexibility of an outline with the power of a row—and—column format to handle even the most eventful business lives. It's like having a spreadsheet and outliner in one, both ready to perform. That's the secret, the ability to present information as a table or as an outline, depending on the task, or the way you work — and the way you think.

Indent, collapse, or expand your view of events, people and possibilities and categorize your information by person, project or due date. Click and drag to create to-do lists. Extremely efficient.

So the big advantage for you is the ability to track the details without losing sight of the big picture. Set priorities, sort your to—do's in any order, and focus on what's more important and more profitable. Keep track of deadlines, assignments, progress and print reports, agendas and action items. Manage client and customer relationships and more. Another great feature: customizable data entry. Also ideally suited for mobile computing; In Control keeps your information handy on the road, and it has low memory requirements.

A better way to perform a familiar function.

WHATEVER YOU DO ...

In Control is perfect for managers in any situation. Production managers, people managers, sales and marketing managers. It's great for making lists, outlining your writing and of course, managing your personal information.

Production managers are able to keep track of the every detail involved in a project and keep them coordinated within the larger plan. Complete status reporting means every report is up-tothe-minute. In Control is the only tool that can do it.

People managers can keep track of deadlines, assignments, progress and resources. Focus workers on the tasks suited to their talents to produce efficient work flow. Sales and marketing

managers can easily manage their relationships with customers and keep all of their important customer information in one place.



IN CONTROL

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The Finest Removable Hard Drives Made

Tiger Presents The PLI 44Mb And 88Mb Cartridge Drives

REVIEWER'S NOTEBOOK: Highly acclaimed, 100% reliable and backed by a solid warranty, the PLI line of removable cartridge drives is the most respected in the industry. When your files and applications grow to monumental size, when you want to perform fast backups or when you want to take heavy megabytes on the road - there're the PLI Infinity 44 and 88mb drives. The PLI Cartridges carry a full 5-year warranty. One other note: The PLI drives and cartridges are thoroughly tested, far exceeding industry standards.

ith much of the design and layout work done at TigerSoftware on Macs, our PLI cartridge drives are critical to a smooth operation. Without their reliable service and unmatched speed, getting our hands on files would be nearly impossible. Our choice: the PLI Infinity 88 Turbo drive. This remarkable instrument carries a 60,000 hour MTBF (Mean Time Between Failure) rating. That's over 6 years between down time! It features the highest level of filtration,



quality-engineered circuitry and is virtually impossible to damage by incorrect cartridge insertion (a leading cause of drive failure).

Designed and engineered for rugged use, the PLI Infinity 88 Turbo has

the industry's highest tolerance to non-operating shock (our 88 Turbo once survived a four-foot fall onto a tile floor).

Of course, you'll get all the features that have made PLI the name asked for most when it comes to removable cartridge drives including external switches for termination and SCSI address, UL-approved, individually tested power supplies, long-life 50-pin Centronics SCSI connectors, an external fuse and (unlike other drives) you get the complete kit, with all necessary cables and accessories. The Infinity 88 Turbo beats Bernoulli hands down when it comes to price, performance and value.

NEW PLI "FLOPTICAL"

The Infinity Floptical. It's the way to make sure backups get done. If you know how to use floppies, you already know how to use the Infinity Floptical, Backups are fast and reliable. You do not have to restore data to use it. The backup files are instantly accessible.

Convenient & Secure Data Sharing. To transfer large files or volumes between computer systems with Infin-



ity Floptical drives, just remove the disk from one and insert it in another. Each Floptical diskette holds the equivalent of 14 HD 1.44MB diskettes.

Unlimited Storage. The Infinity Floptical frees you from the capacity limits of fixed hard disks. You get infinite storage capability simply by inserting additional diskettes. They cost only slightly more per megabyte than standard diskettes, and are just as easy to use.

PLI Reliability, Service and Support. After more than six years of bringing innovative SCSI storage solutions to personal computer users, PLI has become the most trusted name in SCSI storage solutions.

PLI UNIVES & CANTRIDGES			
BCD2460B Infinity Removable 44mb	\$599.00		
BCD2460A Infinity Removable 88mb	\$799.00		
BCD2465A 88mb Unform Cartridge	\$139.00		
BCD2465B 44mb Unform Cartridge	\$99.00		
BCD2465C 88mb Form Cartridge	\$159.00		
BCD2465D 44mb Form Cartridge	. \$89.00		
BCD2899 Infinity Floptical 21mb Ext	\$479.00		

BCD2899A Infinity Floptical 21mb Media \$49.00

Quality Memory – at Just a Fraction of the Price You'd Pay for Apple Memory!

REVIEWER'S NOTEBOOK: Here at Tiger we love our Mac LC and II computers, but we kept getting "The application could not be opened" and "Application has unexpectedly quit" messages. We found out that the amount of memory they came with from Apple just wasn't enough for the newer applications. So we called Apple and priced out more memory. Wow! We were in shock! \$995 for 4MB of memory! We knew something wasn't right. So we looked for a better way.

Who Needs It? Desktop publishing, high-end graphics, animation, CAD, modeling, and a multitude of other applications demand more memory. Quark cries for at least 8MB (MegaBytes). PhotoShop wants to put up "Out of Business" signs unless it gets 4MB. System 7 demands 2MB all for itself, then you must have some more for your applications. And if those applications don't get what they want, they can be pretty tough characters to work with.

When you try to run an application but don't have enough memory, two problems may occur. If you are really short on memory, the application may simply refuse to launch. The Mac will display a dialog box that says "The application could not be opened." Worse, it may let you open the document but later quit in the middle of the session displaying "Application has unexpectedly quit." Usually you get a warning before you launch telling how much RAM you ought to have versus how much is actually available. If the amount is 75% of the total normally required, you are probably risking an "Unexpected Quit." All of your most recent changes since the last Save will be lost. Ever notice the colors reverse on your screen? That's the way some applications warn you of low memory.

Printers Need Memory Too... LaserWriters use mem-



ics, and faster printing in many cases. Z-COM designs, assembles, tests, and packages their memory upgrade products. With a multi-milliondollar assembly facility, including a Class-100,000 Clean Room, all Z-COM products are manufactured using the highest quality equipment under the tightest tolerances and the strictest controls. Everything is double checked, from board tolerance and thickness, to the consistency of the solder paste. Z-COM controls the manufacturing process from the moment the ICs arrive at their facility, through the manufacturing process, up to the final packaging.

EREE BOOK & DISKETTE

What is memory and why do you want more of it? Order now and get "The Macintosh Memory Guide" from Connectix absolutely free. A simple explanation of memory and how to get the most out of your Macintosh. Packed with tips on making your Mac faster; best explanation of 32-bit addressing mysteries. Includes HyperCard stack on diskette for easy reference. A complete memory guide

- FREE! Picks up where your Apple Users Guide left off.

ory to store fonts and

prepare graphics for

imaging. Ever been

stopped from print-

ing a page with sev-

eral different fonts or

graphic image? Then

memory to a Laser-

Writer increases the

space so you can

print with more

fonts, bigger graph-

large

more

Adding

perhaps a

you need

memory.

For example: Did you know that RAM is actually a place to temporarily store your data and applications? When you turn off the power - they're gone. Your hard drive or diskette is where you permanently store your files. That's what happens when you "Save" your file. The file is transferred from RAM to the hard drive or diskette.

Are you confused with Apple's explanation of 32bit addressing and virtual memory? This entry-level guide to high-tech secrets gives you all the facts - in a way that make sense! It's easy and, best of all, FREE! Call Tiger today and let one of our friendly reps help you pack your Mac with lighting fast power.

Z-COM BCD2835 1MB for SE30, II, IIx, IIcx, IIsi \$59.00 BCD2836 2MB for Plus, SE, LC \$95.00 BCD2837 4MB for IIci, IIsi \$185.00 BCD2838 16MB for IIci, IIsi, IIx, IIcx \$655.00 BCD2840 16MB for IIfx \$655.00 BCD2841 4MB for LC\$180.00 BCD2842 8MB for LC \$339.00 BCD2843 2MB for PowerBook 100, 140, 170 . \$135.00

\$259.00

\$359.00

\$39.00

BCD2847 2MB×8 SIMM Modules 80 ns \$75.00 BCD2848 4MB x 8 SIMM Modules 80 ns \$129.00 SIMM Modules have a 5 year warranty; all other memory has lifetime warranty: 60ns, 60ns and 100ns RAM also available.

BCD2844 4MB for PowerBook 140, 170

BCD2845 6MB for PowerBook 140, 170 .

BCD2846 1MB x 8 SIMM Modules 80 ns .



Draw, Paint, Retouch. **Make Digital Movies!**

pressive industry awards grace the Illustrator box, a clue to the amazing capabilities you'll discover inside. In-

deed, Adobe IIlustrator is the most powerful drawing, page design and production tool in the world today.

ADOBE PHOTO-SHOP: The ultimate color-retouching/image processing system for the Mac. A great pre-press and production tool, Adobe

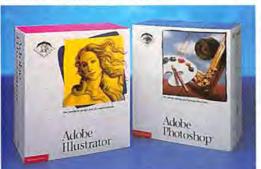
Photoshop has garnered loyal users in all areas of graphic design and color reproduction.

ADOBE PREMIERE... Become a movie maker - with the help of your Macand new Adobe Premiere. It's the newest creative tool from the leaders in precision graphics and manipulation.

ADOBE

BCD2501 Adobe Photoshop . \$549.95 BCD2502 Adobe Illustrator . . \$379.95 BCD2503 Adobe Premiere . . . \$315.95

Adobe Illustrator: Macinosh II, IC or SE product line, Plus or Classic with a hard disk, at least 2 MB of RAM using System 6.0.5 or greater or 4 MB of RAM using System 7. Adobe Photoshop: Macinosh II product line or SE product line with at least 2 MB of RAM. System 6.0.6 or greater or 4 MB of RAM. product ame or so, product are want at least 2 mo. RAM; System 60.4 or later and a hard disk. Adobe Premiere: Macintosh II family computer; 4 MB RAM; high capacity hard drive (80 MB or more recommended); System 60.7 or greater; Oukk Time v1.0 or greater; 32 bit OulckDraw v1.2 or greater.



REVIEWER'S NOTEBOOK: In addition to the two industry standards reviewed on this page: Adobe Illustrator and Adobe Photoshop, TigerSoftware is proud to be among the first to offer Adobe Premiere, an incredible new title that allows you to combine video footage, audio, animation, still images and graphics to produce digital movies on your Mac. Uses Apple's QuickTime media-integration technology, multiunit production hardware isn't required. Adobe Premiere is fast and yields high-quality results. Interactive presentations, television ad concepts and roughs, video databases, merchandising sequences and training sessions are just a few of the wide-ranging uses for this new title.

ADOBE ILLUSTRATOR: A slew of im-

AUTOMATIC TROUBLESHOOTING!

New Help! Finds And Resolves Incompatibilities And Conflicts.

REVIEWER'S NOTEBOOK: Aggravating incompatibilities, raging INIT conflicts, hardware problems, memory shortages and damaged files - they can drive you nuts. Busy Mac users don't have time to wade through stacks of tech notes to find the cure. So ... we end up suffering system errors, freezes, printing prob-lems and the occasional crash...

We need Help!...

Help! is a remarkable software program that uses artificial intelligence to track down system problems and provide you with simple instructions on how to quickly resolve them. Help! includes the largest single source of Macintosh problem information available, with built-in knowledge on over 2,800 Macintosh software products.

Contains tons of information on applications, attached hardware, system software, fonts, extensions, system settings, installed memory and more.

aving Help! on your Mac is like havaving Helpt on your was a same ing the tech support departments of over 2000 companies - and an Apple engineer - on your desktop. Configure your system for maximum speed and efficiency in just a few minutes. You'll be amazed at how much of your Mac's power is wasted with minor system logams or files that weren't installed just right. Eliminate memory problems and printing tie-ups. Fix hardware incompatibilities, find damaged of files - and see the last of system errors.



Thinking of upgrading to a Quadra? Because of the new 040 processor, a lot of software won't run. The unique "Simulation" feature actually tells you what will and won't run with virtually any new hardware upgrade! Owen Linzmayer, writing in MacUser Maga-zine said, "This impressive technicalsupport program belongs in the shirt pocket of every system administrator," and gave Help! a 4 mouse rating.



Help! diagnoses your system for you.

	HELP!	
BCD2025 Help!	\$89.	95

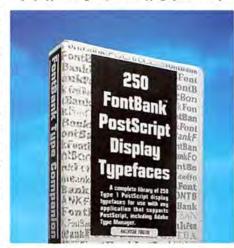
STSCRIPT FONTS: 4

REVIEWER'S NOTEBOOK: What's wrong here? Was that a typo in the headline or has TigerSoftware lost their minds? No typo. No mind loss. Just a great value on a complete (and we mean complete!) library of 250 Type 1 (the best) display faces for use with any applica-tion that supports PostScript (including ATM). You already know the value of great looking type in your documents. Now great type costs less. These faces can be used with more than 4,000 Macintosh applications and run beautifully with all Macs. Includes screen fonts as well as printer fonts. Why pay more for foundry-quality type?

ype 1 PostScript fonts — the best you can buy. Smooth and crisp on the screen and on the page. The standard for Macintosh and adopted by Microsoft for Windows. Take advantage of FontBank's staggering array of quality fonts at down-to-earth prices. You'll create attention grabbing documents and eye stabbing graphic elements for any graphics programs and desktop publishers. With such a wide variety of faces available to you, creating incredible headlines is fast, fun and amazingly professional. The headline is the face of good advertisements. Wimpy headlines are usually ignored, while bold headlines attract the reader, and if your message is important, the casual reader becomes curious - and persuaded. Remember, though, that headlines must be legible. If you'd like to know more about working with display faces and creating winning headlines, call TigerSoftware and ask for a free copy of a 24-page book that we've prepared entitled "A Short Course On Working With Type." It has been prepared by the typographers at Tiger and we'd be happy to get one in the mail to you.

FontBank has assembled a vast array of looks and feels in their type library. 250 different faces, each with its own distinct character. Some you may never have seen before. And FontBank display faces can be easily manipulated with programs like TypeStyler, Adobe IIlustrator, Aldus FreeHand and others. Combining Font-Bank's 250 faces with the capabilities of these programs offers the opportunity for an unlimited number of special effects. And FontBank display faces are compatible with all major page layout applications like Quark XPress, PageMaker, DesignStudio, Multi-Ad Creator and others.

Regardless of what the design assignment, from flyers, posters, ads, coupons and greeting cards, to presentations, notices, memos and packaging, FontBank display typefaces give you the typographic tools you





Just a sample of the FontBank library of pro-quality Type 1 typefaces. Each is smooth and clean on screen - and on paper!

need to look your creative best. And, when converted to editable outlines using FontMonger, these faces can be used to produce special text and design effects to create stunning documents.

How long have you been using those same tired typefaces? Chances are, you use what you have because finding the right typefaces, installing them, and learning to use them is more trouble than it's worth. So, you compromise the overall look of your document by compromising on the one critical factor: the type. That's why FontBank is such an exciting product, easy to install, a pleasure to use - and a low cost way to improve the quality of everything you print.

FREE DESIGNING WITH TYPE BOOK

FONTBANK BCD2425 FontBank \$89.95

Gut-Wrenching WW II Airborne Action!

You And Your B-17 Crew Fly A Pre-Dawn Raid On Nazi Germany..

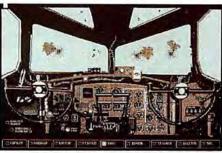
REVIEWER'S NOTEBOOK: Two Rene Vidmer classics, recreating the great air clashes in the history of warfare. Bomber is not a wimpy flight simulator or silly arcade slugfest, it is an intensely realistic action-adventure that takes you and a young B-17 crew on 25 missions over Nazi-occupied Europe. Your plane, a seasoned Flying Fortress and your ten man crew communicate during one of the most vicious campaigns of the war. Great animated sequences keep you in the heat of the action, as you descend on a Magdeburg oil field.

he Battle of Britain is the historically accurate situational game of strategic skill and military instinct. The year is 1940, over the skies of Britain, the relentless Nazi air assault continues. You track incoming

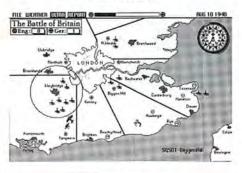
raids using radar screens and ground observer reports. You evaluate your resource of men and machines to carefully plan your missions. It's you versus the uncanny ability of the German Luftwaffe - are you ready at any moment to scramble pilots to their mighty Hurricanes or legendary Spitfires?

Historically accurate recreation of the two greatest air battles in the history of warfare. Employs the identical plotting map actually used by RAF Fighter Command in the summer of 1940 to track incoming raids; and the identical tote-board system to quickly vector the precious few Hurricane and Spitfire Squadrons to intercept those raids. The player will have his hands full tracking Radar and Ground Observer reports, analyzing the size and potential threat of "UNIDENTIFIED CARECRAFT 2000+ SPOTTED VICINITY BIGGEN

HILL...", interpreting the daily 'Ultra' intercepts, and coping with the weather, dwindling resources, and the Luftwaffe's sometimes uncanny ability to outfox you at every turn. By 'Bomber' author, Rene Vidmer.



Just you, a 10-man crew, and a Flying Fortress named "Naked Lady."



	DEADLY GAMES	
BCD2870	Battle of Britain 2.1(Color)	9
BCD2871	Bomber 2.2.5	
	(With Headphones)\$32.	0

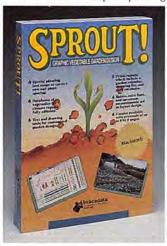


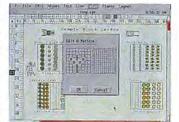
Design Your Vegetable Garden On Your PC.

REVIEWER'S NOTEBOOK: The modern gardener's way to plan a vegetable garden! A great idea, crafted beautifully into a wonderful piece of software. Sprout! combines the power of your Mac with advanced gardening techniques to produce great vegetable garden plans.

A planting tool organizes your garden's layout, change scales to see your garden in different views, add vegetables to the existing database and create your own custom design and figure in your climate (7 regions are provided).

SPROUT! is a complete planning





tool for vegetable gardeners. Its unique planting tool produces a graphic, scalable garden plan with correct plant and row spacing.

In addition, SPROUT! contains a full editable database of vegetables for 7 climate regions which includes: planting and harvesting times, yield, soil pH, seed requirements, plant and row spacing, cool versus warm climate seasons, growing tips, and other information.

Create vegetable symbols and customized your own garden designs with text, drawing and editing tools. Design layouts in four scales with drawings up to 8×8 pages large. Prints out garden layouts, calendars, shopping lists, and reports.

 Special planting tools snaps to correct row and plant spacing

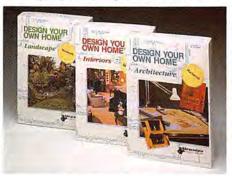
· Ruler, Ruler lines, and on-screen measurements aid in layout design.

SPROUT!

BCD2107 SPROUT! \$59.95 Any Macintosh with minimum of IMB, mouse, hard drive, and printer.

Design Your Dream House on Your Mac.

6 o ahead — design that new addition to your home! Put your imagination to work on the interior, then plan the perfect landscape. Experiment with different layouts, colors, shapes and ar-



rangements with the Design Your Own Home Series. It's fast, easy and fun the results are clean, precise and professional. It's your home, who could design it better than you?

These three simple-to-use computer aided design systems include a dozen of sample floorplans, pre-drawn furnishings, plants, flowers, trees and shrubs. You can modify plans to suit your taste, or start from scratch to create just the environment you've been dreaming of.

ARCHITECTURE. You can create a de-

signer home right on your Mac. Instantly draw floorplans, building side views and structural details. Rearrange your ideas, add notes and labels. Design Your Own Home automatically calculates distances, areas and angles, and uses all appropriate standard architectural scales.

INTERIORS. Bring your own unique interior design ideas to life with Design Your Own Home Interiors. This re-

markable system is easyto-use yet extremely powerful. Arrange furnishings and they're automatically kept to scale! LANDSCAPE. Ask any

real estate professional, they'll tell you that landscaping can significantly increase the value of your home. In any given neighborhood, identical homes may sell for many thousands of dollars difference - simply because of the care

taken to enhance the look of the property. It allows fast, easy planning with a variety of useful tools.

TIGER SPECIAL VALUE BUY ALL 3 - SAVE \$3500!

DESIGN YOUR OWN HOME

BCD2001 Architecture	59.00
BCD2002 Interiors	59.00
BCD2003 Landscape	\$59.00
BCD2004 All 3 Titles \$	59.95
Any Macintosh with 1MB, Mouse, and Laser	Writer

Circle 114 on reader service card

TIGERSOFTWARE

The Art Of The Scan



REVIEWER'S NOTEBOOK: The Logitech series of advanced mice and scanners has won acclaim from the press — and thousands of loyal users. No other manufacturer engineers so much precision and innovation into their products. From an incredibly sharp hand scanner, to the all new breed of "programmable" mice, they're a pleasure to work with. We put the ScanMan 32 hand scanner through it's paces, performing over 50 scans of various black and white images — photos, line art, logos, type, illustrations — even poor-quality photos. The ScanMan 32 features 32 gray scale per-

formance, with adjustable scanning resolutions from 100 dpi for quick scans; up to 400 dpi for magnificent finished images. Use scanned images in word processors, multi-media, desktop publishing, HyperCard, OCR and more.

The Science of Scanning Logitech technology destroys the old barriers of scanning, increasing the speed and accuracy of anything you scan. Superior image quality, with the ability to produce halftones for reproduction. The set of output controls provide the best

possible results on any printer or monitor screen. Its 4" wide scanning area allows full-page scans with just two quick passes.

And Logitech's rugged construction and precision roller system allows straight, unwaivering scans. No curving, no skipping. The scanning speed indicator controls the movement for perfect scans every time. There are three settings for scanning photos and another for scanning line art. Its shape is perfect, its weight and components distributed equally for balance. All of which makes getting an image from paper — into your Mac, simple and easy.

The ScanMan 32 gives you a free set of software editing tools, including a 32 gray scale palette for detailed retouching. There's also a handy dimension box and tear off tool palette; use them alone or incorporate them as a desk accessory.

Included with ScanMan 32 — CatchWord Pro: Powerful Optical Character Recognition (OCR) software that allows you to capture printed, hard-copy data by scanning it, rather than typing it. But, without quality software and a high quality scanner (like the ScanMan 32), scanning text won't work properly. "Dirty" scans produce unwanted characters and commands, requiring enormous cleanup — creating more work than rekeying.

TIGER OCR BUNDLE

ScanMan 32 with CatchWord Pro ONLY \$36

LOGITECH

BCD2509 ScanMan 32 with CatchWord Pro . . . \$369.00 BCD2220 ScanMan 32 with Digital Darkroom . . \$299.00 Machitosh Plus or better running System 6.0 or later. Hard disk recommended.

INSTANT DIGITAL SNAPSHOTS! Introducing The Incredible New Logitech PotoMan...

REVIEWER'S NOTEBOOK: What is it? In short, it's a portable, digital camera - for your computer. Foto-Man takes great pictures with amazing clarity and 256 grayscale richness - then allows you to instantly download them to your PC. It includes a slew of image editing tools that open a world of creative opportunity, and is compatible with virtually all desktop publishing programs. The applications for this new technology are enormous. Insurance and real estate professionals are using it to expedite claims and transmit photographs of neighborhoods and homes. Manufacturers use FotoMan to quickly catalog products and parts, while law enforcement officials are using it to photograph suspects, crime scenes and evidence — without the time and expense of film, processing and prints. Digital images are instantly captured and merged into documents, or stored as a permanent record. Up to 32 images can be shot and stored on the FotoMan's RAM chip, then transferred via serial port to Foto Touch - or previewed on your screen.

There are hundreds of practical uses for this new product, but we found FotoMan was a lot of fun. Fast and easy, it comes with an automatic flash, one-button operation and a field of focus from three feet to infinity. FotoTouch provides a sophisticated range of features including 256 grayscale editing.

One of the hottest new ideas in computing: the digital photograph — taken by a portable and easy to use camera that allows instant transfer to your computer — without a digitizing board or other hardware.

In the past, getting a photograph into your Mac meant using a traditional film method. The film would first be processed into either slides or prints, then scanned or stripped into your document. Now, just snap a photo of a new employee, for example, and send it directly to the corporate database. Once the images are downloaded, FotoTouch shows you miniature versions so you can choose the image you want. When you've got your shot onscreen, the FotoTouch software allows you to easily make modifications. Then save your image in any of the most popular formats. There's no film, no developing and no waiting!

Real Estate professionals can send pictures of homes to prospective buyers, editing out undesirable objects like garbage cans. Or images can be put together — like different shots of landscaping to create a custom layout. FotoMan and FotoTouch are like having a complete darkroom in your Mac. The possibilities are endless.

Use FotoMan images for multimedia and presentations. Produce personalized stationery, letters, invitations and anything else where you want to add real-life images to your computer documents.

It's portable! FotoMan packs all its power in a rugged unit that's small, lightweight and battery operated, so you can take pictures anywhere, and save them in the camera for 24 hours.

Take pictures indoors and outdoors — FotoMan includes a built-in flash for indoor use and a neutral density filter for perfect use outdoors, too.

FotoMan Flash The flash fires automatically whenever it's necessary. It doesn't fire in bright daylight. If the camera senses that the surrounding light is dim,



the flash fires when you take a photo. This can happen outdoors on a dark enough day.

For shooting indoors, where you use the flash most, try to stay between four and ten feet (1.2 to 3.0 meters) away from your subject. If you want to take flash photos a little closer than four feet, use the neutral density filter. Experiment to make the camera do just what you want. With FotoMan's advanced flash, you can take great pictures in just about any lighting situation you find yourself in.

How to Take a Photo The Adaptor Ring allows you to attach a 37mm lens, commonly used with camcorders, so you can capture a wide variety of images. Flash and shutter speed are automatic, focus and f-stop are fixed. The FotoMan camera fits comfortably in either your right or left hand.

LOGITECH FOTOMAN

BCD2585 FotoMan\$649.00

Call for requirements.

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Int'l Orders: 305-443-8212

Create Your Own Multimedia Production!

REVIEWER'S NOTEBOOK: Turns your Mac into a complete audio workshop! Fast, and easy - not to mention a carload of fun! Record, edit and play back live or recorded sound to add enormous impact to multimedia presentations, training materials and documents with voices, music and sound effects. Nothing smacks an audience like great sound - it keeps them right there!

The MacRecorder Sound System Pro digitizer features a built-in microphone, external microphone jack, line input jack and input level control for simple, centralized recording. Just plug the digitizer into your Mac's printer or modem port, open the mic and start recording! The software included, called Sound-Edit Pro, acts as your mixing board to create soundtracks, voice-over narrations and great sound effects. Record directly to disk - then play back right from the disk. The sound appears on your screen as a

MACRECORDER SOUND SYSTEM PRO

waveform for easy editing. Cut and paste sound clips (just like cutting and pasting text) and modify sounds with a host of creative tools to create intriguing effects. Run sounds backwards, add echo, reverb, bender,

envelope, loopback, tempo and filtering. Mix multiple tracks of music, sound and effects, voices to produce pro-quality, multi-track soundtracks for your presentations.

SoundEdit Pro also allows you to open and save 8 and 16-bit samples at rates up to 48kHz.

acRecorder Sound System Pro does not require technical knowledge of sound engineering. The fact is, you can achieve professional results the first time out. Just click to record, edit and mix. Record voices with the built-in microphone and put that voice anywhere by just moving it like you move text or graphics.

You can use MacRecorder Sound System Pro with a variety of software, including MacroMind Director, MacroMind MediaMaker, MacroMind Paracomp Magic, QuickPICS, HyperCard, QuickMail, Microsoft Mail or any program that supports Macintosh Sound Input Manager. It also supports SuperMac's Video-Spigot. MacRecorder Sound System Pro gives sound in-

phone, external mi-crophone fack, line-in jack, and input level controls, for simple centralized recording. capabilities to Macintosh II. Ilcx, Ilci, Ilx and Ilfx. MacRecorder Sound System Pro includes the MacRecorder digitizer, SoundEdit Pro, HyperSound and HyperSound Toolkit, audio cable and MacRecorder Driver.

Built-in micro

MACROMEDIA

BCD2912 MacRecorder Sound System Pro Bundle \$275.90

Call for system requirements.

Create Full 3-D, Photorealistic lmages!

REVIEWER'S NOTEBOOK: MacRenderMan represents the finest software available for 3-D image creation. It is perfect for those who are new to 3-D and for those who have experience with modeling software. Showplace-MacRenderMan gives you an easy way to improve images created with RenderMan compatible modeling applications or to create a dazzling 3-D image using the pre-designed shapes that come with Showplace. With Showplace you just arrange your scene, select realistic appearances for your objects, set your lights and watch the powerful MacRenderMan create your image. Pixar's RenderMan technology was used in the academy award winning film Tin Toy and to create special effects in films such as The Abyss and Terminator 2. Showplace-MacRenderMan gives you access to this amazing technology and you can see impressive results in a short time, but if you get the urge, you can get crazy with these products and never be seen or heard from again ...

MacRenderMan. Fascinating photorealistic design made easy (and fun). Three distinct dimensions in full color, with a variety of surface textures and designs. in our first session, we created several billiard balls with a variety of whacked-out designs and colors in under an hour. That hour passed quickly; the real work was handled by MacRenderMan transparently.

We began the modeling process by describing the objects (geometry and appearance), the characteristics of the lighting (the light sources) and the view we wanted of the object (the camera, if you will). We then



Give images 3-D beauty and realism. You'll see vivid colors and rich detail.

had a scene! We could change the texture of the surface (and how the light reflects off of it) and easily control the various shading techniques. The more you work on your images, exploring the powerful capabilities of MacRenderMan, the more detailed your images become. This is a great tool for CAD projects, product design, animation, merchandising, architecture and presentation graphics. Nothing else can compare to the images you'll create with MacRenderMan, the most visually accurate picture making product available for the Mac today.

MacRenderMan is used with 3-D design applications that produce RenderMan Interface Bytestream (RIB™) files. Use your favorite 3-D design system to shape objects. The design software will record these geometric descriptions into a RIB file and spool the file. MacRenderMan reads the spooled RIB file and produces a color rendition, computing it in the background under MultiFinder.

Showplace. Showplace is the forum for your objects created with MacRenderMan technology. Build a dazzling 3-D scene by quickly importing and arranging

MacRenderMan images, or choose from the library of Pixar ClipObjects, including furniture, lamps, a sleek racing bicycle, billboard, shopping bag, a theater spotlight and more. Then turn your camera loose and move around your scene to create spectacular effects and perceive a multiplicity of angles.

Change the "look" of an object by changing its surface: you could have an oak grain table and a stuccopainted wall, or a stucco-painted table and an oak grain wall, or an oak grain shopping bag and brushed chrome walls! With Showplace, you can decide the appearance of an object independently of its shape. Showplace's ability to combine any object with any appearance (including those you create) is one of its most powerful features.

These "Looks" include: bricks, brushed chrome, gold and copper, concrete, gray and rose granite, veined marble, natural oak, plastic and sky patterns, among others. Manipulate characteristics such as shininess, size, roughness and reflectivity.

ALSO AVAILABLE IN CD-ROM VERSION

MacRenderMan and Showplace applications, complete online documentation for both products, a gallery of images created with Pixar products and a sample of Pixar animation all on one CD-ROM!

INCLUDES FREE CLIP PROP KIT

MACRENDERMAN & SHOWPLACE

BCD2410 Showplace & MacRenderMan

Bundle . BCD2411 Showplace & MacRenderMan CD . . \$349.00

SCD2411 Showplace: runs on any Macintosh II Jamily computer with a Joaling point coprocessor, 32-bit OuickDraw, MultiFinder and at least 5 megabytes of Internal RAM 18 is recommended; color display system (for full-color welving, 24-bit is recommended), MacRenderMan: Macintosh II, Ikr, Ikc, Ikce or Ilfe nanning Systems tools 60.3 or higher, Multi-Finder and 32-bit OuickDraw Installed; 5 MB of disk storage; 8- or 24-bit color display system; 5 MB of memory (8 MB recommended); RenderMan compatible design package.

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IS-PC SOF1

REVIEWER'S NOTEBOOK: At last! The great barrier between Mac and DOS compatibility has been removed — for good. As a user of both Mac and DOS computers, I know the pros and cons. Macs are friendly and advanced, but the DOS world has more people creating more software. Specialized software that might fill your particular needs. Plus today's office environment uses a mix of DOS and Mac computers, which plays havoc with spreadsheet and data files needing to flow smoothly between Mac and DOS PCs. That's why we at Tiger are proud to offer the world's best-selling answer from Insignia Solutions, a dedi-cated company who has had a five-year mission: To bridge the compatibility problem between different worlds of software. They're the best. They have a solution to fit every need and every Mac. Best of all - it's software only! No expensive hardware to buy or install.

ere's a suite of solutions that solves forever the problem of Mac & DOS incompatibility. Need to use a co-worker's DOS floppy with their DOS 1-2-3 file on your Mac? No problem. Simply slip it in and watch as that DOS floppy appears just like any Mac floppy complete with icons and folders. Amazing! But that's not all. Double-click on that DOS 1-2-3 file and stare in amazement as 1-2-3 Mac or Excel starts up automatically and loads that DOS file! You can make changes, save it, give it back to your DOS-using co-worker, and then chuckle as he loads the file with your changes like nothing unusual happened. But that's only the beginning of these incredible solutions...

Turn any Mac into a DOS PC. Run actual DOS applications: 1-2-3, ProComm Plus, dBase - virtually any DOS application — from inside a Mac window. Cut & Paste between Mac and DOS windows. Save, copy and print right from your DOS application. Run your favor-



The ultimate Mac-DOS connection. Run any DOS program or any MAC! Fast and fully capable — even run DOS communication software.

ite DOS application just like it was running on any DOS 286 PC. You can have the best of both worlds: the fast, easy Mac interface you've come to know, and a huge world of specialized DOS software that fits every known need.

AccessPC. Slip a DOS floppy into your Mac and it looks just like a Mac floppy! An icon appears, you double-click it and DOS files and sub-directories appear just like the were Mac files and folders. Double-click on the DOS files and immediately run Mac applications like Word, 1-2-3 Mac and Excel. AccessPC is still the fastest - fully 4 to 10 times faster than the competition!

Now with Cartridge and **Magneto-Optical Drive Support!**

AccessPC is instantly compatible with your external cartridge and magneto-optical drives. No other utility software is needed! (Unlike the others that make you call your drive manufacturer for software they haven't even finished yet.) Your DOS files are ready, will-



ing and able with the finest DOS file access application made - AccessPC.

Added bonus! Intelligent disk cache for your cartridge and magneto-optical drives can increase performance by 30% or more - and it's free!

SoftPC Family. Turn any Mac into an advanced DOS computer! Run virtually any DOS application from within a Mac window, complete with all the extras. SoftPC will turn any Mac into a 286 AT computer, complete with a full 640 K of memory and DOS 3.3.

Run a DOS program and print directly to any Mac printer - just like it was an industry-standard Epson LO2500 (which virtually all DOS programs support). Or if the DOS program supports Postscript printers, you can print directly to any LaserWriter or other Mac PostScript printer. TrueType fonts are even included for the Epson LO2500 so you get crisp, clean printouts every time.

Getting data between DOS and Mac has never been easier. Cut & Paste with the Mac Clipboard between all DOS and Mac windows.

Put DOS files and applications on any Mac drive any folder or volume that appears on your desktop can be used, even remote hard disks on networked Macs.

What I love best about SoftPC is that all the extras have been thought of and included. Like turning your Mac mouse into a Microsoft DOS Mouse so you have complete mouse support in your DOS programs. The one mouse in the palm of your hand works in both DOS and Mac windows. Even DOS communication software works on a Mac. The Mac Printer and Modem ports are used as DOS COM1 and COM2 ports. Every DOS program I've ever heard of works perfectly on a Mac. From CD readers to Novell networks - it's all here - and it's very easy to use.

There are three members of the SoftPC family, each designed to take advantage of the wide range of different Macs:

Entry Level SoftPC. This member of the SoftPC family was designed for low-cost Macs including the Mac Plus, SE, LC, Classic and Portable. You get everything mentioned above including IBM AT 286 emulation, DOS 3.3 and CGA graphics.

Universal SoftPC. Step up to Universal SoftPC and you add several new capabilities to the Entry Level SoftPC package. CD-ROM support lets your Mac CD reader play DOS CDs. And if you purchase the optional SoftNode add-on, you can access Novell Netware networks. It's the perfect solution for offices with specialized Novell software.

SoftAT. Fasten your seatbelt and hang on as SoftAT takes DOS software to new levels of high-performance. You need a Mac LC, SE30, Mac II, si, ci, cx, fx, Quadra or PowerBook 140 or 170 to run it, but it's all speed. You get lightning-fast benefits like a Math Co-processor, EGA graphics for more demanding graphics applications, and Expanded memory for big, hungry applications. SoftPC is the ultimate answer to Mac and DOS compatibility.

SoftNode. Another Insignia Solutions breakthrough is SoftNode - the perfect solution for running Novell Netware PC client software on any Mac. With the addition of the SoftNode add-on, both Universal SoftPC and SoftAT can run off-the-shelf and customized MS-DOS programs on any Mac. Now you can build on your existing PC LAN hardware and software investment and fully integrate Macs into PC workgroups. Call for your Free PC Catalog.

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BCD2919B	SoftNode Bundle 10 Pk \$740.90

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THE BLISTERING 1200dpi, BILLION-COLOR SCANNER!

Presenting The UMAX Line Of Color Scanners And B&W Trendsetters!

REVIEWER'S NOTEBOOK: When the UMAX scanners arrived here at Tiger, their reputation had preceded them. We knew that top designers, architects, artists, pre-press production houses and commercial printers had UMAX flatbeds. A few of us had even seen a UMAX in action.

What surprised us was the prices. This low?!

After plugging in the awesome UMAX UC1200S. and scanning a couple of magazine covers, glossy posters, a snapshot of somebody's baby, a 35mm slide of my trip to The Bahamas and our color matching chart - we knew why so many pros use the UMAX. They deliver one-pass, reproduction-quality scans at 1200 dpi! Drenched colors, razor-sharp detail, But the price...How can a product with such a reputation carry such a modest pricetag?

UMAX scanners come in a variety of flavors, from a compact, 600 dpi speedster to the top of the line, 1200 dpi hellcat that delivers blistering color scans It recognizes a billion colors! Rivals the legendary drum scanning technology - at hundreds of thou-

sands less!

Color, black & white, grayscale, halftone — do it all with the amazing UMAX flatbed scanners. For office use, the UMAX black & white scanners pump out 600 dpi images. Feature for feature, nothing outclasses or outperforms UMAX's advanced technology. Great for OCR, handsome desktop design.

Pro-Quality At A Great Price. Scan your brains out with two high powered grayscale scanners! Scanned images look just like the originals. Great for business use, libraries, medical and government applications. Built to stand up the the punishment of constant use. The UG630 is the perfect first-scanner for Mac users.

Very easy to use with advanced features built-in.

The UG630 produce scans with unbelievable 600 dpi resolution. Scan your images in 600 dpi and you'll be hopelessly addicted to the rich tones, crisp detail and ultra-sharp focus. This is the best value in the industry. Scan color photos, black & white photos, line art or text. The optics are extraordinary, and the UG80 and UG630 are crafted for consistent performance, on-board with selfalignment and pin-point precise, and single-light

For The Pro Who Knows... The UC1200S

accuracy.

Color Crusader! A massive color hemorrhage! Imagine 1 billion colors at 1200 dpi! That's true professional quality - at a great low price! Single-pass and single light source design eliminates the need for filters and delivers great scans at 10-BITS PER COLOR PIXEL! Lifelike images with 1200 by 1200 dpi resolution with full GAMMA correction! We stood with our mouths open when we saw this baby!

Includes PhotoShop LE, a limited edition software release from Adobe, that handles the color explosions captured by the UMAX UC1200S. And this thing flies! Thanks to the ingenious buffering techniques built in.

Color photos, transparencies, illustrations, color graphics and more

Also includes 600 dpi mode and supports 256 grayscale, halftone and black & white. The choice of ad agencies, publishing houses and designers. When you want the best - don't pay more - ask for UMAX.

UMAX

BCD2546 600 DPI Grey Scale Full Page \$999.00 BCD2070 600 DPI Color Full Page \$1295.00 BCD2547 1200 DPI Color Full Page \$3999.00

DD SIX SERIAL PORTS — INSTANTI

Connect And Control Modems, Printers, Networks, Peripherals And Other Serial Devices. Hardware And Software Included.

REVIEWER'S NOTEBOOK: One of the most useful new ideas in computing - Enables you to control from a software interface - up to six serial devices. (Macs only come with 2 - Printer and Modem.) It's like adding six serial ports to your Mac (in fact, we found that it's almost like having TWO computers). Configure your equipment any way you like: One Mac to six devices; One Mac to five networks or four Macs to two devices. A snap to install, simple to operate and fully System 7 compatible. Full two-year warranty on everything,

So forget changing cables, swimming through wires and fiddling with A-B switches (those things can actually cause system freeze-up!). Now you simply pop up the MultiPort screen, select the port you want to use from a graphical on-screen diagram - and you're done. Choose from six serial ports and five ADB ports — a total of eleven! The LED lights on the MultiPort unit indicate the port selected and your INIT installs setups for specific situations, each time the Mac is started. There are dozens of possibilities for the Multi-Port, like using it "inside out" to allow up to 4 Macs to share two non-LocalTalk devices. You can even have more than one mouse connected to your Mac; your standard Mac mouse for normal use, and a trackballtype mouse for graphics and publishing work.

must for the Mac user performing multiple tasks and working with assorted equipment. Everything you need to get going is included: controller box, detailed user's guide and accompanying software. Runs off of ADB power, no power supply is needed to operate the MP-91.

Software-Controlled Ports.

This compact little device - about the size of a paperback book - is the answer to connecting extra se-



rial ports and controlling them on your Mac screen. Simple controls allow you to just click to select a port or to invert the Port in-out lines, or port characterprinter or modem. The MultiPort MP-91 is the ideal Desk Accessory that's guaranteed to save you hours of time switching cables, running and re-running wires. It's the easiest system available for multiple port switching.

Here Are The Installation Instructions:

The MultiPort MP-91 simply plugs into the printer, modem and ADB sockets on the back of your Mac. Your add-on equipment (printers, modems, scanners, etc.) are plugged into the MP-91. A software Desk Accessory goes into the System. That's it.

That Was Fast...

And using the MP-91 is even faster! All the selections you make are handled by the software, so there's really no need to touch the MP-91 again. Just tuck it away and enjoy its ingenious functionality. Our "Printer Sharing Test" saw connections of: Four Macs to one ImageWriter; Two Macs to two LaserWriters and two ImageWriters - and a modem; even One Mac connected to two LaserWriters, 1 ImageWriter on LocalTalk, a modem and a scanner.

MULTIPORT

BCD2785 Multiport MP-91 \$229.00 Dimensions: 120 W x 172 L x 38 H mm, 4.75 W x 6.8 L x 1.5 H I Warranty: Two Years On Everything.

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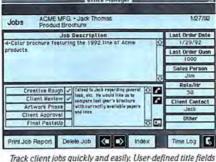
The Small Business Office Assistant.

n this day and age of over-complicated software and highly technical jargon, it's a welcome relief to see something you can really use! And that's what we love best about Office Manager - it does exactly what needs to be done in any small office.

Right out of the box in just a few hours, everyone in your office will be using Office Manager — getting more done in less time. Business letters that used to take 20 minutes are done in a flash! A few mouse clicks is all it takes to print standard business correspondence and that includes the envelope.

Office Manager is the perfect complement to any accounting application. Together they do 99% of what every small office needs to do. Office Manager is the best way to handle these everyday tasks:

- Maintain Addresses
- · Keep ToDo Lists
- · Write Letters
- · Track Client Jobs
- · Print Labels & Envelopes · Track In-house Projects
- . Phone/Fax Dialing (with Call History and Redial)



make Office Manager fit your type of business. You'll know in an instant the exact status of any job.

Address Cards. The heart of Office Manager lies in the Address File. From this central hub of vital information, all the various parts of your office fall into perfect place. More than just name, address and phone number - Office Manager is a fully automatic organizer.

LETTERS.

Business Letters. With Office manager's built-in word processor, you'll whip out business correspon-

dence in record time. Office Manager pays for itself in saved time within the first month. Start with any Address Card, then one quick-click starts a letter - complete with name, address, heading, date and greeting,

Merge Letters. We fell in love with this feature the moment we saw it easy, instant, customized form letters. What a time saver! If you spend time writing repetitive letters you'll love this feature as much as we do.

Predefined letters like "Thanks for Your Business", "Special of the Month", "Welcome New Customer", or anything you can think of will be instantly printed with just a few mouse clicks.

Fax & Phone Dialer. How much time do you spend each day, first finding the right phone number, dialing the phone or fax machine, then possibly re-dialing because of busy or wrong numbers? I added it up one day - I spent an average of 45 seconds for each phone call, and over 75 seconds for each fax.

Job Tracking. This potent Job Tracking feature for your clients could be a separate application all by itself. This one's a real powerhouse! Track every phase and part of a job. Every time one of your clients calls, you instantly start tracking a new job. Jot down quick notes for reference. Run the automatic Timer in the background to track your valuable time. Print a Job Report including total time for the job for fast billing purposes.

In-House Projects. There's always a project running around the office that needs your attention. Whether it's what supplies need to be ordered, new topics that need to be covered in the weekly meeting, or ideas for the upcoming company newsletter, you need something to keep track of it all.

Mail Manager. This optional add-on to Office Manager is a must for anyone doing bulk mailing. You get advanced sorting power, elaborate search filters and powerful mail-merge options.

Office Manager Remote. Without investing in an expensive network, Office Manager Remote allows you to enter names and addresses on any remote Mac and later merge the information into Office Manager's main file.

WHITE CROW

BCD2030 Office Manager\$79.95 BCD2031 Office Manager And Mail Manager . \$119.95 BCD2032 Office Manager Remote \$65.95 Requirements: Mac Plus or higher with at least 2 meg of RAM and a hard disk drive. Mac system software 6.0.5 or later. Office Manager is system 7 compatible. Each package includes HyperCard 2.1.

The Total Organizer Solution For \$99.

Buy The Amazing Dynodex And Get DynoPage FREE!

ynodex is a true personal organizer, capable of handling names, addresses, phone numbers, notes and all other important information - and allows you to print perfect double-sided address book pages that fit virtually any personal organizer.

You'll now have instant access to your personal contacts both on and off the computer. At your computer, instantly look up and dial any number you need from the powerful Dynodex application - or the convenient desk accessory. On the road, all of your contacts are available in your personal organizer. Now your contact information is personal and portable.

The powerful Dynodex database delivers ultra high speed searches: instantly select subsets based on multilevel queries with a set of eight logical and arithmetic operators; for example, "all clients in California contacted within the last 6 months." On sorting: you get 3key, ascending or descending on any field, along with Dynodex's speedy find, change and global delete. You can delete duplicates, Fast-Find and display any record instantly by simply clicking on it in the list window.

If your information resides elsewhere, Dynodex allows you to quickly import it for immediate use. Any text file, tab-delimited or comma-delimited file is ready to use, and Dynodex includes a free copy of DynoStack, for importing HyperCard, Focal Point and Quick-Dex address files.

On to Dynodex's powerful (and very smart) printing capabilities: You can print any size address page, even double-sided pages. Print in any font, size and style on a field-by-field basis for great pages.



FREE DynoPage. This amazing printing utility allows you to print documents at reduced sizes and on both sides of the paper. Double-sided pages are much easier to print using DynoPage, and can be printed to any size from full-size letter, legal or tabloid, to "photoretouched" sizes for personal organizers such as Day-Timer, Day Runner, Filofax, Franklin or any custom size you want. Just drop-and-drag to print from the Finder! They couldn't have made it any easier. Dyno-Page comes complete with over 100 built-in layouts, and prints text in any font, size or style that's used in the original document.

Anything you can get on your Mac screen can be printed in any size or layout using DynoPage. In addition to 1-2-3 spreadsheets and charts, you can print word processing files, presentation pages, database files and more - to any size you like.

You can even print your spreadsheets to create great little "fold and staple" booklets, or print reduced versions of your spreadsheets on larger sheets to use as

handouts during presentations.

DynoPage prints in a variety of useful configurations, and comes complete with 40 sheets of Dynodex Instant Address Book Paper (six-ring along with half-page), dozens of pre-designed layouts, a comprehensive manual brimming with tips and techniques and a valuable coupon for big discounts on personal organizer products. Here's a look at what you'll be able to create with DynoPage:

Dynodex 2.0 Wins **MacWEEK Target Award**

Editors Call It "Best Overall Choice"

In choosing Dynodex 2.0 as an award recipient, MacWEEK's editors wrote: "Dynodex significantly edges out the competition in performance, especially with larger address lists. The program's strong

points include a streamlined interface, complex phonedialing capabilities, versatile import and export features, and a thorough and well-written manual. Unparalleled printing versatility, including address books. labels, envelopes and rotary-file cards.

TIGER EXCLUSIVE!

Dynodex w/Free DynoPage and a package of DynoPaper of your choice.

90 day limited offer (expires August 31st).

PORTFOLIO SYSTEMS BCD2542 Dynodex Macintosh w/Free DynoPage Macintosh & DynoPaper \$99.00 BCD2826 Dynodex Macintosh Competitive Upgrade BCD2442 DynoPaper (white, cream, gray, yellow) ...\$14 Macintosh Plus, SE series, Il series, or Portable; System 6.0.3 or laten .. \$14.00

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The Piano That *Teaches* **You How to Play!**

remember being forced into taking piano lessons as a kid. My piano teacher, Mrs. Reymer, was sort of a crabby woman who'd smack my hands with a ruler when I missed a note. During my lessons, fun was the furthest thing from her mind. The repetition, the drills I eventually quit and I've regretted it ever since. If she had injected a little fun into those lessons, I'd be on tour with The Rolling Stones today!

Now it's my turn to decide on piano lessons for my own kids. I introduced my nine-year-old, a selfproclaimed Nintendo master and junior Mac hacker, to the Miracle Piano Teaching System about four months ago. His first question was "How do I fire the weap-

ons?" Wise guy.

I left him alone with the Miracle and waited to hear something. Ten minutes later I heard Mary Had A Little Lamb, then Chopsticks and then the theme song from The Jetsons. I rushed back to his room and found him with that look on his face - the same look he gets when he reaches a new level in Zelda.

I saw that this thing really works. Today, he's writing his own tunes and getting better each day. He's enjoying music, he doesn't get hit with a ruler and all I

have to do is encourage him.

The Only Self-Teaching Piano. The Miracle Piano Teaching System can teach anyone — child or adult to play the piano with a series of progressive, customized lessons. The Miracle quickly connects to a Macintosh or PC and includes software cartridge that combines an advanced MIDI keyboard with full-stereo sound and brilliant on-screen graphics. In no time at all, students of all ages will learn and perform left and right handed melodies - while having a lot of fun!

There are exercises, musical pieces and drills (cleverly disguised as games), that teach hand positions, notes, fingering, rhythm, scales and more. The Miracle can be quickly set up for any age or expertise, and customizes itself to move the user along at a comfortable

Unlike conventional piano lessons, The Miracle eliminates boring, repetitive routines. The supercreative, artificially intelligent software quickly teaches the basics and builds on them in very entertaining ways. And that makes all the difference.

The Keyboard. Dazzling music! Spectacular effects! Booming orchestras - all created by you - the Miracle keyboard - and a NES. As a stand alone instrument, The Miracle rivals the music industry's most sophisticated MIDI consoles. The 49 full-size keys are velocity sensitive, so you can learn to play utilizing true piano expression. You also get a foot pedal, which controls the length of time each note is sustained and stereo earphones.

The Miracle can produce sounds from its library of over 100 instruments, sounds and effects programmed by a leading motion picture sound designer. To produce its superior acoustics, the Miracle uses sampled sounds, it can be connected to a home stereo system for rich, full sound.

It's Not Just For Kids! The Miracle is a lot of fun and kids all over the world are entering the world of music because of it. But it's not just for kids. The fact is, The Miracle is a breakthrough step in piano self-teaching. If you're an adult and would love to play piano (but think you're too old to learn), The Miracle can teach you with as little effort as it teaches the youngsters. And you'll enjoy it just as much!

It's Not Too Late To Learn... The Miracle is not a toy (but don't tell your kids!). It's so ingenious, it can teach anyone - at any age - how to play piano. The Macintosh and PC software contain exercises specifically designed for

adults, too. You don't have to know anything about the piano, you don't have to read music, and you can have a lot of fun! Normally, adults have a tough time learning something like the piano, but with The Miracle, it's easier because it moves at whatever pace you're comfortable with. If you want to start out learning just one song or melody, you can just work on that, and The Miracle follows you. As you become more comfortable, The Miracle can adjust to whatever method and speed you like.

Endorsed By Educators, Kids And Parents. Everyone loves the new Miracle system. Musical educators love the way it encourages children to practice, making a fascinating game of the piano. And, of course, kids love it because it's not like learning; it's a challenge. Par-

ents love it because...well, what parent doesn't enjoy the sounds of their children enjoying a musical

instrument?

The Miracle provides the ability to create over 100 instrumental sounds... Classical: Clarinet, Oboe, Strings, Sfz Brass 1, Xylophone; Rock: Fuzz Guitar, Stop Guitar, Pluck Synth, Stick Bass, Percussion 1; Jazz: Saxophone, Vibraphone, Jazz Guitar, Fretless Bass, Percussion 3; Blues: Harmonica, Organ, Steel Guitar, Electric Bass, Percussion 1; Rap: Kalimba, Mod Synth, Clean Guitar, Moog; Latin: Pan Flute, Marimba, Guitar, Upright Bass, Percussion 2; Country: Banjo, Violin, 12-String Guitar, Detuned Piano, Percussion 1.

Here's What You Get Free With The Miracle — Only From TigerSoftware. When you buy a Miracle from TigerSoftware, we'll throw in everything you need to create your own recording studio. We'll start with the Miracle Song Collections, Volumes 1 and 2 containing dozens of popular songs from the Beatles, to Michael Jackson. Play along with your favorite songs, or break out into your own solo. These song collections are a great value and are yours free only from Tiger.

Then we add a copy of TRAX, the MIDI recording software that allows you to create your own smash hits. Change the tempo, mix different instruments, add your own vocals, sound effects and more - controlling it all from your keyboard. The TRAX interface is simple and fast, enabling you to lay down tracks using your Miracle to create your own arrangements.

As Seen On "Good Morning America," "Today Show" and Arsenio Hall! But That's Not All. You also get the Miracle keyboard stand you see pictured at the top of this page. With all

this, you'll be ready to create your own live performance or cut your own record.

With The Miracle, you or your child can learn to play without the boring drills and monotonous prac-

tice that music usually requires.

Now There Are 40 More Ways of Playing To Learn instead of Learning To Play! With The Miracle Song Collections, you can add dozens of popular titles to The Miracle Piano Teaching System. All the features that are quickly making The Miracle the most popular keyboard learning method available are fully functional when you use the songs in this collection.

Custom exercises. Video game action. Full monitoring and learning curve analysis. All of it! And best of all, each song is arranged for two levels of playing diffi-

culty: Novice and Expert.

Each volume contains 40 great songs chosen to represent a wide variety of popular musical styles. Rock & Roll. Country. Pop. Rhythm & Blues. Just pick the tune, and in no time at all you're playing it like a pro! All songs are fully arranged so you can hear a complete accompaniment along with your performance. It's like turning a piano lesson into a jam session!

An Instrument That Grows With You. The Miracle is not only an ideal tool for learning, it delivers lasting value as a high-quality, sophisticated musical instrument. With over 100 other instruments available, and a built-in stereo sound system, you can make an entire orchestra come to life whenever you play. As you grow as a musician, The Miracle is compatible with the entire world of modern synthesizers through built-in MIDI connections. (That's Musical Instrument Digital Interface, the worldwide standard for computerized music.) The most amazing educational tool to come along in years.

FREE WITH THE MIRACLE

Everything you see below: Miracle Song Collection Volume 1, TRAX MIDI Recording Studio and Miracle Stand pictured on the top of this page.



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BCD	27792 Song Collection Volume 2	. \$39.95

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TIGERSOFTWARE

ORGANIZE TIME!

REVIEWER'S NOTEBOOK: Taking care of business just got a lot easier. First Things First is an award-winning time management utility that has no learning curve—it's immediately useful right out of the box. It puts up a unique Floating Clock-Icon, which stays "on top" regardless of how crazy your desktop gets. It not only always tells you the time and date, but also provides instant access to ToDo lists, to check your schedule, or to set up a Reminder. Just double-click on it, or use the program's built-in hot key, and you are managing your time without wasting any of it.

Extremely fast. Non-obtrusive, with 30 action/task categories. There's even a built-in demo program for you to copy freely and share with other Mac users. We can't really manage time — it flows on relentlessly — but we can do something about our priorities!

Perfect timing, It's either the result of incredible luck or determined effort. In business, however, you



can't always depend on luck. Even the organized people have trouble keeping track all the things they (and want to) accomplish and which order should be done it. The secret is to be able to instantaneously recall the most important thing to do next. That's where the power of First Things First comes in.

Time-dependent tasks, appointments and deadlines simply don't care if you have enough time to organize them. And unless a time manager is fast and easy, it is of little use. First Things First is extremely easy to use, delivering instant access to your list of tasks and details. It allows you to organize your efforts by category or project, and keeps you in touch with the big picture even in the wake of interruptions, crises and priority shifts.

You'll quickly create categories, establish reminders and things to do, view and print your lists and pop up your current top priority items with the click of the mouse. First Things First is always instantly available and twice as fast as any desk accessory. No application to launch, no menu items to find — ever. And you'll have almost unlimited capabilities for customizing First Things First to fit your personal style. That's important.

The floating clock-icon is an access device unique to First Things First. In its 3-dimensional form, it actually decorates your screen. Or, if you like, you can park it in a reduced form in the menu bar. Either way, you just double-click on your clock (or use the built-in hot key of your choice) any time you want to access your time management utility. Nothing could make more sense or be more intuitively usable! Organization becomes an easy habit.

Creating new Reminders or ToDo list items is simple — just click on the New button and enter the text for your Reminder or Things To Do. You can choose any category you want and set a time and date, or simply create a list of unscheduled things. You can also assign your Things To Do a priority level from 1 to 4, in order to more easily track what's most important, in addition to what is urgent. Whenever you want to see your top priority items for today, all you have to do is Option-click on your clock.

You can customize your listing of Things To Do and scheduled events however you like — according to category, time-range, and priority level. Best of all, since First Things First uses pop-up menus to let you make your viewing selections, you can always see exactly what your current view selection choices are without having to click on a menu or open a dialog box.

Customizable Time Range. Version 2.0 offers you the ability to customize the time range of the tasks and reminders to be viewed. Easily call up a dialog box to input the start and stop date.

Import/Export — Great for Mac Portables. Version 2.0 offers flexible options for converting personal information data from other programs into First Things First and exporting to text formats or to update other First Things First data files. This makes it ideal for Mac Portable users who want to be sure they have the most recent task and scheduling information on both their portable and desktop Macs!

FREE FROM TIGER

DYNODEX AS

A \$129 VALUE

A true personal



A true personal organizer, capable of handling names, addresses, phone numbers, notes and all other important information. It allows you to print perfect double-sided address book pages that fit virtually any personal organizer. So you now have instant access to your personal contact information — both on and off the computer.

VISIONARY SOFTWARE

INTRODUCING NEW GUARANTEED UNDELETE Retain Original File Location And Recover Deleted Files!

REVIEWER'S NOTEBOOK: Tiger is proud to present Guaranteed Undelete, one of the most useful products you'll ever own — it is the only utility that guarantees that your deleted files WILL NOT be overwritten. Deleted files are recovered in the order they are deleted.

We'll take a look at TrashMaster and Incinerator, the most sophisticated Trash utility ever devised, complying to U.S. Department of Defense specifications.

Two of the most ingenious products we've seen in years, they can save your life in those dark moments when something goes wrong or someone makes a fatal error.

GUARANTEED UNDELETE. The act of Undeleting a file can be a tricky process. Often, recovering a file is like playing the lottery: you're taking your chances that the file is still intact. Guaranteed Undelete is the ONIY undelete utility that retains the file's original location and hierarchy. It also guarantees the recovery of the most recent deleted files.

Guaranteed Undelete is very easy to use, just hold down the command key to access a convenient hierar-Special chial menu of your deleted files, organized

by drive. Simply browse Clean Up Desktop the book ...5.4 Meg Recover Trash... the movie ...1.7 Meg the album ...7.7 Meg Eject Disk Erase Disk ... Applications ...2.4 Meg ☐ TrashMaster D Bonds ...4.5 K Restart D Credit Info ...4.5 K Shut Down Sleep

the menu and select the deleted file or folder that you want to recover. That's it!

IT'S AS IF YOU NEVER LEFT... Recovering a large folder could be a nightmare with other utilities, but it's a breeze with Guaranteed Undelete - just one click and all of the files are returned to their original location. Just as they were, just that simple. And Guaranteed Undelete is network savvy, enabling you to recover files on remote volumes. It's also the ideal safety net if you copy files back and forth to your Power-Book. By the way, Power-Book users get a second license free.

TRASHMASTER — With Incinerator. The classic Trash utility. TrashMaster allows you to securely erase

files, protect important data and manage your trash with a number of ingenious and easy-to-use

Address Lists
Order Form ...15 K
Personal Finance
Personal Finance
Title Files.

Without TrashMaster, deleting a file doesn't erase it. That file is available for you — or someone else — to recover. There's no safety.



TrashMaster's "incinerator" completely erases files you don't want anyone else to see. You select the files to be erased (by name, type or creator) — and they are automatically eliminated per United States Department of Defense specification.

Nothing else can erase files with this degree of security.

WHEN'S TRASH DAY? You can choose when your trash gets emptied, and even what trash. Using a hierarchial menu, you simply select the file, folder or volume that you want to empty. While it used to be all or nothing when it came to emptying

the trash, TrashMaster lets you be very selective.

You can even make the whole thing automatic by specifying the date, size, type or name of the files that get emptied — and when (hourly, disk eject, shutdown, etc.). This is a great way to get rid of files that clutter your disk. Tell TrashMaster to take care of them before they pile up.

GUARANTEED UNDELETE

Keep Schedules in Sync with Mac's Best Calendar

REVIEWER'S NOTEBOOK: Computerized calendars have been with us for a long time (they're a natural for any computer), and I've seen more than I can count. So when one comes around that's really heads and shoulders above the rest, it's something to get excited about. It started out as a project at Claris Corp., moved on its own to Now Software (makers of the popular Now Utilities), and finally culminates in Now Up-to-Date - the only calendar that keeps your appointments and your associates up-to-date, in the office, at home, or on the road.

Now Up-to-Date reminds me of important appointments (even when the application is off and I'm only running my spreadsheet). It shows me daily, weekly, monthly and yearly views that make visual sense. It even lets me take my PowerBook on the road and make schedule changes for both myself and my associates, and when I return to the office, it automatically updates both my personal and the centralized Public calendars - that's smart.

he goal was to combine the timeless functionality of the appointment calendar with the power of the Mac. To take the age-old appointment/calendar book, which people instinctively know how to use, and place it on the screen, infused with powerful capabilities that simplify as well as automate. That's a relatively easy task when talking about power and new features practically any professional programer can do that. The hard part is to make it really useable. To make it easy enough and intuitive enough for a novice to sit down and really use it. After all, who wants to have more attention on keeping their schedule than absolutely necessary?

That was the star high goal, and it's our privilege to announce the goal's finally been reached. Introducing Now Up-to-Date, the premier calendar tool that's both powerful enough to fully schedule any individual or group, plus straightforward enough to be easy-to-use and intuitive for every user.

From the unique "Public Calendars" that coordinate your schedule with your associates' schedules automatically, to the powerful "Reminder" feature that notifies everyone about a meeting far enough in advance to ensure everyone shows up on time, Now Up-to-Date is one-of-a-kind software you can't do without. Check out what Now Up-to-Date can do for you...

Even with the new PowerBooks, there are still times when the old-fashioned, printed appointmentbook (on which Now Up-to-Date is based) best serves the purpose. That's when you'll love the printing options with all the popular appointment book formats like DayTimer, DayRunner, Franklin Planner and FiloFax. Plus you can print your calendar in a variety of other formats.

Customize Your Calendar. Now Up-to-Date's flexible Views and Styles let you customize your calendars, so you can see and edit them any way you want.

View a day, multiple days, a week, multiple weeks, a

month, multiple months, or a year at-a-glance

· Edit any event in any view

· Draw extra attention to big or important events with Electronic Sticky Notes and colorful Banners

· Control how many hours are displayed per day

· Create (and easily switch among) multiple style groups

· Display multiple views of the same calendar at the same time



Organize Your Appointments. Now Up-to-Date's unique 'Public Calendars' coordinate your schedule with your associates' automatically, so your left hand can know what your right hand is doing,

· Combine related calendars into custom groups (create a Social Calendar by 'subscribing' to the Holidays, Parties, Birthdays, and Vacation calendars

· Filter out information you're not interested in

· Assign different colors and text styles to events from different calendars to make them more identifiable

· Run the Public Calendars server unobtrusively in the background on any non-dedicated Macintosh on your network

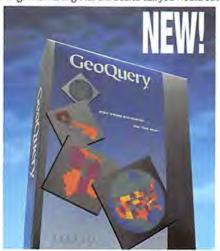
· Import events from other calendars, personal information managers, or any other source of tabdelimited text

NUW UP-10-DAIL
BCD2108A Now Up-to-Date\$65.95
BCD2108B Now Up-to-Date 5 User \$265.95
BCD2108C Now Up-to-Date 10 User \$395.95

The Informative, Intuitive Mapping Software.

REVIEWER'S NOTEBOOK: How many years have you been looking at your business in rows and columns? And realizing that it just isn't laid out that way? Twenty minutes with GeoQuery will change all that. Providing you with a new, and much better view.

GeoQuery instantly transforms your customer and prospect lists — or any business data — into interactive maps. It lets you do things that are impossible with your spreadsheet, database, or contact manager. Things like making that extra sales call you would oth-





"GeoQuery's maps make it easy to spot the best places for growth."

erwise miss, choosing the best location for a seminar or service center, and assigning optimal sales territories. Making your presentations clear and compelling.

GeoQuery is the only software that lets you do these things quickly, easily and affordably. It's the perfect get-it-done tool for anyone whose business extends further than the eye can see...



"Includes maps for US, Alaska and Hawaii with Interstate Highways and all 43,000 + 2IP code locations. High resolution maps with county boundaries are also included for the Il largest metro areas.

Map Mountains Of Data. GeoQuery knows the location of every 5-digit ZIP code in the US - all 43,301 of them, So in the blink of an eye, your customer lists, prospects, corporate facilities, any ZIP-coded data, are magically pinpointed on GeoQuery's built-in maps.

But GeoQuery shows you a lot more than just your business sites. It lets you see how your data relates to each other. Sales territories to customers. Prospects to dealers. Service personnel to equipment installations. Not to mention the Interstate Highways, over a thousand cities, and extensive census data - all included in the basic package. You'll gain new insights on ways to service accounts better. Reduce travel time and costs. And spot the opportunities for growth that others are missing.

Know Where You're Going. How many times have you driven hundreds of miles, and made only one call? How many accounts did you drive past on the way? How would you know? Well, those days are over.

Team up GeoQuery with your contact manager or prospect database and a quick glance at the map will tell you who's next door. Or choose the Find Pins command and GeoQuery will instantly identify your closest account. You will make more calls in less time, sell more, and maybe get home a little earlier on Friday.

Sell Your Ideas. Maps are powerful tools to present and sell your ideas. Whether it's showing a client why you can service their accounts better, explaining that redistricting plan to the board of directors, or just reviewing sales results at the monthly meeting, GeoQuery's maps will help you present your results and sell your ideas. Quickly and effectively.

Free with purchase of GeoQuery: A perfect place to organize your names and addresses. A \$129 VALUE

GEOOUERY

BCD2106 GeoQuery w/Dynodex\$395.00

Fax: 305-529-2990

Automatically Remove Jagged Edges!

New JAG Is The Ultimate Anti-Aliasing Tool For The Mac ...

REVIEWER'S NOTEBOOK: The "jaggies" are gone! Improve your PICT and PICS files to pixel-perfect sharpness and clarity in seconds. This is a product worth its weight in gold for Mac painters, animators, 3-D modelers and photo retouchers/enhancers, Powerful anti-aliasing and edge-detection technology polishes your images for smooth curves, razor-sharp edges and deep, rich detail. Supports 8 and 24 bit still images and animations.

For 3-D rendering applications, JAG cuts your production time by up to 75%, eliminating the need for oversampling. Jaggies are handled AFTER the render-

ing is complete.

Works with all the top programs: Pixel Paint, Studio 8, Oasis, UltraPaint, PhotoShop, ColorStudio, Studio 32 (and other software with built-in anti-aliasing),

MacroMind Director, Gold Disk Animation Works, Swivel 3-D, Swivel 3-D Professional, Ray Dream Designer and more.

Nothing looks like JAG enhanced images. If you want pro-quality work, nothing we've seen anywhere is better. This product has exploded in popularity as the Mac has become the perfect graphics front end. Try it once and you'll be spoiled...

Stop Tolerating The Jaggles! JAG is compatible with virtually all leading Mac color graphics and animation software, with full support for PICT and PICS file formats. It's advanced anti-aliasing technology cleans 8-bit paint images with unbelievable results, and its sophisticated

anti-aliasing techniques for 24-bit images allow greater freedom when working with 24 bit paint and retouching programs. For Mac animators, JAG delivers spectacular 8-bit multimedia presentations. For 24-bit animations, JAG can handle studio quality frame-by-frame, full color output to tape.

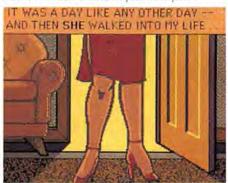
For smaller text and single-point images, JAG puts meticulous controls at your fingertips to protect the sharpness and color. The edge tracking mechanism is fast — unbelievably fast! You'll see crisper, cleaner images in record time.

And high-res is handled up to 4K, for seamless integration into professional graphic production environ-

ments. JAG works quietly in the background, so you can continue to work on your Mac while it performs its magic on your images and animations. There's batch



queue and interruptable processing, adaptable palettes and custom dithering so you can achieve the photorealism of 24 bit brilliance on your 8 bit system!



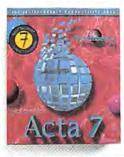
BEFORE

AND THEN SHE WALKED INTO MY LIFE

AFTER

	JAG	
CD2535 JAG	\$65.95	

Two Words to Success: OUTLINE & ORGANIZE



REVIEWER'S NOTE-BOOK: Outliners are fast becoming a standard in today's office environment. While word processors evolve into desktop publishers, outliners have become a vital tool that turn shadowy thoughts and ideas into focused plans of action. Acta 7 is the industrial-strength

thought-processor that stands heads & shoulders above the rest. Here at Tiger we can see how it earned its reputation as "the easiest-to-use thought processor for the Mac".

f you're still using a word processor to gather and organize your thoughts — think again. This is the breakthrough of the 90's. Outliners are ideal for capturing quick, fleeting brainstorms before they can get away. I always keep Acta 7 running in the background. Bright idea? Click — it's instantly noted. When I'm ready, I review my notes and organize them. Rearranging, grouping, evaluating importances and so much more. That's the power of Acta 7. It processes my thoughts.

Outliners are better than word processors for developing concepts, plans, letters and so much more. With its built-in hierarchy of levels and sub-levels, it's easy to rearrange various parts to really fit. The important items bubble to the surface while subordinate ones fall

into perfect place. We find using an outliner a timesaving tool for all our writing. It's simply better-suited for the task than any word processor, but that's only the beginning..

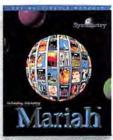
Also Available From Symmetry:

REVIEWER'S NOTEBOOK: Another superior product from the makers of Acta 7 is Mariah — the world's first multimedia organization and retrieval utility. Desktop graphics and multimedia are exploding at a phenomenal rate. You do things on your Mac unheard of just a few years ago. But what about organization? What do you do with all those files, and how do you keep them organized — yet retrievable? Mariah is a heaven-sent tool for every graphics operator. We put all our files in one Mariah "Collection". Now, to find a file we just enter a keyword or two for instantaneous searches, or pull up full-color thumbnails for visual browsing. Finding images we haven't touched in years is now easy and fast.

M ariah lets you manage graphics, sounds, animation, text and more. All in one easy-to-use file. All easily retrievable — fast. All types of files, from B&W to 32-bit color Paint, PICT, PICT2, TIFF (Mac or DOS), EPSF (Mac or DOS), as well as Scrapbook and Picture-Base formats.

And when you find that special file, what do you do? Listen to sound files, play animation files, cut and paste graphics, convert formats and more — all from within Mariah.

Build huge collections of mixed "stuff" that can be sorted, gathered and retrieved at amazing speeds.



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CA-Cricket Graph, also reviewed here, is the perfect tool for serious graphing tasks. Professional power, yet sleek and simple to use. Very flexible, allows 12 different graph types. A great companion product to CA-Cricket Presents.

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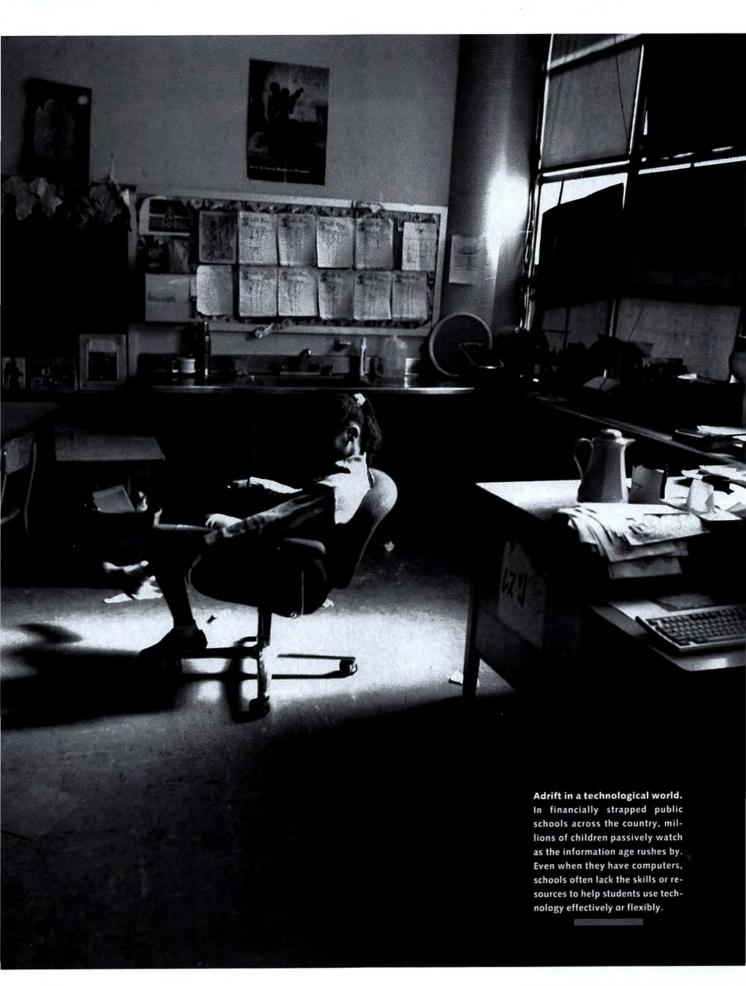
Separate SCHOOLS ealities

BY CHARLES PILLER

Photographs by MAX AGUILERA-HELLWEG Not long ago, access to computers was a yardstick of inequality in American education. In 1984 white children used computers in elementary and secondary schools at about twice the rate of African Americans and Hispanics. More-recent statistics seem to offer cause for elation. In the last eight years, the nation has spent well over a billion dollars to help public schools compete in a technological world. By 1989, according to the U.S. Bureau of the Census, nearly the same percentages of those three groups used computers in high schools. Elementary schools also made dramatic progress. And disparities between rich and poor and between public and private schools seemed to narrow just as sharply.

But any celebration would be premature. After I visited inner-city, rural, and suburban schools in various parts of the country, and after discussions with scores of teachers, students, and school administrators, an inescapable conclusion emerged: Computerbased education in poor schools is in deep trouble. Inner-city and rural school districts rarely have the skills or funds to maintain their machines. These districts lack the training and social support to use com-







puters effectively. In most cases, computers simply perpetuate a two-tier system of education for rich and poor.

Educators, experts, and politicians agree that the U.S. urgently needs high-quality computer-based learning. Yet in the effort to survive amid budget cuts and social decay, poor schools tend to use computers so rigidly and ineptly as to repel students. Poor schools create refugees from technology. As literacy has come to mean more than the ability to read and write, a generation of young people is losing its franchise on independence and its shot at a better life in the information age.

COUNTING COMPUTERS

NOTHING Nearly every school in America owns personal computers. But without expertise to use and maintain them, thousands of machines lie fallow.

Ten recently donated, secondhand IBM PCs are stacked haphazardly in the middle of the computer lab at Menlo Oaks Middle School, part of the school district of East Palo Alto, California, a poor minority blip on Silicon Valley's wealthy white screen. No one knows how to use them. "This is often the problem," says Magdalena Fittoria, director of bilingual education for the district. "People say, 'Here, have some computers!' Well, thank you. Now what?" Most of the lab's ten Macintoshes are broken. The working units are not used for any organized class activity, although a computer club sometimes meets after school for word processing and drawing. Budget cuts in East Palo Alto forced the school's computer teacher into a regular math-science job. The lab primarily serves as a detention center.

The school's tiny library was recently upgraded with grants from the Hewlett and Packard Foundations-philanthropic arms of the Silicon Valley legends who started their high-technology company in

nearby Palo Alto. The library has no computers. Three at a time, fifth- and sixth-graders are permitted to go to the shelves to select a book. The rest sit fidgeting and talking, interrupted by the teacher's occasional reproach.

In nearby Escondido School, part of the wealthy Palo Alto Unified School District, students crowd around CD ROM and laser disc players and eight computers in a 12,000-volume library. The students use Apple IIe's, IBM PCs, and Macintoshes-supported by scores of software titles-for word processing, math, science, social studies, and language development. Fourth- and fifth-graders will soon begin a multimedia pre-



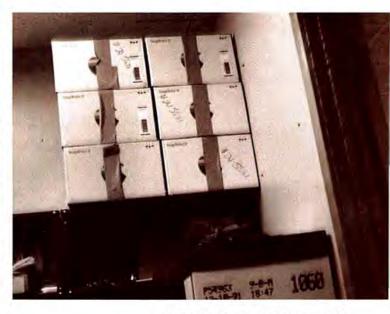
File Edit Goodies Font Style Potterns Tools "She was a true friend" at 100% steady . I told him yeah . One day he came over to my house and I was on my way out the door . He asked me where was I fend to go . I told him I was on my to pick up an outfit, it want take long. He said I will wait until you get back . and I said ok 'O' and my friend Nette will be coming over tell her she can sta of she want's to . Then I left . Nette came over Melvin let her in . She said Melvin where's Kisha? He said she just went to go pick an outfit , she said you can stay if you like . then he le

Wasted machines, diminished lives. Donated computers at Menlo Oaks School, part of the impoverished school district based in East Palo Alto, California, stand idle because no one knows how to use them (left). At the affluent Escondido School, near East Palo Alto, students have easy access to computers and a wide range of software programs beginning in kindergarten (top right). Some first-grade students at Escondido write near the level of this story from a Miami Carol City 11th grader (middle right). Also at Carol City, six antiquated Apple ImageWriter printers are locked in a storage closet; the

school has not found an adequate

means of securing them in class-

rooms (bottom right).



sentation on salt-marsh birds and plants. Students jostle for position to get their chance on the machines; others cluster around joint projects.

In a nearby classroom, students work intently at their computers, with an occasional lapse into playful teasing. Sophie is the computer wizard. She types answers to questions from a reading and writing program on an IBM machine. Then she bobs down the row with brown curls trailing, advising the other kids. Later, she moves to a Macintosh and quickly creates an animated design emanating from her name in the center. Sophie is a first-grader.

Escondido has one computer for every 9 students; Menlo Oaks, one per 14 students. These are impressive numbers compared with the national average of one computer for every 18 students. But counting only usable computers—those in working order that faculty members can operate—Escondido holds at 9, but Menlo Oaks' ratio shoots up to one computer for every 60 students.

TECHNOLOGY IGNORES MANY

SCHOOLS About 269,000 computers flood

America's public schools each year. But many remote
rural schools don't have computers or are forced to
give up essential programs in order to get them.



On this sparkling, warm spring afternoon, any seventh-grader might surrender to daydreams and gaze longingly out the window during a lecture on the digestive system. Students at Hancock Central Elementary School in Sneedville, Tennessee, don't have to look out a window. They can see daylight through cracks in their schoolroom's cinder-block walls.

A poster on the wall says "Access the Future." It's an advertisement for IBM computers, but these kids don't have computers, or, other than one old microscope and a handful of dusty slides, any scientific equipment. There are four or five archaic and infrequently used computers at Hancock Central, not counting the ten obsolete IBM PCjr's used in a special reading program restricted to first-graders. Last year the superintendent of the Hancock County district sought a federal grant to buy 150 computers. The government rejected the application, saying that the funds would "supplant" rather than "supplement" state and local spending.

Sneedville, population 1500, is nestled against the Clinch River about 70 miles northeast of Knoxville, in the center of Appalachia. The school has no money for textbooks or paper or crayons. Teachers double as janitors, and some classrooms are covered with a thick film of dust and grime. To buy toilet paper, Hancock Central holds fund-raisers—a daunting task in a county where 59 percent of households earn less than \$15,000 a year.

Across town at Hancock County High School, home economics has been one of the most popular subjects for decades. Most families in this county live in poverty, few mothers work—a custom abetted by the dearth of jobs in the area. Although the federal government would not buy computers for the district, it funds home economics with a generous vocational-education grant.

In contrast, the 4000-volume school library has no interlibrary loan program or budget to purchase new books. "We got the magazines renewed this year," says librarian Joanne Green. "That was all we got last year as well." The library recently received its first computer, a donated IBM PS/1. Principal Harold Ramsey hopes to get some software and training for it soon.

In Tennessee statewide, 64 percent of high school teachers use computers for instruction. No teachers at Hancock County High use them. Yet, like the elementary school, the high school has one special computer lab. Owned and run by a community college in another county, the lab is open to students whose family income is at the poverty level. In a county with so many poor people, the program is further restricted to students who need remedial training or enjoy the "gifted" designation. The work primarily emphasizes drill and practice, with some writing and videotape-based instruction.

Though extreme, Hancock County's plight is hardly unique. Nearly all public schools are cutting back after years of recession, and many have never been more strapped. "Enrichment" classes—physical education, art, music—are becoming a thing of the past in communities all over the country. When poor schools purchase computers, they defer other needs. But they don't always get the return on investment that they expect.



COMPUTERS ARE NO PANACEA

When computers are grafted onto dismal, underfunded schools that lack appropriate staff support, students and teachers rarely use them effectively.

Miami Carol City High School lies in the shadow of Joe Robbie Stadium, home of the Miami Dolphins football team. The Dolphins recently "adopted" 11 local schools, including Miami Carol City, and will provide a few free tickets, field trips, and a \$2500 scholarship each year.

The term *adoption* seems appropriate. Among ten randomly selected students at that school, four had one parent at home and three were orphans. This reflects national trends. As the poor got poorer in the 1980s, the number of children living in poverty exploded, as did attendant social problems—murder, suicide, teen motherhood, orphaned youths. One in five American children now officially lives in poverty, a figure many social analysts consider a gross underestimate.

Carol City has a prisonlike feel about it; a 10-foot chain-link fence topped by barbed wire surrounds the school grounds. This year the school instituted a lock-down policy at lunch—no one goes in or out—

to guard against intruders.

The Carol City library boasts a minor technological bonanza: eight Apple computers and two printers for writing, and a CD ROM-based magazine database and card catalog. In five visits to the library over two days, I did not see a single student touch a single machine. A teacher later confided that the library is so little used that her colleagues call it "the mausoleum."

The school has about 175 computers, and more on the way. The district in Dade County, where Miami is located, has aggressively pushed technology. Now three of the roughest innercity schools—Miami Edison, Miami Central, and Miami Northwestern—have a better student-to-computer ratio than do high schools in the most affluent areas of the county.

But at Carol City, thieves undermine the district's best efforts. According to three science teach-

Questionable choices. The wrong computers or software can drain scarce resources. At Hancock Central Elementary School in Sneedville, Tennessee, students work in a dungeonlike computer lab in the basement (above). The school's lone computer class, restricted to first graders, uses IBM's "Writing to Read" program. Research has shown the costly program to be less effective than standard instruction. At Miami Jackson High School, a \$200,000 IBM 9370 Mainframe computer (facing page) is used to teach data processing. The lessons include work in the BA-SIC and COBOL programming languages. Those languages offer shrinking job opportunities in entry-level data processing only-not other computing-oriented fields. A popular drafting class in the same school still relies almost entirely on pen and paper, though many professionals in design fields now use computers.







ers, the computers are secured, but cables are frequently stolen, as is anything that can be pawned. Chemistry teacher Robert Metz explains that he rarely operates the three Apple computers in his classroom, even when the cables are there, because he lacks useful software.

Down the hall in a computer lab, a programming class is in progress. Nine of the ten students play Tetris or Joe Montana Football games on their machines. The teacher, standing a few feet away, seems relieved that the students are quiet. In an adjacent word processing class, students listlessly copy text from books.

Across town in the opulent suburb of Coral Gables, the high school draws students from around the county. Students and visitors stream in and out. In the center of the large, crowded old library is a stuffed chair and couch where students read and chat. The library has 34,000 books, but its computer resources are modest-a CD ROM multimedia encyclopedia and two CD ROM databases for newspapers and magazines. I interrupt Anthony, a sophomore investigating the use of animals for cosmetics testing, and ask him about his work. "We need those animals," he says, swelling with indignation. "They've been placed in this world for a reason." Before the words are out, Anthony pays the penalty for his distraction—another student nudges him aside and takes over the newspaper CD ROM. In three visits to the library, I never saw a computer station vacant.

In an advanced-placement physics class, 21 students—some on their way to Princeton, MIT, and Harvard—clumsily crowd a single Macintosh to view a demonstration. It's a sign that Coral Gables, though widely considered one of the top U.S. high schools in overall excellence, has not been immune to funding cuts. But available equipment is used well. Computer-programming students win statewide competitions. In word processing classes, students go to the library and research a topic of their choice, then use computers to craft and refine a report.

For Carol City and schools like it, the easy productivity of Coral Gables is a distant dream.

East Palo Alto, a city of about 24,000, endured 22 murders last year—a higher homicide rate

per 10,000 people than that of any major American city. Five surrounding communities, including Palo Alto, had 2 killings all together. In the first 14 weeks of 1992, 14 more people were murdered in East Palo Alto. During that spate of violence, a person was shot two blocks from the kindergartenthrough-eighth-grade New School. The district had to bring in a team of counselors to calm traumatized kids.

The New School's principal, Gwen Gholson Driver, spends much of her day chasing intruders off campus and keeping the kids in line. When I arrived one afternoon, she had some boys, about 10 years old, washing

Technological graveyards. Joystick at the ready, a student in Sneedville, Tennessee (right), plays a game on an archaic Commodore VIC 20, for which no modern educational software is available. A ten-year-old Commodore 64 model, in the foreground, is nonfunctional. U.S. public schools have more than 2 million microcomputers, but many of those are so old as to be of limited usefulness. Other students in Sneedville schools rely on Zenith (top left) and IBM PCir (middle left) machines-relics long-since discontinued by their respective manufacturers. An old Apple II monitor (bottom left) has found a resting place in an East Palo Alto, California, primary school.





Examples of mastery. In a computer lab at Palo Alto High School in California, physics students cluster around a Macintosh. The lab's design promotes collaboration by groups of students working on joint projects, such as multimedia presentations that describe the physical principles behind amusement-park rides. down walls. It was punishment for disrupting classes and selling beepers—standard equipment for young runners for the drug trade, and a reminder that these boys learn more about high tech on the streets than they do in the classroom.

At a glance, the newcomers class at The New School seems alive with creative energy. But

soon it dissolves into chaos. Peg Dowley, a young teacher in her second year out of college, shouts in Spanish to be heard. The 28 recent immigrants from Mexico, fifth- through eighth-graders, speak little or no English. She has little success.

The class is well endowed—two Macintoshes and four Apple IIe's purchased with federal funds for bilingual education. The kids using the computers seem to enjoy themselves, but amid the pandemonium it's hard to imagine rapid progress. The newcomers class had been limited to 22 in years past, but the district superintendent raised the cap to 29. Dowley shrugs. "Take a program, call it ineffective, then make it bigger. You explain the logic to me."

In 1990 Apple donated a state-of-the-art multimedia lab to the New School (then called Ravenswood Middle School)—more than 30 Macintoshes, including sophisticated IIci multimedia stations, as well as full-page monitors, a CD ROM player, and a video camera. A team of students combined sound, text, video clips, and graphics to create a program on recycling that folded together rap songs with research data. Other students tackled the topics of drugs, violence, and youth. An ambitious and successful program by all accounts.

Last year the East Palo Alto district reorganized the school and replaced most of its teachers and administrators. Since then the lab has been used primarily to teach touch-typing. The instructor stands in front of the class, his hands on a large keyboard chart on the wall. "It'll be painful at first," he says, "but eventually your muscles will learn to conform to the keyboard." The kids stare at their screens in stupefying boredom. Half the lab stations stand idle. The teacher had too much trouble keeping order to have the entire class at one time.

Dowley, the newcomers-class teacher, has shied away from creative uses for computers. "To hand us this much equipment without the staffing that really can help put the mysticism of it into reality . . ." Her voice trails off in frustration.

Two miles away, in Palo Alto, Escondido School resides on the lush and contemplative Stanford University campus. Escondido also has a high population of newcomers. But these are the children of graduate students from every corner of the globe; their intellectual parents prepare them well to excel in a new environment, to speak a new language. Kindergartners move freely between blocks, crayons, and computers; each activity elicits the same relaxed attention. For these kids, computers are a natural part of everyday life. They work on spelling and prewriting games, and a music program to compose simple melodies and play them back.

All grades at Escondido, a kindergarten-throughfifth-grade school, use computer-based instruction, although much of the action is in the library. A firstgrade class views the story of Cinderella on a screen of an overhead projector patched to a CD ROM player. The story is in English, but the Spanish translation comes with a mouse-click on a word or sentence.

Students go about their business finding books; working on word processing, painting, or hypermedia programs; drilling with math or reading games. They need little help from the librarian—nor does she intervene often.

Escondido School is a world apart from the conflicts of nearby East Palo Alto. Escondido's students are trusted to behave responsibly and to do well. They quietly meet the expectations.

TEACHERS AND HOME SUPPORT

ARE KEY In the right environment, computers

make students more independent, teachers more creative.

Students work with computers better at school if they

also have one at home.

Using computers as a tool—for manipulating information, for coping with a fast-changing society, and for thinking—can scare teachers. It shakes up traditional roles. Students break away from the classic pedagogical formula as they press ahead with their own agendas. Affluent schools tend to hire teachers with the training and confidence to see students as collaborators negotiating the technological labyrinth.

"I'm a smart person, but I know with certainty that 60 percent of the kids here are smarter than I am," a teacher at Palo Alto High School told me. This is a teacher prepared to use computers; she respects students enough to let them take charge of their own experience. Such teachers don't end up at places like Palo Alto by serendipity. The better schools recruit faculty statewide or even nationwide. And teachers right out of college earn \$27,591 a year in Palo Alto; their most experienced colleagues can make upwards of \$55,000. In Appalachia's Hancock County, Tennessee, the top salary—with a master's degree and 15 years seniority—is \$26,806.

The best teachers find ways to create excellence out of nothing. In Palo Alto High School's computer-aided-design lab, students sketch ideas at professional-quality drafting tables, work out detailed drawings on 16 computer workstations (including 4 with top-of-the-line 486 processors), then build the parts on computer numerically controlled (CNC) machine tools. Instructor Doug Bertain got the tables for free from an aerospace firm that was upgrading its equipment, scrounged the machine tools from a local college that had phased out its program, and bargained with adult-education programs—his night teaching job—to kick in the computers. Without the school's spending a dime, Bertain's students take machine parts from conception to reality. They are future engineers.

Using the multimedia lab across campus, Clarence Bakken, a physics teacher and computer mentor for the school, contacted the nearby Great America amusement park to get information about how its rides work, then set 24 teams of students loose. Their preparations included a trip to the library and

some field research—they tried out the rides. Each group worked independently, rising to its ability level. The result is the "Great America Sampler," an elaborate HyperCard multimedia project that explains the physics behind the rides. The students then used their projects to teach younger students at a local middle school and at Great America.

Although some affluent schools also have lack-

luster computer-based learning programs, students from these schools usually enjoy supportive, well-educated families that supplement school-based training with home computers. Federal surveys suggest that whites are about three times as likely to have computers at home as are African Americans or Hispanics; affluent students are nearly four times as likely as poor students.

And like student-to-computer ratios in the schools, even such lopsided data seem unduly optimistic. At Palo Alto and Coral Gables, some three-

Squelching creativity. "It'll be painful at first," the instructor tells these students at an East Palo Alto. California, school, "But eventually your muscles will learn to conform to the keyboard." This state-of-theart multimedia lab is used primarily to teach touch-typing. Half the lab stations stand idle, the teacher says, because he had trouble keeping order with the entire class at once. The lecture-hall style seating arrangement makes team projectsone of the most productive and stimulating computer-based learning methods-difficult.



quarters of students have home computers; more than half do at Escondido, where the oldest children are 12. Likewise, the relatively well-paid teachers at such schools buy home computers to plan lessons, develop curricula, and streamline grading and record keeping. At virtually every school I visited in socioeconomically depressed areas, fewer than 1 in 25 students had a computer at home. So, given equivalent technology in school, an inferior computer-based curriculum places poor students at a far greater disadvantage.

BACKWARD METHODS KILL INI-

TIATIVE Amid crushing poverty and social decay,

many schools concentrate on the wrong things or send

messages that drive students away from computers.

On average, training in keyboarding and programming makes up 30 percent of computer use in U.S. high schools, 15 percent in elementary schools. In Carol City and The New School, beginning courses in such subjects make up some two-thirds of all use. There is a widespread tendency to use computers only to teach basic skills in poor schools, but to provide rich discovery environments in affluent schools.

Writing to real people. "These kids are writing to communicate with another individual, which is an exciting concept—a mature concept," explains an instructor at Sir Francis Drake School, located in a poor San Francisco neighborhood. Students polish their writing skills by corresponding, via fax, with pen pals who are employees of a local bank. In another simple, innovative program, kindergartners dictate to fifth-grade writing buddies who word process and edit the stories.

"This differential use is consistent with long-standing beliefs that children must first master the basics before moving to higher order thinking and that poor and minority children lack the basics," according to the winter 1991 Review of Educational Research. In many schools, however, poor and minority children never move beyond the basics.

Regardless of their creative ambitions, principals in poor schools follow the logic of survival. They often lose their jobs when they fail to raise students' low test scores. This pushes them to adopt the least challenging form of computer-based learning, drill and practice ("drill and kill," as many educators say), because it ironically can increase test scores by a few points even if it deadens critical thinking.

In Carol City, the library's software collection includes only word processing, sign printing, and drill and practice for college entrance exams. Still, in 1990 only 3 percent of Carol City seniors scored in the top 58 percent of all American students who took the Scholastic Aptitude Test.

The effects of such circumscribed use of computers are clear: students' glazed eyes or routine misbehavior; teachers who telegraph low expectations and use computer games as bribes for enduring the insipid repetition of drill and practice. Such strategies reflect tacit resignation that these machines extend the misery. In nearly every poor school I visited, some teachers used computer access to reward good behavior—thereby excluding the very students who most need the stimulation that computers can offer.

Still, the most unforgiving environments sometimes provide models to turn this around.

SOME SCHOOLS BEAT THE ODDS

Resource-poor schools succeed when they connect computer education to students' lives and aspirations. More important, they place kids in control of technology.

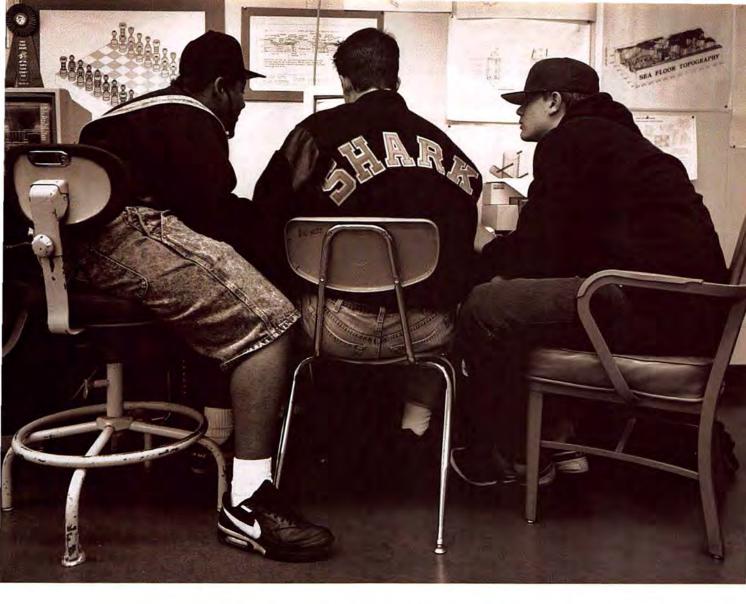
"Slow down," interrupts Sherise, a fifth-grader. Danny, a kindergartner perched on her lap, takes a breath, then continues dictating. The older child keys in Danny's story about "the most important person in my life"—his dad. Sherise gets practice in word processing and learns to interview her young computer buddy. Danny connects his spoken words to those on the screen and printout. He giggles with excitement as he learns to read.

A few minutes later, Juan, a third grader, polishes off a letter on his Apple computer, prints it, adorns it with a sketch of the solar system, and faxes it to his pen pal Yvonne, an employee of a local bank. "We get 'I love you' back and forth on about the second letters," says Ray Porter, computer consultant for the school district. He helped set up the buddy-writing and penpal programs at Sir Francis Drake School in San Francisco's depressed Hunters Point area. "These kids are writing to communicate to another individual, which is an exciting concept, a mature concept." It can be useful in other ways. One child dictated a story about having been abused—it led to intervention by social workers.

Drake's students are mostly African Americans and Southeast Asian immigrants—the latter bused in from San Francisco's Tenderloin district. Eightyseven percent of the families are on welfare. "The only thing they have in common," says principal Bonnie Bergum, "is that they're all poor."

My host in a fifth-grade classroom is Brenda, a girl with a beaming smile. She proudly shows me around the computer area, introducing other kids and ex-





plaining how students desktop publish their school paper and use online services to do research and send electronic mail to students in other parts of the country. A year earlier, Brenda was in a class for slow learners. Through an intensive computer-learning program, Porter explained, Brenda's attention span improved, and she mastered reading and math skills that once seemed out of reach. The school moved her forward to a regular classroom.

To promote writing, Drake sent its students home with laptops. The simple terminals—300-bits-persecond modems with keyboards that plug into TV sets—were once used for home banking. Porter picked up the antiques for \$50 each, supplying a whole class for less than the price of a Macintosh Classic. Instead of going home and watching TV, the kids conversed online. Their writing skills steadily improved. Students and their parents also used the machines to communicate with teachers, opening a new link to families. In one case, a semiliterate parent learned to write by following the child's example.

Drake is a computer magnet-school with extraordinary resources. But some of its most stimulating and successful efforts, such as the laptop writing project, pairing fifth grade and kindergarten writing buddies, and faxing pen pals, cost almost nothing.

Similarly, even in the most tortured settings, stu-

dents and teachers can get impressive results without spending a fortune on hardware. At Miami Carol City, for example, a creative-writing group desktop publishes Rain Dance, a powerfully moving literary journal filled with poems of ghetto life.

Students at Miami Jackson High School, in the beleaguered Liberty City neighbor-

hood, learn in a few weeks to write programs that create elaborate animated cartoons. In one, a pool cue sinks 15 balls into the pockets of a pool table, showing accurate trajectories for each shot.

A Jackson High School class in international finance lacks online access to Wall Street tickers because proper phone lines would be prohibitively expensive in the crumbling school building. "It's hard to run state-of-the-art technology on turn-of-thecentury wiring," says Enid Wiseman, assistant principal. Yet students set up, track, and manage elaborate stock portfolios on Macintosh or IBM computers. "This is against all human odds," says Elio Forte, the school's business manager. "Imagine if they had things going for them."

Job training comes to life. Computer-aided-design students at Palo Alto High School, in the affluent California suburb of the same name, study an advanced 486 workstation as it draws the latest version of their machine-part design. Every computer in the superbly equipped lab was donated to the school.

THE EMERGENCE OF A TECHNO-

LOGICAL UNDERCLASS Such examples

are inspiring. But for every technological success story, impoverished schools suffer a hundred setbacks. The links between a generation of American students and the technological future grow increasingly tenuous.

Computers alone cannot save the public schools, but this much is clear: the vast majority of teachers believe that computers have already become essential learning tools. And baseline computer skills are fast becoming indispensable for employability and upward

mobility in our society.

Many students become familiar with information technologies in a general sense. But those who cannot claim computers as their own tool for exploring the world never grasp the power of technology. Such students become passive consumers of electronic information—usually in front of the television. Once out

of school, they are relegated to low-wage jobs where they may operate electronic cash registers or bar-code readers. They may catch on as data-entry clerks, typing page after page in deadly monotony. They are controlled by technology as adults-just as drill-and-practice routines controlled them as students. Those who fail to master new information technologies even to this minimal extent increasingly drop off the edge of mainstream

society with little hope of climbing back up.

And in the era of electronic media, there is no blissful ignorance. For a rare art project at Hancock Central, third-graders drew pictures showing what should be done to improve their school. "Burn down the school and build a new one," read one caption. Even eight-year-olds know when they're being cheated out of their future.

Charlotte Greenbarg, former head of the Dade County PTA, describes the sense of betrayal felt by

students at Miami Northwestern High School—a Liberty City school that refused my requests to visit. "If you talk to the kids, they want so badly to have things the way they are supposed to be. They want a Coral Gables," Greenbarg says. "They want the classes to teach them something. They want to come out of there being something." m

Some names have been changed to protect students' privacy. Sources for computer use data include Quality Education Data and Market Data Retrieval.

Collecting dust or creating the future. Pompoms and PCs belong together in this East Palo Alto, California, school (left), where budget cuts have eliminated both physical education and computer instruction. Students at such schools have little to look forward to in an increasingly technological society. In the library at San Francisco's Sir Francis Drake School (right), a computer magnet-school where 87 percent of students are on welfare. computers have become a routine and empowering part of life.





HOW OUR
GOVERNMENT
VIEWS
THE USE
OF COMPUTERS
IN

Affinal schools

House ceremony where he unveiled his overall education strategy-America 2000-President Bush announced that, at age 66, he would finally learn to use a computer. The man that Bush credited with encouraging him to become computer literate, Education Secretary Lamar Alexander, is also one of the people in charge of getting America's schools to take advantage of modern technology. As of now, Alexander says that America's public schools are "the last institution in society to be almost untouched by technology"-behind even the Oval Office in the use of

computers.

In April 1991, at the White

MORTON KONDRACKE

Photo illustration by WILL CROCKER

Mond

The federal government is promoting the use of computers in the classroom in numerous ways-by paying for hardware for disadvantaged schools, making local school districts aware of innovative educational software, training math and science teachers, proposing a national fiberoptic network to link schools, and having President Bush visit highly computerized model schools. Nearly a dozen government agencies are involved, including the Department of Education, the National Science Foundation, NASA, the Departments of Defense and Energy, and the White House's Office of Management and Budget and Office of Science and Technology Policy.

Still, Alexander and other key officials admit that there is no overall plan to guide the effort to integrate computers into the educational curriculum, no estimate of the cost, and no single official in charge of programs. "It's part of everything we [the Department of Education] do," Alexander says. "But have we put it on a piece of paper? The answer is no." This lack of detailed planning has opened the administration to criticism from technologyminded Democrats in Congress, notably Senator Jeff Bingaman of New Mexico, who has proposed the creation of an Office of Technology within the Department of Education.

The administration has never officially enunciated its vision of the role of technology in education. Yet many officials have their own views of what such a policy statement would include. According to Bob Grady, deputy director of the White House's Office of Management and Budget and a key player in both education and technology policy, administration policy is guided by the idea that "every classroom should have in it technology that would allow it to access a hugely expanded universe of data, learning tools, and educators."

Similarly, the Department of Education's assistant secretary for research, Diane Ravitch, says that computers, in combination with fiber-optic networks and hypermedia databases, will eventually allow students in any school to take advantage of work by the world's foremost experts on any subject. In Ravitch's scenario, teachers will then be free to give students individualized coaching. Alexander says that software will be available to help learning-disabled children catch up and let gifted children explore to the limits of their potential. "Instead of being boring, as a teacher standing in front of a class-



room often is to a generation raised on TV and Nintendo," Alexander says, "education is going to be fun." And, he says, "computers and telecommunications should be in every child's home as well as school." Still, Alexander acknowledges that no federal program exists to help get computers into children's homes.

Resources and Training

IN RESPONSE TO A REQUEST FROM Macworld, the Department of Education listed 19 separate programs under its jurisdiction that provide funds schools can use to purchase computers-although none of the programs are specifically designed to provide hardware. According to the Department of Education, "Under discretionary grant programs, computers...may be purchased with prior approval of the project officer and as long as it supports the purpose of the grant. The purchase of computers shall not be the primary purpose of the grant, but rather incidental and integral to the grant purpose." Programs permitting hardware purchase include the Chapter 2 education "block grant" program, currently funded at \$475 million, of which an estimated 30 percent is used to buy computers; the \$6.6 billion Chapter 1 program for disadvantaged children; the \$256 million Eisenhower grant program to advance math and science instruction; a \$150 million program to aid magnet schools; and smaller programs for homeless children, migrant education, and libraries. The Department of Education has no estimate of how much federal money has been used to buy computers at the local level. Under a presidential executive order, federal agencies also are encouraged to make their excess computers and scientific equipment available to local schools.

Most national studies show that what schools lack is not so much basic hardware, however, as teacher training in computer use, innovative software, and additional hardware such as CD ROM players and modems. Ninety-eight percent of U.S. schools now have at least one computer, and the national ratio of students to computers is 18:1. According to a famous 1988 study by Congress's Office of Technology Assessment, called Power On, despite the presence of computers in almost all schools, only half of the nation's teachers report having ever used computers. The number who use computers regularly is much smaller. Barriers to greater use of computers by teachers include lack of equipment, inadequate or inappropriate training, and for some, anxiety about new technology. Few classrooms have telephones, modems, or networked computers. A 1988 study by the National Assessment of Educational Progress reported that computers were hardly

> ever used for subjects such as reading, math, or science, but were used almost exclusively for learning about computers themselves.

> Alexander agrees that teacher training "is a problem," but the federal government is taking decisive steps to solve it only in the area of math and science education. Under the direction of an interagency panel called the Federal Coordinating Council for Science, Engineering and Technology, chaired by presidential science adviser D. Allan Bromley, the federal government has increased spending for the improvement of precollege math and science programs from \$344 million in 1989 to \$768 million in this year's budget; the money is to be administered through nine separate agencies. More than half of the money-\$437 million-will be spent on teacher training. About 45,000 teachers will undergo intensive training in their subject areas in fiscal year 1992, and

725,000 teachers will receive informational literature and short-term training. Computers are used heavily in such training programs, officials say, but no figures exist on exactly how much they are used. The government is not giving similar priority to computer training for teachers in English, history, or other nonscientific fields.



Diane Ravitch, the Department of Education's assistant secretary for research, believes that computers combined with fiber-optic networks and hypermedia databases will give students access to work done by world-famous experts.

Model Schools

WHEN PRESIDENT BUSH UNVEILED HIS America 2000 document, the administration's strategy for American education, almost the only reference to computers or technology in his remarks or in the plan was his vow to become computer literate. Computers and technology do not figure, either, among the six national education goals established earlier by President Bush and the nation's governors. However, Alexander says that computers and technology are intrinsic in the administration's aim to "reinvent the American school."

As an example, Alexander talks about a plan to establish 535 experimental "New American Schools" by 1996 that will "break the mold" of American education and serve as models for all schools by the year 2000. With \$200 million contributed by private corporations, the administration has set up a New American Schools Development Corporation, headed by former New Jersey Governor Tom Kean (now president of Drew University). The corporation has received some 700 proposals for experimental schools, many of which will use multimedia technology, and will include extended school days and school years and specialized curricula and classroom arrangements. Research and design teams established by the corporation are beginning to sift through the proposals, and finalists will be matched up with local communities ready to try pioneering technologies.

To promote education reform, President Bush on May 22, 1991, visited a

RANKING STATES

A report by QED—Technology in Public Schools 1991–92—ranks the 50 states and the District of Columbia in order of the best to worst ratio of students per computer. The top 10 states ranged from Wyoming, with nearly 10 students per computer, to North Dakota, with nearly 16 students per computer. The worst ratio was Mississippi's: about 30 students per computer. Even though most schools have computers, access is not always easy.

Top 10	Worst 10
Wyoming	Illinois
Alaska	Tennessee
Washington, D.C.	Vermont
New Mexico	California
Minnesota	Louisiana
Colorado	Delaware
Nevada	Alabama
lowa	Hawaii
Nebraska	New Hampshire
North Dakota	Mississippi

Research by Fergus Ferrier.

model school of the type the administration proposes to spread around the country. The Saturn School in Saint Paul, Minnesota, is a public middle school where, Bush says, "each morning 200 students arrive from all over the district to learn on state-of-the-art technologies: computers that teach reading and math; videodisc systems that access libraries and encyclopedias; off-site classrooms in science and art museums that give kids hands-on learning." According to Bush, "Saturn doesn't look like a regular school. No old-fashioned desks. Kids on the floor, playing with 'mice,' calling up information on the computer . . . Whether these kids know it or not today, what they are doing is exploring new frontiers of education."

Such visits by Bush convince Alexander that the president is personally committed to radical education reform and to technology's role in it. Yet, the only place in America 2000 where technology is explicitly mentioned is in a proposal for USA On-Line, a fiber-optic network that will link homes and schools throughout the country to multimedia educational sources. Several states already have educational computer networks, but no national network exists. The Department of Education has asked Congress for \$1 million next year to start a project called Smartline, a network for connecting schools and public libraries to 400 university and Department of Education databases on education research. According to Diane Ravitch, Smartline would enable parents and teachers to get up-to-date information about teaching techniques from research reports.

So far, Congress is leery of Smartline—it's been frozen out of pending Senate and House legislation on education



Senator Jeff Bingaman (D-N.M.) criticizes the administration for its lack of planning. He has proposed the creation of an Office of Technology within the Department of Education as well as the creation of consortia to develop innovative software for schools.

research—but Congress has passed a bill to establish a National Research and Educational Network designed to link up all federal laboratories and research universities via fiber-optic cable. According to one White House official, this network will form the basis for a national network that public schools, businesses, and homes could access.

The Issue of Choice

MUCH OF THE FIGHTING OVER EDUCAtional policy between the administration and Congress revolves around the issue of choice-an issue that would seem to have little to do with computers. Bush administration officials such as Budget Director Richard Darman say, however, that the two are vitally connected. The logic goes like this: schools will not be able to use technology effectively in education until innovative software exists. Private entrepreneurs won't develop innovative software unless a market for it exists. A market will develop only if innovative schools are founded-and that won't happen unless parents are free to choose what school their children will attend, public or private. Darman favors a plan aimed at low-income families whereby the government would give parents a voucher worth a certain sum of money, which they could use to "buy" education for their children either from a private or public school. Demand, he says, will create competition and better schools.

"What's needed is for the information revolution to hit the education establishment," Darman says. "And it is fundamen-

HOW AMERICA STACKS UP IN NUMBERS

The speeches and the plans put together by government officials may sound glorious, but so far the U.S. government has been ineffective in adapting computers in schools. True, at 18:1, the United States does have a better ratio of students to computers than do either Japan (66:1) or France (60:1). But those U.S. figures are woefully inadequate—especially given that this is the country where the personal computer revolution began. Even worse, only about 39 percent of the nation's high school students use computers at school (see graph at right).

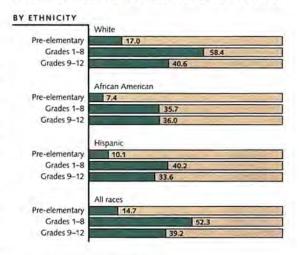
More-detailed research depicts a trend that shouldn't surprise anyone—the more affluent and well-educated a child's parents are, the more likely it is that the child uses computers at school. And more white children use computers at school than do African American or Hispanic children (see graph).

Elementary schools (grades 1 through 8)—not high schools—have the highest percentage of students who use computers. But in high schools, the disparity between the number of white, black, and Hispanic students who use computers is less than it is at other grade levels (see graph). And while geography matters (students in the South use computers less than do students in any other region), there is no correlation between states that have a high per-capita income or strong computer industries and use of computers in schools by that state's students.—CHERYL ENGLAND

Statistics compiled by Fergus Ferrier.

Statistics are from the U.S. Department of Commerce, Census Bureau.

PERCENT OF STUDENTS WHO USE COMPUTERS AT SCHOOL





tally threatening. The computer, up to now, has been viewed as a friend of the establishment, 'the teacher's helper.' The technological revolution is going to help the really sophisticated teacher, who probably ought to be paid \$100,000 a year to guide the students through the wealth of material that's going to be available to them. But this will come at the expense of the low-quality teacher who at best is capable of rote teaching. The rote functions are going to be taken over by software. The people who run the conventional school are going to find this very threatening."

Democrats in Congress, the teachers' unions, most public school officials, and Arkansas Governor Bill Clinton all oppose federal funding of private school choice, on the grounds that it will destroy public schools. And because of the choice controversy, Congress has refused to pass the Bush administration's \$535 million request to establish the New American Schools that have been proposed. Even Jeff Bingaman, one of Congress's leading technology advocates, says he fears that the schools will be privately operated

and available only to the children of well-off families.

Instead of experimental schools, Bingaman has proposed a \$25 million Classrooms of the Future program under which the federal government would provide seed money for states and private companies to form consortia to develop innovative software. The administration does not oppose the idea, or Bingaman's companion proposal to establish an Office of Technology within the Department of Education, but the ideas are part of legislation in the Senate and House that the administration does oppose for other reasons, such as a provision for a board composed of teachers' union and other interest-group representatives to oversee federal education research. Because of this, Ravitch is threatening to ask President Bush to veto a bill reauthorizing her own office and Bingaman's proposals with it. Because of Congress's refusal to fund private school choice, Alexander is calling for a veto of other legislation that includes New American Schools. Both officials hope that veto threats will induce Congress to drop unwelcome proposals, but the game of chicken may result in the failure of all school reform and technology legislation this year.

Meanwhile, the Bush administration does oppose government funding of private companies to develop education software. "No government subsidies were needed to develop WordPerfect," says Budget Director Darman.

The upshot of this political jockeying between administration Republicans and Congressional Democrats is that visions they share for using technology to revolutionize American education may be delayed in fulfillment, and the task left to states and localities. Nearly ten years ago, in its report A Nation At Risk, the Department of Education declared that computer competence was becoming a fourth basic skill, as necessary for an educated person as reading, writing, and arithmetic. At the rate American politics works, it will be another decade before the nation's schoolchildren are computer literate. m

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WHERE THE MONEY WILL GO



Senator Al Gore (D-Tenn.), sponsor of The High Performance Computing Act, believes that networking schools will foment a grass roots change in education.



TOM WOLF

Education Secretary Lamar Alexander has been Bush's front man in supporting America 2000, the administration's plan to revitalize education.

PROGRAM	FUNDING	SPONSOR	WHAT IT IS

America 2000		Department of Education	Plan to reform education by the year 2000
New American Schools	\$200 million (private companies), \$535 million requested from Congress	Department of Education	Proposal for \$1 million for 535 model schools, each redesigned from top to bottom
USA On-Line	Information not available	Department of Education	Fiber-optic network to link homes and schools to educational sources
Smartline	\$1 million from Congress	Department of Education	Network to connect schools and libraries with university and Department of Education databases o education research
Office of Educational Research and Improvement	\$250 million overall	Congress	Creates an Office of Educational Technology to promote the use of technology in schools
Office of Educational Technology	\$3 million	Congress	Supports federal research in education with an emphasis on technology
Neighborhood Schools Improvement Act	\$850 million	U.S. Senate	Provides funds to K-12 schools to help them achieve national educational goals; could include technology
High Performance Computing and Communications Program	\$803 million	U.S. Senate	Plan to advance scientific achievement; calls for a high-performance national network
K-12 Networking Project	private sources	Educom	National network to link K-12 teachers; long- term goal is to support curriculum reform
Chapter 1	\$6.6 billion	Congress	Programs for disadvantaged children
Chapter 2	\$475 million (estimated 30 percent for computers)	Congress	Education block grant for state and local districts, some of which will support technology
Star Schools \$18.4 million		Senator Kennedy, D-Mass.	Demo and magnet schools, telecommunications partnerships for instruction
Classrooms of the Future	\$25 million	Senator Bingaman, D-N.M.	Federal government would provide seed money for states and companies to develop software
Community Learning Network	private sources	Chamber of Commerce/ FCCSET/Corporation for	National fiber-optic network to connect schools

Public Broadcasting



SPECIAL
REPORTS FROM
OUR
CORRESPONDENTS
IN
FRANCE AND
JAPAN

World

JEAN CASSAGNE
TORU IIYOSHI

View 10W While other countries have been slow to begin using computers in education, many are now moving ahead of the United States. Both France and Japan have clearly stated their goals, appointed high-level officials to take charge of implementing those goals, created approved lists of equipment, and mandated funding.

FRANCE Making a Rapid Change

IT WAS THE END OF 1984 WHEN THE French government made its first attempt to equip schools with personal computers. The government initiated a onetime operation called Computers for Everyone, which was supposed to make personal computers as much a part of the school system as they were a part of the business world. The French government allocated \$200 million for the purchase of personal computers for public and private schools.

The plan looked promising. Education in France is closely controlled by the government's Ministry for National Education, located in Paris. Educational programs are set up by the ministry, and even private schools (which receive significant state funding) follow the programs closely. Because of the tight control the ministry maintains over school programs, it was in charge of selecting the hardware, operating system, and software that would be used in the Computers for Everyone operation.

Apple was a contender for supplying French schools with computers. Unfortunately for Apple, Thomson, the French consumer-electronics giant, also wanted the contract—badly enough to lobby to impose its own production. It was difficult for the French government to ignore this important national company, and Thomson finally got an order for 150,000 TO/7s—computers that used an 8-bit design that was obsolete even then and were incompatible with the MS-DOS software standard.

Learning Lessons

THREE YEARS LATER, THOMSON DROPPED out of the computer market, leaving thousands of schools with old-fashioned machines that couldn't be upgraded. Schools independently started to replace their Thomson TO/7s with inexpensive IBM PC-compatible computers. Having learned the dangers of relying on a single supplier, the ministry's technical services group in 1990 selected six manufacturers —Add-X, Bull-Zenith, Normerel, Olivetti, SMT-Goupil, and Philips—to sell personal computers to schools through UGAP, the government's official reseller.

The ministry chose companies on the basis of several criteria—product compatibility with MS-DOS, types of product configurations, and special pricing for education—showing favoritism toward French companies. Apple France did not try to join the six.

The list of companies that can supply computers to schools continues to evolve. One of the six original companies (SMT-Goupil) has gone out of business, and three (Bull-Zenith, Normerel, and Philips) are having financial trouble. Since

last September Apple has been selling its whole line of Macintoshes through UGAP. Apple has been successful with some special promotions, such as ones that offer discounts for students and teachers. Still, the company's share of the market in education is below 10 percent. "The situation is globally good," says Jules Louzon, who is in charge of technical equipment at the Ministry of Education. "Even if the disappearance of Thomson has created problems with servicing and support, a huge operation like the one we introduced in '85 was essential to impose the use of computers in schools."

Computer Use in the Classroom

IN FRANCE THE CURRENT DEBATE CENters not on hardware platforms, but on how best to use computers in education. Many educators believe that a student should learn to program before learning how to use the computer as a working tool. Some teachers strongly oppose a recent decision by the ministry to emphasize the teaching of applications such as word processors, page layout, and spreadsheets instead of programming languages such as BASIC or Logo. As newly trained educators, who are familiar with typical applications, arrive in schools, computer education is focusing more and more on applications such as word processing and page layout. Still other teachers believe that educational software is the best option for using computers in the classroom.

Using computers effectively in education requires a new way of teaching. Traditional classes in France consist of a teacher lecturing in front of a blackboard. Students are not supposed to take much initiative. This model is not easy to implement with computers, where each child concentrates on a single machine. The ministry has asked manufacturers for computers that can be networked. Even the Thomson TO/7 was connected to a master computer so that the teacher could monitor the activity of each station. As a result, classes where children can use computers autonomously are still rare.

The quality of computer use in education varies widely. Most children have access to computers at school—research indicates that in France there are roughly 200,000 computers available for 12 million students—a ratio of 60 students per computer. In addition, schools receive annual funding from the government to replace outdated computers or to main-



In France, many schools are still using outdated 8-bit Thomson TO/7 computers to teach children how to program. Computer use is optional for these seven-year-old pupils in Paris. Once a week, they spend one hour learning how to run simple BASIC programs. Here, children share a computer as they type simple programming instructions to draw a filled box on the computer screen.

tain the machines they already own.

In spite of the numbers of computers, however, the amount of time each child spends using a computer varies widely. The probability that children touch a computer before age 10 is low. Children in secondary school fare better, spending between 1 and 5 hours a week working on a computer. Still, many schools lack the proper equipment and teachers with the proper training. France, however, has a more solidified plan for addressing its remaining problems than does the U.S. The ministry provides annual funding for updating equipment and continues to dictate a national policy based on technological changes. France is encouraging its schoolchildren to become more productive members of their adult world.

JAPAN Strict Guidelines

JAPAN'S EDUCATIONAL SYSTEM IS MUCH more strictly controlled than that of the United States or France. About every ten years, Japan's Ministry of Education revises its Education Guidance Outline (EGO)—a document that dictates the basics of what should be taught in schools and how it should be taught. The last re-

vision came out in 1989 and emphasizes the use of computers in schools.

The ministry plans to equip all schools with computers by 1994. Schools request money from the ministry, which has a special budget for computer purchases. In 1991 the ministry paid ¥5 billion (currently equivalent to US\$39,777,247.41) to public schools and ¥400 million (currently equivalent to US\$3,182,179.79) to private schools for computer purchases. The ministry is also responsible for distributing computers to schools, but it does not specify what brand or type of computers the schools must buy.

Japanese schools—especially primary and secondary schools—have begun acquiring computers at a rapid pace. According to a 1991 survey by the Ministry of Education, since 1989 the number of primary schools that have computers has increased from about 13 percent to 41 percent, and the number of secondary schools that have computers has increased from roughly 37 percent to 74.7 percent. Nearly all high schools (98.5 percent) have computers—a percentage practically unchanged from three years ago.

Still, the number of computers in Japanese schools is low—especially in primary and secondary schools. Primary schools have an average of 114 students per computer, and secondary schools average 57 students per computer. In high schools the numbers look better: 27 students per computer. Yet secondary and high schools have two times the number of computers they had three years ago.

Using Computers in Schools

COMPUTERS ARE USED IN JAPANESE schools in four main ways. One is computer literacy education, or teaching the use of the computer itself. The second way is information processing, or teaching the collection, analysis, and use of information. The third way is the use of computers as educational media, which includes computer-aided instruction and multimedia systems. The fourth way is as a teaching tool.

For primary schools, computers are used mainly as teaching tools. For example, a teacher might use a personal computer and laser disc player to give a presentation. The EGO does not specify a curriculum for computer literacy or information processing for young children. This gives primary schools more freedom in setting up individual curricula than secondary or high schools, and some primary schools have independently set up ways for young students to use the computer in their curricula—for instance, setting up a computer for use in a "free study" class,

or using a computer to supplement a language course by publishing a student

In secondary schools, children are mostly taught computer literacy and information processing. Computer literacy courses don't just teach children about the computer itself, but also give them a fundamental understanding of the technology they will use to process information. Children learn the structure of the computer, computer programming and operation, and how to use application software (such as word processors, databases, and spreadsheets). Children also use computers outside the main class as a study aid-for instance, to reinforce lessons via computer-aided instruction (CAI).

In high schools, children continue to study computer literacy and information processing. High schools, however, also use computers for more specialized training. For instance, teachers increase their efficiency by making computer-aided instruction a main part of a course. Japanese high schools are able to use specialty software because the classes generally have 3 almost as many computers as students.

The Status of Hardware

IN JAPAN, LESS THAN 10 PERCENT OF the personal computers used in education are up-to-date 32-bit machines. Most (78.5 percent) are 16-bit personal computers, and a significant portion (12.7 percent) are still older, 8-bit machines. Most schools have had their hardware for many years and have not yet converted to 32-bit machines. Japan's government, however, expects that because computers need to be replaced and because schools are encouraged by the EGO to purchase more hardware, the percentage of 32-bit machines will increase rapidly.

Most school computers are located in a special computer room (28.5 percent) or in a classroom (27.5 percent); those in the computer room are generally hooked into a network. Little by little, teachers are moving more computers into the classroom, so that students can use them in an everyday environment. And 66.1 percent of the schools have computers in the staff room, where teachers use them for word processing or publishing.

Generally speaking, NEC, Fujitsu, and other MS-DOS-based machines are the most commonly used brands of computer for education, but the use of multimedia computers such as Fujitsu's FM-Towns and Apple's Macintosh has been on the rise. In order to thoroughly standardize curricula in Japan, and to make distribution more efficient, some people in the educational field have considered making one computer the standard. But as

personal computer makers develop machines with unique features, diversitynot standardization-is becoming the norm in education.

Software and Teacher Training

ON THE AVERAGE, JAPANESE PRIMARY schools use about 8 different software programs, secondary schools use about 13 programs, and high schools use about 25. Outside of specialized educational software, business software and authoring tools are most commonly used. The ma-



Onoden Elementary School in Tokyo has a personalcomputer room equipped with 22 Macintosh SEs, a Macintosh II with an Apple 13-inch RGB monitor, a LaserWriter, 5 ImageWriters, and an Apple monochrome scanner, all of which are connected via an AppleTalk network. These fifthgrade students are using Kid Pix during their free study time.

jority of programs are mass-market software (78.1 percent). Such programs may not be the best choice for schools, but teachers are busy, and good authoring software is not readily available. Only 12.1 percent of the software used in classrooms in Japan is independently produced.

In primary schools, 12.8 percent of instructors can operate a computer; in secondary schools, 22.7 percent; and in high schools, 35.5 percent. Of those teachers, 25 percent in primary school can teach the operation of a computer; just over 25 percent of computer-literate secondary teachers can; and 42.6 percent of computer-literate high school teachers can. To train more instructors in how to use computers, the Ministry of Education, manufacturers, and research organizations have set up training lectures and programs. The ministry offers noncompulsory computer classes each year for teachers, and response is good.

Taking Advantage of Computers

THE BIGGEST PROBLEM FACING JAPAN is how the schools will use the large number of computers they have or plan to obtain. In 1986 the Ministry of Education, in conjunction with the Ministry of International Trade and Industry (MITI), set up the Center for Educational Computing (CEC) to act as the core for the promotion of computers in education. The CEC is researching the feasibility of establishing a software standard; methods for distributing computers; establishing designated research schools; and advancing computer literacy. In July 1990, the CEC outlined its thoughts on standard specifications for computers in education-for instance, specifying the appropriate input and output devices and interfaces. According to the CEC guideline, an appropriate interface includes the

> ability to use and display at least 24-dot kanji fonts, the ability to display necessary symbols and characters, and the use of 16-bit CPUs and color displays. These guidelines are only suggestions, however, and have no legal

authority.

Yet, compared with the United States and Europe, education guidelines in Japan are stiff-the Japanese wish to maintain their high level of education. Under the present system, it is difficult for schools and local governments to independently develop new uses for computers in education. As in the United States, it is necessary to establish a

system for supporting the use of computers in schools, and for schools to freely use computers in the curricula. But since Japanese schools place much emphasis on pure knowledge, curricula that develop creative ability are relatively rare. Rote learning through CAI courseware is therefore typical of Japanese education.

Educational media, such as hypermedia and multimedia, which develop creative and analytical thinking ability in the students, is one promising use of the computer in education. For Japanese education to produce individual character in its students, the Japanese must not only distribute computer hardware, but also have a flexible attitude toward the ways they use computers in education. m

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Personal Personal Printers Personal Printers

LAST YEAR WAS THE DAWN OF THE PERSONAL PAGE PRINTER ERA—NUMEROUS COMPANIES, Apple included, introduced laser printers aimed at individuals and small workgroups. This year, there's an even larger selection of printers, and they offer superior features and lower prices. If personal laser printers arrived in 1991, they're making themselves comfortable in 1992.

Ink-jet printers have proliferated, too. Ink jets can't deliver the quality and speed of laser printers, but with retail prices starting at \$399, they're the most personal printers of all (see "Thinking about Ink Jets?"). Some models also fill unique niches—one runs on batteries (perfect for PowerBooks), and two can print pages as large as 17 by 22 inches (ideal for drafting and tabloid publishing).

For bargain hunters who already have printers designed for DOS PCs, there are several driver-and-cable packages that can unite a PC printer and a Macintosh. Such packages have been available for years, but the latest ones work better with Macs than did their predecessors.



PostScript Lasers: The Major Players Laser printers remain the preeminent personal scribes, and almost all of them use the industry-standard Adobe PostScript page-description language. A PostScript printer is a computer unto itself; its internal controller contains its own central processor, several megabytes of RAM, and a selection of fonts (usually 35—four styles each of Helvetica, Courier, Times, New Century Schoolbook, Palatino, Bookman, Avant Garde,

These three are some of our Editors' Choice printers. From top to bottom, the TI micro-Laser XL, the GCC PLP IIS, and the HP DeskWriter.



and Helvetica Narrow, as well as Symbol, Zapf Dingbats, and Zapf Chancery). Software in the ROM of the controller, known as the *interpreter*, accepts Post-Script-language commands from the Mac and governs the printer's *engine*, which applies fine plastic toner powder to paper to produce hard copy.

In the electronics world, technology that debuts at the high end usually trickles down into the mainstream. With personal printers, the trickle is more of a torrent. The current trends are

Resolution enhancement Most personal laser printers produce the standard 300-dots-per-inch output, but some incorporate the kind of enhanced-resolution technology that's becoming commonplace among costlier printers such as Apple's LaserWriter IIf and IIg (see "High-Performance Printing," *Macworld*, December 1991). By playing tricks with their engines' laser beams, the Hewlett-Packard LaserJet IIIP and NEC Silentwriter Model 95 produce text that almost looks typeset (see "Quality Comparisons"). The

Xante Accel-a-Writer upgrade board allows certain Apple and HP printers to produce 600-dpi output. Other high-resolution personal printers include NewGen Systems' TurboPS/400p, Lexmark's IBM LaserPrinter 6A (when equipped with 5MB of RAM), and Abaton's Everex LaserScript LX.

PostScript Level 2 Apple, Texas Instruments, Dataproducts, Hewlett-Packard, and others have adopted this latest version of the PostScript page-description language. Level 2 has the potential to speed print jobs, but the potential won't be realized until Apple releases a new, Level 2-aware version of its LaserWriter printer driver (which allows the Macintosh to talk to a PostScript printer). Until that happens, there's no compelling reason to choose a Level 2 printer over one that uses Level 1. Apple and Adobe have been collaborating on a Level 2 driver for some time, but no availability date has been announced.

RISC processors Many PostScript printers still use 68000-family processors,

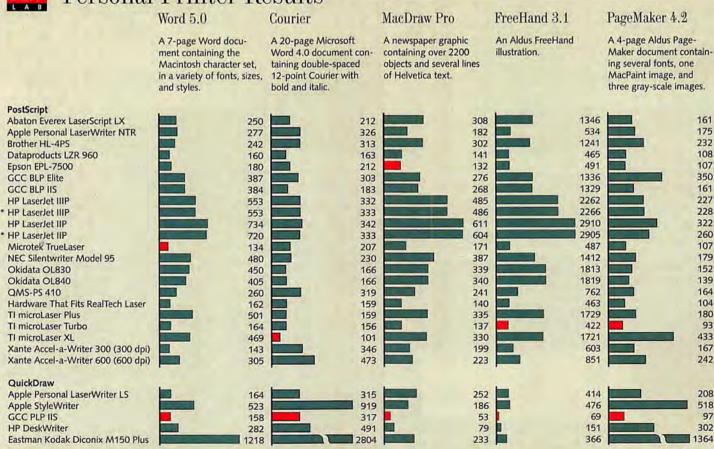
but a growing number use high-speed RISC (reduced instruction set computer) processors whose internal architecture is streamlined for top performance. If you print complex documents containing illustrations and scads of type sizes and styles—elements that make a controller sweat—look for a RISC-based printer (any printer with a non-68000-family controller).

Advanced paper handling Low-end laser printing used to mean a laggardly top speed of 4 pages per minute (ppm). Today, 9-ppm engines are available from Texas Instruments, Dataproducts, Hardware That Fits, and Mirror Technologies. Panasonic's KX-P4455 has an 11-ppm engine, and the Texas Instruments TI microLaser XL has a 16-ppm engine. More printers are also offering such conveniences as included or optional second paper trays—put letterhead in one tray and second sheets or envelopes in the second.

Smoother Mac-DOS PC sharing Every PostScript printer has a built-in network

MW

Personal Printer Results



Times are in seconds. Shorter bars are better.

*With a 2MB memory upgrade.

For top performance on lengthy but typographically simple documents (our Courier test) the TI microLaser XL beat the competition. On complex documents containing a variety of fonts and graphics (our PageMaker and Word tests), the top finishers

(when the results were averaged) were the Microtek TrueLaser and the TI microLaser Turbo. The GCC PLP IIS was the speed champ among QuickDraw printers, especially on the graphics-intensive tests (MacDraw Pro, FreeHand, and PageMaker).

connector-you need only buy inexpensive LocalTalk or Farallon PhoneNet cable kits to share a PostScript printer with other Macs. Most PostScript printers also provide parallel ports for connecting to DOS PCs. You used to have to flick switches to change ports, but many printers now provide an all ports active feature: all of the printer's ports listen for incoming data, and when a print job begins, the currently unused ports are put on holdthat is, if a different machine attempts to communicate with the printer using one of those ports, it's told that the printer is busy. A superior variation on the theme is emulation sensing, where the printer not only switches between ports, but also between its native PostScript tongue and another printer language, usually HP's Printer Control Language (PCL). Emulation sensing is useful if you use older DOS PC software that doesn't support PostScript.

PostScript Clones: Still Shaky?

MOST POSTSCRIPT PRINTERS USE TRUE Adobe PostScript interpreters, but several use PostScript clones—their interpreters understand PostScript but were created by firms other than Adobe. Printers with PostScript clones include Abaton's Everex LaserScript LX (formerly the Abaton LaserScript LX; Abaton is now a subsidiary of Everex), Microtek's TrueLaser, NewGen Systems' 300p and Turbo PS/400p, Brother's HL-4PS, Qume's CrystalPrint Publisher II, and Xante's Accela-Writer upgrade.

It used to be that PostScript clones delivered poor results when printing Adobe's Type 1 downloadable fonts, whose encrypted *bints* allow the controller to fine-tune the appearance of a character at a given size. Today's clones handle Type 1 fonts almost as well as a true Adobe interpreter does, although type buffs may still notice some chunkiness in small type sizes printed by 300-dpi printers.

The compatibility challenge for today's clones is to print Adobe's Multiple Master typefaces, which rely on a battery of PostScript features to allow you to stretch and modify a font in an almost limitless variety of ways (see "Understand-



Hardware That Fits' RealTech Laser (top) and Texas Instruments' TI microLaser XL (middle right) are good choices for high-performance printing. The NEC Silentwriter Model 95 (middle left) and the GCC BLP Elite are good choices for those on budgets.

ing Multiple Masters," in this issue). Of the five PostScript clones tested for Multiple Master compatibility, only one— Brother's HL-4PS—successfully printed Multiple Master fonts.

Why do Multiple Master fonts choke most clones? Adobe says the reason is probably that the new format redefines several basic PostScript commands, including one called findfont, which lets the PostScript interpreter render a specific font's characters. According to Robert Koch, Adobe's Multiple Master product manager, the specifications for the new format are available to clone vendors in a published addendum to the Type 1 specification. "If the clone vendors are interested in being compatible," he says, "they'll have to pick up the addendum and find out what makes their printers break. We're not keeping what we're doing secret."

At press time, only Xante had announced a fix for the incompatibility. The Bézier Systems BP4040 and Microtek TrueLaser use Microsoft's TrueImage clone interpreter, while the Everex Laser-Script LX uses BauerScript, the precursor to TrueImage. The Xante Accel-a-Writer upgrade board uses Phoenix Technologies' PhoenixPage. Phoenix has identified

the problem and says PhoenixPage now supports Multiple Master fonts. Microsoft says it will incorporate a fix into a future release of TrueImage but hasn't announced any availability dates.

Multiple Master fonts even cause problems with Apple's now-discontinued Personal LaserWriter NT, which uses a true Adobe interpreter. According to Adobe, the problem lies in an early version of the Adobe Type Manager (ATM) rasterizer, the portion of the printer's interpreter that translates font outlines into bitmaps of the size needed for a given page. Apple offers no fix for the printer, but tells users who want to print Multiple Master fonts to upgrade to the NT's replacement, the Personal LaserWriter NTR. The NTR is faster than the NT (the world's best-selling PostScript printer last year), but the \$1249 upgrade fee is a stiff price to pay if you're satisfied with the NT and simply want to tap into Adobe's latest font technology.

All this illustrates just how complex PostScript is. Today's clones deliver better-looking type than their predecessors do, but if the past is any indication, you're likely to have fewer compatibility problems if you buy a printer containing a real Adobe PostScript interpreter.

Company	Product	List Price	Imaging Language	Max. Print Speed (in ppm)	Resolution (in dpi)	Number of Paper Trays	Paper-Tray Capacity (in sheets)	Tested by MW Lab
Apple Computer	StyleWriter	\$399	QuickDraw	1	360	2	50	
Bézier Systems	Bézier BP3670	\$2495	UltraScript Plus PostScript emulator	2	360	2	75	0
GCC Technologies	GCC WideWriter 360	\$1699	QuickDraw		360	1	75	0
Hewlett-Packard	HP DeskWriter	\$599	QuickDraw	3	300	1	100	•
Eastman Kodak	Diconix M150 Plus	\$449	QuickDraw	0.5	192	NA	NA	

COMPARING LASER PRINTERS

Company	Product	List Price	Imaging Language	Interpreter	RISC Processor	RAM (base mod- el/Maximum RAM Capacity)	SCSI Port for Font Hard Drive	Paper-Tray Capacity/Seco Tray (in sheets
Abaton	Everex LaserScript LX	\$1995	PostScript Level 1	Bauer BauerScript		2.5MB/4.5MB	0	150/NA
Apple Computer	Personal LaserWriter LS Personal LaserWriter NTR	\$1199 \$2199	QuickDraw PostScript Level 2	NA Adobe PostScript	NA •	512K/1MB 3MB/4MB	0	70/250 70/250
Bézier Systems	Bézier BP4040	\$1895	PostScript Level 1	Microsoft Truelmage		2MB/2MB	0-	75/250
Brother International	HL-4PS	\$2595	PostScript Level 1	Brother BR-Script		2MB/6MB	0	50/2501
Dataproducts	LZR 960	\$2195	PostScript Level 2	Adobe PostScript	•	2MB/10MB		250/250
Epson America	Epson EPL-7500	\$2999	PostScript Level 1	Adobe PostScript	•	2MB/6MB	0	250/250
GCC Technologies	BLP Elite	\$1399	PostScript Level 1	Adobe PostScript	0	2MB/4MB	Ö	200/200
	BLP Elite 8	\$1699	PostScript Level 1	Adobe PostScript	0	2MB/4MB	0	200/200
	BLP II	\$1799	PostScript Level 1	Adobe PostScript	0	2MB/4MB		200/200
	BLP IIS	\$2099 2	PostScript Level 1	Adobe PostScript	0	4MB/4MB	•	200/200
	PLP II	\$949	QuickDraw	NA	NA	1MB/1MB	NA	200/NA
	PLP IIS	\$1299	QuickDraw	NA	NA	1MB/1MB	NA	200/NA
Hardware That Fits	RealTech Laser	\$1995 1	PostScript Level 2	Adobe PostScript	•	2MB/10MB	•	250/250
Hewlett-Packard	HP LaserJet IIP	\$2195	PostScript Level 1	Adobe PostScript	0	1.5MB/4.5MB	0	50/250
	HP LaserJet IIIP	\$2495	PostScript Level 2	Adobe PostScript	0	1MB/5MB	0	70/250
Lexmark International	IBM LaserPrinter 6A	\$2695	PostScript Level 1	Adobe PostScript	0	2MB/9MB	9.	200/500
Microtek	TrueLaser	\$1995	PostScript Level 1	Microsoft Truelmage	•	2MB/6MB	0	150/NA
Mirror Technologies	Mirrorlmage 309	\$1699	PostScript Level 2	Adobe PostScript	•	2MB/10MB	•	250/250
NEC Technologies	Silentwriter Model 95	\$1749	PostScript Level 2	Adobe PostScript	0	2MB/5MB	0	250/NA
	Silentwriter Model 90	\$1906	PostScript Level 1	Adobe PostScript	0	2MB/4MB	O	250/NA
	Silentwriter Model 990	\$2999	PostScript Level 1	Adobe PostScript	•	2MB/4MB		200/NA
NewGen Systems	NewGen 300p	\$1995	PostScript Level 1	Weitek/NewGen	•	3MB/16MB		70/250
	NewGen Turbo PS/400p	\$2995	PostScript Level 1	Weitek/NewGen	•	4MB/16MB		70/250
Okidata	OL830	\$1999	PostScript Level 1	Adobe PostScript	0	2M8/4M8	0	200/200
	OL840	\$2699	PostScript Level 1	Adobe PostScript	0	2MB/4MB	0	200/200
Panasonic	Panasonic KX-P4455	\$2995	PostScript Level 1	Adobe PostScript	0	2MB/4MB	_ '0'	250/250
QMS	QMS-PS 410	\$1995	PostScript Level 1	Adobe PostScript	0	2MB/6MB	0	70/250
Qume	CrystalPrint Publisher II	\$2995	PostScript Level 1	Qume PS		3MB/6MB	0	100/NA
Texas Instruments	Ti microLaser Plus	\$1738*	PostScript Level 1	Adobe PostScript	0	0.5MB/2.5MB	0	250/NA
	TI microLaser Turbo	\$2349*	PostScript Level 2	Adobe PostScript	•	2.5MB/10.5MB	• (250/250
	TI microLaser XL	\$3249*	PostScript Level 1	Adobe PostScript		2.5MB/4.5MB	0	250/250

■ = yes; ○ = no. ¹ Optional. ² \$2599 with lower paper tray assembly. ¹ Price includes printer, second paper drawer, and paper tray. ⁴ Price includes 1MB of RAM, AppleTalk interface (\$100), and 17 fonts (\$400), ³ Price includes AppleTalk interface (\$100). ⁴ Price includes 35 fonts (\$750) and AppleTalk interface (\$100).

QuickDraw Lasers: Gaining Ground

A POSTSCRIPT PRINTER'S CAPABILITIES aren't cheap. If you don't need network ports or PC compatibility, and you don't plan to print illustrations created with PostScript-oriented drawing packages such as Adobe Illustrator and Aldus Free-Hand, consider a QuickDraw printer. You'll save at least several hundred dollars; for example, GCC's least expensive Post-Script printer, the BLP Elite, sells for \$1399, while the same firm's PLP II, a QuickDraw printer, retails for just \$949—and includes more fonts.

A QuickDraw printer relies on the fact that you already have a computer. That is, a printer uses your Mac's memory and processor to handle the calculations involved in imaging a page; the Mac then sends a stream of bits—1's for black dots, 0's for white ones—to the printer's engine. Because the Mac does all the brainwork, a QuickDraw printer's controller needs less memory and fewer parts, and that means a lower price.

Because the Macintosh does much of the work behind a QuickDraw print job, the printer's speed depends largely on the Mac's. (With a PostScript printer, the Mac's speed has a small impact on printer performance.) A Mac LC II or member of the II family yields faster print times than does a 68000-based machine such as a Classic or SE. Several megabytes of RAM are also essential if you're running System 7 or MultiFinder under System 6.

Because QuickDraw printers don't speak PostScript, the "official language" of desktop publishing, they've historically played second fiddle to PostScript printers, have been incompatible with Post-Script illustration programs, and have been unable to exploit the wide variety of PostScript fonts. This is changing. Adobe's \$99 ATM utility enables non-PostScript printers to print any Type 1 downloadable PostScript font (the type of font that would normally be transferred from disk to a PostScript printer's memory during a print job). Adobe's TypeAlign utility enables non-PostScript printers to skew and distort text and print it along a curving baseline. And Apple's own TrueType software, built into System 7 and available for System 6.0.7 and 6.0.8, provides outline fonts for PostScript and non-PostScript printers alike. (Apple and Adobe have also announced that ATM or a portion of it will be built into a future version of the Mac's system software, but no dates have been specified.)

QuickDraw Contenders Compared

THE SELECTION OF QUICKDRAW LASER printers is small. In one corner is Apple's \$1199 Personal LaserWriter LS, which uses TrueType fonts and is also compatible with ATM. In the other corner are GCC's \$949 PLP II and \$1299 PLP IIS. Both include their own fonts and are also compatible with TrueType and ATM (ATM is included).

The PLP II and PLP IIS driver software is flashier than Apple's Personal LaserWriter LS driver. The PLP printers can enlarge or reduce output in 1 percent increments; the Personal LaserWriter LS can print at actual size, 75 percent, and 50 percent. The PLP driver also includes a page preview option that lets you view a page on screen to save toner and paper.

Previous versions of the PLP software didn't support the background printing option of System 7 and MultiFinder (System 6), but the latest version of PLP (4.0) does. (Current PLP owners can upgrade to version 4.0 for \$69; owners of older

Tested by Macworld Lab

Olivery Control of C

PLPs that lack internal memory can also buy a performance-boosting memory upgrade for an additional \$30.) And if you use System 7, you can even share a PLP with several other Macs on a network. You can't share a Personal LaserWriter LS on a network unless you buy a third-party utility, Gizmo Technologies' Shadow-Writer. (This slick little program also works with the Personal LaserWriter SC and StyleWriter; version 2.0 lets you share any serial printer or plotter.)

But Apple's Personal LaserWriter LS is not entirely out of the running. The GCC PLP II models connect to the Macintosh's SCSI port, and each provides just one SCSI port instead of the usual two. This can mean more connection headaches if you have additional SCSI devices such as an external hard drive or scanner. The Personal LaserWriter LS connects to the Mac's printer or modem port-a fuss-free scheme that will have you printing in min-

utes. (If your modem and printer ports are already occupied, you may want to buy a serial switch box to manage the tangle of cables.) The Personal LaserWriter LS also uses the superior Canon LX print mechanism, which is easier to set up than the PLP's Okidata engine. The Personal LaserWriter LS includes more fonts—39 versus the PLP II's 21 and the PLP IIS's 38. And you can recycle spent toner cartridges by sending them to Apple using an included, postage-paid mailer. GCC offers no such service.

On the test track, the Personal Laser-Writer LS and GCC PLP IIS turned in similar times for the Fonts and Courier documents—surprising, considering the PLP IIS's engine is twice as fast as the Personal Laser-Writer LS's. This suggests that the Personal Laser-Writer LS would be considerably faster in these tests than the 4-ppm PLP II. In the graphics-intensive MacDraw Pro, Free-Hand, and Newsletter tests, it was no contest: the PLP IIS humbled the Personal Laser-Writer LS.

Where GCC really leaves Apple behind is on the upgrade path. You can upgrade either PLP to a PostScript-based BLP Elite for only \$599. For \$999, there

is the BLP II PostScript upgrade, which includes a SCSI port to which you can attach a hard drive to store downloadable fonts. Apple offers no PostScript upgrade for the Personal LaserWriter LS. Xante's Accel-a-Writer Post-Script-clone upgrade works with the LS, but it is disappointing that Apple doesn't provide a path to true Adobe PostScript. If that is important to you, look to GCC for a QuickDraw printer.

Bargain-Basement Alternatives

ATM, TYPEALIGN, AND TRUE-Type enhance QuickDraw printing by using the Macintosh to perform the kind of processing that used to take place only within PostScript controllers. PostScript-emulation software takes a similar approach. A PostScript emulator is essentially a clone on a disk: it intercepts PostScript commands from the Mac's LaserWriter driver and translates them into commands a non-PostScript printer can understand. The result: A non-PostScript printer can print just about anything a PostScript printer can, including Illustrator or FreeHand drawings.

PostScript emulators include Custom Applications' Freedom of Press, PM Ware's UltraScript Mac (formerly marketed by QMS), and TeleTypesetting Company's T-Script. All are available in a variety of versions, some including more fonts and supporting more printers than others. For example, the \$149 Freedom of Press Light in-

cludes 17 fonts and supports only blackand-white printers, while the \$495 Freedom of Press 3.0.1 includes 35 fonts and also supports color printers. All support a large selection of printers, including laser, ink-jet, and even dot matrix printers. All also support a variety of DOS PC printers—add a cable, and you've patched together a quasi-PostScript printer for a fraction of the cost of the real thing.

You will pay in other ways. PostScript emulators are often slow (especially on a Mac Classic, SE, or Plus), and you'll need to set aside a few megabytes of space on a hard drive for the emulator's software and

Quality Comparisons

ABCDEFGHIJKLMN

HP I aserlet IIIP

ABCDEFGHIJKLMN

Apple Personal LaserWriter NTR

ABCDEFGHIJKLMN

Apple StyleWriter

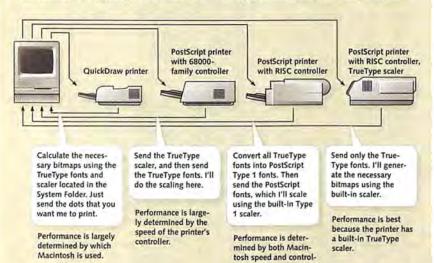
With today's laser printers, resolution-enhancement technology provides the clearest, sharpest type at 300 dpi. The diagonal lines on the A, and the curved lines of the B and C most clearly show the differences between printers. The top sample is representative of printers using resolution enhancement, and shows clear, crisp lines of type that almost look typeset. The middle sample is representative of unenhanced 300-dpi printers and shows jaggier output with distinct stairstep gaps between dots. The bottom sample is representative of ink-jet printers and shows jaggy output that is a result of the ink being absorbed into the paper fibers.

fonts. If you don't need to print PostScript output, you may get more satisfying performance from a PC cable-and-driver package such as GDT Softworks' Power-Print, Orange Micro's Grappler IIsp, or Insight Development Corporation's Mac-Print. These packages essentially turn PC-oriented printers into QuickDraw printers; all are also compatible with ATM and TrueType.

GDT's PowerPrint is the best of the three, supporting a far greater number of printers (over 850) than those supported by the other two products as well as offering features similar to those provided by

Printing TrueType Fonts

All printers do not print TrueType fonts in the same way, or at the same speed. Scaling-the process of converting TrueType's mathematical outlines into bitmaps in the sizes required-is handled differently depending on the kind of processor a printer's controller has, and on whether or not the TrueType scaler is built into the printer. The method for scaling TrueType fonts is resolved at the beginning of a print job in a dialogue between the printer and the Mac.



EDITORS' CHOICE

PostScript Laser

Ti microLaser series For lengthy documents or small networks, consider the 16-ppm, TI microLaser XL. For short but complex documents that require a fast controller, there's the 9-ppm TI microLaser Turbo. The 17-font TI microLaser Plus is a good choice for bargain hunters who want the ability to upgrade to a fast controller later. Company: Texas Instruments. List price: TI microLaser Plus \$1738; TI microLaser Turbo \$2349; TI microLaser XL \$3249.

QuickDraw Laser

PLP II series The PLP II breaks the \$1000 barrier, while the PLP IIS provides an 8-ppm engine. And unlike Apple, GCC provides a path to PostScript: both can be upgraded to the BLP II. Company: GCC Technologies. List price: PLP II \$949; PLP IIS \$1299.

ink Jet

HP DeskWriter It's portlier than Apple's StyleWriter, but the DeskWriter is twice as fast, handles paper better, and provides a LocalTalk network connector, and its ink is less prone to smearing. Company: Hewlett-Packard. List price: \$599.

Apple's PostScript driver, such as the ability to invert a page (turn black to white and vice versa). PowerPrint could be a godsend for nomadic PowerBook owners: take along a cable, and you will probably be able to connect to any printer you

Grappler IIsp has a unique plus: it lets you share a patched-PC printer on a network. (GDT Softworks offers a Power-Print and ShadowWriter 2.0 bundle for \$249.) Insight's MacPrint primarily supports Hewlett-Packard DeskJet- and LaserJet-series printers and compatibles; unlike PowerPrint and Grappler IIsp, it doesn't support dot matrix printers.

Top PostScript Picks

ler speed, but the Mac's

performance plays a larger role.

CHOOSING A PERSONAL POSTSCRIPT printer means deciding between speed and print quality. (You can have both in the high-end PostScript world, where printers such as Apple's LaserWriter IIg and Hewlett-Packard's LaserJet IIIsi combine resolution enhancement with fast engines and controllers.)

If you opt for speed, you need to refine your criteria further. Will you be printing long but typographically simple documents such as contracts and manuscripts? Short but complex documents such as newsletters? Or primarily graphics and illustrations? A printer that excels in one area may lag behind in others (see "Personal Printer Results").

For top performance with lengthy documents, engine speed counts most. Consider Texas Instruments' \$2399 TI microLaser XL. Its 16-ppm engine left the rest behind. The closest finishers in the Courier document test were 9-ppm machines: TI's microLaser Plus and microLaser Turbo, Dataproducts' LZR 960, and Hardware That Fits' RealTech Laser. (The RealTech Laser is identical to the Dataproducts LZR 960, but sells for less and includes a second paper tray.) If you decide you need top controller performance, you can upgrade the micro-Laser XL to the RISC-based microLaser XL Turbo for \$1250.

For complex documents containing a variety of fonts and graphics, a fast controller is in order. Top finishers included the TI microLaser Turbo, the RealTech Laser and Dataproducts LZR 960, Epson EPL-7500, and the Microtek TrueLaser.

If you plan to print TrueType fonts frequently, you might want to avoid a printer with a RISC processor-unless it also has the TrueType rasterizer, as do Apple's Personal LaserWriter NTR, Microtek's TrueLaser, and Bézier Systems' BP4040. With a RISC printer that lacks the TrueType rasterizer, the Mac must convert the TrueType fonts to Type 1 PostScript fonts before printing-a process that lengthens print times, especially if you have a slower Macintosh such as a Classic or SE (see "Printing TrueType Fonts"). Products for which this routine is necessary include Abaton's Everex Laser-Script LX, Epson's EPL-7500, Dataproducts' LZR 960, Hardware That Fits' RealTech Laser, Brother's HL-4PS, Qume's CrystalPrint Publisher II, Texas Instrument's microLaser XL and micro-Laser Turbo, NewGen's 300p and Turbo PS/400p, and Xante's Accel-a-Writer upgrade board.

If your budget overrules your stopwatch, look at the \$1399, 4-ppm GCC BLP Elite. TI's microLaser Plus retails for \$1738, and although its controller is slower, its 9-ppm engine makes the microLaser Plus faster for simple but lengthy documents (or for printing many copies of a single document). Note that both of these printers have just 17 fonts (a 35-font version of the microLaser Plus retails for an extra \$350). If you want the standard 35 fonts most printers include, you may want to consider the 35-font microLaser Plus or the RealTech Laser; the \$1799 GCC BLP II; Apple's \$2199 Personal LaserWriter NTR, which is often discounted to below \$2000; or NEC's Silentwriter Model 95, which retails for just \$1749.

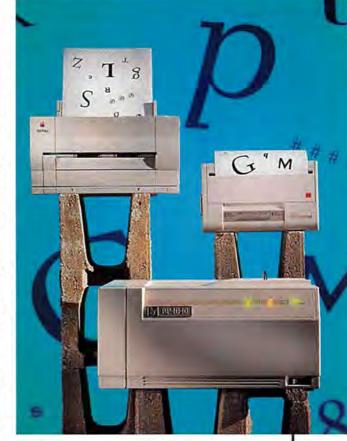
Thinking about Ink Jets?

Ink-jet printers produce output by spraying a microscopic stream of ink from a reservoir located in a disposable print head. The printing mechanism is simple (allowing for a low price), but the high precision of the print head's nozzles allows for laserlike resolution—with some printers, up to 360 dpi. On the downside, ink-jet printers are slow and finicky about paper, producing fuzzy-edged output on inexpensive bond. And the ink can smear if moistened.

But an ink-jet printer's low price can make these drawbacks palatable. Apple's 360-dpi StyleWriter retails for \$399, while the 300-dpi HP DeskWriter retails for \$599. The DeskWriter is the better of the two: although bulkier, it handles paper better, its ink is less prone to smearing, and it is considerably faster (see "Personal Printer Results"). The DeskWriter also includes a LocalTalk connector, so it can be shared on a network—if you are patient.

The StyleWriter is the smaller of the two, but it doesn't run on batteries. If you want a printer that does, consider Eastman Kodak's \$449 Diconix M150 Plus. Its Kodak-built print mechanism prints 192 dpi and runs on five C-cell batteries or an included AC adapter. The Diconix M150 Plus includes Adobe Type Manager (ATM) and a special version of Insight Development's MacPrint driver. (For another battery-powered alternative, you might consider pairing GDT Softwork's PowerPrint or Orange Micro's Grappler Ilsp with Canon's DOS PC-oriented BJ-10ex, which uses the same print mechanism as Apple's StyleWriter.)

At the opposite end of the size spectrum are GCC's \$1699 WideWriter 360 and Bézier Systems' \$2495 Bézier BP3670. Both use a Canon-built print mechanism to produce 360-dpi output on pages as large as 17 by 22 inches. Again, GCC gets the edge. The WideWriter costs less and includes ATM and better driver software (which is similar to that used by the PLP lasers). The WideWriter also provides a LocalTalk connector for network sharing, while the Bézier printer uses a SCSI connection. The Bézier printer can still be shared on a network, however, thanks to its print driver, a special version of the UltraScript Mac Plus PostScript emulator. GCC also includes a sheet feeder that Bézier charges an extra \$150 for.



Ink-jet printers offer near-laser printer resolution for a low price. From top to bottom: Apple's StyleWriter, Eastman Kodak's Diconix M150 Plus, and Bézier Systems' Bézier BP4040.

And if you want that sharp-edged look of resolution enhancement, check out NEC's 6-ppm Silentwriter Model 95, HP's 4-ppm LaserJet IIIP, or Lexmark's IBM LaserPrinter 6A. HP's Resolution Enhancement Technology delivers better results than NEC's Sharp Edge techniques do, but the LaserJet IIIP is also slower. (Neither is particularly spry.) The \$2695 IBM LaserPrinter 6A sports resolution enhancement and will even print 600 dpi if you upgrade its RAM to 5MB. Our review unit arrived too late for lab testing, but some informal benchmarks showed mediocre performance. And unlike the NEC and HP printers, the 6A is not a good choice for mixed-platform offices-you can't attach the printer to a DOS PC unless you remove the Local-Talk interface from the printer or add a LocalTalk board to the PC. That's too bad, because the 6A's print quality and paper-handling features are superb.

If you already have Apple's Personal LaserWriter LS, consider upgrading it with Xante's Accel-a-Writer board. The 600-dpi version starts at \$1695, is fast, and produces beautiful halftones of gray-scale scanned images. The Accel-a-Writer has Xante's Virtual Disk Technology: extracost chips that let you permanently download up to 30 fonts to the printer. It's a slick innovation publishers will like. The Accel-a-Writer we tested couldn't print Multiple Master fonts; however, at press time, Xante said it had fixed the problem and will provide a free upgrade.

No matter which PostScript printer you choose, if you plan to print TrueType fonts frequently you should consider a printer that has the TrueType rasterizer. Only Apple's Personal LaserWriter NTR and the TrueImage-based PostScript clones do. If you plan to print Multiple Master fonts, consider buying a printer that provides (or can be upgraded to) at least 3MB of memory. You may also want 3MB or more if you want to print TrueType fonts on a printer lacking the TrueType rasterizer. Just as today's larger programs demand more memory from a Macintosh, the latest font technologies

require more memory in a printer. And to think that the February 1985 *Macworld* called the original LaserWriter's 1.5MB "an enormous amount of memory."

Such is progress, and it isn't over yet. But due to the complexity of laser printer engines, prices aren't likely to fall much more. Indeed, today's printers are not much cheaper than the batch I reviewed in last year's "Personal Page Printers Arrive" (Macworld, May 1991). Still, as memory and other controller components become cheaper, speed will improve, and enhanced resolution will probably become more common. m

See Where to Buy for contact information.

Contributing editor and Getting Started columnist JIM HEID has worked with nearly 100 laser and inkjet printers since Hewlett-Packard's original LaserJet was introduced. His latest book is Macworld Guide to Microsoft Word 5 (IDG Books Worldwide, 1992).

Macworld Lab testing by MARK HURLOW and DANNY LEE.

that polish your prose-

and more

OST OF US USE WORD PROCESSORS STRICTLY FOR ENTERING, EDITING,

and formatting text, but the current programs enable you to do much more than process words. Most allow you to design publications, some let you draw graphics or create tables, and a few go so far as to offer limited multimedia functions. And that's great news, because nobody wants to purchase several programs when one will suffice.

I've put the newest batch of word processors-Claris's MacWrite II 1.1, T/Maker's WriteNow 3.0, Microsoft Word 5.0, Word-Perfect for the Macintosh 2.1, Nisus 3.06, DeltaPoint's Taste 1.02c, and Nest Software's MacQuill 1.0-through their paces to see which of them offers the best array of features that go beyond everyday text editing. Also, because formatting and manipulating text is the main reason for using a word processor, I've looked at how each of these programs handles those tasks; whether they offer macros; and how easy (or difficult) the programs are to use.

MCCLELLAND

Low-End Layout

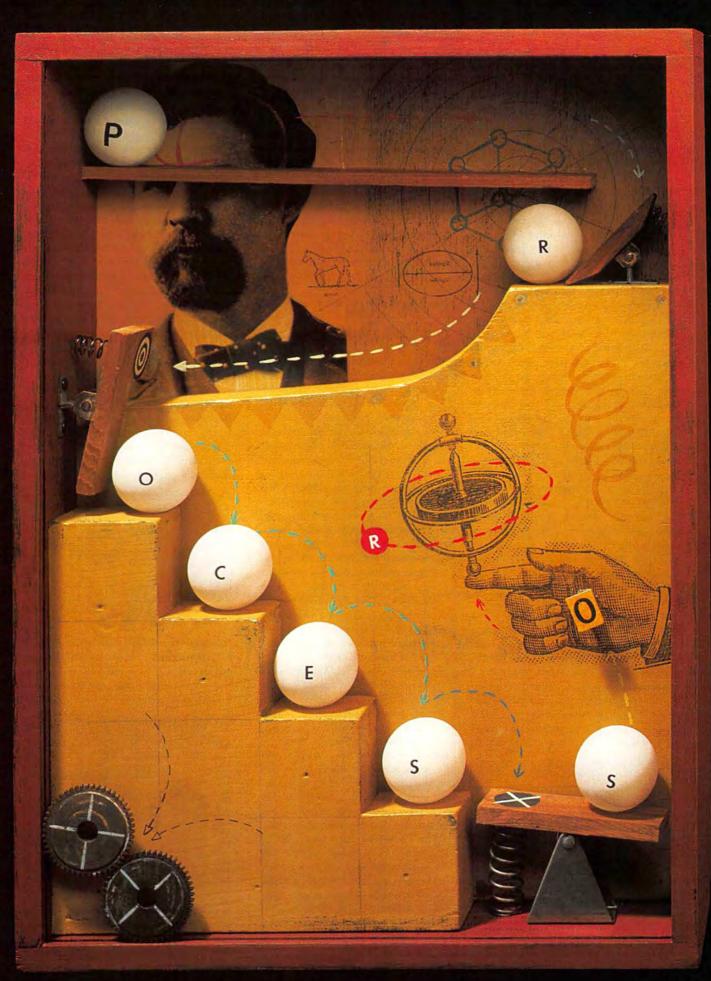
ADMITTEDLY, NO WORD PROCESSOR offers the same level of object-by-object control that a desktop publishing program does. None, for example, let you specify a complex network of guidelines or set aside objects on a pasteboard the way you can in Aldus Page-Maker or QuarkXPress. And only MacQuill allows you to drag text blocks on a page. But

even low-end word processors such as Write-Now and MacWrite enable you to lay out a page in a pinch, and the most sophisticated text processors provide enough features to distinguish themselves as hearty desktop publishers.

A primary concern in laying out a publication is to distinguish between left and right pages. Ideally, you want to position a page number in the lower-right corner of a righthand page and in the lower-left corner of a left-hand page, the common format for newsletters and other publications. The word processors I evaluated let you assign separate headers and footers for pages with even (left) and odd (right) page numbers. In MacQuill, you can customize the header or footer for a single page in the layout mode. More useful, WriteNow and WordPerfect let you change a header or footer in middocument. This feature enables you to use a single left-page header to identify the name of the publication and a series of right-page headers to track the most recent headlines, for example.

To repeat headlines, disclaimers, logos, and other elements from one page to the next, you need a program that offers a master-page function. Only MacQuill, Taste, and WordPerfect offer anything resembling a master page. In MacQuill, you can save the layout from one document and apply it to another, but the program provides no dynamic link between the two. In other words, editing the original masterpage layout has no effect on the appearance of the current document, greatly under-

PHOTO ILLUSTRATIONS GARY TANHAUSER



mining the utility of the feature. Luckily, dynamic links abound in Taste and Word-Perfect, in which you can specify that text and graphics created in the program's drawing window be repeated in subsequent pages. WordPerfect's watermark function goes a few steps further, enabling you to assign separate master-page items for left and right pages—a function that is shared by MacQuill—as well as to suppress the appearance of the item on any specified page.

Columns are another foremost concern for the desktop publisher. Text laid out in multiple columns is usually more legible than text that is plastered across the entire width of a page; columns also add visual interest to the page and provide a versatile structure for placing headlines and graphics. Among the seven programs, MacWrite, WriteNow, and Nisus offer the least-flexible column formatting. In these programs, each page must contain the same number of columns; the width of each column must be equal to that of its neighbors; and only headers and footers may violate the boundaries of any column. (Nisus does provide a workaround feature, which enables you to place, for example, a two-column sidebar as a graphic on a three-column page.) Taste is only slightly more flexible, allowing you to vary the width of side-by-side columns. To create text that goes outside column boundaries-say, to position a headline across the top of a two-column article without affecting any surrounding columns-Nisus and Taste users have to enter the headline in the drawing layer and wrap text around the headline as a graphic.

Only MacQuill, Microsoft Word, and WordPerfect allow you to stack columns of different widths on a single page (a one-column headline across a three-column page, for example). In Word, you insert a section break to indicate the end of one set of column specifications and the beginning of another. WordPerfect simplifies the process slightly, permitting you to apply a new set of column specifications to

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Side by Side In WordPerfect you can adjust the width of each column independently of its neighbors by dragging icons in the ruler bar.

a selected range of paragraphs. Word-Perfect is also more capable than Word in that it lets you set side-by-side columns to different widths (see "Side by Side"); in Word, the width of neighboring columns is constant. In a dramatic departure from the rest of the word processing crowd, MacQuill allows you to draw columns, link them in any order, and drag columns to change their width, just as in a dedicated page-layout program.

Of the three word processors that offer kerning, Microsoft Word is clearly the least capable, only allowing you to reduce the default space between two characters by as much as 1.75 points and to increase

Tomorrow's Type Makers

After years of steadily growing word processing programs (Word 5.0 now comes compressed on five floppy disks), there are signs of life again in the category of smaller and simpler text programs.

Perhaps the most eagerly anticipated of the low-end up-and-comers is Claris's Mac-Write Pro (\$249), which was supposed to arrive last year but is now scheduled to ship sometime before 1993. A \$69 upgrade for registered users of Mac-Write II, MacWrite Pro will offer character- and paragraph-level style sheets, just as in WriteNow 3.0. Also as with WriteNow, MacWrite Pro will let you create multiple headers and footers within a single document. The new MacWrite will also offer balloon help and other System 7 functions, frame drawing, automatic and manual kerning, and friendly control over variables such as page numbers and dates.

Most notable, however, is MacWrite Pro's new table feature. As in Word, you'll be able to create flexible tables of words and numbers, insert and delete rows and columns, and even sort rows in ascending and descending order.

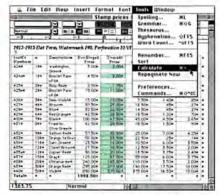
LetterPerfect for Mac 2.1 (\$199) is a scaleddown version of the feature-heavy WordPerfect. Aimed at users with lowmemory machines, LetterPerfect offers the same code-based word processing functions that users of WordPerfect have come to rely on, but it lacks several of WordPerfect's more sophisticated functions, including style sheets, a sort function, a drawing window, a macro editor, and QuickTime support. Letter-Perfect retains WordPerfect's support for System 7, its graphic import capabilities, its spelling checker and thesaurus, and mail merge. the default space by as much as 3 points; this range is remarkably inadequate, sufficient only for the smallest of type sizes. Furthermore, you can't kern text directly from the keyboard; you must enter a value into a dialog box and click on the Apply button to see the result.

Taste lets you kern from the keyboard, but its range is also somewhat limited (you can reduce or increase the default space by 1 to 25 points), and you can't kern characters in the program's drawing layer, the place where you're likely to need it the most. WordPerfect offers the best kerning capabilities, including an unlimited kerning range and the ability to kern special-function text such as drop caps and margin headlines. Word-Perfect shares its only page-layout detriment with Taste: you must kern characters in 1-point increments, which is roughly 1000 times the size of kerning increments provided by dedicated desktop publishing applications.

WordPerfect turns out to be a wonderful alternative to desktop publishing packages, winning over the others thanks to its superior handling of most major page-layout functions. If you've long been intimidated by the thought of learning a dedicated page-layout program, Word-



A Taste for Color Taste lets you add a full-color graphic behind, or over, text. You can also wrap text around a graphic and create gradient backgrounds, as shown here.



Words and Numbers In Microsoft Word, you can figure the sum of a range of selected cells by choosing the Calculate command. Word sends the result of any calculation to the Clipboard so that you can paste it in any document.

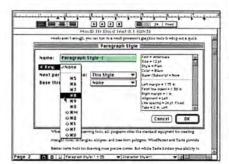
Perfect serves as a fine introduction. With its point-and-drag page-editing capabilities, MacQuill also bears mention, but due to its lack of support for any file format other than its own (you can't even open a text-only file), the program is unlikely to draw many converts. Slated for a September ship date, MacQuill 1.1 hopes to remedy this inadequacy by supporting the Claris XTND system, which converts word processing and DTP file formats.

Drawing Tools

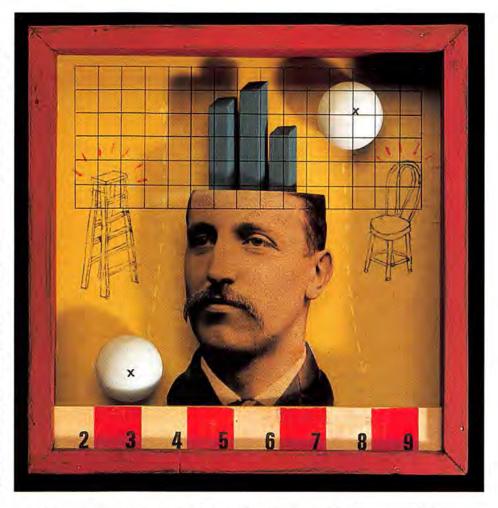
WHY SWEAT OVER 1000 WORDS WHEN A single picture will do? Four of the seven word processors—all but MacQuill, Mac-Write, and WriteNow—provide built-in drawing tools. Of these, Microsoft Word and WordPerfect provide separate drawing windows that are entirely independent of your text. Such a setup lets you draw without distraction, but it also prevents you from seeing how the graphic in progress will interact with its surroundings. Nisus and Taste offer a better solution, however. In both of these programs you can draw directly over text. When the drawing is complete, you have the option of layering it behind or in front of the text or wrapping the text around the drawing.

When it comes to drawing tools, these four programs offer the standard equipment for creating straight lines, rectangles, ellipses, and free-form polygons. WordPerfect and Taste provide Béziercurve tools for drawing more-precise curves. But while Taste hinders your ability to perform essential activities—the act of closing a shape, for example, is nearly impossible—WordPerfect lets you create corners between curved segments and edit a curve by simply double-clicking on it.

If you want to create color graphics, WordPerfect and Taste again take the honors, each providing access to the full 16-million-color range (see "A Taste for Color"). By contrast, Microsoft Word



Friendly Styles WriteNow 3.0 provides one of the most friendly implementations of style sheets available in any word processor. Not only do you have the choice of saving character styles separately from paragraph styles, but you can also assign keyboard equivalents and update a style by simply choosing a command.



provides a palette of eight fixed colors, and drawing in Nisus is limited to black and white. No word processor prints color separations, but don't think that the potential of color is confined to color printers. On a standard laser printer, full-color graphics translate into rich gray-scale halftones. Color graphics also serve to spruce up an on-screen document.

Overall, WordPerfect is the clear graphics leader among word processors. The program lets you numerically rotate or scale a graphic, specify a grid color, and display the coordinate location of the cursor (a function shared by Nisus). It's the only word processor that provides multiple view sizes for magnifying details of a graphic on screen, and the only one that offers a palette editor for customizing colors in a document.

Tables and Equations

NO WORD PROCESSOR IS A SPREADsheet. But if you typeset lists and equations in the course of creating technical documents or catalogs, you'll appreciate a program that handles letters and numbers with equivalent savoir faire.

Two programs supply table-making functions so you can assemble flexible columns of textual and numerical information, but each approaches the subject differently. WordPerfect lets you establish

what it calls parallel columns, which enables you to create tables in which any entry can occupy as many lines as needed.

In Word, you can insert a spreadsheetlike table, complete with cells. As in
the case of a parallel column entry, each
cell may contain as much data as you like.
But because cells are distinct, selectable
units, they provide more flexibility than
column entries. For example, in Word,
you can add an empty column or row anywhere inside the table. Meanwhile, Nisus
lets you select a tabular column by pressing the option key and enveloping the column in a marquee. While Nisus doesn't
rate full table-making status, this technique allows you to cut a column from
one location and paste it into another.

Finally, Word lets you sort rows in a table by the contents of any column. For example, you might sort a price list in order of catalog number, alphabetically by manufacturer, or in ascending order by price. In WordPerfect, you can sort only individual entries, so that A precedes B within a single row—which is utterly useless in tables.

When it comes to calculating and typesetting numbers, the ball game belongs to Microsoft Word. Like a child's calculator, Word can make arithmetic computations. For example, you can select a range of cells and compute the sum (see

"Words and Numbers"). You can also add, subtract, multiply, and divide values that are contained within a cell or in a paragraph of text.

Microsoft Word users have been able to take advantage of a code-based formula editor since version 3.0. By combining a special formula character with an operative command letter, followed by numbers in parentheses, you can create fractions, radicals, integrals, and more. For example, to create the fraction 3/4, press #8-option-

return key. To express the algebraic equation $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$, you enter $x = .NF(-b \pm .NR)$ (b.NS(2) - 4ac),2a). You can display a for-

backslash (\); this enters the formula char-

acter (.\). Next, type F(3,4) and hit the

mula on screen in code form or as it will appear when printed.

Unfortunately, many folks have difficulty creating and editing a formula by way of codes. What's even more limiting is that a coded formula doesn't translate when poured into a page-layout program such as PageMaker or QuarkXPress. To offset the liabilities associated with its formula feature, Microsoft licensed the numerical typesetting utility MathType from Design Science and now bundles it with Word 5.0 under the name Equation Editor. Accessible from inside Word, the Equation Editor utility allows you to create and edit a complex formula as easily as you would construct a simple graphic.

Backdoor Multimedia

THEY AREN'T LIKELY TO PUT HOLLYwood out of business, but two word processors can now talk and show movies.

Word 5.0 ships with a voice-annotation module that enables you to import sounds saved to disk and record sounds from an attached microphone such as MacRecorder or the mike included with the Mac Classic II, LC, LC II, and IIsi. (A sound module should be available by year's end that allows Nisus XS users to import and record sound files.) Voice annotation helps clean up some of the clutter that accompanies documents in the edit cycle. Imagine, for example, receiving a report and being able to record comments directly into the file, rather than scrawling them in the margins of a printed copy. On the downside, sound data eats a lot of memory-up to 1.5MB per recorded minute-and the larger the file, the longer it takes to load and save. To offset this problem, Word provides three compression options that sacrifice some high fidelity for disk space.

Both WordPerfect and Word go the visual route by offering support for QuickTime movies. WordPerfect 2.1 supports QuickTime directly; if you purchased Word 5.0 before May 4, 1992, you need to purchase the Movies plug-in module from Microsoft (\$7.50) or download the file from a bulletin board service. With QuickTime, you can type up a com-

prehensive product description and throw in a movie that shows the product in action. But as with sound, QuickTime movies devour disk space—the amount varies, but figure on at least 100K per second.

While WordPerfect provides the better QuickTime options—you can, for example, restore a stretched movie to its original size, select a desired play speed, and specify frame displays—only Word allows you to edit a movie by deleting and adding frames copied from other movies. In addition, Word's support for voice annotation puts it over the top for the multimedia enthusiast.

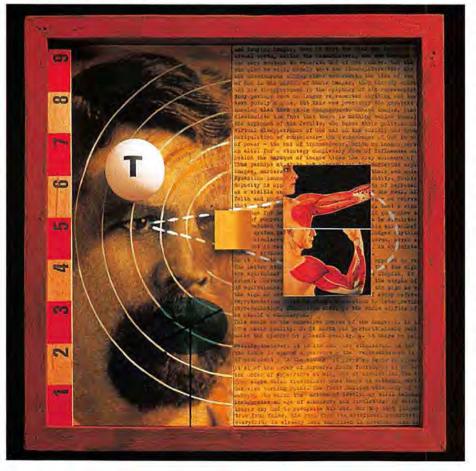
Back to Basics

OF COURSE, NOT ALL OF US USE WORD processors to design documents, draw graphics, tally spreadsheets, or make presentations. I know it sounds old-fashioned, but a few folks out there still use word processors exclusively to write. If you fall into this category, you'll find that these seven contenders offer a wide range of formatting and text-editing functions. Take style sheets, for example. Once the exclusive domain of Microsoft Word and a few desktop publishing programs, all seven word processors now include style-sheet formatting.

But while style sheets are universally available, their implementation varies dramatically. MacWrite II has the least-capable style sheets, allowing you to specify only character-based formatting attributes, including font, type style, size, and color. Character-based styles can be applied to individual characters and words in a paragraph. While such a feature is helpful, the more powerful style sheets control paragraph-based formatting attributes: leading, indents, tabs, and alignment. Available to every program but Mac-Write, paragraph-based styles affect whole paragraphs at a time, even if only a single word is selected.

If you're searching for convenience, look to WriteNow and WordPerfect. In both programs, you can invoke style sheets with user-defined keyboard shortcuts: WordPerfect lets you use any keystroke, and WriteNow limits you to a handful of options (see "Friendly Styles"). WordPerfect goes the extra mile by allowing you to store styles in a library and load them at will.

But the best formatting options belong to Microsoft Word. First, Word is the only program in which you can control all paragraph formatting attributes from a single dialog box. In most word processors, you have to rely exclusively on the ruler; other programs, including MacQuill and WordPerfect, scatter their paragraph options all over the place. Sec-



THE WORD ON WORD PROCESSORS

	MacQuill 1.0	MacWrite II 1.1	Microsoft Word 5.0	Nisus 3.06	Taste 1.02c	WordPerfect for the Macintosh 2.1	WriteNow 3.0
Company	Nest Software	Claris Corporation	Microsoft Corporation	Nisus Software	DeltaPoint	WordPerfect Corporation	T/Maker Company
List price	\$99	\$129	\$495	\$395	\$149	\$495	\$249
TRADITIONAL WORD PROCESSING							
Count selected words	0	•	•	20			•
Thesaurus	none	Word Finder DA	built-in	built-in	built-in	built-in	WordMaster DA
Grammar checker	0	0	•	0	0	0	02
Glossary	•	0	•	•	0	0	0
Automated footnotes	0	•	•	•	•	•	•
Indexing/table of contents	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Mail merge	•	•	•	•	•	•	•
Mac file formats supported	native only	ASCII, MacWrite 5, II; MS Word 3, 4; MS Works; RTF; WordPerfect; WriteNow	ASCII; MacWrite 5, II; MS Word 1, 3, 4; MS Works; RTF	ASCII; MacWrite 5; MS Word 3, 4; Nisus	ASCII; MacWrite 5, II; MS Word 3, 4; MS Works; Taste; WordPerfect; WriteNow	ASCII; MS Word 4, 5; RTF; WordPerfect	ASCII; MacWrite 5, II; MS Word 3, 4, 5; MS Works; RTF; WordPerfect PC; WriteNow
BEYOND WORD PROCESSING							
Wrap text around graphics	•	0	•	•	•	•	0
Automatic/manual kerning	0/0	0/0	0/0	0/0	0/0	0/0	0/0
Master pages	•	0	0	0	•	• (watermark)	0
Type size limits (in points)	2 to 127	2 to 500	4 to 16,383	1 to 255	3 to 127	1 to 32,767	1 to 127
Number of colors for graphics	2 (black and white	e) 8	8	2 (black and white)	16 million	16 million	8
Edit imported PICT graphics	0	0	0	•	0	•	0
Publish and subscribe	0	0	•	0	0	•	0
Graphics file formats supported	Clipboard only	MacPaint, PICT	MacPaint, TIFF, PICT, EPS, QuickTime	Clipboard only	PICT, EPS	TIFF, PICT, PICT 2, EPS, GIF, QuickTime	Clipboard only

■ = yes; ○ = no. ¹ Only after performing a spelling check. ² Grammatik Mac 2.0 bundled with program.

ond, Word's style sheets are smart. The program automatically constructs styles for body copy (Normal), headers, footers, and footnotes. If you make changes to a style sheet or apply a new style, only the attributes that match the style sheet in force are affected.

Beyond formatting, an array of capabilities distinguish one word processor from the next (see "The Word on Word Processors"). A glossary feature lets you input text more quickly; an online thesaurus helps you articulate your thoughts more eloquently; indexing and footnoting capabilities automate tedious tasks. But for the consummate writer, what your word processor does matters less than how it accomplishes each task.

A case in point is WriteNow 3.0. What it lacks in high-end capabilities there's no glossary, no grammar checker, and you can't search and replace text based on its formatting-it easily makes up in sheer simplicity. Sporting a streamlined interface, WriteNow is the only word processor of the seven that runs on a 512KE Mac, System 4.2, and two 800K drives. And it runs quickly; its speed makes it an ideal choice for portable-computer users.

If your Mac is adequately equipped and you appreciate a wide range of features, Microsoft Word is the best overall word processing package. For the power user, Word offers an editable interface in which you can hide and show commands,

assign keyboard equivalents, and send commands to different menus. For the intermediate user, Word provides an extensive and well-organized system of preferences. And for the everyday user, Word offers effort-saving tidbits like its new ability to drag selected characters to a new location rather than move them via the Clipboard.

Certainly, WordPerfect and Nisus also pack in the capabilities and even outperform Word in certain areas. For example, both provide built-in macro editors that enable you to automate repetitive tasks more satisfactorily than anything available to Word users. But WordPerfect with its code-based formatting routines and Nisus with its strangely organized and badly indexed documentation are no match for Word in terms of ease of use.

After examining word processors from five different angles-desktop publishing, drawing, tables and equations, multimedia, and text editing-it's clear that the most popular word processor on the Mac also happens to be the best. Word 5.0 combines top-notch text-editing functions with a table feature, an equation editor, voice annotation, and support for QuickTime. In fact, Word's only notable failing is its drawing window, which, though capable, pales when compared with those of WordPerfect and Taste. So if you're like most folks, the best allaround word processor to buy is probably the one you've already got. m

See Where to Buy for contact information.

DEKE McCLELLAND's newest title, Macintosh A to Z (Sybex, 1992), would have been out sooner if only he had not failed in his quest to locate the elusive word processor that will compose his text for him.

EDITORS' CHOICE

Beginning Word Processing

WriteNow 3.0 If you're new to the Mac, WriteNow is an excellent introduction to word processing. What WriteNow lacks in power it makes up for in simplicity and speed. Company: T/Maker Company. List price: \$249.

Advanced Word Processing

Microsoft Word 5.0 Out of seven word processors, Word is the only one in which you can create tables, calculate sums, and typeset numbers. Word also bundles the widest array of straight word-processing capabilities. Company: Microsoft Corporation. List price: \$495.

Beyond Word Processing

WordPerfect for the Macintosh 2.1 Word-Perfect combines the best desktop-publishing and drawing capabilities of any word processor with QuickTime support and some of the best word processing features this side of Microsoft Word. Company: WordPerfect Corporation. List price: \$495.

by Gregory MacNicol BIGGEP PICTURE

Macworld Lab tests 26 color monitors

Professional graphic artists know that the better they see, the better they work. Good work starts with good working conditions, and it is precisely this need for a better workplace that is behind the demand for ever-higher-quality Mac displays. And when it comes to displays, better usually means bigger, which is why so many professionals are migrating from 14-inch monitors like the AppleColor High-Resolution RGB Monitor to larger, 16-inch and even 19-inch and 21-inch displays.

But is bigger really better? For professional-level work, the answer is clearly yes. While many pros need to view 1024-by-768-pixel images—

for example, magazine publishers need to see two facing pages simultaneously—a 14-inch monitor cannot show this number of pixels (despite what some vendors might claim).

But the bottom line in the trend is visual ease of use. Once you get used to creating detailed graphics on a large, flat, high-resolution display, you'll wonder how you (or anyone else for that matter) could produce work on a diminutive 14-inch screen in the first place.

Key applications for 19-inch to 21-inch monitors are those that require detail, like electrical or mechanical CAD, 3-D modeling, industrial design, and geographical information system work. The 16-inch monitors, however, are good enough for working with video-resolution animation, business graphics applications, and graphic design production.

Macworld Lab tested 26 large color monitors—those with cathode-ray tubes (CRTs) measuring 16 inches or greater diagonally and offering display resolutions of 800 by 600 or more pixels. These criteria led us to three major groupings of color displays. We tested 8 single-page displays; these are 16-inch or 17-inch monitors with resolutions of 832 by 624 pixels, which is the resolution required for WYSIWYG (what you see is what you get) display at this size. (The difference in reported size is due to how vendors measure the CRT, not to actual size differences.) We tested 13 two-page 19- or 20-inch monitors offering WYSIWYG resolutions of 1024 by 768. (Just as with the 16-inch monitors, some vendors label 19-inch monitors as 20-inch.) And we tested 5 two-page 21-inch monitors offering WYSIWYG resolutions of 1152 by 870.

We tested all monitors at 8-bit color depth (256 simultaneous colors) using either the vendor's own display board, if any, or Apple's 8•24 graphics board. We also tested the 16-inch monitors with the Quadra's built-in video, since many monitor vendors are targeting Quadra-video users.



Of the eight 16-inch monitors, only two—the Sony CPD-1604S and NEC MultiSync 5FG—did not work with the Quadra built-in video at WYSIWYG resolutions. Sony does offer a separate adapter that lets the CPD-1604S use the Quadra's built-in video, but the adapter was not available for our testing. The NEC MultiSync 6FG requires a special \$29 adapter to run in WYSIWYG mode with the Quadra's built-in video.

Some monitors will also work with other vendors' video boards, which we did not test. But they don't always work the same way. For example, Sony's 19-inch GDM-1936 runs at 1024 by 768 resolution when used with a Radius video board and the appropriate adapter. With an Apple 8°24 board, the GDM-1936 runs in 1152 by 870 mode, which is the WYSIWYG resolution of a 21-inch monitor.

While the prices of 16-inch monitors are not that much higher than their 14-inch siblings (figure on an extra \$500), stepping up to a 19-inch or 21-inch moni-

tor is dramatic in terms of what you payfigure tripling the price for the jump in size. Costing over \$3000 (some are priced in the \$4000 range), these mammoth display units usually weigh in at well over 60 pounds and consume a considerable chunk of desktop real estate to boot.

A hidden cost is that of a video board, which is required to run a large monitor on most Macs. (Only a Quadra can run a large monitor at WYSIWYG resolution without a video board, but then only with enough video RAM.) But, if you can afford one, these grand and beautiful displays are well worth their considerable additional cost. And for professional-grade applications they are indispensable.

While these monitors are designed mainly for use with Mac II and Quadra series computers, SE/30 owners have two solutions: MicroMac Technology offers a \$1995 upgrade that includes a Sony 16-inch monitor, and companies like Lapis Technologies offer video boards for large monitors.

We found that, almost without exception, the units tested were serviceable and were superior in quality to the monitors available just two years ago. However, we did find remarkable variation in output not only from one manufacturer to another but sometimes even between units from the same manufacturer.

Picking Quality Criteria

SO, YOU'RE CONVINCED—IT'S TIME TO upgrade. Logically, the place to start is with the specs, right? Wrong—in fact, choosing a monitor solely on manufacturer-supplied specifications is a waste of time because no consensus exists on measuring display attributes.

For example, a monitor's sharpness is a function of the brightness of the display. But manufacturers do not agree on how bright to set their monitors when measuring sharpness. Therefore any measure of sharpness is arbitrary (and misleading).

So, can you effectively choose a monitor based on cost? Not really. Sony and Apple position themselves as moderately priced, but they are still relatively expensive. Smaller companies with lower-priced units produce fine monitors, but they often lack proper cables, and their manuals are frequently inadequate.

Companies that market high-end units often claim added value, in the form of graphics boards with extra graphics-related features, whose worth is questionable for many users. (An example is the built-in color calibration in NEC's monitors—it's a fine feature for color publishers and game developers, but most business users don't need it.)

What's more, there are several important factors that you won't find detailed on a spec sheet. For example, when we tested brightness levels, the brightness of the 16-inch NEC MultiSync 5FG increased dramatically as a displayed image got whiter, stabilizing at a brightness of about 90 percent for a white that should have been at 60 percent bright. (The 5FG has an automatic brightness-stabilizer circuit that causes this effect.) This anomaly could be catastrophic in certain applications (such as computer animation) but is an advantage in environments where you need a bright (and stable) display such as inside a brightly lit office.

Here's another item spec sheets won't detail. All large monitors based on Sony's Trinitron CRTs (including some 19-inch and larger models from Radius, Sigma Designs, Sony, and SuperMac Technology) display moirés—fine, multicolor patterns made up of concentric ovals—when the screen is displaying large areas of a light or medium gray (such as for an all-gray desktop background). These patterns

Monitor Confusion

Surprisingly, large monitors are still somewhat of a novelty in the Macintosh world. Most manufacturers of large color monitors originally targeted the multiresolution MS-DOS marketplace, where their displays could be switched to accommodate display resolutions ranging in sophistication from EGA, VGA, Super VGA, 8514/A, and XGA—a set of standards that covers a range of resolutions from 640 by 480 (common to Mac 13-inch monitors) to 1024 by 768 (common to Mac 19-inch monitors). Any monitor labeled Super VGA or XGA can handle all three common resolutions—640 by 480, 800 by 600 (832 by 624 on a Mac), and 1024 by 768—no matter what size monitor it is.

For Mac buyers used to associating specific resolutions with specific monitor sizes, this can be confusing. But the basic lesson to learn from this is that many display manufacturers are now packaging their wares for both the Mac and the PC marketplaces. This gives Macintosh users the advantages of lower prices and new multiresolution capabilities from those vendors who offer appropriate video boards or cable adapters.

But the shift from DOS to Mac has not been smooth. In the DOS world, video signals are independent of machines and video boards, letting you display a range of resolutions on any size monitor. This is not true in the Macintosh world, where each Mac uses a different sense line (a wire in the monitor cable and video port) to identify the resolution it will operate the monitor at. Many DOS-oriented vendors—including some of the giants—claim Mac compatibility but don't even know they need to offer cable adapters to work on a Mac's built-in video in the first place.

One of the main problems in adapting a monitor for Mac use has arisen out of confusion about cabling—a problem that still exists, especially among vendors who sell primarily to the DOS market. See *Lab Notes*, this issue, for an explanation of the problem and how to solve it.

The cabling problem is most acute for large monitors, because the companies moving over to the Mac market from the DOS world created adapter cables that are compatible with the built-in video of the Mac LC, IIsi, and IIci—Macs that work only at 640 by 480 resolution with landscape monitors 14 inches and larger. These adapters weren't set up to tell which mode the Mac is running in (most companies didn't even realize that those Macs use sense lines to detect the monitor's mode). If you try to use one of these adapters on a Quadra (which supports 640 by 480, 832 by 624, and 1152 by 870 resolutions), you wind up with a big monitor that runs only in 640 by 480 resolution—completely wasting the benefits of a large monitor.

are caused by electron beams interacting with the monitor's internal metal grid. The unwanted pattern disappears when the image is bright.

Behind the Specs: Seeing Is Believing

BECAUSE SPECIFICATIONS ARE UNdependable, selecting a monitor is ultimately a personal endeavor. What's more, important visual features typically go unappreciated by many users. The primary attributes to look for are brightness and contrast, color purity and uniformity, gray linearity, sharpness, convergence, and geometric distortion. "Gauging Monitor Quality" shows Macworld Lab's results for areas that can be reliably measured. A group of *Macworld* editors also subjectively evaluated each monitor.

Brightness and contrast A monitor's brightness and the associated contrast is perhaps a monitor's most visible attribute. Because of its design, a Trinitron CRT offers the best brightness as well as the most extensive contrast levels.

But the gap between CRT technologies is closing—you don't need a Trinitron to get high brightness: the 16-inch E-Machines ColorPage E16 and NEC MultiSync 5FG, which use a more conventional tridot tube (made by several manufacturers, including Hitachi, Matsushita, and Toshiba), are very bright.

But the 5FG uses a brightness stabilizer circuit that limits the brightness of small regions of intense white when the circuitry determines that there is too much brightness in the overall scene. What this means in real life is that an object such as a white square changes brightness depending on the relative brightness of the surrounding image—a serious drawback in certain applications.

Color purity and uniformity An important issue with graphics-intensive applications is color purity. Color purity relates to the ability to display pure white. In fact, no monitor displays pure white. Plus room temperature, warm-up time, and age all affect the colors a monitor produces. If you want, say, to match onscreen colors with the inks your press uses, you must calibrate your monitor (using a color monitor calibrator like those from Minolta or Barco) as you work.

Furthermore, certain types of monitors have color personalities. Trinitrons, for example, tend to emphasize certain segments of the color spectrum. Reds have an orange hue on most Trinitronbased monitors.

Of the Trinitrons we evaluated, the Sony and Apple 16-inch monitors had the most noticeable reddish casts. The E-Machines T19, by contrast, had a blu-



The new crop of 16-inch monitors boast high quality. Examples include (clockwise from top) the NEC MultiSync 5FG, Apple Macintosh 16" Color Display, and Sony CPD-1640S.

ish cast, although the colors still seemed true to life.

Monitors based on tridot CRTs also have color personalities. For example, we found the 19-inch Sampo America Alpha-Scan LS to have a strong aqua cast—so much so that it unpleasantly distorted all other colors. The NEC 5FG had a slight orange cast, and its colors seemed a bit flat, although not disconcertingly so. And on the RasterOps 2168 21" Color Monitor, light colors seemed washed out.

An important aspect of color fidelity is color uniformity, which gauges how evenly a monitor displays white over the entire screen. While significant improvements have been made over the years, no monitor we tested was uniformly white. To test monitors' color uniformity, we created a completely white image and then observed how white it remained throughout the display.

We discerned warm spots (differences in colors or brightness) on all monitors evaluated. Both Sony monitors we tested, the 19-inch GDM-1936 and the 16-inch CPD-1604S, had the best uniformity except for a single region near one edge that was noticeably off-white. Other Trinitron-based monitors, such as the E-Machines T16 II, displayed excellent uniformity except for the upper corners, where they turned reddish.

In contrast, tridot-based monitors had greater variations in uniformity. For example, both NEC monitors were excellent; in fact, the 21-inch 6FG had the best uniformity of all the tridot monitors we tested. Apple's Trinitron-based 16-inch monitor displayed very good uniformity, but its larger tridot-based 21-inch cousin appeared blotchy. The tridot-based Radius Color Display/21's uniformity was excellent throughout.

Our testing showed that a monitor's color can be affected by the system in which it is installed. Macworld Lab tested monitors using different display boards and found that some display signals delivered an obvious and distinctly warmer tone to the overall color. The Quadra's internal video, for example, produced redder images than an Apple 8.24 video board on the same monitors. This variability is due to the internal values of the board's digital-to-analog converters (DACs), which translate the computer's digital information to analog electron beams. These DACs, incidentally, are not adjustable.

Gray linearity Another color-display issue is gray linearity, which measures how evenly a monitor produces each shade of gray, from 0 percent black (that is, white) to 100 percent black. Ideally, each shade of gray contains equal amounts

Gauging Monitor Quality Maximum Brightness Contrast Ratio Distortion Convergence Red bars indicate the best result in Most people prefer a brighter Better contrast helps a Convergence denotes how The greater the difference a test category. monitor. We turned up the monitor show details in both closely a monitor's red, green, between the screen's average light and dark areas of an and blue electron beams hit screen's brightness as high as distortion (the tick mark) and it could go without showing image. We calculated the the same pixel on screen. The its worst distortion (the total scan lines. A reading of less ratio between the luminance better the convergence, the length of the bar), the more than 20 footlamberts is of white and black squares noticeable the distortion will sharper the image and the considered dim; most throughout the screen. A truer the colors. A measurebe to a user. A measurement monitors are much brighter. ratio of 6:1 or higher is good. ment of 0.00 is perfect. of 0.0 is perfect. Longer bars are better. Longer bars are better. Shorter bars are better. Shorter bars are better. 16-/17-Inch Apple Macintosh 16" Color Display 31.7 9.2 0.44 0.9 2.5 E-Machines ColorPage E16 26.8 6.9 0.38 2.1 5.0 E-Machines T16-II 35.3 8.2 0.9 2.0 0.24 Generation Systems 16" Trinitron 43.3 5.3 0.22 1.4 3.0 Mirror 16" Trinitron 1.9 5.0 29.3 9.2 0.21 NEC MultiSync 5FG 62.8 6.0 0.23 0.5 2.0 Sony CPD-1604S 42.2 8.7 0.29 1.1 4.0 SuperMac SuperMatch 17 MultiMode 61.9 2.1 5.0 7.0 0.34 19-/20-Inch E-Machines T19 30.9 14.0 0.30 2.6 5.0 Generation Systems 19" Trinitron 20.3 10.8 0.38 1.7 3.0 Generation Systems 20" Ikegami 30.2 9.4 0.34 1.3 4.0 MacTel Sony 19" 31.6 10.3 0.58 1.3 4.0 Mirror 19" Trinitron 18.6 0.28 2.8 5.5 10.4 Mirror 20" Ikegami 25.3 8.3 0.40 1.0 2.0 Radius PrecisionColor Display/19 34.9 8.8 0.39 0.6 2.0 Radius PrecisionColor Display/20 29.3 1.0 2.5 11.6 0.37 Sampo America AlphaScan LS 34.2 8.4 0.57 0.8 2.0 Sigma Designs ColorMax 30.9 0.9 2.0 12.6 0.23 Sony GDM-1936 36.7 9.9 0.56 1.8 5.0 SuperMac 20 Color Display 37.5 1.8 4.5 8.4 0.31 SuperMac 20" Dual Mode Trinitron 39.3 11.2 0.89 1.3 3.5 Apple Macintosh 21" Color Display 25.1 13.2 0.26 1.8 3.0 2.0 4.0 NEC MultiSync 6FG 39.5 6.9 0.22 Radius Color Display/21 37.0 11.6 0.27 1.5 3.0 RasterOps 2168 21" Color Monitor 37.2 10.7 0.37 1.3 3.0 SuperMac SuperMatch 21 Two-Page 36.1 11.3 0.35 1.4 3.0 ratio of white to black footlamberts millimeters 64ths of an inch

of red, green, and blue. If a monitor's three electron guns and three color amplifiers (which control each beam's intensity) operate differently for red, green, and blue, a full-screen image that is supposed to gradate from black to white might, for example, appear bluish at one point or reddish at another.

Likewise, if one of the amplifiers suffers from poor calibration, the black portion of a gradient may rapidly shift to a medium gray, or perhaps to a bright white. Because gray linearity affects all colors, not just gray, trying to create a photo-realistic image on a monitor with severe linearity defects is difficult.

Once again, most of the Trinitronbased monitors (all sizes) excelled, presenting the best gray linearity across a smooth range of grays from black to white. And once again, the tridot monitors' quality varied. Both NEC monitors had problems distinguishing grays 70 percent or darker, as did the 19-inch tridot-based Mirror Technologies 20" Ikegami (also sold by its sister company, Generation Systems) and SuperMac SuperMatch 20 Color Display. The E-Machines ColorPage E16 looked purple in the regions that should have been medium gray. The Apple 21-inch monitor had an even distribution of grays, but the percentages were off—everything was darker than it should have been.

(at 20 footlamberts)

Sharpness A monitor's sharpness how well pixels are displayed both individually and as a group—is ultimately a subjective feature. Like color, sharpness varies throughout the display area, and fuzziness tends to set in near the corners.

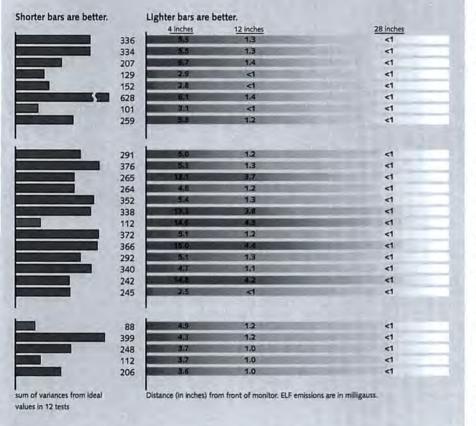
Sharpness depends on how precisely the manufacturer has been able to aim the CRT's red, green, and blue electron beams and on the size of the dots or lines that make up the mask or grille through which the beams pass. Because electron beams and the elements that control them are analog technologies, not digital, there is always a certain degree of spillover among the three beams. This means that when the brightness is turned down, the image appears sharper, since there is less chance of spillover into adjacent dots or lines in the mask or grille. Macworld Lab tested each monitor for sharpness subjectively, viewing a series of detailed color and monochrome images. All the monitors had the best sharpness in the center of the screen, since the angle at which the beam strikes the center results in the most

Gray Linearity

Gray linearity shows how accurately a monitor displays shades of gray across the spectrum from pure white to pure black. No variance from ideal (a measurement of 0) is perfect; 2700 is theoretically the worst total variance.

ELF Emissions

The bars show the change in emission levels of extremely-low-frequency (ELF) electromagnetic radiation as one gets farther from the front of the monitor. The more intense the bar's color, the more intense the emissions. Measurements of less than 1 milligauss (mG) are too weak compared with normal background emission levels to be measured accurately. Instrument accuracy is ±0.2mG. We tested ELF emissions with a Combinova MFM-10 meter from Ergonomics, of Southampton, Pennsylvania.



circular and thus the truest pixels (for more on how this works, see "Color Display Bargains," *Macworld*, March 1992).

We repeatedly found that Trinitronbased monitors displayed the sharpest detail on tiny objects (such as small letters). The Radius PrecisionColor Display/19 was the least sharp, but it was still fine for demanding everyday work.

Tridot monitors are less sharp than Trinitron monitors, sometimes resulting in slight fuzziness of small letters. The NEC MultiSync 6FG and SuperMac SuperMatch 17 MultiMode Color Display had slight fuzziness, while the Sampo AlphaScan LS, Radius PrecisionColor Display/19, and RasterOps 2168 21" Color Monitor were noticeably fuzzy. The other tridots had very little fuzziness, rivaling Trinitron monitors in sharpness.

One sharpness-related quality factor not widely used by Mac buyers is pitch, which is the distance between each group of red, blue, and green phosphors that make up the smallest physical pixel possible. There are two ways to measure pitch, depending on the type of monitor. Dot pitch measures the distance for tridot monitors, which use a metal grid (called a shadow mask) made up of small holes; each hole has three phosphors associated with it, one for each color. Aperture pitch measures the distance between phosphor groups for Trinitron monitors, whose metal grid (called an aperture grille) is composed of vertical slots; each slot has three stripes associated with it, one for each color. Pixels are composed of groups of dots or stripes (see "Do Trinitrons Still Have an Edge?")

Generally speaking, the smaller the number, the better the dot pitch. The closer the dots get to each other, the finer the pixel you see on the monitor; too fine a dot pitch, though, can allow too much overlap among dots. And a small dot pitch requires more expensive, better controlled beam positioning. A large dot pitch, such as 0.31mm on a 17-inch tridotbased monitor, makes it difficult to view fine work. Images on such a monitor are less detailed. A small dot pitch (typically 0.28mm) provides clearer images. Super-Mac's SuperMatch 17 MultiMode has a fine 0.26mm dot pitch. All the 19-inch tridot monitors we tested have a dot pitch of 0.31mm, which is due mostly to the expense of producing a finer dot pitch on screens of that size.

For Trinitron monitors, an aperture pitch of 0.25mm or smaller is good for 16-inch monitors; 0.28mm or smaller is good for monitors 19 inches and larger. Because their grids are physically different, you cannot directly compare a tridot monitor's dot pitch to a Trinitron's aperture pitch. But you can roughly compare them along the horizontal axis by multiplying the dot pitch by 1.13 to get an equivalent aperture pitch or multiplying the aperture pitch by 0.89 to get an equivalent dot pitch. (Along the vertical axis, a Trinitron has no pitch since the phosphor stripes are continuous.)

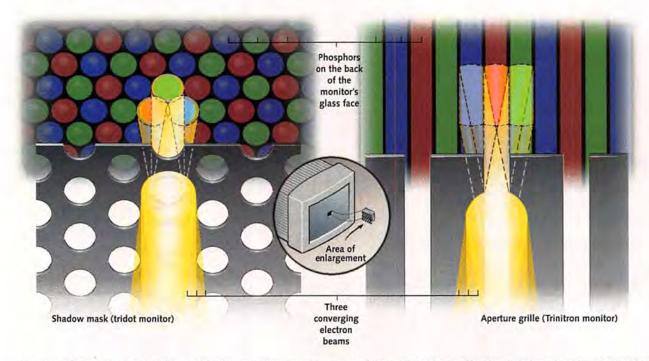
Convergence The degree of a monitor's convergence—how precisely the beams from the red, green, and blue electron guns hit their target—can seriously affect the coloring of straight lines. On a monitor with poor convergence, what should appear as a white line may in fact break out into rainbowlike red, green, and blue lines. For some applications, such as CAD or animation model-making, this produces some extremely frustrating artifacts—especially when you consider that a line's color may have a specific meaning.

The rainbow effect happens because the three beams that mix to produce white are not working completely in concert. Despite seemingly satisfactory convergence specs, most monitors will show symptoms of poor convergence toward the edges of the screen, where curvature magnifies the effects of the electron beams that are even slightly off.

While the tridot-based SuperMac 19inch monitors had excellent convergence, the 19-inch Trinitron-based SuperMac and Sondy GDM-1936 had the worst (in their corners), but they were still usable. Although the Mirror/Generation 16" Trinitron had good convergence, it displayed fuzzy text.

The poor performance of the Sony 19-inch and Mirror 16-inch Trinitron

Do Trinitrons Still Have an Edge?



For years, reviewers have acclaimed the quality of Trinitron-based monitors over conventional tridot monitors. The higher quality is due to the difference in how the monitor "paints" the red, green, and blue phosphors on the monitor's surface to make up each image. But newer tridot monitors have come a long way in overcoming this quality difference through better beam focusing and better shadow-mask design, so a tridot monitor can now rival a Trinitron in image quality.

Both Trinitrons and tridot monitors use a metal grid to filter electron beams so the electrons hit only the approriate phosphors—sort of a sieve for color. In a tridot monitor this grid, called a shadow mask, is composed of holes. In a Trinitron, the grid is called an aperture grille and is composed of slots. The grid blocks excess energy that might spill over onto neighboring phosphors. Because the beam for each color hits the hole or slot at a slightly different angle, the grid masks the beam in such a way that elec-

trons intended to excite, say, the blue phosphors do strike only the blue phosphors.

Because a Trinitron's slots do not block the top or bottom of a beam, the full cross section of the beam can strike the phosphors, and there can be almost continuous phosphor illumination vertically. On a tridot monitor, the grid that separates the holes creates a slight border of inactive phosphors around each illuminated area, which can cause noticeably discrete pixels. That's why a tridot monitor's image can appear to be fuzzier than a Trinitron's image.

The Trinitron's aperture grille does have a disadvantage: it is more fragile than a shadow mask, so it requires stronger support and heavier glass, which is why a Trinitron monitor usually weighs more than a comparable tridot. A Trinitron also requires more energy (because of the thicker glass) to make the phosphors bright enough to be visible.

monitors was surprising because, generally, Trinitron-based monitors have excellent convergence, which we experienced with other Trinitrons during our testing. As expected, convergence was poorest at the edges on all units.

Geometric distortion The fact that electron beams travel in an angled path onto a display screen that is curved can lead to distorted shapes. What is supposed to be a square may, in fact, be distorted so that all four sides are no longer equal. This type of distortion is especially noticeable at the corners of a monitor, because the electronics that control the beam have trouble adjusting the beam size and position to compensate for the effects of striking a curved surface at an angle.

Fortunately, vendors seem to have minimized geometric distortion by precisely controlling the beam movement: all the tested monitors displayed reasonably round circles at the center of the screen (which is where most people put the current object of interest) at all tested resolutions. The best of the lot were the monitors from NEC and the E-Machines T16 II.

In another form of distortion, image size shifts as brightness changes. An ideal monitor displays an image in the same physical location regardless of overall brightness.

Most monitors we evaluated fared well with this test. But some did have shifting problems, including the E-Machines E16 and Apple 16-inch. The SuperMac SuperMatch 17's shifting was particularly noticeable. And RasterOps had to remove its Sweet 16 from our evaluation because its first production models had noticeable shifting (the models that ship

when this article appears should have solved the problem).

The size changes because as the beam intensity changes, the magnetic field (which bends the beams to sweep across the screen) exerts a different amount of force on the beams, altering where they strike the monitor's face. (The less intense the beam, the more the magnetic field bends it; the more intense the beam, the less the field bends it.) Although annoying, shifting is detrimental only in certain applications, such as animation.

Multiresolution Support

A FEATURE THAT IS GAINING POPularity is multiresolution support, which lets a monitor display an image at WYSI-WYG (near-72-dpi) resolution and at finer (and sometimes coarser) resolutions, acting as a sort of hardware zoom. Using a higher resolution, which in essence draws pixels closer together to let you see more of an image although at a reduced size, comes in handy to preview large images or facing pages. Using a lower resolution, which moves pixels farther apart to let you see part of an image or page at an enlarged size, comes in handy for the visually impaired or when using a monitor to make a presentation.

About half the monitors we tested could run at two or more resolutions. The SuperMac SuperMatch 20" Dual Mode Trinitron, the Radius PrecisionColor Display/20, and the NEC 6FG operate at three or more resolutions when used with their own video boards. We tested all the 16-inch models at 832 by 634 resolution. which means images are close to 72 dpi. We tested compatibility with the Quadra's internal video, since it supports this resolution, as well as with the Apple 8.24 board. We tested the 19-inch monitors at 1024 by 768 resolution and the 21-inch monitors at 1152 by 870 resolution, which again are close to 72 dpi. We also evaluated all the monitors at any higher resolutions supported.

On some monitors, we found that when the resolution changed, the aspect ratio (the image's height compared with its width) changed, too. We discovered that the 21-inch NEC 6FG, for example, when switched to 1024 by 768 resolution, had such a change in aspect ratio that a displayed image appeared conspicuously squeezed; in fact, some of the image was actually lost. But when set to 1152 by 870 WYSIWYG resolution, the NEC 6FG aspect ratio and overall image quality were excellent. (When used with Radius's Mac-FG board, the 6FG supports six resolutions from 480 by 640 to 1152 by 870.)

Most vendors who provide monitors with multiresolution capabilities-either through separate video boards or adapters that take advantage of the Quadra's builtin video-also provide software that lets you change resolutions through a control panel, without restarting the Mac. E-Machines, NEC, and Radius offer the easiest multiresolution controls-after you change the resolution, these monitors automatically change the display without restarting. The multiresolution-capable monitors from RasterOps and SuperMac require a restart. (E-Machines requires that you change a jumper on the video board before installing it in the Mac to enable its multiresolution capabilities).

Ease-of-Use Features

KEY ERGONOMICS FEATURES INCORPorated into many monitors can make your life as a desktop illustrator or digital designer a good deal easier. For example, some monitors let you adjust vertical and horizontal image size and positions, to optimize overall screen usage. NEC offers such control options on its 21-inch 6FG. Others, such as the Radius monitors, provide a degaussing push button. This is convenient because, whenever you move the monitor, the magnetic field shifts and the display colors may change. The degaussing feature resets the field and corrects the colors.

Push-button controls are the latest trend in monitor design; fewer monitors use the familiar dials of yore. But the push-button method is not universally beloved: some editors liked it, others did not. Among monitor makers who've gone the push-button route are NEC, Sony, SuperMac, and Radius.

Macworld Lab rated the 21-inch NEC 6FG the most reconfigurable. It has flexible controls for image size and position—even letting you fill the screen area completely—in addition to offering a wide range of brightness and contrast settings.

A constantly changing attitude among vendors about display surfaces that reduce glare is evident in the varying types of CRT coatings on the monitors we evaluated. The underlying problem is that glare reduction often decreases image sharpness, which is especially critical when displaying images at resolutions finer than 72 dpi. Today, the trend is away from heavy glare coatings.

Yet manufacturers provide options for those who want to cut down on glare. For example, NEC's monitors are relatively reflective, but for an additional \$200 you can purchase an Optical Coating Laboratories Inc. (OCLI) antireflective panel (available in both a light and a dark version) from NEC. A high-quality monitor with the OCLI panel built in is Radius's Color Display/21. But the best way to reduce glare is to set the lights near your monitor at low levels and avoid lighting that shines directly on the monitor.

An important ease-of-use feature, especially for setting up, is technical support, particularly the manuals—if there are any. NEC's manual for the 5FG is well thought out and easy to understand, which speeds installation and helps users understand unusual capabilities like multiple resolutions and color calibration.

Speed Concerns

A LARGE-SCREEN MONITOR NEEDS A lot of data to describe all of its pixels, so a video board can be crucial in ensuring that the monitor does not bog down your system and make your work painfully slow. At 8-bit color, we found that the difference among various boards was considerable.

The average time for ten scroll operations in various applications ranged from 14.9 seconds on an Apple 16-inch display running off the Quadra's internal video to 48.4 seconds for the 19-inch Sampo AlphaScan LS running on a Lapis Technologies ColorServer video board on a Mac IIci.

As a group, the 16-inch monitors were faster than the larger monitors, and any monitor using the Quadra's built-in video ran faster than the same monitor using a video board. The slowest 16-inch monitors were those using the Apple 8•24 board (including the Apple and Sony 16-inch monitors) and the Mirror Technologies/Generation Systems monitors (using a Mirror board).

The SuperMac 19-inch and 21-inch monitors, using SuperMac's Spectrum/ 8•24 PDQ boards, were also very fast,

Measuring ELF Emissions

Macworld's readings of extremely-lowfrequency (ELF) emissions differ from vendors'. Most vendors have adopted the Swedish government's guidelines, which is essentially a pass/fail system that measures emissions one-half meter (about 19 inches) from the electron gun. But these guidelines are vague about the monitor's state during testing. In some configurations (such as with a mostly black screen) a monitor's emissions register lower than in a typical user's configuration (such as with the Apple desktop screen open). Emissions are lower with a dark screen than with a light one because more energy is required to light up pixels brightly than to light them up dimly. The more energy, the more power needed, and the higher the ELF emissions.

Macworld Lab measured emissions at several points with the monitor displaying the Apple desktop screen. We measured from the front of the monitor, not the electron gun, because that's how people gauge their distance. We measured emissions at several points to help you gauge your comfort zone. (Our measurements also let us gauge whether a monitor would pass the Swedish guidelines). Because so much remains to be learned about ELF emissions and their possible effects, a pass/fail system creates a false sense of security. -GALEN GRUMAN

WHAT LARGE COLOR MO	Section 1997					
Сотрапу	Product	Tested	Monitor Price	Video Board (8-bit) Price	Quadra Built-In Video Supported ¹	Multiple Resolution Supported
16-INCH/17-INCH			THE PERSON NAMED IN COLUMN	(E)	The Parket	
(832 × 624 WYSIWYG RESOLUTION)						
Apple Computer	Macintosh 16" Color Display		\$1599.00	\$699-\$1499	•	0
E-Machines	ColorPage E16	•	\$1299.00	\$449		•
	T16 II	•	\$1699.00	\$449		•
Generation Systems	16-Inch Color Display	0	\$1695.00	\$755	•	•
	16" Trinitron	•	\$2295.00	\$825		
Mirror Technologies	16-Inch Color Display	0	\$1299.00	included	•	•
	16" Trinitron	• 211	\$1599.00	included	• 1 100	•
Mitsubishi Electronics America	Diamond Pro 17	0	\$1608.00°	NA ³	· Carrie	01
	Diamond Scan 16	0	\$1308.00 ²	NA ³	Mot make the	01
Nanao USA Corporation	T560i	0	\$2699.00	NA ³		01
NEC Technologies	MultiSync 5FG	•	\$2598.00	included	O 5	•
Philips Consumer Electronics	Magnavox MagnaScan/17	0	\$1499.00	NA ³		0.1
RasterOps Corporation	Sweet 16	0	\$1499.00	NA ³	• *	0
Seiko Instruments USA	CM1760LR	0	\$1599.00 ²	NA ³	• Spain w	0
Sony Corporation of America	CPD-1604S		\$1809.902	NA ³		04
SuperMac Technology	SuperMatch 17 MultiMode Color Display		\$1299.00	\$599-\$1599		•
19-INCH/20-INCH (1024 × 768 WYSIWYG RESOLUTION)						Tink
E-Machines	T19		\$2999.00	\$799	0	0
Generation Systems	19* Trinitron	•	\$3595.00	\$755	0	0
	20" Ikegami		\$2595.00	\$755	0	0
Ikegami Electronics USA	CT-20D	0	\$3695.00	none	0.	0
MacTel Technology Corporation	Sony 19*	•	\$2497.00	none?		
Mass Microsystems	19" Rival Color Display System	0	\$3598.00	included	0	0
Mirror Technologies	19* Trinitron	•	\$2499.00	included	0	0
	20" Ikegami		\$1799.00	included	0	0
Mitsubishi Electronics America	Diamond Pro 20	0	\$3008.002	NA ³	•	•4
	Diamond Scan 20	0	\$2608.00 ²	NA ³	· Inches	•4
	Diamond Scan 20M	0	\$2208.00°2	NA ³	T. OF MICHAEL	01
Nanao USA Corporation	6500	0	\$1899.00	none		01
	T660i	0	\$3999.00	none	•	04
Philips Consumer Electronics	Magnavox MagnaScan/20	0	\$1999.00	none	•	• 4
Radius	PrecisionColor Display/19	•	\$2499.00	\$599-\$899	0	
Service Land	PrecisionColor Display/20	•	\$3299.00	\$599-\$899	0	•
RasterOps Corporation	2075 20" Color Trinitron Dual Scan Monitor	0	\$2999.00	\$599-\$1199	0	••
Sampo America	AlphaScan LS	•	\$2595.00	\$395	0	•
	PrismView II	0	\$2849.00	included	0	•
Sigma Designs	ColorMax		\$4295.00	\$1795	0	0
Sony Corporation of America	GDM-1936	01	\$4014.952	none		•
SuperMac Technology	SuperMatch 20 Color Display	•	\$1999.00	\$599-\$1599	0	0
	SuperMatch 20* Dual Mode Trinitron	•	\$2999.00	\$599-\$1599		
21-INCH (1152 × 870 WYSIWYG RESOLUTION)					1000	
Apple Computer	Macintosh 21" Color Display	•	\$4599.00	\$699-\$1499	0	0
Nanao USA Corporation	F750i	0	\$3299.00	none	0	•4
NEC Technologies	MultiSync 6FG	•	\$4398.00	included	0,	•
Radius	Color Display/21	•	\$3699.00	\$599-\$899	0	•
RasterOps Corporation	2168 21" Color Monitor	•	\$3599.00	\$599-\$1199		0
SuperMac Technology	SuperMatch 21		\$3649.00	\$599-\$1599	•	0

^{• =} yes; O = no. C = Capetronic, Co = company's own, H = Hitachi, I = Ikegami, M = Matsushita, Mi = Mitsubishi, P = Philips, S = Sony (Trinitron), Sa = Sampo, T = Toshiba ¹ At WYSIWYG doesn't make a video board. ⁴ Third-party board or software required for on-the-fly resolution change. ⁵ For 1152 × 870 resolution, extra cable is required to sense Quadra built-in video's signa standard resolution for this size. ⁵ Recommended board is the RasterOps 8XLi, which costs \$1095. ⁵ Tested with Apple 8•24 board, which drives the Sony monitor at 1152 × 870 resolution. The pitch horizontally and vertically to avoid moirés. For other monitors the horizontal and vertical dot pitches are the same.

Pixel Density	Dot or Aperture	Component Sources (CRT/
(in dpi) 1	Pitch (in mm)	Electronics)
-		
70	0.26	5/5
72	0.26	T/T
72	0.25	5/5
72	0.31	T/Co
72	0.25	5/5
72	0.31	T/Co
72	0.25	5/5
65	0.26	S/Co
74	0.28	Co/Co
72	0.26	S/Co
726	0.28	Co/Co
68	0.31	T/Co
71	0.28	Co/Co
72	0.25	S/Co
68	0.25	S/S
70	0.26	T/C
76	0.31	5/5
72	0.31	5/1
72	0.31	H/I
80	0.31	5/1
80	0.31	5/5
75	0.31	5/1
72	0.31	5/1
72	0.31	H/I
75	0.31	Co/Co
75	0.31	Co/Co
75	0.31	Co/Co
75	0,30	M/Ca
72	0.31	5/Co
75	0.31	M/Co
72	0.31	H/Sa
72	0.30	S/Co
72	0.31	5/5
75	0.31	H/Sa
72	0.31	H/Sa
72	0.31	5/5
72	0.30	5/5
72	0.31	H/H
72	0.31	5/5
79	0.26H, 0.29V°	M/P,Ca
72	0.31	Mi/Co
72	0.28	Co/Co
78	0.28	H/Co
77	0.28	H/H
77	0.28	H/H

resolution. ³ Includes cost of required adapter. ³ Vendor ⁶ Tested at 896 × 672 resolution, which is MacFG video board's dpi at this setting is 80. ⁹ Apple's shadow mask has different dot coming in right after the Quadra-based 16-inch monitors at speeds between 18.5 and 20.6 seconds. The slowest 19-inch and larger monitors were those from Apple, Mirror/Generation, Sampo, Sigma, and Sony.

At 24-bit color, a fast video board becomes critical. We found only one exception: the Quadra's built-in video actually runs faster with a 16-inch monitor at 24bit color depth than at 8-bit color depth. It turns out the Quadra can send the pixel information at 24 bits faster than it can translate the 24-bit data into 8-bit data and then send the 8-bit data.

ELF Emissions

ALTHOUGH MONITORS' EMISSIONS OF extremely-low-frequency electromagnetic radiation can be measured, it is difficult to gauge what risk, if any, these emissions pose. Although the biological effects of long-range exposure to ELF radiation is debated, limiting exposure appears to be a sensible precaution.

The monitors we tested varied considerably in their shielding of ELF emissions. The Mirror Technologies/Generation Systems 20" Ikegami, Radius PrecisionColor Display/19, SuperMac SuperMatch 20 ColorDisplay, and Sampo AlphaScan LS all showed high ELF readings, although they fell within the range of the generally accepted Swedish government guidelines. Trinitron-based monitors typically have had higher ELF emissions than tridot monitors, but the high emissions from the Mirror, SuperMac, and Radius 19-inch were surprising because they use tridot CRTs.

Putting It All Together

MONITOR SELECTION IS NOT SIMPLY a matter of going out and purchasing "the best" on the market. Different monitors are optimized for different tasks. You must select a monitor to match your particular—and usually multiple—needs.

For example, if CAD applications are your mainstay, you require a monitor with excellent convergence, so that white lines don't separate into other colors. And if you work with photo-realistic images or other color-sensitive applications, the color-purity and gray-linearity results will be important to you. For these applications, the 21-inch NEC 6FG is the monitor of choice.

For less-specialized tasks, we found many high-quality monitors to choose from. The best 16-inch monitor was E-Machines' T16 II, while the monitors from Sony, Apple, and NEC were also excellent products overall. Of the larger monitors, the E-Machines T19, Radius PrecisionColor Display/20, SuperMac

EDITORS' CHOICE

16-Inch Monitors

T16 II The monitor is excellent in almost all respects, particularly in brightness, contrast, sharpness, and overall color purity.

Company: E-Machines. List price: \$1699 plus \$449 for Futura MX video board.

19-Inch Monitors

PrecisionColor Display/20 The only monitor with top scores in all image-quality tests, the Display/20 also offers easy-to-use multi-resolution settings. Company: Radius. List price: \$3299 plus \$899 for PrecisionColor 8x video board.

21-Inch Monitors

SuperMatch 21 Two-Page Color Display This high-contrast monitor also did well in other image-quality tests. Company: SuperMac Technology. List price: \$3649 plus \$999 for Spectrum/8•24 PDQ video board.

MultiSync 6FG For applications involving photo-realistic display and color accuracy, this monitor is the no-question choice. Plus its on-the-fly multiresolution controls have set a standard. Company: NEC Technologies. List price: \$4398 (MacFG video board is included).

SuperMatch 20" Dual Mode Trinitron, Sigma Designs ColorMax, and SuperMac SuperMatch 21 Two-Page Color Display were the best.

Most of the other tested monitors are adequate to good, so if you see one at a price you can't resist, set up a test view.

The only units we would avoid are the Sampo AlphaScan LS and the E-Machine ColorPage E16, whose overall image quality was poor. Nor did we like the Radius PrecisionColor Display/19, mostly because its very curved surface, which is set deep into the casing, gives you the feeling of looking through a goldfish bowl.

When you've narrowed your decision, test a prospective monitor using the software you expect to use ordinarily. In the case of monitors, the medium is the message. Observe the display carefully and you should see everything you need to know. **m**

See Where to Buy for contact information.

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Macworld Lab testing supervised by TIM WARNER.

ot so long ago, a font was a solid entity; it's hard to think of anything more solid than a hunk of cast metal. But with the advent of digital type-made possible on the Mac with Adobe's pioneering PostScript language—fonts gained a new fluidity. Designers and typesetters could produce type at virtually any size, with fonts generated from a single, scalable outline. Font flexibility has gone a step further with Adobe's new Multiple Master typeface techter outlines. nology, which enables you to produce thousands of

A guide to the promise and the reality—of Adobe's new font technology

variations in font characteristics, such as in weight and width, from a single set of mas-

With all the confusion surrounding font formats over the past few years, there are bound to be a lot of questions about the latest newcomer, Multiple Masters. How does the technology work; who's using it; what applications support it; what are its limitations; and, above all, why is it important? Considering that the technology offers advantages in performing such daily tasks as copyfitting, and that it could play a significant role in the transfer of documents from one computer to another, Multiple Masters are worth a closer look.

What It Is

MULTIPLE MASTER TECHNOLogy lets you create thousands of variations on a set of master, or primary, fonts. A Multiple Master font uses a conceptual design space, made up of primary fonts and the variations you create by altering attributes along a design axis (see "How Multiple Masters Work"). For example, Myriad, Adobe's first Multiple Master typeface release, comes with 15 primary fonts that can be altered using two design axes: weight and width. By changing attributes on each axis, you can create thousands of intermediate fonts (called instances in Multiple Master parlance) between the primary fonts, going from a condensed light font to an extended black one.

In order to set font-design attributes, Adobe is shipping a utility, Font Creator, with each Multiple Master font package (see "Type Transitions"). After vou create an instance, it's assigned a name that's a combination of numbers and letters-"Myriad 277 wt 322 wd" for a custom font with a weight of 277 units and a width of 322 units, for example.

Some of the advantages of Multiple Master fonts are pretty straightforward-the various widths come in handy for copyfitting, for example. You might argue that your copyfitting needs are handled just fine by your page-layout program; if a line of text is too

long, the tracking command will tighten the letterspacing. Similarly, if a headline doesn't fit, you can use a command like QuarkXPress's Scale Horizontal to compress the letters until the line is the right width.

But Multiple Masters offer a much more elegant solution than simply squishing letters to fit into a given space (see "Putting the Squeeze On"). In addition to aiding the process of copyfitting, Multiple Master weight and width variations address the problem of font families that are limited to only a few styles—a designer might want to use a semibold weight if a bold typeface overwhelmed other typefaces in a design, for example.

How It Works

ALTHOUGH WEIGHT AND width variations can be useful, Multiple Master's most impressive typographic feat is its capacity for *optical scaling* (sometimes called visual scaling or optical sizing), a characteristic that was lost when scalable outline fonts appeared.

In the days of metal type, a font was a certain style and size of typeface. The letterforms for a small point size were designed to be substantially different from those of the same face at a larger size. For example, the characters of a small point size (say, 6 or 7 points) were proportionally thicker than those of a larger size, making them more readable and preventing character elements from dropping out when the text was printed. That type-design process was virtually abandoned in the 1950s in favor of phototypesetting, which was less expensive and more efficient because it created all type sizes from a single master font. PostScript fonts in the 1980s carried on where phototypesetting left off-a 6point letter and a 100-point letter in a given PostScript font

had the same overall proportions, since they were created from the same set of points and curves.

With its Multiple Master technology, Adobe has brought the art of scaling metal type to the Macintosh, and with this capability comes greater flexibility for typographers. Although Myriad offers only two design axes, weight and width, Adobe's second Multiple Master font, Minion, adds to that

a third design axis for optical scaling. Set the optical-scaling slider at 6 points, for example, and you get characters with thick strokes, chunky serifs, large counterforms (the open spaces in characters like g and a), lots of space between characters, and a tall x-height (the height of a font's lowercase letters)—ideal characteristics for legibility at such a small size. The opposite characteristics apply to a font when the maxi-

mum optical-scaling setting of 72 points is applied—thinner strokes and smaller counterforms, for example (see "Optical Solutions").

The characteristics of a design axis are up to the font designer; a four-axis Multiple Master font is theoretically possible, although nobody has yet braved that task. Additional design axes could include style (serif to sans serif), kind of serif (square to rounded), stroke contrast (thick to thin), or even decorative elements (solid to in-line).

Minion not only offers an automatic approach to optical scaling, but is a beautiful face in its own right. Although it may seem expensive at \$470 (versus \$370 for the plain PostScript version of Minion, which offers nine style and weight variations), keep in mind that you're

getting any number of custom widths and weights, as well as optical-scaling capabilities.

Who's Using It

SOME DESIGNERS ARE TAKING advantage of Multiple Master to solve a variety of typographic problems. Cope Cumpston, the design and production manager at Stanford University Press, designed a book catalog with about a dozen custom versions of Myriad. She used the Multiple Master font to, among other things, thicken text so that it would be more legible as reverse type (white type on a black background). Michael John, a cartographer for the American Automobile Association, Northern California branch, generated custom fonts with Myriad to create a hierarchy of faces for AAA maps, which employ various text weights for highways, streets, parks, and map legends.

Meanwhile, type designer David Berlow is experimenting with new Multiple Master faces for *Time* magazine and the *Wall Street Journal*. He pointed out that Multiple Masters could be used to maintain a consistent look for international publications, which may be produced with different printing processes or paper types at a variety of locations.

Robert Scoble, production and design editor for San Jose State University's newspaper, is redesigning the paper to use Multiple Master Minion as the text face; his decision was based not just on practical factors (creating a variety of custom weights, for example) but on aesthetic ones as well. The paper had been set in that sturdy newspaper work-

horse, Times, which fits a lot of text into a small space and holds up under poor printing conditions, but is nowhere near as beautiful as Minion.

Who's Supporting It

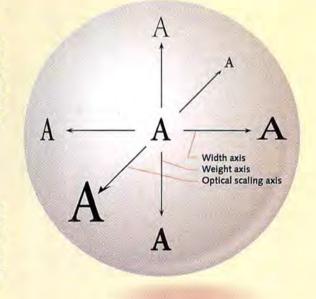
WHEN MYRIAD WAS RELEASED in early 1991, some users complained that it was cumbersome to use. If you were working on a layout, for example, and needed a new custom font, you had to quit your page-layout application, open Font Creator, and construct the font you needed. And if you took your document to a service bureau for printing, you had to bring your entire batch of custom fonts to make sure you had the ones you needed to print. Some of these problems (but not the numerical naming, alas) have been addressed by recent application updates.

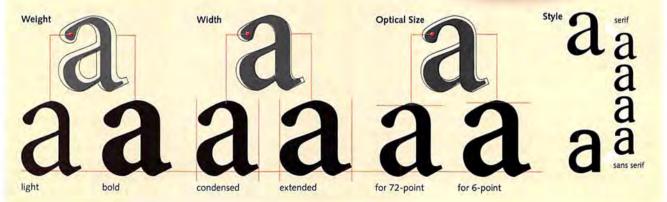
How Multiple Masters Work

Multiple Master fonts offer design axes, which enable you to alter characteristics of a font and to save the altered font as a custom font. In the example at right, the Multiple Master Minion font has three design axes: weight, width, and optical scaling (or optical size), all of which can be manipulated with Adobe's Font Creator utility. By adjusting the weight axis, you increase or decrease the font's density. By altering the width, you make a face's characters wider or narrower. With optical scaling, each font created between 6-and 72-point on the design axis is optimized for use at that particular point size. You can adjust more than one design axis at a time.

How Multiple Masters Look

While Minion (shown here) offers only weight, width, and optical scaling axes, future Multiple Master fonts will offer additional design axes, such as a style axis (far right, below). A style axis will let you adjust a variety of characteristics, such as transforming a font from serif (top) to sans serif (bottom). A Multiple Master face will be able to have more than one style axis. The outlined character atop each example below is a combination of the two characters beneath it; the white space between its black outline and gray interior shows the degree of difference between the two characters.





Typographic Subtleties Typographic Subtleties Typographic Subtleties

Putting the Squeeze On Look closely and you'll see that compressing text with a page-layout application or graphics program distorts characters. The top sample reflects Myriad's regular width; the middle sample was compressed with QuarkXPress's Horizontal Scale command to 70 percent of its normal width; the bottom sample is a custom Multiple Master font. In the middle sample, note that the horizontal stroke of the T is thicker than its vertical stem, and that the dot over the i is an ellipse rather than a circle.

At press time, QuarkX-Press 3.1 offered the most direct support for Multiple Master fonts. Quark is now offering a Multiple Master extension that lets you open the Font Creator from within a Quark-XPress document and create custom fonts as you work (the extension is available free on various online services, or in an XTensions package from Quark for \$25). The extension also creates Multiple Master instances, if needed, when you open a QuarkXPress document on another Macintosh. Thus, if vou open a QuarkXPress document on a Mac that doesn't have the same Multiple Master instances contained within the document, the extension automatically creates them, enabling you to print the document-as long as the Multiple Master base font is installed.

In addition, Altsys Corporation's Fontographer 3.5 allows you to create Multiple Master fonts. More precisely, version 3.5 allows expert typographers to create Multiple Master fonts. Multiple Master technology is extremely finicky about matching attributes such as origin point and number of points per character between one base font and another. An error log tells you what's wrong with mismatched characters so you can go in and fix them, but creating a Multiple Master font is, as Fontographer's documentation admits, "not for the squeamish."

Otherwise, Adobe Illustrator 3.2, like the QuarkXPress extension, saves the information you need for printing customized Multiple Master fonts on Macs that don't contain those particular font instances. And a spokesperson for Aldus said a future version of Page-Maker will invoke Font Creator commands; no further details were available, however.

Why It's Important

EVEN IF YOU'RE NOT A TYpographer or graphic designer, you may soon find yourself using Multiple Master fonts. Adobe is working on a document-interchange scheme, code-named Carousel, that uses Multiple Master technology to create fonts in a document when the originals aren't available. If you've ever transferred a document from one computer to another-sending or receiving office E-mail, uploading or downloading files from an online service, swapping files between your home and office computer, or taking a document to a service bureau to be printed-you're probably well aware that the computer on the receiving end must have the same fonts that are used in the document. If not, formatting is lost, and unavailable fonts are displayed and printed as bitmaps or Courier.

Carousel will ensure that a document replica (a compressed PostScript file containing text, graphics, and formatting information) can make the rounds between Macs and MSDOS, Windows, and Unix systems and still display and print correctly, even if the recipient computer doesn't have the cor-

Optical Solutions

7-point Minion

"The beginnings of any handicraft take note only of pleasing utility, but as requirements become more and more complex and must be satisfied, and new ideas come which must find expression, greater subtleties of design and invention appear, until finally the tradition of the craft has reached us adorned and enriched for our use."—Frederic Goudy, 1940

7-point Multiple Master Minion

"The beginnings of any handicraft take note only of pleasing utility, but as requirements become more and more complex and must be satisfied, and new ideas come which must find expression, greater subtleties of design and invention appear, until finally the tradition of the craft has reached us adorned and enriched for our use." —Frederic Goudy, 1940

Multiple Master Minion's optical scaling axis enables you to create type with better legibility at small point sizes than you'd have with Adobe's non-Multiple Master version of Minion. The top example was printed using the traditional 7-point Minion typeface. In the second example above, the Multiple Master Minion text was optically scaled to 7-point and is more legible. Notice the thicker strokes and serifs, the larger counterforms, and the taller x-height.

72-point Minion

Big Typ

72-point Multiple Master Minion

Big Typ

While optical scaling makes Multiple Master Minion's characters thicker and more assertive in a smaller point size, the font's characters become thinner and more elegant when optically scaled to a large point size. At top is the traditional Minion face at 72-point; at bottom is Multiple Master Minion optically scaled to the same size. Note the Multiple Master font's slender serifs, the tighter letterspacing (as between the *i* and *g* in *Big*), and the reduced width of the thin strokes in the *B*, *g*, and *T*.

rect fonts—or the application used to create the document—installed. Carousel will actually create facsimiles of fonts, using font metrics information that's included with the document, to build fonts that mimic the ones used when the document was created. Because Carousel compresses data, its files shouldn't be significantly larger than the original documents it replicates.

Documents that employ the Carousel scheme aren't "live"; you can't add or delete text, for example. But you can view a document, zoom in on a section, read linked notes, search for an indexed word, and print the entire document or a selected section on a PostScript or non-PostScript printer.

Carousel, which is expected to be available later this year, could be useful not only for transferring files from one platform to another, but also for CD ROM and online publishing, as publishers won't be confined to the limited set of fonts (Times and Helvetica among them) that all Macintosh owners can be expected to have. Carousel won't be the only game in town, though; other companies, including Microsoft and Interleaf, are working on their own document-interchange methods.

What's Wrong

OF COURSE, MULTIPLE MASter fonts have a few flaws. Many designers I've spoken to have found the alphanumeric soup of the custom font names confusing at first, although most grew accustomed to it after a few font-creation sessions. Printer memory requirements are another problem. Multiple Master fonts, which are somewhat larger than regular PostScript fonts, require a printer with at least 3MB of RAM, thereby pushing many older printers and current personal laser

printers out of the running. (PostScript printers with 2MB of RAM should be able to print Myriad, but can run out of memory with the larger Minion. QuickDraw-based printers, which depend upon the Macintosh for processing, should have no trouble printing Multiple Master fonts.)

Other printer incompatibilities exist as well: Apple's Personal LaserWriter NT is incompatible with Multiple Master fonts because of a problem in the printer's ROM; the new Personal LaserWriter NTR works fine with Multiple Masters, however, Finally, Multiple Master fonts worked with only one of the PostScriptclone personal laser printers Macworld tested (see "Personal Printers," in this issue), due to discrepancies in the printers' versions of PostScript and memory limitations.

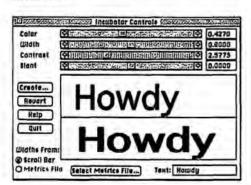
Create or Remove any font: Veight 345 620 Veight 450 620 Optical 8128 6 72 Minlomm 367 wt 595 wd 34 op Sample Sample Size 48

Type Transitions Adobe's Font Creator enables you to adjust any Multiple Master design axis. Minion, shown here, includes three axes: weight, width, and optical size. By clicking and dragging the adjustment control on the weight axis, for example, you can precisely alter the typeface's weight, and your changes are previewed in the bottom window. When you click on the Create button, the axes changes you've made constitute a new font, or instance; the new font's cryptic name then appears in your applications' font menus.

Transforming TrueType

For all you TrueType fans (I know you're out there somewhere), there's a new utility that enables you to alter TrueType fonts. Developed by Sampo Kaasila, one of the originators of TrueType, Type Solutions' Incubator (\$149.95; now available) lets you change the weight (called "color" in Incubator), width, and slant of a character and vary the contrast between thick and thin strokes. Once you've altered a font to your liking, you can save it as a new font.

Incubator offers an added bonus: You can use the information in an AFM (Adobe Font Metrics) file to make one font conform to the metrics of another. Therefore, if you send a document to someone who doesn't have the TrueType font that was used to create it, that person can print the document with another font. The layout—character width, line breaks, and so on—are preserved, thanks to the metrics information.



TrueType, Too Type Solutions' new Incubator utility enables you to alter certain characteristics of TrueType fonts.

What's Ahead

DESPITE THEIR CURRENT limitations, you'll be hearing more about Multiple Master fonts in the near future. A Minion Expert Collection is in the works at Adobe (expert collections include special characters such as small caps, fractions, and old-style numerals). Adobe is developing several other Multiple Master faces as well, but declined to give details. Meanwhile, Xerox and International Typeface Corporation are collaborating with Adobe on a revival of Bodoni, featuring weight and opticalscaling axes. And the Multiple Master technology has already spawned a similar fontcreation product, Incubator, which works with TrueType fonts (see "Transforming True-

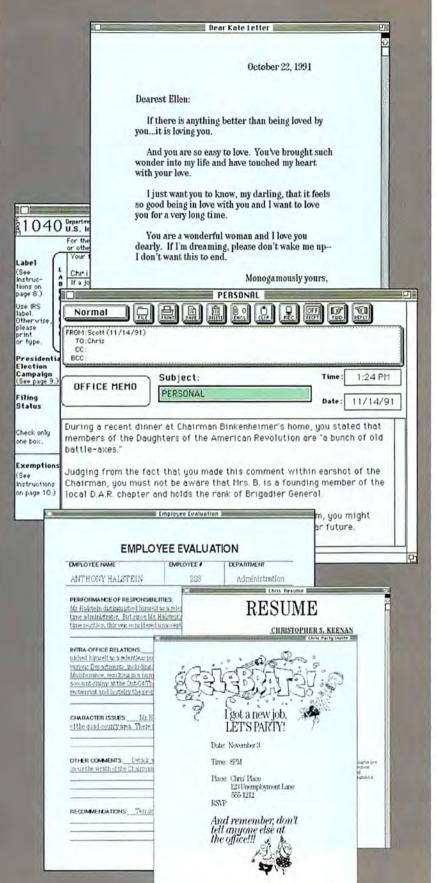
Chances are good that Multiple Master fonts will be more directly supported in the near future. Since Apple has announced plans to incorporate Adobe Type Manager into a future version of the Mac's system software, it's not unreasonable to speculate that some kind of Multiple Master support might become part of the system as well.

In addition, you can expect applications to support Multiple Master fonts in more elegant ways as developers have time to work with the new technology. I wouldn't be surprised if Font Creator soon became a thing of the past, and applications let you do things like expand the characters in a line of Multiple Master text by simply stretching the text until it filled the right amount of space. This kind of improved application or system-level support will undoubtedly make Multiple Masters easier to use. And even if you don't use Multiple Master fonts for sophisticated page design, you may well find them useful, via Carousel, for simply getting a document from one computer to another.

Like Adobe's original Post-Script fonts, the Multiple Master font technology has brought digital type a step closer to some of the refinements once available with traditional typography. Optical scaling and the ability to make minute adjustments to width and weight are a typesetter's dream come true. So who knows—perhaps silicon will ultimately prove superior to lead when it comes to forging fonts. m

See Where to Buy for contact information.

San Jose, California-based ERFERT FENTON is the author of *The Macintosh Font Book* (Peachpit Press, 1991) and a *Macworld* contributing editor.



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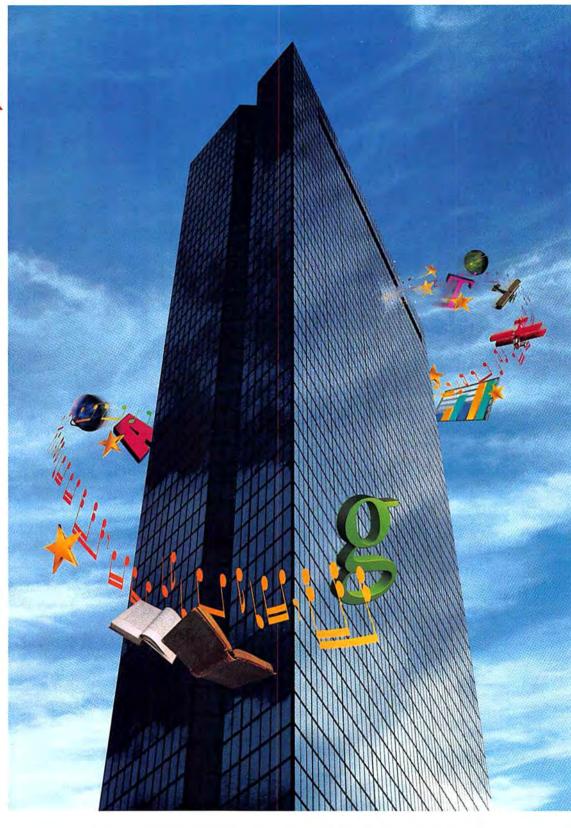
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IN THIS ISSUE: WriteNow, AutoDoubler, More Disk Space, NetMounter, AgentDA, Cyberblast,

IN THIS ISSUE: WriteNow, AutoDoubler, More Disk Space, NetMounter, AgentDA, Cyberblast,
MacPalette, StyleWriter, Ray Dream Designer, Components, nuBase Pro, and more

Low-End Word Processor

WriteNow 3.0

PROS: Extremely compact program; fast; has paragraph and character style sheets. CONS: Graphics treated as text objects. COMPANY: T/Maker Company (415/962-0195). REQUIRES: Mac 512KE; second disk drive. Recommended: Hard drive. LIST PRICE: \$249.



ROM THE BEGINNING, T/MAKER'S WriteNow was acknowledged to be a good, solid, utilitarian word processor, and yet many Macintosh users dismissed it as too bare-bones. However justified this image may have been in the past, it's certainly outdated with the release of WriteNow 3.0.

WriteNow has an appealing mix of solid, staple features such as a spelling checker, a thesaurus, word count, footnotes, mail merge, and now includes style sheets. The program runs briskly on even modest Macs—needing only 500K or so of disk space—and at \$249, it costs considerably less than its competitors.

One of WriteNow 3.0's best improvements is the addition of paragraph and character style sheets. Style sheets, which enable you to quickly apply and update text formatting throughout a document, have traditionally been the exclusive domain of high-end packages such as Microsoft Word and WordPerfect. It's even

more surprising, then, that this inexpensive and compact word processor's implementation of style sheets is so



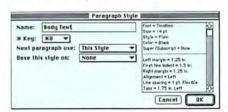


superior. Unlike those in Word, for instance, WriteNow's style sheets are easy to use—you create, apply, and redefine them through one straightforward dialog box accessed from the Custom menu. Style descriptions are easy to discern, family hierarchies are plainly indicated, and the program ships with four paragraph styles—body, footer, footnote, and header. There is no limit to the number of paragraph or character styles you can add.

In addition, you can apply WriteNow styles not only to paragraphs, but also to individual characters (this is a first for Macintosh word processors). This feature is handy when you want to specially format certain types of words—technical terms or foreign expressions, for example—regardless of the paragraph's overall formatting. You can assign keyboard equivalents to both character and

paragraph styles. Temporary modifications to styles, or *overrides*, are indicated by symbols in a pop-up window at the bottom of the screen.

WriteNow's other improvements include the ability to scroll documents fast-



Paragraph Styles WriteNow 3.0 should introduce a whole new class of Macintosh users to the concept of style sheets. From this simple dialog box, you can set the global style formatting for your entire document. When saved in the Microsoft Word format, WriteNow's style sheets are compatible with popular page-layout programs.

er. In addition to the normal scroll speed, WriteNow has settings for faster scrolling. Version 3.0's spelling checker now includes a guess feature that automatically suggests the best alternatives to misspellings. There is also an automatic correction feature: you teach the spelling checker the appropriate spelling, and the new word is automatically added to the list of possible correct spellings.

The print preview window gives you three viewing options—single page, facing pages, and a thumbnail view that displays as many pages (or pairs of facing pages) as will fit on screen. Within print preview you can zoom in on a page and go directly to a specific page by clicking on its thumbnail image. WriteNow 3.0 can also open and save documents in MacWrite II, Microsoft Works, WordPerfect PC, and Microsoft Works, WordPerfect PC, and Microsoft Word 5.0 formats (though it may not translate elements such as index markers, multiple columns, and special DOS graphics).

Other, minor enhancements include six different underline formats, great for reports and tables; a new online help system that thoroughly explains features (though it lacks a detailed table of contents); and System 7 support for everything but publish and subscribe. T/Maker also throws in a free, full-function copy of Reference Software's Grammatik Mac grammar checker.

WriteNow's page-layout capabilities allow multiple columns and graphics in a document. Unfortunately, the graphics capabilities are not flexible; the program treats graphics as text characters, which means that they can only be positioned in a line of text.

All in all I find little to criticize about this fast, compact, and able package and much to praise. Many Macintosh users—especially those with lower-end Macs and storage-conscious PowerBooks—will appreciate its streamlined approach to word processing. And thanks to the new style sheets, a whole new class of users will find the package worth a careful look. For everyday writing projects—from correspondence, business memos, and school reports to articles and novels—WriteNow has all you'll need.—HELMUT KOBLER

Automatic File-Compression Utilities

AutoDoubler 1.0.7

PROS: Transparent operation; compressed files easily identified. CONS: Limited configuration options; files copied with Finder are not compressed. COMPANY: Salient Software (415/321-5375). REQUIRES: Mac Plus; System 6.0.4. LIST PRICE: \$79.95; ten-pack \$479.95.



More Disk Space 1.1

PROS: Extensive user controls; compressed applications can run on machines without MDS installed; user can select files for compression and decompression. CONS: Must run as start-up application to work automatically; does not identify compressed files. COMPANY: Alysis Software Corporation (415/566-2263). REQUIRES: Mac Plus; System 6.0.5. LIST PRICE: \$99.95.



OR YEARS, OLD MAC HANDS HAVE used compression software to shrink files before transferring them by modem. Unlike conventional utilities, which compact specified files on demand, Auto-Doubler and More Disk Space reclaim disk space by compressing applications and documents unobtrusively, decompressing them automatically as needed.

AutoDoubler

AUTODOUBLER IS DESIGNED TO OPERate as transparently as possible: you install the control panel, set a few options, and forget about it. Whenever the Macintosh is idle, AutoDoubler scans designated disk volumes looking for files to compact. You have limited control over the compression process. You can skip certain files and folders, or compact only files older than a given age. Files in the System Folder are always excluded from compression, as are locked or open files.

AutoDoubler displays a special cursor to let you know that it's working. Although a complete scan of even a small hard drive can take hours, you can interrupt at any time—AutoDoubler stops the moment it detects mouse or keyboard activity and resumes automatically when the Mac is free. When AutoDoubler has freed the user-specified amount of space, it stops scanning.

AutoDoubler lacks most of the features of dedicated compression utilities like Salient's own DiskDoubler, available separately for \$79.95. For example, with AutoDoubler alone you can't select files or folders to compress or expand, and you can't create self-extracting archives. Compressed files, whose icons you can opt to automatically mark with a DD symbol, can be used only on machines equipped with AutoDoubler or DiskDoubler. (AutoDoubler automatically expands compressed files when you copy them with the Finder.)

More Disk Space

ALTHOUGH MORE DISK SPACE (MDS) IS an application, the installer also adds resources to the System File, which some purists find objectionable. MDS can work automatically in the background, but only if you set it to launch at start-up. MDS can get by with as little as 256K of RAM allocated to it, but Alysis recommends a much larger partition (1MB or more) to achieve maximum compression.

Like AutoDoubler, MDS waits for a user-specified interval before scanning the volumes you've selected. You can exclude documents or applications from compression, or skip documents according to file type and creator. To reclaim additional disk space, MDS can replace duplicate files with System 7 aliases. A helpful option allows you to compress applications in a special format that runs on any Mac, whether or not it has MDS. Files condensed with MDS cannot be automatically marked to show that they've been compressed.

Unlike AutoDoubler, which always decompresses files when you copy them with the Finder, MDS lets you copy documents in compressed form. MDS also incorporates many of DiskDoubler's functions, including on-demand file compression and expansion, and creation of self-extracting archives.

Though AutoDoubler and MDS can squeeze some files to tiny fractions of their original size, you can realistically expect overall savings of around 30 to 40 percent. Decompression speed is generally impressive. In my test suite, MDS was sometimes faster than AutoDoubler at launching compressed applications, but on the whole, neither utility caused a bothersome increase in launch times.

Based on my own and other users' ex-

	WriteNow 3.0	Microsoft Word 5.0	MacWrite II 1.1V3
Application size	212K	852K	750K
Spelling checker size	297K; 135,000 words	255K + 144K extension file; 130,000 words	172K; 100,000 words
Thesaurus size	585K + 76K DA; 1,400,000 words	109K + 46K DA + 35K extension file; 220,000 words	153K; 660,000 words
Requirements	490K RAM; System 4.2; two 800K floppies	2048K RAM; System 6.0.2; hard drive	750K RAM: System 6.0.2 two 800K floppies

perience, AutoDoubler and MDS don't pose a significant threat to file integrity. Still, both vendors recommend backing up before installing. Compatibility with other software (especially system extensions) is more of a problem; you are well advised to pay close attention to the Read Me files that come with AutoDoubler and MDS and to call the vendors for technical support if you experience difficulties.

Automatic file compression is a practical, inexpensive solution for users who are short of disk space. If transparent operation is important to you, AutoDoubler is the better choice. If you want an extra measure of control or need selective compression and expansion capabilities, give More Disk Space a try. - FRANKLIN TESSLER

Ink-Jet Printer

StyleWriter

PROS: Compact; quiet; easy to set up and use; good print quality. CONS: Slow. COMPANY: Apple Computer (408/996-1010), LIST PRICE: \$399.



OU'VE GOT TO HAND IT TO APPLE. After years of acting like price is no object, they finally figured out that for most of us, price is an object-usually the object-in making a buying decision. They also figured out that paying as much for a printer as you did for a Mac Classic isn't real popular here at the low end of town, no matter how good a printer it is.

Enter the StyleWriter, a small ink-jet printer with near-LaserWriter print quality and a modest \$399 price tag. First introduced in March 1991, the StyleWriter satisfied just about everyone who needed nice-looking printed pages, but it was only for the patient.

An ink-jet printer sprays tiny dots of ink at the paper, creating output with 360-dots-per-inch resolution. An ink-jet printer produces pages that look a lot better than those printed from a dot matrix printer. The StyleWriter's output is close enough to laser quality for use on personal

THE STYLEWRITER'S NEW TIMES MacDraw TrueType Courier Pro Multifont Version 7.2 695 1160 973 314 Version 1.0 2055 1186

Tests were performed on a Mac Classic with 2MB of RAM, using System 6.0.7. All times are in seconds. Tests included a 20-page Word 5.0 document in Courier including bold and italic; a MacDraw Pro newspaper graphic containing more than 2200 objects, plus text; a 1-page Word 5.0 document with four TrueType fonts and four point sizes for each font; and a 7-page Word 5.0 document in multiple fonts and styles.

correspondence, business letters, and the like. But because the ink spreads out a bit when it hits the paper, the sharpness of the type depends on the paper quality; use good, absorbent paper if you want to make the best possible impression. And because an ink-jet printer relies on the computer's CPU to do the calculations required to print a page, the faster your computer, the faster the printing.

Even better, Apple has recently introduced a completely rewritten printer driver, StyleWriter driver version 7.2, that improves the StyleWriter's performance by nearly 50 percent in our tests. In practical terms it means that you can print the same documents in close to half the time it would take using the original 1.0 driver software.

All StyleWriters shipped since January 1992 have driver version 7.2 (renumbered when System 7 shipped); if you purchased a StyleWriter before that, you can get the new driver plus a set of 39 TrueType fonts (the standard 35 Laser-Writer fonts plus Chicago, Monaco, New York, and Geneva) for \$18 (for U.S. shipment, call 800/947-5176).

If you're looking for a speed demonspeaking in relative terms only-you'd best consider Hewlett-Packard's Desk-Writer. Even with the new driver, the StyleWriter takes 40 to 50 percent more time to print the same files as the Desk-Writer does. In addition, the DeskWriter has better paper handling, and its ink is less prone to smearing (see "Personal Printers," in this issue, for a more complete printer comparison).

But the DeskWriter is much bigger and bulkier than the tiny 5-by-131/4-inch StyleWriter (with the paper tray folded up). The StyleWriter also matches the design of my Classic as if it were, well,

made by the same company.

The StyleWriter is a snap to put together and plug in, and it comes with all the necessary software, cables, and ink. Installing the ink cartridge was easy-the pieces fit together only one way. If you get stuck, consult Apple's manuals, which are beautifully put together and clearly illustrated. My only quibble is minor: the plastic access door and the wire paper sup-

> ports feel flimsy, and it's easy to imagine pieces breaking after a few years of hard daily use.

If money is tight, you want nicely printed output, and you've got a little time to spare, the Style-Writer is a good personal printer, and Apple's new driver makes it an even better one.-LIZA WEIMAN

Notebook Computer

Outbound Notebook System 2030S

PROS: Fast; large memory and storage capacity; upgradable. CONS: Merely adequate screen; not certified for home use. COMPANY: Outbound Systems (303/786-9200). LIST PRICE: \$4699 (8MB of RAM, 80MB hard drive configuration tested).



F RAW POWER IS WHAT YOU SEEK IN a Macintosh notebook, Outbound's Notebook System 2030S is the handsdown choice. Macworld Lab tests show that the 2030S-based on a 33MHz 68030 processor and with an optional (\$250) 68882 floating-point math coprocessor (also called a floating-point unit, or FPU)-is nearly 1.5 times as fast as the Apple PowerBook 170, which is based on a 25MHz 030 and has a built-in FPU.

Overall, the 2030S performed at a level between a Mac IIfx and a IIci. And the 2030S adds to that speed both greater memory capacity (16MB addressable by applications, compared with 8MB for the 170) and greater storage capacity (120MB hard drives are available for the 2030S, while 80MB is the largest available for the PowerBook 170). (Of the first 16MB of RAM, 2MB is reserved for the system and 14MB is available to applications. Any more RAM installed is available only as a RAM disk.) The Outbound 2030S is simply a small (8.5 by 11 by 2.1 inches), lightweight (6.25 pounds, which is slightly lighter than a PowerBook) desktop Mac.

Based on real Apple ROMs (from old Classics, SEs, and other compact Macs), the Outbound notebook is completely Mac-compatible. We ran it under System 7 with no problem (the 2030S came configured with System 6.0), using typical applications like Aldus PageMaker, Microsoft's Word and Excel, Intuit's Quicken, and Lotus 1-2-3, as well as some specialized programs such as Altsys's Fontographer and DataViz's MacLink-Plus/PC. The only differences were in control panels-you have to use Outbound's control panels for battery and notebook management, rather than the ones that come with System 7.

Perhaps the biggest advantage to the Outbound 2030S is its upgradability. You can add an FPU, more memory (it supports up to 50MB, although anything after the first 16MB is usable only as virtual-disk RAM), and even replace the procontinues



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cessor. And while dealer installation is recommended, the Outbound notebooks are designed to be upgradable—unlike the PowerBooks, which have stricken technicians with terror at the thought of frying the logic board when doing something as basic as adding memory.

A small but significant benefit is the optional (\$89) docking connector, which lets the Outbound appear as a device on a desktop Macintosh, making file transfer easy. Only the low-end Mac PowerBook 100 offers this ability.

A Few Blemishes

AS POWERFUL AS THE OUTBOUND 2030S is, it does have some flaws. Its passive matrix LCD screen is duller than a Power-Book 170's active matrix screen and even duller than a PowerBook 140's passive matrix screen. The 2030S also has more noticeable ghosting on its LCD screen than any of the PowerBooks. An Outbound 2030S with an active matrix screen would come close to being the ultimate Mac notebook.

We found that this more powerful version of the Outbound notebook (see Reviews, December 1991, for an evaluation of the 2030 model) uses up battery power more quickly than its predecessor does, at least when used in a configuration of 8MB of RAM and an 80MB hard drive. The battery lasted only about an hour in a continuous-use test, compared with about 1 hour and 45 minutes on the 2030 model. Fortunately, the Outbound offers good battery-management options, so you can stretch your battery's life when you're on the road.

It might be familiarity, but the builtin TrackBar pointing device seemed less obnoxious than when I tested it on the 2030—I did not resort to using a mouse, as I had before, although I still prefer mice or side-mounted trackballs. The TrackBar felt a bit more responsive, especially in close quarters such as airline seats. I continue to prefer the Outbound's full-size keyboard over the PowerBooks' slightly compressed layout, although the Outbound keyboard can be overly resistant to typing pressure for people who don't bang on their keys. Fortunately, I do. (Strangely, the Outbound felt less comfortable to use when placed on a desk, even with its tilt bar attached, than when used in a plane or on a couch.)

I was surprised to see that the 2030S is not certified with the Federal Communications Commission for use in the home. The 2030S would be a great choice for a home-based business's primary Mac (unless you need to do color work, of course), but its lack of home certification essentially restricts its purchase to traveling businesspeople.

While traveling, I quickly realized that the 2030S has a small but annoying omission: there is no power-off switch. (At airport security, you're supposed to turn on the machine to prove it's not a bomb.) The other significant omission to its controls is the lack of a physical dial or slider for brightness or contrast adjustment. Otherwise, the controls are comparable to a PowerBook's.

It Takes a Licking

THE OUTBOUND TRAVELED WELL IN A week-long trip, surviving airplane takeoffs and landings and bouncing around in a rental car trunk. It also survived our bicycle-commute torture test, in which the notebook was left on, accessing the hard drive every second, while bouncing around in my backpack as I cycled through the streets of San Francisco.

The 2030S also survived being dropped a couple of feet and landing on its corner. (This really was an accident, not an intended test.) The TrackBar flew off and the casing around the display came loose, with a retaining spring popping out. Putting the notebook back together was simple, requiring only a tweezer. But the

case's corner was damaged enough from the impact that I couldn't get the LCD's cover to fit snugly. All the components worked fine after this incident, but it underscores that you can easily damage something that costs half the price of a car simply because of slippery fingers or a momentary distraction.

A Serious Notebook

OUTBOUND'S NOTEbooks are strong performers, worth a look by anyone seeking a Macintosh notebook. Apple continues to offer better displays but has hamstrung its machines by limiting upgradability. Neither set of machines is perfect, and neither is clearly superior overall. For many people, the Outbounds are the right choice. For others, the PowerBooks are. If power is your thing, then the Outbound is quite likely your choice.—GALEN GRUMAN

3-D Imaging Software

Ray Dream Designer 2.02

PROS: Excellent tutorial; allows creation of multiple cross sections; continuous preview; background processing; optional DreamNet extension provides distributed rendering. CONS: Poor text handling; inadequate scrolling and zooming capabilities. COMPANY: Ray Dream (415/960-0768). REQUIRES: Mac SE/30 or Mac II with coprocessor; 5MB of RAM; System 6.0.5 (System 7 for DreamNet); 32-bit QuickDraw. Recommended:



Color monitor. LIST PRICE: \$895.

ANUFACTURERS OF 3-D PROgrams are stumbling over one another in their rush to attract Mac graphic designers and illustrators. What designers really want-and what has yet to be delivered by any programmer-is a 3-D program that is as easy to use as MacDraw, is powerful enough to create stunning highresolution graphics (suitable for use in a future Schwarzenegger movie), and renders as fast as, say, a complex preview in Aldus FreeHand or Adobe Illustrator. While we're probably a few years away from that ideal vision, Ray Dream Designer 2.02 delivers a simple and powerful 3-D tool to the desktop today.

The folks at Ray Dream have divided the program into two separate applications: LightForge, a modeler that enables you to create individual 3-D elements; and SceneBuilder, the program's assembly and lighting application. LightForge is in turn broken down into two modules, one for extruding objects and the other for creating lathed objects. These multiple modules seem confusing initially, but breaking the program into bite-size chunks actually simplifies the learning process.

Let There Be Light

TYPE HANDLING IN LIGHTFORGE IS new (since version 2.0) and, unfortunately, rather poorly implemented and skimpy on features. Although the program supports both PostScript and TrueType fonts, there is no text menu; you make text continues

OUTBOUND PERFORMANCE

Computer	Overall	Processor	Peripheral	
Mac IIfx	96	41	55	
Outbound 2030S	132	60	72	
Mac IIci	159	82	77	
PowerBook 170	195	82	113	
Outbound 2030	211	111	100	
Mac Ilex	253	148	105	
PowerBook 140	572	439	133	
PowerBook 100	676	527	149	

We compared the Outbound Notebook Systems' times for certain tasks with other notebooks' times. Tasks were divided into processor-intensive (find/change in Word 4.0, open and recalc in Excel 3.0) and peripheral-intensive (open and scroll in Word and Excel). These operations do not require CPU time but do rely heavily on screen-refresh rates and drive access times. Times are in seconds.

It's About Speed. It's About Resolution.



Xante's Accel-a-Writer 8000

Finally. A PostScript® compatible printer that delivers high resolution with speed and flexibility like you've never seen. Quality

It's about Speed. You'll get 8 MB RAM Guarantee (expandable to 16 MB), an AMD 29000 RISC processor, Xante's Advanced Memory Management and 8 page-per-minute print speeds to break through the bottlenecks typically found on PostScript printers. It's about Resolution. There is no substitute for true 600 x 600 dpi. The Accel-a-Writer 8000 provides highquality, consistent output without the side effects of artificial smoothing. Your scanned and other grav scale images will dramatically improve with Xante's

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> 8000 to any other printer and we think you'll agree.

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Burning the Midnight Oil This Ray Dream Designer image took 7 hours to render on a Mac IIcx; but using DreamNet, seven Quadras linked by Ethernet could render it in about 45 minutes.

changes by clicking on the text icon in the toolbox, which brings up a dialog box. LightForge does not support individual letter kerning, condensing and expanding letterforms, or superscripts and subscripts (or baseline shifts); and there are only three levels of tracking. Designers interested in using the program to create 3-D logos will need a workaround-for instance, creating a two-dimensional logo in a draw program, using Ares FontMonger to save the logo as a font (since Ray Dream Designer doesn't recognize the type's counters, the "holes" in the letter O or B, for example), then typing the logo in Designer. Another possible and equally clumsy option is to create individual letters as objects in LightForge and assemble the logo in SceneBuilder. Ray Dream Designer needs to beef up its text-handling features or provide seamless links to and from the major 2-D draw programs.

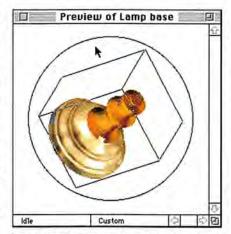
Font fumbling notwithstanding, LightForge 2.02 boasts several significant enhancements over earlier versions. The first is the ability to create multiple cross sections. In version 1.1 if you wanted to create an object with multiple cross sections-such as a doorknob with a round top, faceted sides, and a square axle-you needed to create those sections separately and fit them together in SceneBuilder. Designer 2.02 eliminates this tedious process; you can now create the doorknob as a single object in LightForge. The width and position of the different sections of your drawing can be adjusted easily using color-coded, word processor-like tabs in the Elevation window.

Once you've drawn a cross section and the elevation along which it is extruded, LightForge treats you to a fullcolor preview of your design, including textures and lighting effects. Depending on the horsepower of your Mac and the complexity of the drawing, this minirendering takes anywhere from a few seconds to a minute to display. When you make changes in LightForge's Cross Section or Elevation window, the preview automatically rerenders. If you switch programs under MultiFinder or System 7, the preview continues to render in the background, only marginally slowing the performance of the program in which you are working.

Once you have a preview (or even while the preview is rendering), you

can rotate it in three-dimensional space using the virtual trackball. The trackball is simply a circle around the preview image; when you click on the circle, a 3-D bounding box appears around the object. You can then spin the image around to face any direction you want. Operating the trackball is highly intuitive; getting the hang of it takes less than a minute. One minor omission: it would be helpful (and consistent with the Mac interface) to be able to constrain the movements of the image by holding down the shift key.

Adding texture to a model is a simple matter, thanks to a wide selection of textures and a texture editor with a helpful preview feature. It is also possible to create objects with multiple textures. For instance, you could simulate a soda bottle by applying a green translucent texture to the bottle shape and then wrapping a four-color label—created in a draw pro-



Lamp Base in Space Even while it is rendered, this lamp base is being rotated in space, using the virtual trackball. Clicking at any point on the circle brings up a three-dimensional bounding box that enables you to spin the object in any direction.

gram or a paint program and saved as a PICT or EPS file—around it.

Make a Scene

ONCE YOU HAVE CREATED THE ELEments in LightForge, you're ready to assemble the finished product in Scene-Builder. First you load the elements into the Objects window, then you arrange, resize, and rotate them in the Perspective window. Actually, you don't manipulate the objects directly, and this takes a little getting used to. You work with an outline "shadow" that the object casts onto one of the two walls or the floor of the scene. To simplify complex drawings, Designer includes a Hierarchy window that functions as an advanced grouping tool.

SceneBuilder has plenty of nice touches that make it a pleasure to use. Under System 7, double-clicking on an item in the Object window automatically launches that element in LightForge. An excellent alignment feature with a dynamic preview (much like FreeHand's, but in three dimensions) helps you locate separate elements precisely in relation to one another. A Point At command hastens the process of aiming lights; and the Light Source dialog box provides good previews of the lighting color, angle, falloff, and shadows. If you like numerical precision, a dialog box lets you enter precise figures for position, size, and orientation (yaw, pitch, and roll) of your objects.

My only major complaint with Scene-Builder relates to moving around a crowded Perspective window. The program has very limited zooming capabilities; it's not easy to get a close look at your work. It would be great to have a magnifying-glass tool for zooming to a selected area. Also tiresome is the need to use the scroll bars to move around—a grabber hand would be a nifty addition.

Once you've arranged and lit the scene, you can move the camera around and adjust its zoom (from 5mm to 200mm), then take a low-resolution preview snapshot to show positioning. If you like the arrangement, you can then render in draft mode to show textures and lighting. Final rendering offers a single option—ray tracing—but the quality seems to be equivalent to photo-realistic rendering in other programs.

Rendering times are comparable to those of Alias Sketch and StrataVision 3D, but if you're on a network, you can cut rendering times dramatically with Ray Dream's DreamNet (sold separately as a System extension). DreamNet enables any Mac running System 7 and connected to your Mac on an AppleTalk or Ethernet network to help render the image, even continues

MacroMind-Paracomp and Authorware Merge to Form Macromedia.

New multimedia leader offers wide range of products on multiple platforms.

By Dan Burrier

San Francisco, CA - MacroMind-Paracomp and Authorware announced last week that the two companies have agreed to merge, creating the leading independent supplier of multimedia software for multiple platforms.

The new company will be named Macromedia.

The merger pools MacroMind-Paracomp's mation, 3-D and multimedia authoring tools with 's multi-platform authoring tools for earning, creating one of the widest onal and professional multimedia date in the industry.

Apr

So what else is new?



3D MODELING

MacroModel The first Macintosh 3D modeling program that combines the CAD-accuracy of

spline-based modeling with familiar 2D drawing tools. Start with 2D objects, and extrude, lathe, sweep or skin them into 3D objects. Provides real-time visualization from any angle for instant, intuitive feedback. Supports

System 7 and 32-bit color. Imports and exports polygon-based objects for compatibility with other modelers like *Swivel 3D*. Supports DXF for CAD compatibility; PICT for DTP. Add photorealistic rendering and 3D animation with *MacroMind Three-D*. Render still images with Pixar MacRenderMan. Export images into *Authorware Professional* applications or *MacroMind Director* productions. *Version 1.0. Suggested list*, \$1495.



3D MODELING

ModelShop II™ \$\$\$\$



Create and manipu spatial models with interactive designatool. Quickly create

surface perspective with CAD Allows real-time walk-through

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3D MODELING

Swivel 3D[™] Professional 2.0

Create, rotate, scale and animate 3D models with this complete modeling and design en-



vironment. Hierarchically link object parts. Export 3D views and animation sequences. Swivel 3D models are compatible with MacroMind Three-D and Director for advanced animation and rendering of 3D models. Supports 24-bit color, full screen display, Pixar MacRenderMan output,

AutoCAD DXF output, Adobe Illustrator EPS, PICT and PICS files. Version 2.0. Suggested list, \$695.



AUTHORING

MacroMind Director® 3.1 NEW VERSION \$\pm\$\pm\$\pm\$\pm\$\pm\$\pm\$\pm\$\pm\$



The leading animation and authoring tool for high-impact multimedia productions.

Create, combine and synchronize graphics, text and animations with audio and video. Add full interactivity with buttons and scripts. Author, edit, playback, export and import Quick-Time movies. Add interactivity to QuickTime movies with enhanced Lingo scripting. New expanded Help, increased Score functionality, and higher performance. Incorporate 3D models from Swivel 3D, animation from MacroMind Three-D, sounds from MacRecorder as well as all standard Mac file formats. Includes Macintosh Player for license-free production distribution, and Accelerator, a \$195 value, for smoother animation playback. Version 3.1. Suggested list, \$1195.

Director Players Convert fully interactive MacroMind Director productions created on the Macintosh* for playback under Microsoft* Windows or Silicon Graphics IRIS workstations with complete interactive control of CD-Audio and digitized sound. Includes a license-free distribution policy for projectors. Windows Player Version 1.2, \$995. MacroMind Player for Silicon Graphics IRIS Workstations, Version 1.0, \$995.



SOUND

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digitizing hardware and software), \$349. Upgrade to SoundEdit Profor just \$75.



PRESENTATIONS

Action! Macintosh 1.0

NEW!

Designed for business users

rather than multimedia professionals, this easy-to-use tool helps you create dynamic presentations and demos complete with in-scene

animation, motion, sound, text and graphics. Features 120 professional presentation templates, scene interactivity via outtons, 39 preset scene transitions, and a Scene Sorter. Supports 32-bit color and System 7. Control timing and flow with a simple timeline, instant links and buttons, and a VCR-like control panel. The best tool for presenting from your Mac. Also available for Windows. Action! Mac Version 1.0. Suggested list, \$495. Special introductory offer, \$295.

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AUTHORING

Authorware® Professional® for Macintosh

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non-technical users to build applications without scripting. Eleven design icons provide full authoring functionality and a powerful development platform. Full range of multimedia tools help you incorporate text, graphics, sound, animation and video in applications. Imports 3D models from Swivel 3D, animation from MacroMind Director or Three-D, sounds from MacRecorder, as well as all standard Models to the formation of the form

LIFE FORMS

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Industry at Work, ClipMedia 2

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2D ANIMATION

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BEHIND THE SCENES AT MACROMEDIA



Young Harvill—artist, holographer virtual reality inventor, and Director of 3D Product Development—talks about Macromedia's newest 3D modeling package and how it lives up to the design team's original ideals.

What did you set out to do in designing MacroModel?

We wanted to create a modeling environment that was as easy to use as Swivel 3D, as fast as Swivel 3D, but very accurate and capable of doing anything from concept design through CAD.

We also wanted to build a core technology that would last five to ten years, that would be a key part of the technical equity of the company.

How is MacroModel more compatible with CAD than other modelers?

The accuracy is very important. So are CAD functions like 2D and 3D snapping, being able to snap to exact geometry.

That's a main difference between Swivel 3D and MacroModel. With Swivel 3D, pretty much all the modeling is approximate—it's great for presenting concepts—but with MacroModel you can actually start with a plan or drawing and by typing in numbers and snapping to points, come up with an exact representation of your object.

That you could then use to pass on to manufacturing?

Yeah, you could use it to develop a comprehensive set of drawings for engineering or to go out through DXF to a CAD/CAM environment.

What do you mean by 2D and 3D snapping?

That MacroModel is very similar to [Adobe] Illustrator and other illustration programs, in that you're always drawing on a 2D surface that's called the working plane. Most often that plane is flat on the screen, but you can place the plane anywhere in the world, say at an angle or on top of a building, and extrude a water tower, or whatever you like, in that plane.

The plan was to give people who are familiar with 2D CAD and illustration programs all of the tools they're used to using on 2D surfaces, but once they start extruding or sweeping they can jump off into the third dimension.

I think we've been pretty successful at it.

Now, for rendering, you'd really want to use Three-D or MacRenderMan, right?

That's true. MacroModel's rendering is what I'd call a draft-togood quality rendering. For the real high-quality photorealistic rendering you'd want to go to [MacroMind] Three-D for animated rendering, or to [Pixar] MacRenderMan for stilllife rendering.

You hear a lot about modeling speed. How fast is MacroModel?

Well, one of the main things we tried to achieve was to have smooth-shaded hidden-surface images of objects be updated in a reasonable time as you model them. Basically we had to write a highly optimized renderer.

Just to give you an idea, right now we're essentially comparable with the speed of Swivel 3D, so we're rendering about 1,000 polygons per second on a IIci. And on a Quadra, just in terms of the interactivity and responsiveness of the edit, we're

approaching a Silicon Graphics Personal IRIS kind of speed.

So Swivel 3D and MacroModel are both modelers with roughly the same speed . . .

Yeah, that's right. But they're pretty much different tasks—going from concept modeling [Swivel 3D] to having a real numerical model with curved surfaces [MacroModel] to prepare for CAD or working drawings, or to use in animations.

What we're seeing is that people who want to graduate from display modeling to models that have real dimensions—if they're trying to model real products, or extremely large worlds, if they need curved surfaces—then they should move up to MacroModel.

And MacroModel does splinebased modeling rather than polygons. What's the advantage?

Polygons are fine to model flat surfaces. But if you have objects with curved surfaces, the advantage to representing them with curved surfaces—splines—is that you can render at various levels depending on how much time you have or how much update speed you want.

In the long run, representing

curves as polygons is just an approximation. It's not accurate.

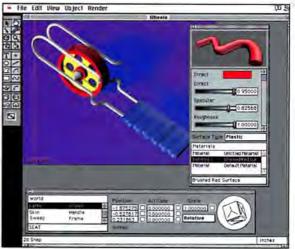
What do you love the most about MacroModel?

The thing I enjoy as a user is that when you create an object, Macro-Model remembers how you created it. So if you make a Bezier line or put out a letter that has an Illustrator-like outline and then extrude it, Macro-Model doesn't forget that you extruded it from this profile.

So you can go back and edit the original object and the extrusion changes too?

That's right. That was a goal we had at the beginning—and we kept it for all the different object types—that you can go back and edit the defining geometry and get updates in a reasonable time.

Other things I like are all the neat user interface things like the track ball interface, the browsers, and the numerical updating. I think it worked out really well. I think people are going to be jazzed.



Does anyone else do all this?

They're beginning to. But this is the sort of stuff you have to do at the beginning—you can't go back and add it on. So I think a lot of our competitors, once they see this, are going to have to go back and rewrite everything.

Macromedia User's Conference San Francisco Oct 30 - Nov 1, 1992

Don't miss this opportunity to see the latest new technology, network with the pros, and get insider info on making a profit in expanding markets. Call (415) 442-0200 for details. while it works on other tasks. DreamNet works as advertised: in my tests, using one assistant Mac cut rendering time in half, and using eight reduced a 2-hour rendering event to 15 minutes.

Other benefits: LightForge and SceneBuilder open quickly from the Finder and don't burden you with outrageous memory requirements; each module needs 4MB of RAM to run. Finally, Designer's tutorial is one of the best in the business, thoroughly preparing you to create images on your own.

Ray Dream Designer 2.02 comes close to being an ideal program for the designer making the leap from two dimensions to three, and experienced 3-D aficionados will find it a welcome addition to their arsenal. If LightForge's type handling and SceneBuilder's viewing capabilities improve, this program could set the standard for beginning and intermediate 3-D illustration on the Mac.—IIM SCHMAL

Accounting Software

Components 1.0

PROS: Flexible; excellent report writer; relatively easy to learn and use; good interface. CONS: Slow previewing reports; documentation needs work; module integration is weak; support is expensive. COMPANY: Satori Software (206/443-0765). REQUIRES: Mac SE; ZMB of RAM; hard drive; System 6.0. LIST PRICE: 5795 per module.



VERY COMPANY HAS DIFFERENT accounting needs that require different solutions. Most accounting products address this problem by adding lots of features that match specific requirements. Satori Software's Components attacks the problem by providing a simple, flexible accounting architecture that users can modify to fit many different situations.

Components currently has four modules—General Ledger, Accounts Payable, Accounts Receivable, and Job Cost/Time Billing (for more on Job Cost/Time Billing 1.05, see Reviews, August 1992). Each module provides the functionality you would expect. For instance, General Ledger has a chart of accounts, a general journal, budgeting, and standard financial reports and audit trails. Accounts Payable includes detailed vendor information, check-writing capabilities, multiple bank accounts, and control over payment selections. Accounts Receivable includes customer management and history; inventory capabilities; multiple invoice formats; receivables aging; and multiple tax rates, payment terms, and finance charges. Job

Cost incorporates job cost and accounts receivable with an excellent report writer. Accounts payables (A/P), accounts receivables (A/R), and job cost information can be incorporated in the general ledger (G/L) module.

All the modules share certain features that greatly expand their flexibility. First, within each module you can create up to 252 user-defined journals, and any journal can be marked as a recurring journal for recording repetitive transactions. G/L journals are either manual (traditionally called double-entry) or automatic (often called one-write). A/P journals are classified as either purchases, checks, one-write checks (immediate cash purchases), credit memos, or bank entries. A/R journals are either invoices, cash receipts, credit memos, or miscellaneous.

By defining your journals, you can separate your financial activity into categories that reflect your business needs. For instance, if your accounting needs are simple, you can set up G/L journals for recording sales and purchases, and recurring journals for payroll and depreciation. The sales journals could be further divided into sales by product line, purchases by purchase type, depreciation by depreciation method or asset type, and payroll by payment frequency.

The second feature that all Components modules have in common is a report writer for creating what Satori calls Views. You define each View using a simple tool palette. In addition to adding simple graphic elements from the tool palette, you can also add headers and footers, user-defined calculations, fences, filters, and graphs to each View. A fence is a collection of data fields from a single file; a filter is a set of options for record selection and sort order. Most Components reports and special output forms (checks, W-2 forms, and so on) are Views.

Finally, each Components module has robust import and export capabilities. You can export any report in tab-delimited format. More important, you can import data into most Components files. This makes it easy to migrate to Components from another accounting program (assuming you can export data from that program). In addition, you can integrate spreadsheet data with Components. For instance, if your company uses a specialized billing program, you can load sales data from that program into the G/L or A/R module.

In addition to common features, each Components module includes a variety of options. For example, you can select 3-, 4-, or 5-digit G/L account numbers, with optional profit centers and departments. You can specify voucher and invoice numbering schemes, indicating which portions

of each number are static and which should change with each new transaction. You can control the layout of the invoice format by removing and resizing fields in each A/R invoice journal. This lets you set up a variety of invoice formats, both service-based and inventory-based, to match specific sales categories. Finally, you can customize each module's Help system to include special topics unique to your company.

Each Components module has a consistent, easy-to-understand interface. Each program's menu bar is identical, with Accounts, Journals, Action, View, and Design menus. You set up static information about accounts, clients, vendors, and so on using the Accounts menu. You enter data with the Journals menu, post and close journals and periods with the Action menu, and view and design reports with the View and Design menus. The commands on the Action, View, and Design menus are almost identical in all modules. Various window controls for viewing multiple pages of account information, moving through groups of records, and so on, are consistent, readily identifiable, and straightforward.

Despite all the praise, Components is not without flaws and bugs. First of all, each module has its own specialized View implementation, although most View commands are the same for all of the programs in the series. The three modules clearly do not share the same View code (G/L is the weakest of the three). You can include fields in headers and footers in A/P and A/R views, but you receive a warning (and often you crash) when you try to do the same in G/L. Colors and fill patterns don't always work properly in General Ledger, but I had no problem with them in the other modules.

Second, the integration of the modules is weak. To integrate A/R with G/L, for instance, you're supposed to define the various G/L accounts used in A/R. Components doesn't check many of the continues



Accounts Receivable The Item Setup window is indicative of the flexibility of the series. In addition to typical item options, you can set up a pricing matrix based on different units of measure. You can also set up a series of commission percentages for each item.

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Circle 59 on reader service card



Phoenix Page Color is a trademark of Phoenix Technologies, Ltd. account numbers to see if they're valid. Consequently, you can create and transfer data to the G/L module that cannot be successfully integrated because of invalid account numbers. The series needs more robust and tighter integration.

In addition, the documentation needs work, support is expensive (\$2 per minute with a \$25 minimum, or \$495 per year with a toll-free telephone number), and creating view calculations and modifying invoice formats is awkward. Components needs refinement, but it sets a new design standard for Macintosh accounting.

-STEVE MANN

High-Capacity Floppy Disk Drives

Floptica

PROS: Extensive documentation; external termination; compact Mac footprint; auto-eject; fast performance; extendable warranty; toll-free technical support; bundled software. CONS: Allows invalid SCSI ID addresses. COMPANY: Procom Technology (714/852-1000), REQUIRES: Mac Plus; System 6.0. LIST PRICE: \$585; formatted disk \$45.



Floptical 5020FL

PROS: Portable; optional battery; powerful formatting software. CONS: Skimpy documentation; allows invalid SCSI ID addresses; DB-25 SCSI connectors; internal termination; complex software; no auto-eject; slow performance; compatibility problems; nonextendable warranty; toll-call technical support; black case. COMPANY: Liberty Systems (408/983-1127). REQUIRES: Mac Plus; System 6.0. LIST PRICE: S699; internal battery pack \$199; formatted disk \$29.



Infinity Floptical 21MB

PROS: Extensive documentation; switchable termination; auto-eject; extendable warranty; toll-free technical support; DOS support. CONS: Allows invalid SCSI ID addresses; odd size; doesn't reject 800K floppy disks; bundled software not System 7–compatible. COMPANY: Peripheral Land Inc. (510/657-2211). REQUIRES: Mac Plus; System 6.0. Recommended: System 6.0.5. LIST PRICE: External drive \$599; Quadra 900/950 Internal drive \$549; unformatted disk \$49.



HEN THE MAC PREMIERED IN 1984, it used 400K floppy drives. These were soon phased out in favor of 800K drives, which were in turn eclipsed

by 1.4K SuperDrives included in all new Macs since the IIx. What's next? If Insite Peripherals (the OEM for the three reviewed drives) has its way, *flopticals* will soon be the low-end medium of choice.

The floptical represents the marriage of the floppy with optical data-storage technology. Floptical drives save data on magnetically coated, mylar-based disks that have been stamped with grooves that permit an optical mechanism to position read-write heads with great accuracy, resulting in very high data-storage capacities. Floptical drives are compatible with today's standard 1.4MB, 3.5-inch Mac disks, and can store approximately 20MB on special media. With such impressive specifications, it's no wonder that Liberty Systems, Peripheral Land Inc. (PLI), and Procom Technology have all recently introduced drives that are based on the Insite flootical mechanism.

All three drives attach to the Mac via the SCSI port, and as such suffer from the problems typically associated with setting appropriate SCSI ID addresses and termination. While Liberty provides an extensive manual for its disk-management software, the floptical has only a single sheet lacking illustrations. In contrast, both PLI and Procom provide detailed manuals with specifics about installing the floptical and using the related software.

All three drives deserve criticism for not restricting you to the valid SCSI ID addresses of 1 through 6. The Liberty Floptical 5020FL drive compounds this problem with its nonstandard DB-25 SCSI connectors and internal termination. The Procom Floptica's external termination is better, but not as nice as the switchable termination found on the PLI Infinity Floptical.

The Liberty drive is about the size of a Tom Clancy paperback, yet the drive's black metal case has separate power and LEDs up front, includes a power supply, and has room for an optional internal battery. The Procom drive comes in a platinum-color plastic case with a classic Macintosh footprint. The PLI drive is housed in a midsize, platinum-color metal case, uses an external power supply, and—like the Procom drive—sports a single access LED on the front.

Each drive comes with a single, preformatted floptical disk with 19.4MB of free space. Additional unformatted flopticals are available for \$29 to \$49—considerably more expensive than floppies on a price-per-megabyte basis, but in the same range as Bernoulli and SyQuest cartridges. Formatting blank flopticals takes roughly 23 minutes on each of the three drives. Of the three formatting programs, the Liberty drive's HDT Primer (a "light"

version of FWB's extensive Hard Disk ToolKit) offers the most features, but its interface can be somewhat intimidating to nontechies. By comparison, the software that comes with the PLI and Procom drives is simple and friendly.

In addition to formatting software, all three drives come with their own system extensions that allow the Finder to deal with removable media. There's no need to have a floptical inserted in a drive at startup; you simply pop in a disk when necessary, and it appears on the desktop just like a floppy. Well, not just like a floppy. Although all three drives take only 4 seconds to mount a floppy, they require roughly 17 seconds to mount a floptical, during which time the Mac can't do anything else. It might not sound like a lot of time to wait, but if you're searching for a file and can't remember where it's located, heaven help you.

To remove a floptical, drag its icon to the Trash. With the PLI and Procom drives, the Mac ejects the disk automatically, the same way it spits out floppics. But Liberty uses the noneject model of the Insite mechanism, so after the drive stops spinning, you must press a manual-eject button on the front of the unit. Incidentally, all three drives have manual-eject buttons, and there's nothing to prevent you from pressing the button while a disk is being accessed. Since doing so can cause irreparable harm to the media, PLI soon plans to offer its drives without a manual-eject button.

I tested the performance of the flontical drives by using the Finder to copy 1.4MB of files from my Mac IIci's internal hard drive to a floptical disk after starting up from the internal drive. The Liberty drive took 90 seconds, the PLI drive required 63 seconds, and the Procom drive completed the task in only 42 seconds. To put these results into perspective, consider that copying the same files to another folder on the hard drive took 16 seconds, whereas copying to the IIci's internal floppy was considerably slower at 147 seconds. And in case you were wondering, copying to a high-density floppy disk in a floptical drive was slower still. Given that the Insite mechanism is based on floppy-disk technology, the sluggish performance was to be expected, but I was surprised to find that the Procom drive was fully two times as fast as the Liberty drive. Chalk it up to superior driver software.

One of the biggest selling points of floptical drives is backward compatibility with I.4MB floppy disks, achieved by the use of separate read-write heads: one for conventional disks, and another for flopcontinues ticals. Now owners of older Macs can add SuperDrive capability without the need to upgrade their hardware. Both the PLI and Procom drives mount, read to, and write from high-density Mac disks without incident; but the Liberty drive has difficulty getting such disks to mount properly. After repeated reformatting attempts, I finally aborted by pressing the manual-eject button.

Floptical drives aren't compatible at all with 800K disks, but I was curious to see what would happen if I inadvertently inserted a double-density (800K) floppy. The Liberty drive exhibited the same problem it had with high-density disks; the Procom drive didn't bother ejecting the disk after failing to mount it; and curiously enough, the PLI drive offered to format the disk after failing to identify it as a Mac volume. Accepting the offer results in a bastard 720K Mac disk that is unreadable in standard Mac floppy drives. In my opinion, a foolproof floptical drive should identify incompatible media and eject same after displaying an alert box explaining the problem. (By the way, on flopticals the write-protect hole is placed on a different corner than on an 800K or 1.4MB disk; so there's no danger of overwriting a floptical disk mistakenly inserted in a standard Mac drive.

All three vendors back their products with a one-year warranty covering parts and labor, and both PLI and Procom offer an extension for \$59 per year. Furthermore, with PLI and Procom, technical support is a toll-free call away; Liberty operates a technical-support hot line, but you pay for the call.

The current crop of floptical drives has some attractive attributes (high capacity and backward compatibility), as well as a few glitches to be expected in an emerging technology (mostly related to the removable nature of the media). As more vendors enter the market, the competition should cause drive and media prices to fall and performance and reliability to rise.

Of the floptical drives tested, the Procom Floptica gets my recommendation. It's the fastest, least expensive, and most trouble-free of the trio. Furthermore, it is bundled with Microcom's 911 Utilities and Virex. Given its high list price, slow performance, and operation problems, I can't recommend the Liberty Floptical 5020FL, even though its small size and battery option may appeal to PowerBook users looking for a portable drive. A better choice is the PLI Infinity Floptical, It's slightly larger and comes with Turbo-Optimizer and TurboCache, although the last one is not compatible with System 7. Also included is DOS Transfer, which allows you to read and write standard as well as floptical MS-DOS disks. You would expect to be able to do this with Apple File Exchange, but Apple's utility doesn't yet support removable media.

-OWEN W. LINZMAYER

Tabloid-Size Laser Printers

LZR 1560 and RealTech Laser 400

PROS: Fast; 400-dpl resolution. CONS: No universal way to access both paper trays. COMPANY: LZR 1560, Dataproducts (800/334-3174); RealTech Laser 400, Hardware That Fits (800/364-9335). LIST PRICE: LZR 1560 \$6495; RealTech Laser 400 \$4495.



HE DATAPRODUCTS LZR 1560 laser printer comes with letter-size and tabloid-size (11-by-17-inch) paper trays. The printer is based on a 16MHz Weitek 8200 RISC processor and prints at 400-dots-per-inch resolution. The LZR 1560's base configuration includes 4MB of RAM, expandable to 16MB; 35 resident PostScript fonts; a SCSI hard drive port for additional fonts; and Apple-Talk, RS-232 serial, and Centronics parallel interfaces. The printer senses the active port and switches to it automatically, making the LZR 1560 a good choice for mixed networks. The printer uses Adobe's PostScript Level 2 page-description language and emulates the Hewlett-Packard Laserlet II.

Dataproducts markets the LZR 1560 through computer stores and other dealer channels. Hardware That Fits, a mail-order vendor, also sells the LZR 1560, relabeled as the RealTech Laser 400. Except for the label, the RealTech Laser 400

is identical to the LZR 1560, so all of the following comments apply to both versions of the printer.

The printer's speed is excellent, thanks to the RISC processor and the Fuji Xerox print engine, which is rated at 15 pages per minute. The printer blazed through *Macworld*'s standard printer test suite, turning in faster times than the Apple LaserWriter IIg and Dataproducts' own LZR 960, which is a speed demon in its own right. I also printed many tabloid-size newsletter pages using PageMaker 4.2; the pages contained a mix of graphics, scanned photos, and text in a variety of fonts and font sizes.

Print quality was good. Output from the printer was noticeably better than pages from two 300-dpi printers: the Apple LaserWriter IINT and the Dataproducts LZR 960. The LZR 1560's 400dpi resolution resulted in crisper letters, especially at small font sizes. Halftones of scanned photographs also benefited from the increased resolution, looking much better than with the 300-dpi printers. Toner coverage was good, with rich, deep, and even blacks.

Although the LZR 1560 has two paper trays, Apple's standard LaserWriter printer driver can't take advantage of the second, lower tray. This driver also can't take advantage of new features in Post-Script Level 2, such as form caching and increased speed. While an improved LaserWriter driver is expected later this fall, until then you're limited to manually switching trays. Aldus's PageMaker and FreeHand use their own printer-description files so you can control which tray the printer uses in these programs. Manual feed is through the back of the printer.

Technical support from Hardware That Fits was good. I was able to get through immediately to a technician on each of the three tech-support calls I

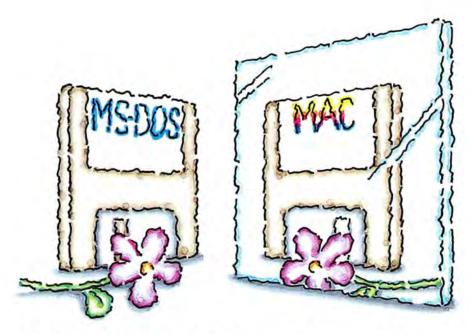
> made, and the advice I received was accurate and courteously given. Dataproducts prefers that users obtain support first from a dealer, but when I called Dataproducts direct, I immediately got through to a technician, who handled my questions with aplomb.

The LZR 1560/Real-Tech Laser 400 is a fine printer, capable of producing great-looking tabloid-size and letter-size pages quickly. From either vendor, you get a lot of printer for your money.—TOM NEGRINO

PERSONAL PRINTER PERFORMANCE

LKIO	MIAINCE			
Test	Dataproducts LZR 1560	Dataproducts LZR 960	Apple LaserWriter IIg	
Courier	132	163	169	
FreeHand	422	465	700	
MacDraw Pro	104	141	118	
Multiple Fonts	135	160	155	
Newsletter	93	108	173	

The LZR 1560's performance is compared with that of the LZR 960 and Apple's LaserWriter IIg using five printing tests: Courier (a 20-page Word 5.0 document in Courier, including bold and italic); FreeHand (an Aldus FreeHand illustration); MacDraw Pro (a newspaper graphic containing over 2200 objects, plus text); Fonts (a 7-page Word 5.0 document in several fonts and styles); and Newsletter (a 4-page Aldus Page-Maker document containing several fonts, 3 gray-scale scanned images, and a MacPaint image). Tests were performed using a Mac IIci with 8MB of RAM and a cache card. Times are in seconds.



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External-Monitor Support for PowerBooks

Notebook Display Adapter

PROS: Fast; no external cables or boxes. CONS: Understaffed technical support; various bugs and glitches; incompatible with some software, some monitors, virtual memory, RAM disk, and all third-party memory upgrades. COMPANY: Envisio (612/339-1008). REQUIRES: PowerBook; specific monitor models (call for details). LIST PRICE: PowerBook 140/170 with no additional RAM \$795, with 2MB to 4MB \$1195 to \$1595; PowerBook 100 with 1MB of RAM \$695, with 2MB \$895.



HE ENVISIO NOTEBOOK DISPLAY Adapter is a tiny circuit board that a dealer installs in the PowerBook. It replaces the hinge of the laptop with a standard connector into which you can plug an external monitor. The adapter is designed to overcome two drawbacks of the PowerBook: its inability to use external monitors and its inability to display color. This arrangement could be a godsend for travelers who have to make presentations-especially since the board is also supposed to work with several brands of LCD projection pads, which enable you to use an overhead projector to display the Macintosh's screen to a whole roomful of people.

Rival external-monitor products use the PowerBook's SCSI port, which, according to Envisio, slows down the display. The 2-ounce Envisio board is completely enclosed inside the Mac. The advantage of this scheme is speed; as you watch the external monitor, objects and windows appear almost as fast as they would on a non-laptop.

First Impressions

MY FIRST ENVISIO BOARD WENT UP in thick, smelly, gray smoke that poured out of the keyboard. When I tried to turn the laptop on again later, it was dead.

Envisio's technical-support staff recognized the symptom immediately. Up to 2000 of the first boards, I was told, had an exposed piece of circuitry. In rare Power-Books, they said, this protruding metal caused a short circuit with the underside of the keyboard. The company assured me that the potential problem has long since been fixed, and that if you return a smoked-out PowerBook to Envisio, it will be repaired free. Envisio restored mine, and installed a new Notebook Display Adapter board.

As the Mac starts up, you're supposed to press the option key until the Envisio control panel appears, where you specify the external monitor's size. But my second Envisio board had trouble with every monitor I tested (the Apple 12-, 13-, 15-, 16-, and 21-inch displays, and the Radius Pivot). On some monitors, applications behaved as though they were on a black-and-white Mac. On others, several inches of usable display area were blanked out, producing (for example) a Mac Classic-size image even when attached to a full-page monitor.

When I tried to get help from the company, I was repeatedly told there was only one technician who could answer my questions, and he was frequently either "on another line" or "away from his desk." When I finally did reach him, he was as mystified about the board as I was. "I don't know what to tell you," he said finally. I later learned that there are, in fact, two technicians—but both of them are hard to reach, and they gave me contradictory advice.

Third Time's a Charm

THE COMPANY FINALLY SENT ME ONE of its own PowerBooks, with a brand-new Envisio board and version 1.2.2 of the software in it. It worked beautifully: all five Apple monitors I tested displayed smooth, quick graphics. (The Pivot only worked in portrait orientation.) I could easily understand why a trainer or presenter might savor a PowerBook thus equipped.

But even Envisio's own handpicked board held rude surprises, not one of which is mentioned in the shamefully incomplete manual. You can't use virtual memory. If you try to use the Power-Book's RAM disk while a monitor is attached, the PowerBook gets permanent lockjaw and won't start or restart until you remove the battery. The protruding connector prevents you from opening the PowerBook screen as far as you could otherwise. File icons and the Apple menu icon aren't in color, and neither the Labels menu nor the Apple Color Picker works. Wacky things happen when you open a color graphics program-scroll bars and window elements turn violent shades of purple and brown, and the colors in your artwork are randomly scrambled. The number of colors that can appear on screen decreases with the monitor size, ranging from 256 colors on a 12inch screen to only black and white on 19inch or larger screens. (The PowerBook 100 adapter isn't designed to show color on any monitor.)

The software isn't smart enough to know when the PowerBook is no longer connected to an external monitor; if you try to start up after disconnecting the monitor, the Mac hangs at the Welcome to Macintosh screen until you repeat the option-key restart business. The software is also incompatible with several popular programs, including Now Startup Manager 3.0, SAM Intercept, and, incredibly, Apple's System 7 Tune-Up 1.1.1, which protects you from the famous disappearing-files bug.

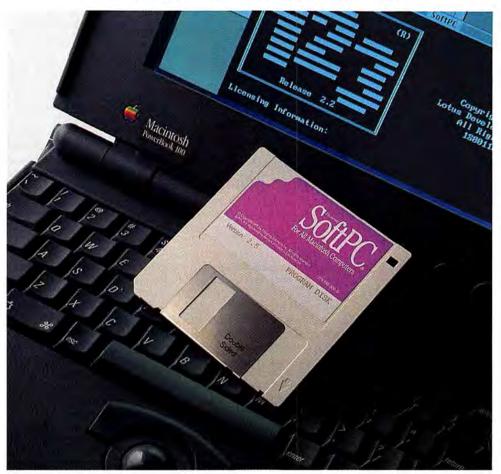
Because the board uses the Power-Book's memory-expansion slot, you can't upgrade your PowerBook's memory (or use any RAM upgrade you've already bought). The only way to get more memory is to purchase an Envisio board that has more RAM installed on it; the company sells its board with 2MB, 4MB, or 6MB of RAM. If you later decide you want more, the company will swap you a more heavily RAM-laden board-removed, incidentally, from somebody else's machine—for the difference in list price. (According to the company, by the time you read this, the list price for the adapters will be lower.)

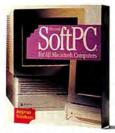
During the course of this review, Envisio produced a stream of software and hardware revisions. First, a piece of Mylar was added to the board to prevent the short-circuiting risk. Then the company replaced the flimsy wire connector, which didn't attach firmly to the monitor, with a built-in connector. Envisio upgraded the software from version 1.2.2 to 1.2.8—and then, when 1.2.8 was found to have problems, withdrew it and reinstated the previous version. (Envisio board owners were notified about the connector replacement, but not about the smoking risk or the software change.)

If you get a bum board, Envisio promises to make things right, no matter how many times you have to send your Power-Book back. (Envisio pays the shipping one way, but you will have to do without your PowerBook for a couple of days.) Before you go out and buy one of these boards, though, answer three important questions. First, is your monitor on the list of models that work with the board? (Raster-Ops monitors, for example, aren't, and over half the supported monitors require special cables. Call Envisio to find out.) Second, is it worth sacrificing virtual memory, some software compatibility, and your memory-expansion slot-especially in light of the new, faster SCSI adapters coming to market? And third, how's your stomach for worry? It's my guess that sending a pretested Power-Book-as Envisio did for me-is an option the company probably won't extend to you.-DAVID POGUE

Special thanks to Atlantic Computer Systems for providing a loaner PowerBook, and to Microcomputer Publishing Center, whose staff patiently assisted with the testing of various monitors.

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Arcade Adventure Game

Prince of Persia

PROS: Superb graphics and animation; can save game in progress. CONS: Copy protected.

COMPANY: Brøderbund Software (415/382-4400). REQUIRES: Mac Plus; 2MB of RAM (2.5MB of RAM for System 7, 4MB for color under System 7); hard drive; System 6.0.2 (System 6.0.5 for color). LIST PRICE: \$49.95.



HE EVIL GRAND VIZIER HAS seized the throne of Persia. Locking the beautiful princess in a tower high above the palace, the vizier has demanded that she marry him within the hour. You are an adventurer from a distant land and the princess's true love. Unfortunately, your current abode is the palace dungeon. Unless you escape and make your way to the tower in time, all will be lost.

The dungeon and palace are divided into 12 mazelike levels. The object in each is to find the exit and open it by pressing a trigger hidden somewhere in the level. Obstacles in your path include sword-wielding guards, deadly spikes, poisoned potions, and razor-edged gates. Plus, being human, you can only survive a two-story fall.

In addition to the normal arcade action, magic plays a part in Prince of Persia. Some potions give you astounding powers. You also learn firsthand about the dual nature of man as your good and bad halves run in opposite directions after you pass through a very special mirror.

You control Prince of Persia entirely from the keyboard. Single key-presses enable you to run or jump to the left or right, climb or jump up, climb down or crouch, pick up an object, and thrust or block with your sword. Shift-key combinations let you take careful steps or hang from a ledge. The action performed by each key varies depending on whether you are moving or fighting. Getting a firm grasp on the keyboard commands is essential to advancing in the game. Pressing the wrong key while dangling from a ledge, for instance, is often fatal.



Finding the Sword Unless you quickly find this sword, you are at the mercy of the guards.

It generally takes many tries to complete each level, and since you must start at the beginning of the level each time you die, a high tolerance for frustration is required. Luckily, you can save the game at each new level, so you don't have to restart from the beginning. However, the faster you complete each level, the better off you are. You have only one hour to rescue the princess.

The sound effects and music are excellent, but the graphics are what make Prince of Persia a standout. The detailed drawings and colorful backgrounds are far superior to those found in many other recent multiplatform games (ones that have chosen instead to emulate the IBM PC's CGA or EGA graphics on the Mac). The character animation, although choppy at times, is amazingly realistic. In fact, the game may be a little too realistic for children. When characters die, a lot of blood is spilled.

My only other reservation is the game's copy protection. To start each playing session, you must look up a keyword in the manual and then find a magic potion on screen that is labeled with the first letter of the keyword. It's not a large imposition, but it is an imposition nonetheless.

If you're impressed by smooth animation and finely detailed graphics, you'll be amazed by Prince of Persia. And if you're an arcade fan, you simply must buy this game.

—STEVEN A. SCHWARTZ

Screen Recorder

CameraMan 1.0

PROS: Reliably records on-screen operations; shoots sequential PICT images; records framed area centered on cursor; comprehensive QuickTime support.

CONS: User can't specify location for storing recordings and screen shots. COMPANY: Vision Software International (408/748-8411).

REQUIRES: Mac Plus; 2MB of RAM; System 6.0.7. Recommended: Mac II; 4MB of RAM.

LIST PRICE: \$149.



IKE SCREEN RECORDERS FROM THE past, CameraMan allows you to record and save clicks and other mouse operations for easy retrieval and replay. But unlike most old screen recorders, CameraMan records custom screen sizes, handles 32-bit Quick-Draw, and takes advantage of Quick-Time's long list of compression and playback capabilities. And if you're desperate, you can even use CameraMan to take a still screen shot (although System 7's built-in screen shooter is basically the same).

CameraMan is really two pieces of software: a system extension (or INIT) that enables your computer to record continuous screen operations, and an application that lets you configure the system extension. CameraMan also includes MoviePlay, a utility for playing and editing QuickTime screen recordings.

In addition to storing sequences in QuickTime format, CameraMan lets you store a screen sequence to the PICS animation format or to sequential PICT images. The ability to store sequential images is especially useful if you're having trouble shooting a tricky dialog box or a briefly displayed error message.

Regardless of format, you can specify the number of frames that CameraMan records per second and draw a frame around the area of the screen you want to record. By default, CameraMan records 4 frames per second. You can create a smoother animation sequence by entering a larger number. But a high-speed movie consumes more disk space than its low-speed counterpart. Also, increasingly higher frame rates result in progressively more lethargic computer performance. The trick is to find a frame speed that both records smooth sequences and lets you work quickly enough to produce actions worthy of recording.

The same goes for frame size. Sometimes you need to record the entire screen area. But if you can confine your operations to a smaller area, you'll speed recording times and reduce file size on disk without sacrificing smooth playback. CameraMan even lets you frame an area around your cursor and record everything in the frame as you move the cursor. Though the results can be a little choppy, this feature provides essential control, allowing you to govern exactly what the audience sees by simply pointing at it. As an added bonus, Camera-Man throws in a few preset frame sizes that match other Macintosh models, like the Classic, in case you decide to record your operations using a large-screen Mac and play them back on a smaller screen.

I found only two problems using CameraMan. After installing CameraManwithout reading the instructions, of course-I accidentally activated the record function and had to dig around for the manual so I could figure out why my computer had suddenly gone into slow-motion mode. Needless to say, this represents a continuing problem with my brain rather than a shortcoming on the part of the program. The second, more serious problem is that CameraMan always saves screen recordings to the disk that contains the active System Folder. You cannot, for example, record a long QuickTime movie to a mounted Sy-Quest cartridge or another large-capacity holding tank (unless you make that device your start-up). But if you've got the space and you want to record screen movies, CameraMan is the best deal around.

-DEKE McCLELLAND

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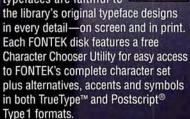
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Time-Billing Utility

Timeslips III 2.1

PROS: Flexible; suitable for almost any type of business. CONS: Somewhat complex; visually cluttered; restricted invoicing layout. COMPANY: Timeslips Corporation (508/768-6100). REQUIRES: Mac Plus; System 6.0.2. Recommended: Hard drive. LIST PRICE: \$299.95; five stations \$699.95; each additional station \$139.95.



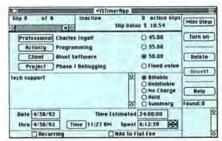
OST GENERAL-PURPOSE ACcounting systems include generic inventory and service-based billing methods that fit some businesses' needs. Timeslips Corporation instead aims at companies with more-sophisticated billing needs. Timeslips III is an outstanding program for tracking time and expenses, calculating complex billing amounts, and creating reports and invoices. It can adapt to almost any type of business, and its data can be integrated with most popular Mac accounting programs.

Timeslips III consists of two primary programs. In TSReport you define four types of entities—users; user activities such as research, writing, and consulting; clients; and client matters, which you define according to your need. For instance, a client matter can be a project of fixed duration, such as building a house; part of a project, such as pouring the foundation; or an ongoing task, such as lawn care. You can change the names of the entities to match the way you do business, and all reports, menus, windows, and dialog boxes update accordingly.

The second part of Timeslips, TS-Timer, is a DA (or for System 7 users, an application called TSTimerApp) that can be set to run in the background at all times. You use it to create slips, which record either expenses or tasks and are the basic charging unit Timeslips manages. TS-Timer's clock can time activities and then calculate the proper billing amount for each slip. You also use TSReport to enter payments, refunds, finance charges, and credits. TSReport can also track and manage fund accounts, client-prepaid cash accounts for accruing and paying all charges.

TSReport has a variety of functions. In addition to bills, TSReport generates timeslip and client-analysis reports. You can define your own client and slip reports, and create your own bill layout using the layout function. Most reports have extensive selection, sorting, and subtotaling options.

It's difficult to think of a billing situation Timeslips III can't handle. For instance, you can define hourly rates for users, clients, and activities. You can define about 60 permutations of fixed-fee billing arrangements



Tracking Client Charges Timeslips lets you create and track client charges for both expenses and timed activities. You can assign one of several billing and charging options to each slip.

for each client. Each time slip can be billable, unbillable, free, a flat fee, or charged at any of the user, client, or activity rates. You can set the amount for taxes, late charges, billing adjustments, and client budgets, among other choices. Timeslips III has impressive format options for client bills. You can specify the order of the sections of a bill. Many users will be disappointed at having only partial control over the layout of bills and messages, however.

The price of Timeslips' flexibility is complexity. Its many options and the cluttered windows and dialog boxes make it tough to grasp the program at first glance. Fortunately, the thorough documentation, excellent tech support, and default settings should get you started.—STEVE MANN

Arcade Game

4-D Boxing 1.0

PROS: Entertaining format; multiple viewing angles. CONS: Can't save fights in progress; off-disk copy protection. COMPANY: Electronic Arts (415/571-7171). REQUIRES: Mac Plus; System 6.0.5; 2MB of RAM for color version. Recommended: Color monitor. LIST PRICE: \$49.95.



LECTRONIC ARTS DELIVERS A knockout blow with 4-D Boxing, a uniquely entertaining boxing game. Instead of the rigid movements found in most arcade boxing games, 4-D Boxing presents authentically humanlike motions, although the boxers' geometric bodies and heads leave something to be desired. The one- or two-player game offers nine viewing angles—from a full view, similar to what you'd see on TV, to the contender's-eye view. Trust me, it's a rare feeling to be on your feet one moment and the next instant watching your opponent's glove hit your face.

The game comes with 50 ready-made boxers you can try out in exhibition rounds, but creating your own contender (which you must do to enter competition) is part of the fun. Boxers range from 5-feet, 135-pound lightweights to 6-feet-6-inch, 250-pound heavyweights. There are 14 heads to choose from—12 male and 2 female—and many combinations of jerseys and trunks.

The Options menu lets you change the controls of the boxers' motion, and set the number of rounds and the time limit of exhibition fights. In the Gym you create custom boxers, whose skills you can hone in the Exhibition area (training rounds don't count toward your record). The Main Event is where you play professional matches.

The object is simple—beat the champion and you win. But you can't go out and challenge the champ in your first fight; you have to earn your way up the challenge ladder to the title shot, beginning on the 51st rung. Fortunately, you can skip up or down three positions, so if you're stuck at one level, or if a particular boxer keeps beating your brains out, skip past him or her. Or move back down the ladder and get more power, stamina, and speed to win the next time. As you move up, fights take longer.

Early fights are mostly slugfests, but as you climb the ladder, you must rely increasingly on your boxing skills and defense. After 35 fights your fighter is not what he or she used to be. If after 45 bouts your fighter is the champion, he or she must retire; otherwise, you've got five more chances to reach the top of the ladder. You can play unlimited exhibition fights, but they don't

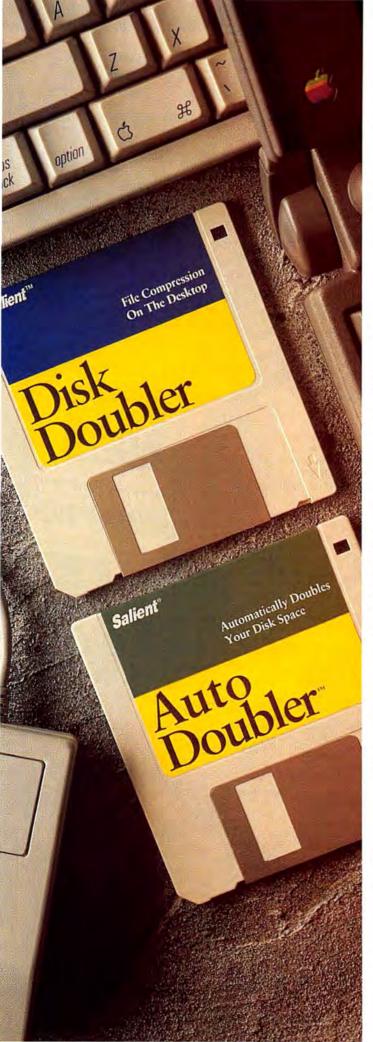


Tale of the Tape Andrew P. Miller was not a successful fighter, but he earned a lot of money.

count toward your overall standings, improve your skills, or earn you title money.

During a fight there are two important items to keep an eye on (besides your opponent). One is the bar under your nameplate that shows the damage you've sustained, your remaining stamina, and your overall condition. The other is the Fighting Distance Indicator, which shows when the boxers move close enough to score blows.

After a fight is over, the *Times* newspaper appears with a photo and large headline showing the results of the game. Inside the photo a "video recap" replays the last few seconds of the fight. Unfortunately, you can't save fights in progress. On the other hand, you may not mind; 4-D Boxing has enough action and realism to keep any challenger eager to rumble.—ANDREW MILLER



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- Publish magazine, 2/92

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Bar-Coding Software

Bar Code Pro 1.0

PROS: Good documentation; easy to use. CONS: Copy protected; lacks balloon help; no alert when invalid characters are pasted into text box. COMPANY: Synex (718/499-6293). REQUIRES: Mac Plus; System 6. Recommended; Hard drive. LIST PRICE: \$149.95; with 14 symbologies \$450.



NE WAY WE COPE WITH LIFE IN the fast lane is to put a bar code on everything we see. Those little vertical lines are everywhere—on your mail to signify your zip code, on price tags, and on packages of your favorite food. Bar Code Pro is an easy-to-use desk accessory that creates bar codes in either EPS or PICT format for use in your desktop publishing or labeling program. It installs in under 60 seconds and takes less than 5 minutes to master. The program is best suited for people who don't need to generate bar codes sequentially or for more than one product line at a time.

Bar Code Pro supports the 14 most common bar-code symbologies—POST-NET, POSTNET/FIM, UPC (A), UPC (E), EAN-8, EAN-13, CODE 25, ITF, ITF-14, Code 39, Codabar, Code 128, ISSN, and ISBN—the ones used by the postal service, food stores, booksellers, and clothing stores, among others. You can also order codes individually through Synex's toll-free telephone number.

The manual is well presented and complete, explaining everything from what bar codes are to where you can buy bar-code readers. It details the purpose of each bar-code type, how codes relate to each other, and when and how to use bar codes—a must for neophytes. Synex also provides a list of sources for bar-code specifications—number of digits, required spacing, and so on.

Creating a bar code with this product is very easy. After launching Bar Code Pro from the Apple menu, you choose the type of code you want from a pull-down menu. and in the Characters text box enter the digits you want to use for the bar code. A warning dialog box appears if you enter an invalid character. For example, UPC (A), the 11digit code used in grocery stores throughout the United States and Canada, accepts only numbers, no letters or punctuation. (Unfortunately, the alert does not appear when you paste in invalid characters.) Bar Code Pro also lacks the ability to automatically create sequential bar codes; you have to change each bar code manually. The absence of this feature is a real shortcoming for the smallbusiness owner who needs unique codes for each item in a large inventory. Then you

click on the Save button and choose either EPS or PICT format. You can import the bar code into any application that accepts these graphic formats.

You can also modify the appearance of the bar code by clicking on the Rotate button to rotate the graphic in 90-degree increments, for example, or by changing the code size and font (allowable only for certain codes). By clicking on the Spees button, you can select the resolution of the printer you will be using, and the font, style (bold, italic, or hidden), and format (EPS or PICT) of the bar code. You can also control where text is placed on the bar code.

Although I was sent from one person to another, it didn't take long to reach a knowledgeable support representative, who was courteous and even funny. I wanted to know why the manual recommends that you not resize bar codes by stretching or shrinking them within another application. He told me you can sometimes get away with it but that you need to check that the bar code is still readable after the alteration. Best to do it within Bar Code Pro, he told me. "That way you'll sleep better at night knowing your bar code is readable."

Overall, the program does what it sets out to do and does it well. Aside from the lack of automatic sequential coding and the failure to catch invalid characters, Bar Code Pro has my support.—DANNY LEE

35mm Film Scanner

Nikon LS-3510AF

PROS: Fast; easy to use; makes high-quality scans. CONS: Less-than-optimal tonal control for the price. COMPANY: Nikon (516/547-4355).

REQUIRES: Mac II; 8MB of RAM; System 6.0.5; hard drive with 80MB of free space. National Instruments NB-GPIB board required for GPIB version. LIST PRICE: 8-bit version \$9535; 12-bit version \$11,316; 300-slide autofeeder \$5375.



ON'T BE FOOLED BY THAT bread-box-style design. The LS-3510AF Film Scanner looks like its forebear, the LS-3500, but Nikon has replaced just about all the parts I can name—the lens, the motor, the light sensor, the analog-to-digital converter, the system board, and the interface (which is now SCSI, although the GPIB model is still available).

These changes make the LS-3510AF a lot more convenient to use. It scans at twice the speed of the old model, and it's easier to set up and focus. The LS-3500 had a fixed-focus design that forced users to try different slide holders until they found the one that would bring their slide into the scanner's focal plane. The new autofocus

model adjusts itself during prescanning.

One of the more visible changes of the LS-3510AF is its larger, 40mm-by-40mm, imaging area (the old area was 36mm by 24mm). The square window lets you physically orient slides, instead of losing time and image sharpness by rotating scans in software. The larger window also accommodates the superslide format available on many 2½-inch cameras, as well as the aperture card microfiche format favored in government work.

The larger imaging window diminishes the LS-3510AF's resolution from that of the LS-3500—3176 dots per inch compared with 4335 dpi. That resolution is still sufficiently high to allow publishers to print 35mm slides as 150-line film separations 10 inches by 15 inches in size, even assuming a maximum-quality, 2:1 sampling ratio.

An optional plug-in board enables the LS-3510AF to collect 12 bits of data per red, green, and blue channel, instead of the standard 8 bits. The main advantage of this extra information is the additional control it gives advanced users over the tonal characteristics (contrast, brightness, and so on) of their scans. Unfortunately, when this review was written, Nikon's Photoshop plug-in couldn't access the 12-bit data fully.

This brings me to my main criticism of the LS-3510AF. In 8-bit mode and in the current implementation of 12-bit mode, the

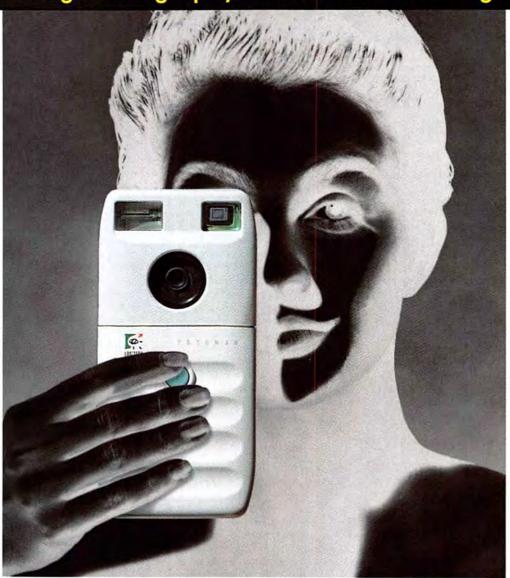


The Nikon LS-3510AF

scanner does a great job of measuring a slide's tonal values and sending a good-looking image to screen. But it doesn't offer advanced users satisfactory tools for overriding automatic exposure and tone adjustments. There are no Set Highlight or Set Shadow controls, no means to enter a new gamma number, and no tone-curve editing facility. Contrast and brightness tools are available, but they offer fairly crude control.

Most people willing to put down \$10,000 for a scanner are looking for—and deserve—optimal image quality. If that sounds like you, presets won't cut it, and you'll have to pay the price for 12 bits. But before you do, make sure Nikon has released the new software it's promised—which is supposed to include all the tools mentioned above.—JOE MATAZZONI

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Business Simulation Game

Capitalist Pig

PROS: Well designed; engaging. CONS: Game has no clear ending. COMPANY: Pluma Software (602/969-9441). REQUIRES: Mac Plus; System 6.0. Recommended: Hard drive, LIST PRICE: \$59.95.



ANT TO BE A BUSINESS TYCOON for a day? With Capitalist Pig, you can be—without risking your shirt.

As in a real business, you begin by securing start-up capital and devising a strategy. Next you enter your fictitious company's name, stock symbol, and product. You can set your business's founding in the present or as long ago as 1901. As you play, a smattering of world events are reported in New Pork Times bulletins. Some historical events, such as the Great Depression, can affect your business positively or negatively.

Next you create your business, marketing, and financial plans. Sliders let you set more than 30 business variables, including your target customer's age range and income level; materials and labor costs; advertising, public relations, and market-research budgets; and even insurance premiums. If all

this decision making unnerves you, the manual has a tutorial that leads you through the planning stages and into operation.

The main window contains a control panel and two views of your corporate head-quarters. The control panel provides tools for hiring and firing employees, evaluating their performance, reading electronic mail from advisers, and monitoring product supply and demand. At the beginning, the floor plan shows vacant offices, which you then populate with managers, salespeople, assemblers, and shippers. The elevation shows your company's building as it expands.

You quickly learn that events threaten the bottom line and call for vigilant countermeasures. Information regarding most problems comes to you via E-mail from your advisers. For example, employees overworked for too long will quit or go on strike. Solution: Increase employee compensation to get them back to work. Some problems are not as easily rectified. A disgruntled employee might stalk the building and murder several employees (accompanied by animation and machine-gun sounds). If you've purchased insurance, the victims' families receive compensation, but it's still bad for business, says your PR adviser, who suggests you increase your PR spending to soften the blow to your company's image. Meanwhile, the dismal E-mail keeps piling up. Due to a recession, your economist explains, you have



Putting Out Fires Terrorist attacks, embezzlement, fires—keeping a cool head is half the challenge in becoming a successful capitalist pig.

enough inventory to last a year; she suggests you fire several employees in order to stay in business. Capitalist pig!

Luckily, you can deactivate events until you get the hang of doing business. I pride myself on being a willing businessworld dropout, so I was surprised to see how fervent a capitalist pig I became. After two hours of nonstop play, I ranked number one in the Pig Pen, a spoof on the Fortune index.

One tiny criticism: the game has no clear end point. If you manage to avoid bankruptcy, you could theoretically run your business forever, saving the game in progress and resuming later. I'd like the ability to set a time limit—say, ten game-years—with an option to sell the company at the end, take my money, and go write novels.—JOE HUTSKO

Relational Database

nuBase Pro 1.5

PROS: Improved speed; built-in LAN support; trouble-free import of all types of DOS data files; manual and phone support still tops. CONS: Minor inconveniences when converting projects from version 1.3 to 1.5. COMPANY: Tactic Software (305/253-9033). REQUIRES: Mac Plus; 2MB of RAM; System 6.0.5; hard drive. LIST PRICE: \$395.



ACTIC SOFTWARE (FORMERLY NEW Era), vendor of nuBase Pro (formerly called nuBase for the Mac, and before that dBase Mac), has been streamlining and updating the product at an impressive rate. Version 1.5 now imports DOS files created by dBase II, III, and IV, as well as FoxBase, SyBase, and RBase; and it has simplified import and export of delimited text files.

NuBase is the only relational database actively dedicated to the service of mere mortals. 4th Dimension, Omnis, and Fox-Base are really developers' products, Double Helix is in corporate transition, and File Force is not receiving much promotion from ACIUS. The flat-file database File-Maker Pro has been the most popular database, probably because it's possible for us-

ers with no programming background to design a useful database. FileMaker makes it easy to set up new files and to lay out forms for printing, and "programming" really amounts to assigning buttons to macros.

The advantage of nuBase is that it approximates FileMaker's virtues in a relational database. Creating a new data file consists of making choices in a series of dialog boxes, and you can add, change, and delete fields after creation with minimal fuss. Tactic includes templates and detailed instructions for form and label printing, and includes a sampler set of Avery label blanks in the package. Although you can write nu-Base procedures in a scriptlike language, you can formulate fairly complex procedures (for example, "print invoices for all service accounts that have owed more than \$100 for more than 90 days") with a few mouse clicks; you can then assign such procedures to buttons in a form.

Going beyond FileMaker, nuBase lets you relate data files by drawing a path between files on screen with the mouse. A special section of the manual explains relational matters for beginners, and the program includes an assortment of templates (Labels I, Labels II, Client Tracker, Invoice Manager I, and Invoice Manager II) and samples to study for some ideas on applying relational power. The relational capabilities in nuBase Pro don't make it much more challenging to



Relativity You can make up two-way, one-way, or one-to-many relations between files by drawing arrows. You can do this in other databases as well, but nuBase's explanation supposes no prior user knowledge of relational database theory.

use than a popular flat-file database.

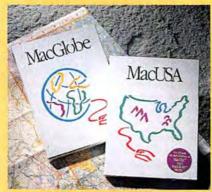
For support you talk directly to people who know nuBase intimately at the sourcecode level and are used to stepping neophytes through the basics. Version 1.5 not only includes the now-requisite System 7 capabilities, including a large selection of Apple events, but also built-in network support for the nuBase data server promised for this summer. nuBase is still seriously slower than FoxBase, and doesn't have the phenomenally rich feature set of 4th Dimension, but nuBase's capabilities expand with each release. And nuBase Pro is the simplest path to relational databases if you're a File-Maker Pro user running up against flat-file limitations.—CHARLES SEITER

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demographic, economic, political, climate and health data; state flags and entire state songs. Publisher: PC Globe GRA0246

\$39*



Sprout!

② Sprout! is a complete computer planning tool for vegetable gardeners. Its unique planning tool snaps to correct row and plant spacings and automatically fills in plant symbols, producing a graphic, scalable garden plan. In addition, Sprout! contains a fully editable database of vegetables for 7 climate regions containing. planting and

harvesting times, yield, soil PH, growing tips, and other information. Standard text and drawing tools are included allowing users to create their own vegetable symbols and customize garden designs. Sprout prints out garden layouts, calendars, shopping lists,

and reports.
Publisher: Abracadata
GRA0339

\$45



JAG or Ray Dream Designer 2.0*

Remove jaggiest JAG works in the background, removing jagged edges from PICT files automatically, producing pixel perfect 8-bit and 2-bit still images and animations. It works with images created in color paint applications and with scanned images. With its sophisticated edge-detection scheme, JAG produces sharp, clear images of superior quality to those produced by edge-blurring filters. GRA0291 \$79.

Inters. GRAU291.

**O Ray Dream Designer's drawing and text tools for creating lines, circles, ellipses, polygons, Beziers, colors and shadings, are virtually the same as those in most 2D illustration programs. But now your objects have the realistic look of three dimensions. It even comes with a library of 3D solid textures to be used as-is or customized. Lighting, shadows, transparency, reflections and perspective are handled automatically. Publisher: Ray Dream GRA0292

\$629*

Painter 1.2

☼ Fractal Design's Painter 1.2 simulates the tools and textures of natural media. Painter's revolutionary approach has earned it 5-mice, MacUser's Eddy Award, MacWeelss Target Award and Personal Publishings paint program of the year. Among Painter's customizable tools are airbrushes, crayons, felt pens, chalk, charcoal, pencils, calligraphy pens, and water color brushes. All the tools interact with the

surfaces to create the complex textures of natural medial. It supports Photoshop plug-ins and ColorStudio masks, and the Wacom pressure-sensitive stylus and tablet.

Publisher: Fractal Design GRA0323 \$**285**



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WristSaverMousePad ACC0635 \$15. WristSaver ACC0560 \$15. Bundle BND0033

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Publisher: T/Maker GRA0317

\$25

Canvas 3

② Canvas 3 is fast, powerful, easy to learn and provides all the tools you'll need to create and print professional quality color or monochrome graphics. Use in a wide range of design projects including desktop



illustration, design graphics, architectural rendering, engineering drawing, presentations, multimedia and general business graphics. Carwa 3 offers unparalleled productivity. Create illustrations from scratch with our new freehand tool, or scan existing artwork and let Carwas auto trace its outlines for you. System 7 Savy! 1991 MacUser

Editor's Choice Award. Publisher: Deneba Software GRA0280

publishing, technical

\$249



AccuZip6

O AccuZip6 is the most advanced, professsional-level postage reducing software on the market for the Macintosh®. This extremely powerful mailing list management software produces the most accurate mailing lists possible from your database. AccuZip6 corrects, parses and standardizes every address in your database, then adds Carrier Route, Zip+4 and a Postnet Bar Code to every deliverable address. Thoroughly tested against millions of addresses throughout the United States, AccuZip6 is CASS (Coding Accuracy Support System) Certified by the U.S. Postal Service. AccuZip6 doesn't stop there. AccuZip6 performs 1st, 2nd and 3rd class-presorts, produces all applicable bulk mail forms, sack tags and labels necessary to do bulk mailing. A built in word processor will handle all of your mail merging tasks. Publisher: Software Publisher, Inc. BUSO235

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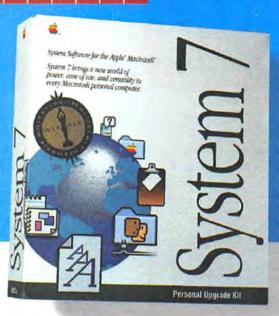
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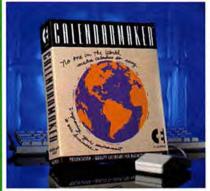
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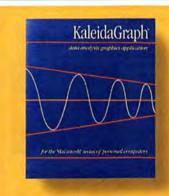
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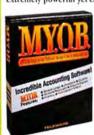
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M.Y.O.B. 3.0

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Command Centers are arranged in a flowchart form making the program unlike all others. Version 3.0 features: Importing, Backorder Tracking, Increased Password Protection and more. Publisher: Teleware, Inc. FIN0087

Virtus WalkThrough 1.11

The latest version of this award winning 3-D drawing program ② The latest version of this award winning 3-D drawing program provides everything you need to quickly capture and explore your ideas in 3-D. The intuitive interface and complete set of drawing and presentation tools make Virtus WalkThrough ideally suited for designers of all types including graphic artists, architects, space planners and theater and film professionals. Multiple windows and extensive drawing aids provide and interactive environment for editing and viewing your ideas. Interactive 3-D presentations, QuickTime® and PICS animated movies, and perspective pictures dazzle your audiences. Enhanced data exchange capabilities include. Imports of 3D DXF and trace layers for PICT, Claris® CAD and MacDraw, Exports of 2D DXF, 3D DXF, PICT, PICS, EPS,Claris®CAD and MACDraw. Winner of MacUser breakthrough Product of the Year MacDraw. Winner of MacUser breakthrough Product of the Year Award 1990.

Publisher:

Publisher: Virtus Corporation S RA0278



MacGolf Classic 1.1

MacGolf Classic v1.1 challenges one to four players to match their skills against sand and water traps, deep roughs, winds, and undulating greens. Six tough courses are brought to life with full screen color graphics, five enlargement options, and digitized

sound effects. Control your stance, ball position, shot direction, swing power, and club choice. Supports Honors between holes and allows hard disk installation. System 7 compatible (except PowerBook and Quadra). Publisher: XOR Corporation ENT0274



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Publisher: MicroMat UTI0285

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MacPrint 1.3

Use a Macintosh with non-Apple printers. Print Mac applications on HP Laserjet, Deskjet or compatible printers including all Series Ils, IIIs and the Deskjet 500. Prints text and graphics at the printer's maximum resolution.

Does not require PostScript. Cable is included. Publisher: Insight Development UTI0098

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White Knight V.11

The perfect low-cost solution to almost any Mac telecommunicator's needs. Offers the kind of power associated with products costing hundreds of dollars more,



but is easier to learn and more flexible. 270+ page user manual is geared to all levels of experience. Winner of 11 awards including MacWorld's World Class Software Award 1987-1991. Publisher: FreeSoft COM0060



FileGuard or MaccessCard Reader*

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O Design Your Own Home: Architecture, Interiors, or Landscape. Create floor plans, elevations and building plans with structural details that you can hand right to your contractor. Do

individual room plans and kitchen/bath designs. Then complete your dream house with graphic landscape plans. Interiors and landscape programs generate 4 side views from top-view perspective. Sample plans are included.

Publisher:

FolderBolt

 Folderbolt protects your folders (including your System Folder) with a password. Create completely locked folders, read-only folders, or password-protected drop box folders. No one without the password can open, duplicate, delete, or move them. FolderBolt can



unlock all your folders at once and re-lock them on shutdown. It also generates a complete audit trail of failed attempts. Combine FolderBolt with other security products from Kent Marsh, Ltd. for comprehensive protection second to none. System 7 compatible

Publisher: KentMarsh, Ltd. UTI0212



Turbo Mouse® 4.0

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You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

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Adding memory doesn't require technicians in lab coats. You'll find installation at home easy when you follow our FREE** step-by-step installation video instructions. Just open your Mac, slide out the main circuit board and plug in your SIMMs.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs (2@\$39 ea.)

The chart explains exactly what you need to achieve the desired level of performance.

To open your Mac Plus, SE, and Classics you'll need a specially designed tool - it's available from us as part of a handy tool kit for just \$9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMs (Single Inline Memory Modules). Each one megabyte SIMMs card holds eight top quality,

To upgrade a 4-socket Mac Plus or SE to this amount of memory	Do this: (Install in multiples of two only) SIMMs must be 150ns or faster
2 MB	Remove all four existing 256k SIMMs, install two 1 MB
Acceptable to the second	Simms, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256k SIMMs, install two 1 MB SIMMs
4 MB	Replace all four 256k SIMMs with four 1 MB SIMMs.
To upgrade a	Do this: (Install in multiples of two only)
2-socket Mac Classic	SIMMs must be 100ns or faster
II or LC to this	
amount of memory	
4 MB	Install two 1 MB SIMMs
To upgrade a	Do this: (Install in multiples of two only)
2-socket Mac LC II to this amount of memory	SIMMs must be 100ns or faster
6 MB	Install two 1 MB SIMMs.
To upgrade a	Do this: (Install in multiples of four only)
8-socket Mac II, IIx, IIcl, IIcx or SE/30 to this amount of memory	SIMMs must be 120ns or faster
4 MB	Remove all four existing 256k SIMMs, install four 1 ME
4 PMD	SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256k SIMMs, install four 1 MB in
3 (10	remaining sockets.
8 MB	Remove all four 256k SIMMs, install eight 1MB SIMMs
To upgrade a	Do this: (Install in multiples of four only)
4-socket Mac IIsi to this amount of memory	SIMMs must be 100ns or faster
5 MB	Install four 1 MB SIMMs.
To upgrade a	Do this: (Install in multiples of four only)
4-socket Quadra 700 to this amount of memory	SIMMs must be 80ns or faster
8 MB	Install four 1MB SIMMs.
To upgrade a	Do this: (Install in multiples of four only)
16-socket Quadra 900 to this amount	SIMMs must be 80ns or faster
of memory	
4 MB	Install four 1MB SIMMs.
8 MB	Install eight 1MB SIMMs.
12 MB	Install twelve 1MB SIMMs.

memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung.

Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120ns

Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100ns chip. The original Mac used relatively slow 150ns memory chips. The 68020 processor needs 120ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Install a MacWarehouse Expansion Kit and working with your Mac will never be the same! Call us now. We'll help you select just the right Memory Upgrade, and we'll ship it overnight for just \$3.

CHP 0012 120ns SIMMs...

Magyarehouse[®]

1-800-255-6227 Overnight Delivery Only \$3.00!

Call 24 hours a day, 7 days a week

MACWAREHOUSE 30-DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your Power User Memory Kit, you may return it for a full refund within thirty days of purchase. All you have to do is call us for a return authorization number and return this product, postage paid, in its original condition, with the original packaging and documentation.

ONE YEAR WARRANTY.

MacWarehouse also guarantees its Memory Kits against manufacturer defects for one year from the date of purchase. We will repair the item or replace it at our discretion

MWJ2P

* SIMMs prices vary. Call for latest information.

** Limited Offer! Free video with purchase of 2 or more SIMMs.

7GREAT REASONS

Finder 7

The new Finder 7 is worth the cost alone. Access, organize, and view your folders, documents and applications faster and easier with the new improved finder.

Balloon Help

Use the new Balloon Help for interactive help while you work. Turn this feature on and point to anything on your screen - a menu item, icon, or tool - and a "balloon" appears, telling you what it is and what it does.

File Sharing

With the new File Sharing features you can share hard drives, folders, and files, with others on your network; it has never been easier. You can even set passwords so that only specific individuals or groups can see your files and work with them.

Fonts in System 7

Apple's new advanced font technology gives you clear, crisp type on screen in any size plus the ability to print to many different kinds of printers. No more struggle with font compatibility.

Multitasking

With System 7 Multitasking is always optional. Now you can run multiple applications at the same time, and switch from one to another with a click of the mouse. System 7 also supports background processing, so that while you're working in your word processor, you can print a document and have your spreadsheet recalculating.

System Folder Simplicity

Apple has completely redesigned and improved the System Folder, making it much easier to organize. Predefined subfolders are created automatically, to reduce clutter. The new System Folder includes a Control Panel Folder, Extension Folder, Apple Menu Folder, Preference Folder and Startup Folder.

Publish and Subscribe

You can "publish" any part of your document (a graphic, chart or piece of text), to another document even in another application - which "subscribes" to the original. Any changes you make to the original document will automatically appear in the other, even across a network. Now that's live copy and paste!

Plus Your FREE System 7 Tutorial from MacWAREHOUSE!

Video, sound, and animation on your Macintosh

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button. QuickTime brings Multimedia to the Mac!

GRA0347

Publisher: Apple Computer, Inc.

QuickTime PC

Open PC formatte Mac des and delefiles! Cus

§169

Macintosh PC Exchange

Open PC files on 3.5" MS-DOS and Windowsformatted floppy disks. Read DOS files on your Mac desktop. Open, save, rename, move, copy and delete documents just as if they were Mac files! Customize the program for even faster access. Requires Apple SuperDrive or compatible.

COM0126

Publisher: Apple Computer, Inc.

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EXCITING NEW APPLICATIONS THAT TAKE FUL

AccessPC 2.0

With AccessPC 2.0, your Macintosh can make MS-DOS files look just like Mac files, instantly. Pop any DOS floppy in your drive, and in a couple of clicks, the PC files are on your Mac desktop, looking and acting perfectly Mac-like. Edit, copy, save, print, play with the numbers, print again, and give the PC people back their diskette. It's that easy to use any PC file in any Mac application.

AccessPC is an easy-to-install control panel utility that's always been completely compatible with System 6 & 7.

Publisher: Insignia Solutions



\$60

DiskFit Pro

Fast, efficient, easy backup
For Finder-readable backup to
floppies, cartridge or other hard
disks, get Diskfit Pro. Diskfit Pro
copies files from a hard disk to a
"SmartSet" of floppies, and then
updates that "SmartSet" with each
subsequent backup. By replacing
onlythe obsolete files in the backup
set, Diskfit Pro keeps your
SmartSetfrom growing everytime
you back up. Backups stay fast
and backup sets compact. And since files
retrievals are a breeze. Don't leave
your data at risk backup with
Diskfit Pro. System 7 Savvy.
System 6.x compatible.
Publisher: Dantz Development
UT10246

Total DiskFite

e files stay in Finder format

\$74



SAM 3.0 or NUM 2.0*

SAM 3.0 detects viruses by monitoring the suspicious activities that characterized them. Version 3.0 has enhanced update and repair capabilities, faster scanning, and more. The CDEV portion operates during normal Mac usage, and offers a number of options for checking disks and folders as you work. UTI0214 \$55

NUM 2.0 combines and integrates two outstanding collections of Macutilities: SUM 2.0 NUM 1.1 plus automatic backup, data security (both DES and FasCrypt), and many productivity enhance-

many productivity enhancements. Other utilities recover lost or accidentally deleted files, restore crashed hard disks and more. Publisher: Symantec UTI0151 \$**95***

Overnight Delivery Only \$3.00! Call 24hrs. - 7 days!

KAUE

System 7 brings dynamic new apabilities and ease of use to everyone who uses a Mac. System 7 builds on the Mac basics ou already love, and paves the vay for a whole generation of owerful new software. A simple lick of the mouse installs the oftware. Then advanced features ake over, letting you work faster. asier, and more productively.

Multitasking provides effortless switching between applications Finder 7 lets you customize your desktop to the way you work

File Sharing allows access to any folder and its contents among workgroups

Publish & Subscribe lets you update several documents by only changing one

TrueType gives you crisp. clear type of any size

And that's just for starters! low it's easier than ever to jet System 7 up and running in your Mac, because you an get it right from MacWAREHOUSE! Join the generation of System 7 ower users!

System Software for the Apple" Macintosh" System 7 brings a new world of



*Limited Offer -- Not Available

System 7 Personal Upgrade Kit

SYS0001

to Resellers.

Publisher: Apple Computer, Inc.

System 7 Group Upgrade Kit

SYS0002\$279 System requirements: 2MB RAM; hard disk drive.

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with your order!

Make System 7 even easier with this Personal Training Systems

System 7 lutorial!

Get up and running with System 7 in a flash! This Personal Training Systems Tutorial is the fastest, easiest way to put all the power of System 7 right to work on your Macintosh desktop. And it's yours FREE* with your order for any product from MacWAREHOUSE! Just ask for item #AAA0021 when you place your order.
*\$2.00 shipping and handling charge applies.

order System 7 from MacWAREHOUSE

ATM with four FREE fonts! Get the Adobe Type Manager program disk, user guide and registration card FREE* from MacWAREHOUSE when you order System 7. You'll also get as a bonus, four Adobe Garamond typefaces from the Adobe originals. When you place your order for System 7 just ask for item #AAA0023.

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*\$2.50 shipping and handling charge applies.

Personal Upgrade Kit

QuickTime Starter Kit

Play QuickTime movies right on your Mac! Pause, fast-forward, rewind, advance frame by frame. Copy video and animation clips and paste them together. Transform still images and information into a single movie. Use a video-capture card and sound digitizer to record movies with the touch of a button.

QuickTime brings Multimedia to the Mac! GRA0347 Publisher: Apple Computer, Inc.

\$169

AppleTalk Remote Access

Gain direct access to information and resources from your AppleTalk network. Simple to set up and use. High performance is optimized for a broad range of modems. Provides multiple security levels, and requires only System 7 and a high-speed modem. No special hardware required.

\$175 com0131 Publisher: Apple Computer, Inc.

AppleShare 3.0

NTAGE OF THE POWER OF SYSTEM 7!

UserLand Frontier

Frontier is the power user's scripting system for System 7. Write and run your own utilities to customize the Mac file system, networks and applications. Frontier has all the development roles you need to net your scripts. rromer has all the development tools you need to getyour scripts running quickly, including a full script debugger and structured symbol tables you can watch and edit while your scripts are running. When your done, you can link scripts into Frontier's editable menu bar, or save them to the Finder desktop.

Publisher: Userl and Software

Publisher: UserLand Software



AutoDoubler or DiskDoubler 3.7

AutoDoubler is the easiest way to increase hard disk capacity. It's lightning quick and completely transparent, so it won't interrupt your work. The new patent-pending technique lets your Macintosh

use files and applications while they are still compressed! It's fully compatible with almost all applications, desk accessories, and system extensions. UTI0254 149.

DiskDoubler 3.7 gives you total control of file compressionarchiving for modern transfer, compressed backups, self-expanding files, and fast copying of files. Combined they give you use ultimate in speed, convenience, Combined they give you the and control. System 7 Savvy! Publisher: Salient



Word 5.0 or Excel 4.0

Microsoft Word 5.0 simplifies word processing, whether you need to dash off a quick memo or create a complex report. Its Ribbon control panel makes changes with a single mouse click includes a grammar checker, spelling checker and thesaurus. WRDNOSD 2005



MWJ2A



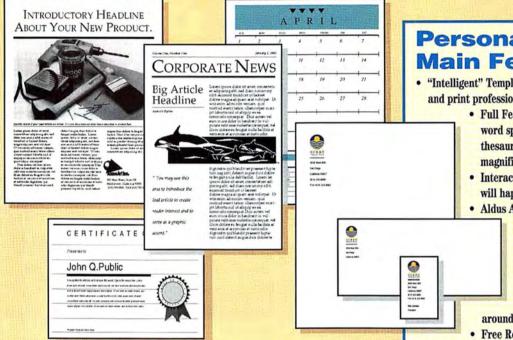
Microsoft Excel 4.0 streamlines the tasks of creating and using a basic spreadsheet. Fully System 7 Savvy, it now allows you to include QuickTime audio/video clips in your spreadsheets. Wizards (Excel's on-line assistants) walk you through complex tasks

MICROSOFT EXCEL 4.0
UPGRADE ONLY

To order, call MacWarehouse at 1-800-255-6227.

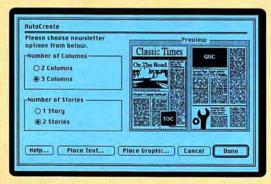
Page layout that's easier Aldus Personal Pre

You want all your documents to look polished and professional. You've seen how graphics and charts can jazz up those otherwise dull memos and reports. But trying to do page layout with your word processor is almost impossible. And high-end page layout programs take too much time and effort. Introducing Personal Press 2.0 — the first page layout software that does it all for you — automatically!



"Intelligent" Templates guide you through the whole process.

Create a publication that's perfect for your needs in a matter of minutes with Personal Press. Choose from a wide selection of professionally-designed, "intelligent" templates for newsletters, forms, memos, flyers, brochures, greeting cards, and more. The templates take care of everything — headlines, tabs, indents, image cropping, text size and style, even table of contents. The templates also fine tune the document for you, so it's clean, professional, and ready to print. Plus, each template includes several variations, so you can create a custom look without spending a lot of time or effort.



The AutoCreate dialog box lets you see how your publication looks as it's being built.

Personal Press 2.0 Main Features

- "Intelligent" Templates help you create, assemble and print professional-quality documents with ease
 - Full Featured Word Processing with 100,000 word spelling checker, 660,000-synonym thesaurus, search and replace, and magnification of 10% - 400%
 - Interactive Graphic Previews show you what will happen before it happens
 - Aldus Additions make special tasks,
 such as creating drop-cap letters,
 pull quotes and bullet text, fast and
 automatic
 - Copy Fit automatically adjusts text to fit the space you designate
 - Text Wrap lets you easily wrap text around text and graphics of any shape
 - · Free Rotation of text and graphics
- Image Controls let you adjust brightness or contrast of grayscale images
- Drawing and Manipulation Tools give you added flexibility
- · On-line Help as well as dimmed-menu help
- Imports and exports in the most popular Macintosh formats
- System 7 Savvy features, including Balloon Help, Apple Events, Subscribe, TrueType, 32-bit Addressing, QuickTime Movie Support, and Virtual Memory

Personal Press does the work, so you don't have to.

Use the Copy Fit command and Personal Press will reformat your text to fit in the space you designate. AutoFlow eliminates the guesswork because it adds pages to your document as necessary. Interactive Graphic Previews show you what will happen before it happens, and provide constant, interactive feedback so you can avoid mistakes and work more efficiently. Text Wrap automatically wraps text around text and graphics of any size or shape. And with the incredible Aldus Additions, performing special tasks, such as creating drop-cap letters, pull quotes or bullet text, is fast and automatic.

than word processing! SS 2.0 — Only \$99 Solution of the control of the c

Personal Press puts it all together so you look like an expert.

But if you'd really rather do it yourself ...

Personal Press 2.0 gives you powerful tools and advanced features that are easy to learn and use. There's a full-featured word processor with a 100,000 word spelling checker and 660,000 synonym thesaurus. Import text and graphics and rotate them freely for just the right look. Create various line styles, including hairline and custom widths. Adjust the brightness and contrast of your grayscale images. Preview, crop, scale, and place frames from QuickTime movies right into your document. And much, much more.

Outstanding printing and output capabilities.

With Personal Press, your documents will really look great in print! Output to the most popular Mac printers, including high-resolution black and white and color QuickDraw and PostScript printers. Rotated text prints at the highest resolution possible, and your grayscale images will come out looking clean and crisp. Personal Press will even print spot color separations.

This Month's Adventure



Local Longboard Competition

Scott tonnson won the longboard competition for the third year straight, but surfing wasn't the only thing on his mind yesterday. "My whole family was watching." Said Scott, Randy was watching," said Scott Randy Johnson, local hero of past surfing contests was on hand to watch his little brother do what he couldn't do himself - win the title three years running.

The amazing, I remember Scotty cheering me on, and now 's outdone me, I'm proud of m,' said the older Johnson. Randy wasn't the only person cheering Scott on yeste there were more than 12,000 people on hand to view what

New Version

iton, and it will be televised nation wide next weekend. A local movie producer has also asked Scott to serve as a consultant on her next

movie. "I'm just happy to be able to compete," continued Johnson, "My wife's eight months pregnant, so them," chang subar market more than them." wife's eight months pregnant, so there's been other matters on my mind, "Johnson hasn't decided whether will try his luck again next year," 'At some point you've on to move on to other areas of got to move on to other areas of your life, with a new baby on the your me, wan a new papy on me way, this might be that time." Beth Johnson, on hand to watch her Journal to water ner husband said, "I'm glad it's all over we can spend more time together ids. We just bought a new there's lots of things that

Surf Scene

This month's issu focuses on the San Diego Beach Front Residents Associatio (SDBFRA). The chaner of the organization is to bring together

all those with an interest ng the beach front environnatural—and to work together to mprove it now for all the residents.

Geographically, the focus of the SDBFRA ranges from Imperial Beach in the south to Carlshad in the north. Admittedly this covers an enormous range of beach front environments. The barrier islands of the Silver Strand (and the wetlands on the bay side of the strand) differ fundamentally from the vast ecology of such an island like Coronado, which differs, in turn, from the rapidly eroding cliffs of the North County beaches. But that diversity can be an opportunity for us, not a drawback.

Ultimately the main concern of the SDBFRA is to protect the environment. By presenting a cohesive front in dealing with such a wide range of issues, the SDBFRA can emerge as the single most important force to be reckoned with in dealing with beach front issues anywhere in the San Diego county.



Personal Press 2.0 — Makes you look like an expert!

DTP 0080 FaxFACTS 2502

Publisher: Aldus

Suggested Retail: \$199

System requirements: Mac Plus or higher (including PowerBook family and Quadra); System 6.0.3 or later (6.0.5 or later recommended); 1 MB RAM (2 MB recommended); hard disk drive.

MacVAREHOUSE

1-800-255-6227 Overnight Delivery Only \$3.00!

Call 24 hours a day, 7 days a week.

Circle 70 on reader service card

MWJ2S

NetWare File Access

NetMounter 1.00

PROS: Includes mapping between file extensions and creators. CONS: Can't access NetWare print queues; selection of Ethernet options is confusing. COMPANY: Dayna Communications (801/531-0600). REQUIRES: Mac Plus; System 6.0.5; NetWare 2.15c server; LocalTalk or Ethernet network. LIST PRICE: \$99; five-user pack \$399; ten-user pack \$599.



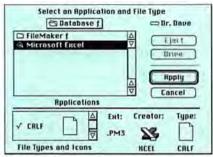
LTHOUGH NETWARE SUPPORT for client Macs has been around for the last few years, Macintosh users have had to rely on the installation of the proper software on the server before they could access files and printers. Dayna's NetMounter provides client software that can access Net-Ware file servers without the installation of Novell's NetWare for Macintosh software.

NetMounter is Chooser selectable, like the AppleShare Chooser resource; you can log on to a NetWare file server. NetMounter installs and uses NetWare's native protocol, IPX, on the client Mac. In contrast, Novell's NetWare for Macintosh receives AppleTalk protocols from a client Mac and translates them to IPX at the server. NetMounter does have a few shortcomings. First, it gives access only to NetWare file services, not to NetWare's print queues (not a problem for Mac and DOS workgroups that only want to share files). Second, NetMounter can't run AppleTalk Filing Protocol over IPX, which can be a problem for databases that use AFP's bytelocking feature (an AppleTalk protocol implemented in AppleShare servers) to offer multiuser support. Novell's NetWare for Macintosh supports AFP byte-locking because the entire AppleTalk protocol suite (including AFP) is supported on the server.

Although installing NetMounter on the client Mac is straightforward (NetMounter uses Apple's Installer program), configuring NetMounter is a bit confusing. For example, you have to select the type of Ethernet frames (packet format) you're using to communicate with the NetWare server. While the choice is normally between 802.3 frames and Ethernet II frames, as it is with NetMounter, I don't know why NetMounter includes a choice for the 802.2 SNAP format, which depends on 802.3. Fortunately, with only three choices, it doesn't take long to get the right one—that's when the Net-Ware servers appear in the Chooser.

NetMounter spares you the task of installing NetWare for Macintosh software on the server, but you still must rely on the NetWare administrator to create a Mac namespace on the NetWare file server. This namespace file is used to map DOS file names to Mac file names and vice versa, and is the basis for constructing a desktop file for the file server for use by client Macs.

NetMounter is a reasonably priced utility for companies that use NetWare servers but have only a few Macs. For companies with more than 15 Macs or where Macintosh users need access to the NetWare print queues, it is more cost-effective to install Novell's NetWare for Macintosh software on the server.—DAVE KOSIUR



NetMounter In NetMounter, you can open non-Mac files by using specific Mac applications. This screen shows how you select an application from your Mac and select the foreign file type that will be opened by that application. In this case, plain text files that have carriage returns and line feeds (CRLF), such as files created on DOS computers, will be opened by Microsoft Excel.

Calendar Program

AgentDA 2.0

PROS: Extensive display options; easy to use.

CONS: Expensive. COMPANY: Team Building
Technologies (514/278-3010). REQUIRES: Mac
Plus, System 6.0.7. LIST PRICE: \$129.



GENTDA IS A CALENDAR PROgram that was so exactly what I needed that I'm still in awe. It's easy to use, incredibly flexible, and does absolutely everything a calendar program should do, while remaining simple.

The calendar has two different displays, the list display and the grid display, and icons to let you readily switch between them. There are also selectors for the days of the week and the number of weeks, so you can display anything from a single day to five full weeks. I don't know why you'd choose to display the more unusual variations (such as four days of three weeks), but it's entirely up to you. The Preferences submenu enables you to change the appearance of the calendar, including date and time formats, fonts and styles, and a number of aspects of displayed activities.

Logging in activities is as simple as

double-clicking on the day box and typing the activity in the description window. (You can change—or ignore—the default values set via the Preferences submenu for displayed activities.) Each activity can contain up to 255 characters of information. If the day box contains more information than can be displayed, tiny arrows appear on the date line, allowing you to scroll up and down. You can also magnify any day box to full-screen size with a single click.

Just click and drag to move an event from one date to another. The time changes or remains the same depending on where you drop the event. (Holding down the option key copies the activity.) If you want to move several events from several days, you can have them retain their time relationship by holding down the # key while you drag; otherwise, they all land on the same date.

You create a recurring event by choosing the activity, pressing 36-D, and indicating in a dialog box when and how many times the event should be repeated. The choices for when are unlimited—every two minutes, every ten years, every third Tuesday, and so on. When you move or delete a recurring event, only the single activity is affected, unless you have used the Find command to locate an entire series of identical events.

The alarm function alerts you to an activity through a system sound and a reminder box. A remind-me-again option at the bottom of the box gives a wide range of choices—minutes, hours, or days—for when you'd like to see the reminder again.

It's easy to keep track of the things you've done and those you still need to do. One command places a check mark next to a completed activity; another finds the activities without a check mark. It's equally easy to make a complete list of unfinished activities—after you've found them, you can copy and paste the activities into another document, resulting in a neatly tabbed list, complete with date, time, and activity headings.

Other features include the Find command, which allows you to search for any activity; easy navigation using an icon that displays a monthly calendar, and another that returns you to today's date; a wide variety of printing options using the Page Setup dialog box; and the ability to open several calendars at once for easy scheduling of group activities.

Any Macintosh user will be able to use AgentDA instantly and effortlessly. (And if not, the manual is clear and straightforward, and tech support is fast and helpful.) The flexible display allows you to adjust the calendar to your own specifications and for your own needs, and every obvious calendar function has been included. AgentDA is a good, solid program with a great interface.—WENDY SHARP

Dynamite Comes in a Small Package...

Voice: Supra Authority Caller ID:

14,400 bps FAX

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Never before has so much power & technology been packed into a SupraFAXModem! The SupraFAXModem V.32bis combines a potent mix of fax and data features — for explosive results! Maximum fax potential is achieved with Group 3 fax machine compatibility at up to 14 400 bps

at up to 14,400 bps and Class 1 & 2 software compatibility. With raw data speeds from 300 to 14,400 bps, and up to 57,600 bps with V.42bis compression, it blasts data over telephone lines. Plus its revolutionary display gives you 25 different status reports! For just a little more, you can add caller ID and voice capabilities later this year. All this for a dynamite

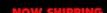
price! In addition to the \$399.95 stand-alone version (without cables and

software), the
Macintosh package
combines the
SupraFAXModem
V.32bis, cables,
and FAXstfTM,

MicroPhone™ 1.6, and CompuServe Information Manager™ software for \$479.95.

Supra Corporation

1-800-967-8772



Footnote/Bibliography Database Program

EndNote Plus 1.2

PROS: Integrated operation with word processor, rapid indexed searching; permits editing of formatted citations. CONS: Extension provided works only with Microsoft Word 5.0; no word wrap in library window. COMPANY: Niles & Associates (510/649-8176). REQUIRES: Mac 512KE; System 4.2. Recommended: Hard drive. (Extension for Word requires Mac Plus; 2MB of RAM; System 6.0.7.) LIST PRICE: \$249.



HEN I REVIEWED THE ORIGINAL version of EndNote, I concluded that it was worth its weight in gold for people like me whose writing incorporates references and bibliographies. Niles & Associates now offers an extension that makes EndNote Plus's features accessible from within Microsoft Word 5.0. After you install the extension, EndNote Plus's commands magically appear in Word's menus. (A desk accessory and stand-alone application provide the same functionality for other word processors.)

EndNote Plus functions as a reference database and a tool for inserting and formatting citations and creating bibliographies. The program provides 14 reference classes, including journal articles, conference proceedings, and books; you can create 1 custom reference type. Each record has space for 27 fields for authors, titles, volumes, keywords, and other information. To add a reference to a library file, you select the type of reference from a pop-up menu and fill in the fields. EndNote Plus also lets you import references from certain databases; for the full suite of import capabilities, you need Niles & Associates' EndLink, a companion program that lists for \$99.

The library window displays author, year of publication, and title for each work. There's no word wrap, so long titles disappear off the right side of the window, and there's no horizontal scroll bar to let you view the text you can't see. By default End-Note Plus displays references alphabetically by author, but you can sort on as many as five fields. Extensive search capabilities let you find references that meet specified criteria: you can scan for text strings in any field, and you can set up complex searches using AND, OR, and NOT operators. A special command locates duplicate references for you to weed out. Scanning a large database goes much more rapidly if it is indexed beforehand, but indexing every field consumes a lot of time and disk space. It's more economical to index only the Keywords field, but you must choose keywords carefully when entering references.

When preparing a paper or dissertation, building a bibliography is only half the job. You must still place citations into the text, a task that the new Word extension makes even easier than earlier versions of EndNote did. You simply select references in the library window, click at the right spot in your document, and select Insert Citation(s). For each citation, EndNote places a special marker in the text. (All references for a given paper must be in one library file, or else EndNote can lose track of citations.)

The final step is to select a style for the citations and bibliography. EndNote's ten preformatted styles suit just about any type of publication: you can specify everything from author order to text font and style. You can edit bibliographic styles and save them, making reformatting a document for different journals a snap. In earlier versions of EndNote, you couldn't add, delete, or change citations once a bibliography was compiled from your document; now, if you use Word, the extension provides a new command that lets you unformat citations and restore EndNote's original markers, so you can make as many alterations as you like.

EndNote's extension for Word represents a significant enhancement to an excellent product. If you're using older versions of Word or EndNote, it's a compelling reason to upgrade both.—FRANKLIN N. TESSLER

Educational History Game

Time Treks 1.0

PROS: Fun and challenging to play; extensive Archives stacks encourage browsing and learning. CONS: Limited animation and use of color; slow. COMPANY: Earthquest (415/321-5838). REQUIRES: Mac Plus; 2MB of RAM; System 6.0.5; hard drive. LIST PRICE: \$59.95.



N ECCENTRIC ARCHAEOLOGIST has been peering into the past through a number of doorways into time. Unfortunately, the absentminded scholar has left several time portals open, and tyrants from the past have skulked into the present, threatening to destroy the past and control the future. Your mission is to stop the tyrants by closing a majority of the 30 "time doors" on the game board. At the start of the game, each time door is hidden by a time tile. There are ten types of time tiles, each representing a different kind of historic challenge you must solve to earn points and close the time door. Each challenge is timed, and some of the more difficult challenges, if successfully navigated, close more than one time door. Closing 16 or more time doors jails that tyrant, provides you with a new tyrant to battle, resets the game board, and advances you to the next level. Higher levels give you more points, but less time to earn them.

The Time Treks Archives is a well-written series of stacks split into two main sections. The stacks contain information on such subjects as daily life, maps, science, war, empires, and others. Time lines show you a linear view of history, divided into historical periods (early civilizations, the Middle Ages, the Renaissance, and so on). You can zoom into each historical period to view specific time-line events in six topics (general, wars, empires, people, progress, and leisure). Archives facts are extensively cross-linked, so you can follow trends throughout history. You're encouraged to browse the



To the Next Level After you put the two tyrants at the bottom of the screen behind bars, the game board is reset with time tiles.

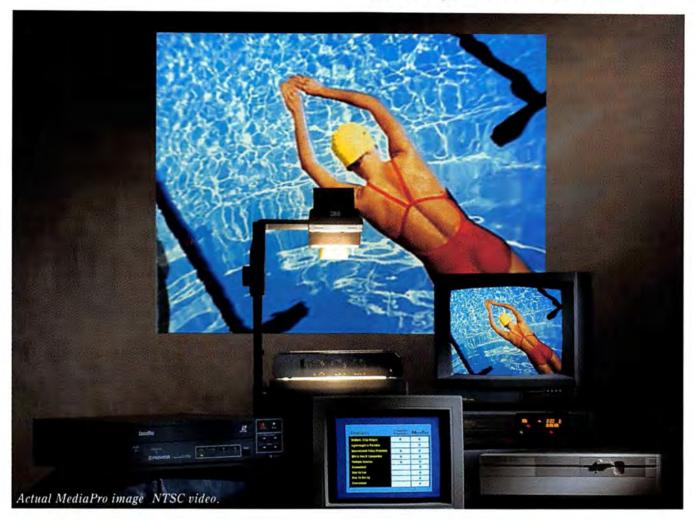
Archives to become a better Time Treks player. The Archives alone are a great reason to buy the package; they're an interesting minihistory text on disk.

Time Treks' problems can be traced mostly to HyperCard. The program is slow moving from one scene to another, and the feel of buttons and actions is not crisp. You often encounter a few seconds' delay between a mouse click and a response. At the higher levels, you finally reach a situation where even if you know the answer to a challenge, the game's slow response wastes too much time and you fail the challenge. Because of HyperCard, animation and the use of color are limited, although Earthquest has done an admirable job of squeezing in as much action as possible. In particular, I like the extensive use of digitized sounds.

One other caveat: the game is labeled for ages 9 through adult, but I found that it may be too difficult for some 9- and 10-year-olds. Of the five people who tested the game (ages 9, 10, 12, 14, and 36), the 9- and 10-year-olds needed the most time to navigate the Archives stacks to find the right answers. They tended to run out of time early in the game, preventing them from reaching the higher levels. Despite these minor drawbacks, Time Treks is a fun game, and the Archives are a valuable and enjoyable tool for browsing through history.

—TOM NEGRINO

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Adventure Game

The Secret of Monkey Island 1.0

PROS: Splendid graphics; continuous sound track; amusing story line; spectacular finale. CONS: Low screen resolution; copy protected. COMPANY: LucasArts Games (415/721-3300). REQUIRES: Mac II (also runs on LC); 2MB of RAM; color monitor; hard drive; System 6.0.7. LIST PRICE: \$59.95.



T ALL STARTED WITH A THREATENing note from my editor. "Keep it under
550 words, and don't miss your deadline—
or else!" Anxiously I ripped open The Secret
of Monkey Island and rummaged through
the box. Several minutes and 5MB of hard
drive space later, I found myself on Mêlée
Island, a community teeming with ghosts
and pirates. As I investigated my surroundings and traded dialogue by way of pointand-click conversation options, I got lost in
the escapades of my on-screen character.

I discovered early on that, although indisputably a drunken lot, pirates can be likable, polite, and even thoughtful as they swill their grog. But when I expressed a hankering to join their ranks, they turned me down flat, saying I was too inexperienced. In an attempt to gain the acceptance of my new heroes, I endeavored to become a master swordsman. I learned that to effectively wage battle I had to master the subtle art of verbal repartee. When a pirate attacked me with "I got this scar on my face during a mighty struggle," my first reaction was an inept "Oh yeah?" Needless

to say, he trounced me. But when I approached the cad armed with a deadly comeback I'd picked up from another pirate ("I hope now you've learned to stop picking your nose"), he ran from me screaming.

Just when piratehood seemed within my grasp, the evil ghost-pirate LeChuck made off with the island's beautiful leader, Governor Marley. I had to rescue her and I had but one hope: to recruit a three-person crew and head for the elusive Monkey Island.

The journey seemed doomed from the start. Equipped with a ramshackle schooner and a mutinous crew, I had to rely exclusively on my own wits. Unfortunately, I spent most of my time on board just trying to feed myself. Then, after a severe bout of food poisoning, I awoke to the astounding sight of Monkey Island, more splendid and terrifying than I had imagined.

Did I vanquish the demon LeChuck and rescue the governor, or did I perish miser-



Pirates of the Caribbean This composite screen shows the Disneyesque world you explore above and below the surface of Monkey Island.

ably in a river of lava? Sorry, I'm sworn to secrecy. But I will say this: The Secret of Monkey Island uses 256-color graphics and an original sound track to tell a genuinely amusing tale of swashbuckling and daring deeds. If you're worried about whether it's suitable for kids, rest assured. You can't even get away with stealing, let alone the more unmentionable pirate crimes.

Alas, even a good thing can be better. Like all of LucasArts' cross-platform adventure games, Monkey Island's screen resolution is limited to 320 by 200 pixels, so the images are pretty jagged. Also irksome is the game's cumbersome date-wheel copy-protection scheme. But compared with most adventure games, in which the smallest mistake may be punished by death, forcing you to restart from the last point saved, The Secret of Monkey Island is very forgiving. It's a genuine interactive pleasure for kids—and certain kidlike adults.—DEKE MCCLELLAND

Martial-Arts Game

Blade 1.1

PROS: Stunning graphics. CONS: Extremely difficult to win; no scoreboard. COMPANY: Leviathan Corporation (313/826-3560). REQUIRES: Mac II (also runs on LC); 2MB of RAM; hard drive. LIST PRICE: \$99.95.



LADE IS A FANTASY MARTIAL-ARTS game whose object is to collect all the pieces of a "teleporter" from the right-hand side of the screen and then throw the switch on the assembled vehicle to travel to the next level. To win the game you must proceed through five levels, each consisting of three screens. To assemble the teleporter, Blade must simply touch each piece, which automatically moves to its correct position. But be forewarned, each piece is guarded by an assortment of strange-looking creatures whom you must battle before you can acquire it.

Your character, a warrior named Blade, is a martial-arts expert who turns somersaults, kicks, and thrusts to vanquish the creatures (he moves more slowly than the attacking creatures, so outrunning them is almost impossible). Mastering the many

moves and combinations of moves takes a lot of practice. Your only weapons are a pair of knives attached to your hands. Some opponents survive several slashes before dying, and some cannot be killed at all—the only way to know which ones are which is through trial and error. You also have opportunities to collect pieces of body armor to make Blade stronger against attack.

The graphics in Blade are spectacularly surreal. The backgrounds remind me of a cross between Salvador Dali paintings and illustrations from a Dr. Seuss book. The creatures come in all

shapes, sizes, and colors. The first screen, for example, features a squidlike monster that hovers in the air and attacks you. While you fight the squid, roly-poly purple creatures spring from the ground and try to mow you down (see "A Moment to Reflect"). Music and sound effects also enhance the game.

Battles shorten your life; killing an opponent gives you a longer life. Two small gauges in the upper left-hand corner of the screen show how much life and fighting power you have left. When your life energy runs out, Blade dies and the game ends. Unlike most arcade games, in which you are



A Moment to Reflect Blade pauses to survey the surreal landscape before attempting his descent. The heart and shield in the upper left-hand corner represent remaining vitality and strength.

given three or four characters, Blade gives you only one. An option allows you to resume the game at the level at which you left off.

A word to the wise: although it is easy to learn, this game is not for amateurs. I spent many frustrating hours just trying to advance past the first screen. When I first started, I kept getting killed within the first 30 seconds of combat. You can vary the speed of play, so you can choose a slow setting while you learn the moves, speeding up later when you feel ready. If you have lots of patience and an appetite for challenges, Blade will give you a run for your money.

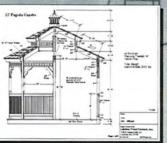
-RICHARD POPKO



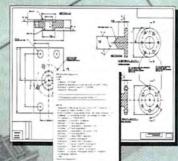
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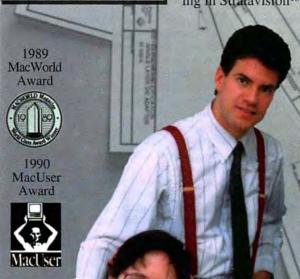
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Freedom 120

PROS: Portable; very quiet. CONS: No batterypower gauge; no automatic sleep mode; SCSI cable not provided; comes unformatted; skimpy manual. COMPANY: Maxen Corporation (619/558-6985). REQUIRES: Mac Plus. LIST PRICE: With standard battery \$999; with extended-run battery \$1039.



IRED OF GROPING FOR A POWER outlet when you tote a hard drive to another Mac for swapping large files? Need more disk space than your PowerBook's internal hard drive has? Want a hard drive that keeps going during a power failure? Maxen's Freedom 120, with a formatted capacity of 114MB, answers these demands.

The Freedom 120 has no power cord, just two 50-pin SCSI ports, a push button for setting the SCSI ID, and automatic termination, so you'd think it would be simple to hook up. Unfortunately, the automatic termination doesn't work with all Mac models, and the drive's manual offers no advice on termination. After much experimentation, I discovered that I had to add an external terminator to get a PowerBook 140 to

recognize the drive. Also, the manual tells you to connect the drive while the Mac's power is on. Apple's Mac manuals explicitly warn that this practice "can cause permanent loss of information and damage to your computer equipment."

The evaluation unit arrived unformatted, without a SCSI cable, and with a dead battery. Formatting is time-consuming and unnerving—if you're not careful you can wipe out another hard drive connected to your Mac with the Disk Manager Mac software (or any other formatting software). After spending a fruitless hour trying to format, I called Maxen and learned I had to restart my Mac with all system extensions (INITs) turned off before formatting. The manual does not mention this unusual requirement. Most vendors ship their hard drives already formatted, a practice that Maxen plans to implement soon.

The Freedom 120 demonstrated respectable performance in my speed tests: when connected to a PowerBook the Freedom duplicated a 3.2MB file and a 3.2MB folder slightly more slowly than the PowerBook 140's built-in 40MB hard drive did. On a Mac IIci, with its faster SCSI port, the Freedom 120 duplicated the folder 24 percent faster and the file 37 percent faster than it did on the PowerBook.

Charging the battery takes 2 to 3 hours, depending on if the drive is off or on. You must time the charging cycle as well as drive use because there is no gauge that shows the amount of charge. A red light on the drive glows about 30 minutes before the battery runs out, and an alarm sounds when about 10 minutes remain. A fully charged battery lasts about 3 hours (4 hours with the more expensive, extended-run model). The drive has no automatic sleep mode like the Power-Book's, so if you go away and leave the drive on for a couple of hours, you will come back to a system error. Maxen hopes eventually to have an on-screen battery indicator.

The Freedom drive measures 6.2 by 8 by 2.3 inches and weighs 3.7 pounds, and is about half the size and weight of a Power-Book 140—hardly the smallest or lightest portable drive around. It owes its size and its relatively high capacity to its 3½-inch disk mechanism, which is more than twice the size of the lower-capacity 2½-inch mechanism used in PowerBooks and pocket hard drives. When you travel with a Freedom drive, you must carry along its power adapter (about the size of three decks of cards), the power adapter's conventional grounded power cord, and a SCSI cable.

Despite its weaknesses, the Freedom 120 does its job—providing hard drive storage for three to four hours without a power cable. It's worth considering if you have a driving need for self-powered disk space.

-LON POOLE

Business Data Sets

Perspective 1.5

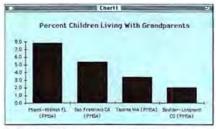
PROS: Large set of business demographic information; manual provides intelligent discussion of applications. CONS: Can't generate maps from a spreadsheet. COMPANY: U.S. Data On Demand (717/485-5630), REQUIRES: Mac Plus; spreadsheet that can read SYLK files. LIST PRICE: \$129.95.



ERSPECTIVE, WHICH U. S. DATA ON Demand describes as a business-development information tool, is a collection of United States demographic and economic information, presented in tabular form and grouped by city, county, and state. The Macintosh version consists of 59 files of data (on five disks), stored in SYLK format so it can be called into any spreadsheet: Microsoft Excel, Claris Resolve, Lotus 1-2-3. U.S. Data On Demand advances the simple idea-one of the articles of faith of doing business-that if you look at population and business trends, you can figure out what your own business should be doing next.

Perspective gives you standard types of data on 50 states, from acres of state parkland to welfare outlays. Employment and unemployment data, utilities costs, education levels, crime statistics, population changes, health and hospital data, divorce rates, and auto sales—it's all there. While state figures are interesting and can give rise to many a political discussion (compare a state's outlay for education with its percent of population in prison for a quick conversation starter), the data on standard metropolitan areas are more helpful in business planning.

It may not be obvious to people just starting out in business, but the Dallas-Fort Worth area in planning terms is an identifiable economic unit, whereas Texas is a collection of areas on a map comprising several

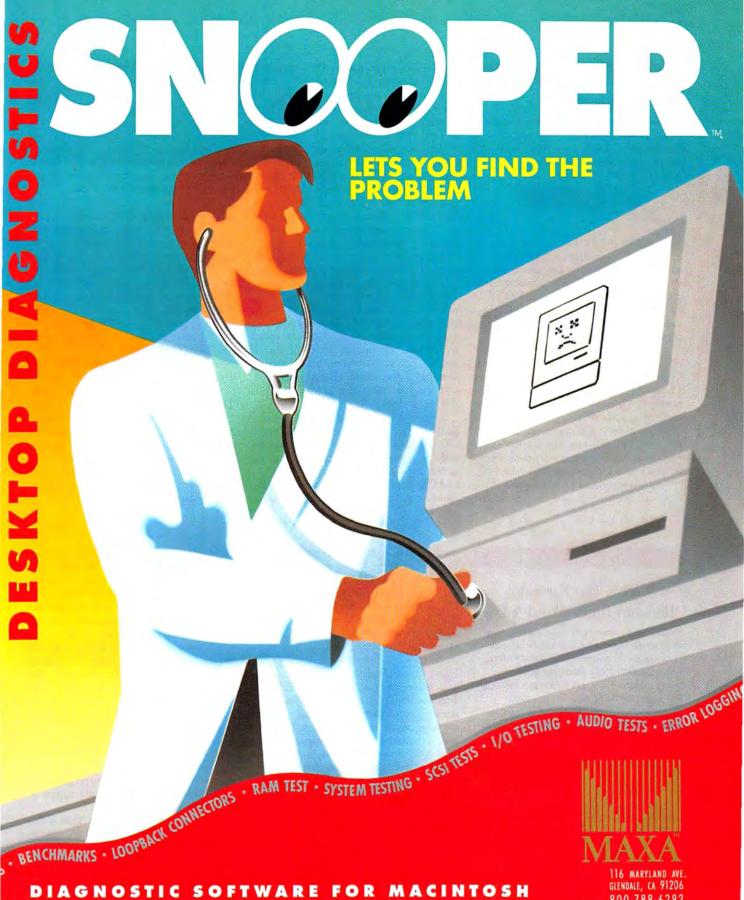


Happiness Is In this bar chart, Perspective shows your prospects of unloading an overstock of "Happiness Is Being a Grandparent" bumper stickers in various metropolitan areas. The original file contains data on hundreds of metropolitan statistical areas in the United States.

distinct economic units. In Perspective, city data is collected into metropolitan, primary metropolitan, and consolidated metropolitan statistical areas, with a special set for New England counties. The level of detail and completeness is impressive; consider the fairly obscure demographics related in "Happiness Is."

Although Perspective is purely a data set-rather than an application-it is valuable as an aid to making decisions about advertising, expanding a business, or contracting a business. The manual contains one of the more enlightened discussions of demographics in business planning. For maximum usefulness, you probably need to buy Geo-Query or an equivalent mapping programyou don't get an easy, at-a-glance overview of nationwide data on hundreds of metropolitan areas by inspecting hundreds of tiny lines in a Microsoft Excel bar chart (perhaps U.S. Data On Demand could include a modest map utility in a later version). Similarly, to examine most of the data in this compilation properly, you will need a fullfeatured statistics program (SYSTAT, for example), so that you can determine the actual significance of state-to-state or metroto-metro differences. But even without mapping, Perspective's reasonable price at least puts useful primary data within reach of even the smallest businesses.

-CHARLES SEITER



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Sound Manipulation and Audio CD Control

Audioshop 1.0

PROS: Fun; includes editable sound effects; inexpensive. CONS: Quirky bugs. COMPANY: Opcode Systems (415/856-3333). REQUIRES: Mac Plus; 2MB of RAM (4MB under System 7); System 6.0.7. LIST PRICE: \$89.95.



UDIOPHILES WILL GET A KICK out of Audioshop. It enables you to apply sound effects to any sound file on your Macintosh and control the order of songs or sounds on an audio CD in a CD ROM player. You can even use Audioshop to insert vocal commentary and sounds between songs.

The program's on-screen CD ROMplayer controls are fairly straightforward. They look and work just like the controls of a high-end audio CD player, with some advantages. Opening the playlist and then clicking on a bar above the playlist expands the list to show you all the tracks on the audio CD. The software marks each audio track as untitled, but you can title it simply by clicking on the word *untitled* and typing.

Audioshop includes sample sound effects and short songs you can experiment with, or you can play with sounds on your hard drive. Try lowering the pitch on the monkey squeak in your system, for example, or add an alien vibrato to a recording of your own voice. When you open a sound file, the selected sound or recording is shown as a sound wave. You make changes by clicking on an effects tool in a palette next to the sound wave.

The echo, vibrato, and "flange" sound effects—which create a decaying echo, a vibration effect, or a drive-by effect—can all be adjusted to produce a variety of results, and one sound effect can be layered atop another. You can apply effects selectively to sections of the sound file. The software does not have the level of control or detail a professional-level MIDI sound editor has, but the advantage of that is you do not have to worry about making a mistake; the sound effects are preset, and most of what the product does is self-explanatory.

Unfortunately, version 1.0 is incompatible with Now Utilities. Also, the audio CD title should appear as entered, but instead it appears as "Untitled 1" in a box in the upper left-hand corner of the virtual CD player; Opcode has not been able to correct this problem without making



Virtual CD Player Audioshop has a familiar audio CD player interface, representative of the program's ease-of-use.

Audioshop crash more frequently.

A number of minor annoyances may confuse new users. For instance, if after recording a sound for editing, you again click on the Record button hoping to add more sound, the program simply erases what has already been recorded without any warning. Audioshop also tends to be memory hungry. It had no problem on a 20MB Quadra 700, but it sometimes balked at editing sound files on an 8MB Mac II.

Nevertheless, I recommend this program to anyone with a CD ROM player, a microphone, and a collection of sound files. The manual is concise and clear, and I found Opcode's technical support staff knowledgeable and easy to reach. Opcode promises that updates to fix the bugs will be free. However, since there's no competition for this product at this price, Opcode could have waited to release the product without the bugs.—CAROLYN BICKFORD

Daily Planners and Calendars

Cathy; The Far Side; Random House Word-A-Day

PROS: Great cartoons; easy to use. CONS: Application must be running for alarm to function; graphics take up a lot of hard drive space. COMPANY: Amaze (206/820-7007). REQUIRES: Mac Plus; System 6.0.5; hard drive. LIST PRICE: Cathy Daily Planner \$59.95; The Far Side Computer Calendar \$69.95; The Random House Word-A-Day Daily Planner \$59.95.



HE FOLKS AT AMAZE HAVE DONE their part to make scheduling more fun with three new Mac-based calendars. Two offer daily levity from popular comic strips: Cathy Guisewite's "Cathy" and Gary Larson's "The Far Side." The third, The Random House Word-A-Day Daily Planner, presents a multiple-choice quiz each day that asks you to pick the correct definition for a moderately difficult word ("two-dollar words," we used to call 'em).

The three packages are sold separately, but each is based on the same core calendar program. You can purchase refills (\$19.95 for Word-A-Day, \$24.95 for either comics package). The calendars start on the day you begin using them, so you won't be cheated if you buy one in December.

The daily planners are heavy on graphics—they offer not just cartoons, but an icon-based interface as well. Click on an icon to view your planner by day, week, month, or year, then click on arrows to move forward or backward in time. The Event Editor displays an array of icons as well; a dozen animated icons help call your attention to important events—balloons and streamers for a party, for example. Type in onetime events or recurring ones, and the planner adds them to the appropriate day or days. You can even set an alarm to remind you of an event, and you can print your calendar in day, week, month, or year format.

I can't complain about the cartoons; Gary Larson is my all-time favorite cartoonist, and I've always empathized with Cathy's eternal struggle against her in-box. The cartoon panels translate remarkably well to the Mac's screen; the drawings are crisp and the captions are readable. As a bonus, each cartoon package includes several animations that pop up at random intervals; I got a kick out of watching a gang of "Far Side" penguins cruise across my screen.

I have a few complaints about the programs, however. I liked The Far Side Computer Calendar the best, not only because "The Far Side" is my favorite comic, but also because it took up a lot less room than Cathy did: 1.8MB for The Far Side versus 4.4MB for Cathy (which contains multipanel strips). Granted, you can install a few months' worth at a time to save space, but installing them in batches is a chore (the calendar program itself takes up 370K).

Although the Word-A-Day package was the smallest of the lot (1.5MB), I was disappointed in the selection of words. For example, here are three words chosen at random from Word-A-Day: mentor, ulterior, and peccadillo. I don't imagine I'm much more lexically erudite than the next person (although studies have shown that I'm smarter than the average bear), but I missed only two or three words a month. What's the fun of that? And I wish the program had included some etymological information to supplement the definitions.

Worse than the programs' bulk is that they must be running in order for the alarm to sound. (Visionary Software's First Things First, JAM Software's Smart Alarms, and Essential Software's Easy Alarms are activated when you start up your Mac.)

Amaze's cartoon packages are clear winners in the fun department, but I can't stand to use up a megabyte or so on my paltry 80MB hard drive. As for the Word-A-Day, it's a pleasant diversion, but I wish it were more challenging, and therefore less apt to induce a stertorous state.—ERFERT FENTON

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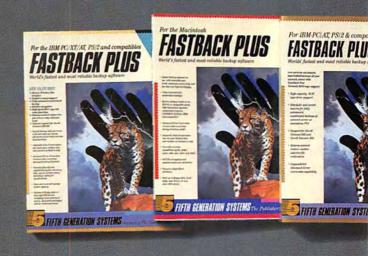
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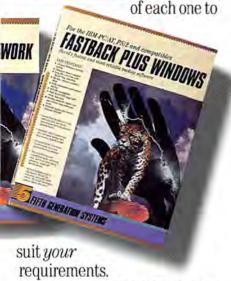
In fact, if the people in your company are like those at most other companies, about the only way you're going to get regular backups out of them is to do it without them.

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Not to mention every DOS and Windows based PC and Novell network server.

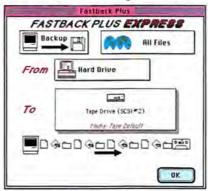
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It even formats floppies on the fly, so you don't have to bother.

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In addition to floppies, hard disks and other HFS devices, Fastback Plus for the Macintosh lets you back up to direct access and streaming tape drives.

vaunted 24-hour toll-free technical support. And our one-year money-back guarantee.

There's more. So pick up the phone. Dial 1-800-477-8212.

And tell everyone to stand back.



Medical Simulation Game

Surgeon 3, The Brain

PROS: Realistic graphics and sound; entertaining.
CONS: Need to make screen captures to print
instructions; can't save game in progress; overly intolerant of mistakes. COMPANY; ISM (410/
560-0973). REQUIRES: Mac Plus; 2MB of RAM;
System 6.0.7; hard drive (4MB of RAM, video board,
and color monitor for color). LIST PRICE: Blackand-white version \$49.95; color version \$59.95.



F YOU TURN GREEN AT THE thought of cutting into a rare steak, Surgeon 3, The Brain, is not for you. But if you've ever had the urge to root around inside someone clse's head and can't afford medical school, give this game a look—if you have a high tolerance for frustration.

Surgeon 3 is the third surgical simulation from the folks at ISM and the first to fully support color. The fun begins when the patient arrives at the hospital in an ambulance. At the bedside, the emergencyroom nurse and the patient's family fill you in on the patient's condition and any pertinent allergies or other medical problems.

Then you get to do a simple neurological exam on the patient's face, arms, and legs. You can test speech, reflexes, muscle strength, and sensitivity to pain, as well as pupillary light response and eye movements. It's engaging the first few times, but the routine soon becomes tedious. Next you can order an angiogram, skull X ray, or a CT (computerized tomography) or magnetic-resonance scan before recommending a therapy. The quality of the diagnostic images is sufficient to enable you to render an opinion, although I lost a few patients before finding that the program doesn't follow the display standards most radiologists use.

If you don't know the difference between a subdural hematoma and an aneurysm, some background reading is in order. All the intricacies of examining patients, interpreting test results, making a diagnosis, and operating are covered in textbooks in the hospital library and lounge. But you



Brain Drain Draining a subdural hematoma is the simplest surgical procedure in Surgeon 3.

can't consult references while you're busy at the bedside or in the operating room, so you'll need a hard copy. Unfortunately, you must capture screen shots of the pages in order to print them.

If the patient makes it to the O.R. without succumbing from an allergic reaction or some other untoward event, you can start operating. The operating room is quite realistic-the heart monitor beeps, the respirator "breathes," and an attendant names each instrument or supply as you select it from a pull-down menu. You begin by preparing the head for surgery, cutting the scalp, and drilling through the skull. What you do next depends on the diagnosis. Even with printouts, however, it's sometimes hard to judge. Plus, every so often the game gives you an abnormal heart rhythm or other problem to contend with. Especially frustrating is how little time you have to respond before the patient dies and you hear from the lawyer. Real patients don't go downhill that fast, unless it's on a runaway gurney. And you can't save a game in progress, so you must start each operation over if you quit before finishing.

Overall, Surgeon 3 is an impressive piece of software, and it can be both entertaining and educational. But being forced back to the beginning every time you foul up can lead to major headaches for you and the patient.—FRANKLIN TESSLER, M.D.

Online Style Reference

Correct Writing 2.0

PROS: Convenient DA version; clear examples for most rules. CONS: Incomplete coverage of rules. COMPANY: Wordstar International (800/523-3520). REQUIRES: Mac Plus; System 6.0.2 for DA, System 6.0.5 for application; second disk drive; HyperCard 1.2 for DA. Recommended: Hard drive. LIST PRICE: \$59.



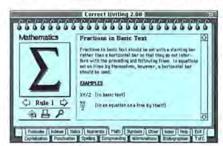
EARS AGO MY MANAGING EDITOR gave me a 1953 edition of the United States Government Printing Office Style Manual (GPO) he'd found in a used-book store, complete with the previous owner's notes in the margins. The publishers I've copyedited for adhere to the Chicago Manual of Style and Words into Type, so my gift sits unused. Now Wordstar offers Correct Writing, an online style guide largely drawn from GPO rules and presented in a Hyper-Card-based format that allows you to append your own notes. I wonder if this edition will sit unused on my hard drive.

Correct Writing is organized into 13 categories of style rules, including spelling, punctuation, compounding, bibliographies, and numerals. Wordstar provides two ver-

sions—a desk accessory and a stand-alone application—that differ only slightly. You can invoke the DA from within another program; and when using the application, you can launch one other linked program.

Wordstar recommends the DA for systems with no more than 1MB of RAM and says the application should be fine on Macs with more than 1MB of RAM and System 6.0.5. However, with 4MB on my SE/30 running under System 7, opening memory-hog Microsoft Word 5.0 and Correct Writing meant juggling memory sizes and settling for slow Word performance.

Correct Writing packs quite a bit of useful information into the stack, but it's far from complete, especially when compared with the Chicago Manual, Words into Type, or



Easy Navigation Click on a category title along the bottom of the card (say, Math) to see a list of subcategories; click on a subcategory (such as Mathematics in Type), and the card flips to the first rule.

Petroglyph's online reference, Editorial Advisor (\$149.95), which draws on a library of reference works. While many of its style rules echo those found in text reference works, the program offers no guidance for some common questions, such as whether to italicize the punctuation immediately following an italic passage. For me, the convenience of a DA doesn't make up for that lack of completeness. I don't mind thumbing a reference book as long as it has what I need.

Correct Writing's strengths include its convenience and fine organization, an extensive list of frequently misspelled words, a strong guide to compounding words, and proofreader's marks. Still, I trust Webster's Ninth New Collegiate Dictionary more for spellings and to determine if an anglicized word should retain its diacritical marks. Correct Writing's rules are to the point and accompanied by clear examples. A hypertext index takes you directly to the pertinent card when you click on an entry; you search by keyword, and you can print any page.

For Macintosh users who are a little unsure of the elements of style, Correct Writing offers a convenient and comparatively inexpensive alternative to stocking up on reference books. If you're willing to follow the GPO's advice when setting your house style, or if you deal with government documents in your work, Correct Writing may be the online reference for you.—PAUL KING

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Arcade Game

Cyberblast 2.01

PROS: Levels change randomly; varying degrees of complexity on levels; appealing graphics. CONS: Inaccuracies in manual; not incredibly original.

COMPANY: Innerprise Software (410/560-2434). REQUIRES: Mac Plus. Color version: Mac II; 4MB of RAM; System 6.0.5. LIST PRICE: \$49.95.



ISASTER HAS STRUCK AT FAST-rax Labs—those crazy scientists have unleashed a nightmare! Aliens from another universe are pouring in through a mysterious portal and only you, Darik Starr, can save the lab by finding the missing control chip to the Controlled Transuniversal Portal generator—after you battle your way through 64 levels of ugly aliens, bizarre traps, mysterious objects, et cetera. OK, OK, so it sounds corny. It's still lots of fun.

Although the scenario of Cyberblast might be cliched, the execution is clever. As with most games of this type, the basic goals are to shoot or outrun the bad guys, scoop up miscellaneous objects, avoid traps, and find the keys that allow you to move on to the next level—all while staying within time limits and watching your energy level. Still,

Cyberblast has a couple of unusual features.

Instead of the typical reincarnation principle of many arcade games (where you accumulate lives), in Cyberblast you play two characters, Darik Starr and his arch rival, Harris. The characters have different attributes, and on each level you must choose which one will play. This forces you to learn the levels and think about which character will have the most success with the different perils you face. The differences are not immense, but once you've accumulated some objects (zappers, ID cards, maps, grenades, and bombs), they can be crucial.

Another nice feature is that, with the exception of the first level, the order of the levels changes randomly from game to game. (The last level might also remain constant—I admit I never saw it, nor do I expect to ever see it.) The levels do get progressively more difficult, but the varying order means that even on the easy levels you don't get bored. Each level is different; some are very simple, others quite complex.

The graphics are appealing. My favorite aliens resemble tomatoes in the blackand-white version; others look like soccer balls, giant plants, and bubbling slime.

There are other aspects of Cyberblast that I'm not totally happy with. First, the manual's descriptions don't quite match the reality of the game: zappers, for example, do not always kill everything on screen as promised. (However, it was accurate about the commands and other important stuff.) Also, controlling characters' movements is sometimes difficult. Finally, I would like a Save Game feature, since making it through 20 or 30 levels (much less all 64) takes a fair amount of time. Without that feature, there's no chance I'll save the universe.

Cyberblast is a nice, basic shoot-'em-up. If you're opposed to computer game violence, it's not for you. Still, if you like exercising your hand-eye coordination, if you find shooting nonexistent aliens relaxing, or if your forte is saving the universe, check it out. It's not the most unusual game in the world, but it's fun.—WENDY SHARP



Cyberblast This scene shows extra energy (at the top), a grenade, extra points disguised as treasure, and plenty of green, attacking aliens. The squares with the blue and pink symbols are incubators, which produce more attacking aliens.

Color Printer Driver for ImageWriter II

MacPalette II 2.2

PROS: Inexpensive color output; puts your Image-Writer II back to work. CONS: Less than state-ofthe-art results. COMPANY: MicroSpot USA (408/ 253-2000), REQUIRES: Mac II; ImageWriter II; four-color ribbon, LIST PRICE: \$69; LocalTalk version \$249.



N THE EARLY DAYS OF THE MAC, IF you wanted to buy a printer, you were essentially limited to choosing between an ImageWriter II and coughing up seven grand for a LaserWriter. Today, there must be a million ImageWriter II printers out there, most of them underutilized. With MacPalette II, a new printer driver, MicroSpot hopes to change that.

MacPalette II enables you to print images from 8-bit and 24-bit color programs on an ImageWriter II with a four-color ribbon. The results won't cause vendors of thermal-transfer color printers to lose any sleep, but for adding inexpensive color to PTA-meeting handouts, social-club fliers, or signs to post around your store, MacPalette II is just the ticket. The Image-Writer II was always capable of printing the

eight original QuickDraw colors, a capability some early color programs used for spotcolor output. But ImageWriter II output options sort of withered away in the face of 8-bit and 24-bit color. MacPalette II not only puts your ImageWriter II back to work, but goes beyond spot color.

MicroSpot claims MacPalette II can produce 250,000 colors. Of course with a four-color ribbon, in actuality it's the illusion of that many colors that MacPalette II produces. To get around the ImageWriter II's color limitations, MacPalette II uses dithering to approximate color halftones. Actual four-color halftones reproduce images using variable-size dots that in combination appear as different colors or grays. MacPalette II cannot vary the size of dots that the ImageWriter II print head produces, but by changing the mix of color dots and white space, it does produce a reasonable likeness of color halftones. MacPalette II can print gray scales on an ImageWriter II equipped with a black ribbon.

MacPalette's dithers are quite good, resulting in colors that are evenly toned and closely related to the shades on screen—adequate for a quick color comp. Of course, the printed page is no match for the vibrant glow on your monitor, plus you lose some image detail. Where dithers require a lot of white area, individual dots are clearly visible. However, as with pointillistic paintings, the overall look is pleasing from a distance.

To install the driver, you simply drag MacPalette II to the System Folder and select it in the Chooser. It's compatible with virtually any program that can address QuickDraw printers. This rules out Adobe Illustrator, which can output only to Post-Script devices, and UltraPaint, which must print from its composite layer. With programs that offer multiple printing options, such as ColorStudio, you must remember to select QuickDraw output.

If you've printed any document from a Mac, you already know how to use Mac-Palette. The only difference is there are Print dialog options that let you alter the character of the dither, and select color or black-only ribbons. An image-scaling option is available in the Page Setup dialog box.

Documentation is minimal—two readme files covering installation, hints on using printing options, and possible problems and their solutions. Possible problems relating to hardware are not covered. A sticky printhead pin, for example, can significantly degrade print quality. For best results, consider giving your ImageWriter II a tune-up.

MacPalette II won't quell your yearning for high-quality color output, but thermal-transfer printers have yet to become really affordable. Besides, \$69 is not much to pay for a new lease on your ImageWriter II's life.—CARLOS DOMINGO MARTINEZ

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The Case (etc.) for the PowerBook

BY DAVID POGUE

S THE T-SHIRT SAYS, WHAT separates us from the animals is our ability to accessorize. Here's an overview of the latest plug-ins, add-ons, and wraparounds for Apple's wildly popular Mac PowerBook laptops. I'm not going to discuss big-ticket items like hard drives; anyone who's just spent several grand on Apple's latest appliance probably isn't in the mood to buy much more than gewgaws (or, more to the point, I'm not).

LapStrap

THIS MINI-TABLE (FLAT FOLDING TECHnologies, \$49.95) straps to your thigh; it's designed to be a stable platform for legtop computing. You're going to get some funny looks—but then, anyone who uses a PowerBook in a public place is used to getting attention.

To fasten your PowerBook to the platform, you have to apply Velcro strips to your machine. (The platform has some elastic straps as an alternative, but they interfere with the mouse buttons and screen controls.) The Velcro holds the PowerBook so firmly that you can almost walk around with it stuck to your leg like a Sony Leechman. The elastic leg straps were designed with a somewhat unrealistic conception of the average person's thigh size; it'll be a tight fit for some. But even for PowerBooking lying down, this contraption is steady and sturdy.

Cable Safe

WITH THIS IMPRESSIVE \$39.95 SECURITY kit from Security Concepts, you can leave the PowerBook alone in your hotel room without worrying. Cable Safe is a rugged steel strip that screws into the sockets normally occupied by the PowerBook's case screws. Using the included cable and padlock, you chain the machine to the nearest piece of plumbing or immovable furniture. The added hardware doesn't do much for your laptop's looks or weight—especially since it prevents the machine from sitting flat—but better a tilted, heavy machine than a missing one.

Automobile Power Adapter

FOR THOSE IN THE CAR-AND-BOAT SET who can't even tear themselves away from

their PowerBook while humming down the highway (or splashing through the surf), consider Lind Electronic Design's car/boat adapter (\$99.95). Once you shove the adapter into your cigarette lighter, the PowerBook earnestly believes that it's plugged into a regular outlet.

My adapter emitted a high-frequency whine, like a transistor TV. It drove me (and probably the local dogs) nuts, even after I wrapped the wallet-size adapter in a Spider-Man towel; but in my decidedly unscientific sampling, nobody older than about 45 could hear it. Lind will send you a replacement if you get one that, as the company tactfully puts it, "sings."

Power Adapter DC7.5PB

EMPIRE ENGINEERING'S CAR/BOAT adapter (\$99) works just like Lind's, but it's smaller and better-looking; it automatically adapts 24-volt current (as found on commercial planes and vehicles) as well as the standard 12V cigarette-lighter current; and it doesn't sing, dance, or act. It even costs 95 cents less. Now you can get that presentation finished up by the time you dock in Miami.

Auxiliary Power Pack

ANOTHER OFFERING FROM LIND: A \$189.95 megabattery. Built into a textured plastic housing, it looks like a tackle box for Munchkins—but it weighs 5 pounds.

I set up a self-timing benchmark test that woke the hard drive every

other minute; the screen was dimmed to half. A newly charged PowerBook battery survived this treatment for two hours; the bricklike battery kept it alive for eight. (You can recharge the brick from either a wall outlet or a car/boat cigarette lighter.)

Battery Charger/ Reconditioner

AS LIFE WITH YOUR POWER-Book 140 or 170 battery goes on, residual chemicals from repeated chargings gradually diminish your battery's capacity. To restore the battery to its virgin state, you must discharge it completely, which you can do by leaving the



Providing

padding, protection, or

power for your

PowerBook

PowerBook on, ignoring the out-of-juice messages, until it blinks into a coma.

If it's worth doing right, here is yet another powermeister from Lind (\$189.95)—a battery charger/reconditioner. In an eight-hour process, it sucks every last drop of juice out of the battery, then charges it. My grueling benchmark test showed that the PowerBook does almost as good a job at charging the battery (the same two-hour battery mentioned above lasted three hours after being emptied and refilled, whether by the Power-Book or the Lind gizmo)-but you could use the Lind device to juice up an extra battery. (The PowerBook 100 battery doesn't need to be discharged in this way; Lind's charger-only costs \$149.95.)

Power Partner

ANOTHER MEGABATTERY (INTEREX COMputer Products, \$59.95). The twist: this one takes eight alkaline D-cell batteries. There's a certain appeal to that—you can't always find an outlet, but you can always find flashlight batteries. In my tests, the Duracells lasted eight hours to the PowerBook battery's two.

The black brushed-aluminum brickshape device isn't the height of engineering perfection. You have to remove two screws to change batteries, and the puny 6-inch cable means you get to carry this 3.3-pound baby in your lap all the way to La Guardia. (The impending redesign may iron out some of the glitches.) Still,

> if you can swallow the environmental irresponsibility of chucking eight batteries at a pop, the idea is a gem.

BookEndz

THE BUZZWORD "DOCKING station" has been hot ever since Apple hinted at a new PowerBook model that will leave behind its floppy drive and connectors in a single unit on your desk. Pilot Technologies doesn't want you to wait: its BookEndz docking station for the model 140/170 is here now. Well, almost.

You'd hope BookEndz would be a compact peripheral into which you plug your key-

	1/0	1/0	Kensington	Kensington	Madson	Magenta	Magenta	Pastel Developmer
	Design	Design	Microware	Microware	Line	Seven	Seven	Corporation
	Ultimate	Ultimate	NoteBook Traveler	NoteBook Traveler	PowerBook	Magenta-	Magenta-	Pastel
Product	Notebook EX	Notebook SL	Deluxe Case	Compact Case	Case	Case	Case Lite	TravelCase
Price	\$129.95	\$119.95	\$149.95	\$79.95	\$129.95	\$119.95	\$39.95	\$79.95
Outer surface	Cordura	Cordura	nylon weave	nylon weave	Cordura 1	Cordura	nylon	Cordura
Warranty	lifetime	lifetime	lifetime	lifetime	lifetime	1 year	1 year	lifetime
Handle-wrap material	Cordura	Cordura	foam rubber	foam rubber	leather	none	none	nylon
Separate magazine-size compartment with flap	•	•	•		•	0,	0	•
Room for accessories		•	•	O	• 1		O	•
Colors	black, navy, teal blue	black, navy, teal blue	black	hlack	purple, green†	black, dark gray	black, blue	black
Protective feet on bottom		D	0	0		0	0	
U.S. made	•		0	0	•			0

• = yes; 🗅 = no. * Also available in ballistics nylon (\$149, black only) or leather (\$249, black only). *Pocket. ** Except \$59 Sac model, available only in black ballistics nylon with

board, microphone, printer, modem, and the like, with corresponding correctly positioned jacks that mate with your PowerBook when it's docked. (A built-in SCSI cable adapter would be nice, too, so you don't have to buy one.) What you actually get is a glorified plastic sandwich that clamps your connectors down so the PowerBook can slide onto them.

You have to assemble 16 little plastic parts. It's a lot like building a model airplane. The instruction sheet is hopeless, without a single word to indicate where each piece goes. Seven screws clamp the thing together—and you have to take out all of them each time you want to change a cable in your setup. Worse, you have to measure and wedge each connector into a position where it'll mate with the Mac, through a process of error and error. And, of course, each time you want to adjust a plug's position, all seven screws have to come out.

Once everything's positioned and put together, it's nice enough: just slip the laptop in, and you're all connected. I'd be happy to pay \$25 for this rhapsody in plastic. But for \$179 and an hour of setup, I'll stick the darn things in myself.

Carrying On

NOW THEN, CARRYING CASES. BEFORE we delve, rest assured that you truly can't go wrong. All are attractive, comfortable. and well built. Unless noted in "Power-Book Carrying Cases," the outer surfaces are tough nylon backpack material. A few are made of the more expensive Du Pont Cordura nylon, which (according to the case makers who use it) is tougher yet softer. Unless noted, the basic design is a slim, zippered briefcaselike affair, with handles and a shoulder strap, and a few inches longer than the PowerBook itself; the single large compartment is divided in two (computer on one side, adapter/battery/floppy drive on the other) by a movable, cushioned, Velcro-attached divider. Except where noted, they're all made outside the United States.

MagentaCase

THE MAGENTACASE IS NOT, IN FACT, magenta. It's black. Not as wide as other cases, its footprint (hipprint?) matches the PowerBook's. The adapters and stuff go in a separately zippered outside pouch, which probably eliminates some scratching risk. The other ostensible feature is that each is serial-numbered, so anyone who finds your case can call Magenta Seven to find out how to return it to you. Wouldn't a luggage tag be more direct?

They also offer a MagentaCase Lite, a thinly padded slipcover with handles. No shoulder strap, no pockets, no room for an adapter—it's designed to protect your PowerBook from the wayward objects in your briefcase. Good idea.

PowerBook Case 7373

THIS GOOD-LOOKING. U.S.-MADE CASE (West Ridge Designs, \$90) breaks the usual design mold in two ways—either of which may be a pro or a con. First, its shape and vinyl trim make it look more like a piece of luggage than a computer case. Second, the computer-compartment zipper only unzips across the top, so you can't work on your PowerBook while it's still in its case, as you can with other cases. For the office-supply nut, maybe the three separately zippered, full-size compartments (and see-through pockets for 25 disks) compensate.

NoteBook Traveler

KENSINGTON MICROWARE'S POWER-Book case has pockets aplenty for office doodads, but it's flimsier than the other cases, offering the thinnest layer of foam rubber between your Mac and the outside world. The Deluxe Case has a Velcro'ed compartment separator; the Compact Case isn't as wide because it doesn't have room for an adapter or a battery.

Notepac, Premier Notebook Leather Case

COMPUTER-LUGGAGE GIANT TARGUS offers a slew of cases. My favorite is the cheapest: the Notepac. The zipper is smoother, the fake-leather trim classier, the padding slightly thicker than most of its rivals. The Notepac also has *feet*, so you can set it down on the floor without getting gunk on the fabric surface. It's not U.S.-made, and not Cordura, but the company's aggressive no-fine-print lifetime warranty covers everything from tears to worn-out Velcro.

Then there's Targus's \$229 Premiere Notebook Leather Case, a leather brief-caselike bag. While the leather smells great and the padding is excellent, there is no separate compartment for your AC adapter or other sharp-edged accessories.

Pastel TravelCase

PASTEL DEVELOPMENT, MAKER OF THE DayMaker daily-planner program, has a PowerBook carrying case with some clever touches. Like the MagentaCase, the Pastel's footprint matches the PowerBook's. The design takes using-the-computer-still-in-the-case to a new level: the zipper unzips not just three edges, but six, so that the case's panels can be unfolded completely flat. I guess the point is easy access to every PowerBook surface (and easy insertion and removal). The lower-density foam makes this case bulky; but you gotta give it some points for the unorthodox design and the locking zipper.

PowerBook Carrying Case

AT LAST: A SLIM-LINE CASE THAT doesn't fall over when you set it down. The extra-sturdy bottom is only one detail that indicates serious luggage-design nerds at work. The Madson Line case

Targus	Targus	T/Maker Company	West Ridge Designs
Notepac	Premier Notebook	PowerBundle	PowerBook
	Leather Case	Carry Case	Case 7373
\$69	\$229	\$79	\$90
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lifetime	lifetime	60-day	lifetime
fake leather	leather	foam rubber	leather
•	•	•	•
•		•	•
black	leather	black	black, teal
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leather handle and removable shoulder strap.

holds all the usual PowerBook plug-ins, vet it's actually an inch or two shorter than the other slim-line cases. Inside, there are pockets aplenty. Outside, there's a zippered, gusseted expand-o-pocket that fits a Diconix printer, or what have you.

This case protects your Mac better than any other, too-but that means trade-offs. The AC adapter has its own protected compartment, but it's therefore harder to put away. And the tough Poron foam walls make the case seem bulletproof-but twice as heavy as others.

You've got more options on this bag than you do in the November election: a choice of color (black, purple, or green); material (Cordura at \$129, ballistics nylon at \$149, or gorgeous leather at \$249); and style (there's also the PowerBook Sac-a zippered, padded slipcover with one external pocket but no room for accessories; it's \$59). You also get a nice 30-day moneyback guarantee, and a lifetime we'll-fix-anything warranty, (The company has been in business for 18 years.)

PowerBundle Carry Case

THIS CASE COMES BUNDLED WITH A bunch of software, mostly useless except for the splendid WriteNow word processor (but it's version 2.2), for \$149. T/Maker Company also sells the case by itself. The case is attractive but (due to less foam) less sturdy than the others.

Ultimate Notebook

I/O DESIGN'S U.S.-MADE ULTIMATE Notebook EX is the get-serious carrying case. It's twice as deep as the other cases; a sturdy hinged flap separates the top half

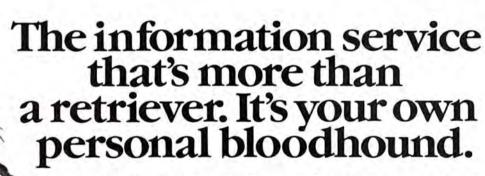
(which holds the computer) from a bottom roomy enough to stash a floppy drive and adapters, a Diconix printer, or a week's worth of socks and underwear. For \$10 less, you can get the slim-line SL model, which is the same design as the other cases.

Both models have Cordura fabric, a locking zipper, and-my favorite-straps that secure the PowerBook inside the case. These Velcro-tipped straps prevent your life's work from clattering to the floor if you grab the case without zipping it shut.

The Upshot

OF THE POWER PRODUCTS, THE EMPIRE car adapter and Lind battery rechargers are the best-executed. Need a case? The tough Targus Notepac, with its ironclad warranty, is a \$69 PowerBargain. If your tax bracket is slightly higher, you can't miss with the Madson case for sheer protection, slim size, and another worry-free warranty. If you have more stuff to haul around, you may prefer the rugged and practical I/O Design model EX. 'Cause hey-if you're a true PowerBook accessory junkie, you'll need the space. m

Contributing editor DAVID POGUE is the author of Macs for Dummies, a survival guide for the terrified technophobic beginner (IDG Books Worldwide).



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MB 3.5" 9ms, Fast SCSI, 5yr warr, 200,000 MTBF	\$1248	\$1318
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Condor 650e

A rewritable, 51/4-inch high, magneto-optical drive with a 256K data buffer and a formatted capacity of 652MB per cartridge. The company's literature claims the drive has an average access time of 37ms, a sustained data-transfer rate of 1MB per second, and a mean time between failures of more than 30,000 hours. The drive uses a splithead optical system and supports the ISO standard format for system



Condor 650e

and media compatibility. \$4679. Rodime Systems, 407/391-7333, 800/227-4144; fax 407/ 391-9950.

CY-4000

A 51/4-inch tape drive that is available in internal or external versions providing 1GB of storage. The drive uses read-afterwrite recording and parity checking of bus transfers to continuously monitor data and uses 3M Magna tapes. If an error occurs, the entire data block is rewritten to ensure data integrity. Pricing starts at \$1700 and goes up, depending on options. Contemporary Cybernetics Group, 804/ 873-9000.

Finalé 8000

A laser printer based on Samsung's 8-pages-perminute print engine and the Intel i960 32-bit RISC processor; comes with two paper trays, 2MB of



Finalé 8000

RAM, and built-in Post-Script emulation. The printer has parallel, AppleTalk, and RI-11C ports and uses Samsung Auto Interface Switching to switch between the three ports, depending upon which one is receiving a print job. \$1995. Samsung Electronics America, 201/587-9600; fax 201/587-9187.

Hubcast 4392

An Ethernet hub with 12 UTP ports, two AUI ports (one of which is switch selectable), and a BNC port; each hub has its own management information base. The unit can be purchased with or without an SNMP module, which comes as a piggyback board, uses an 80c188 controller, and contains nonvolatile RAM. The piggyback board adds network-



Hubeast 4392

management capabilities to the hub. All the connectors on the unit are front-mounted, and each UTP has two LED status lights. \$695; with SNMP module \$1495. Lancast, 603/880-1833; fax 603/ 881-9888.

Impact 030

A 68030 accelerator for the Mac LC and LC II that runs at 32MHz and does not require an adapter board to fit in the LC. The board has a 32K direct-mapped-cache and a PMMU; can be configured with an optional floating-point unit (FPU).



Impact 030

The board also comes with QuickSANE software for enhancing SANE routines to speed mathematical computations. \$795; with FPU \$945. Extreme Systems, 206/575-2524, 800/995-2334; fax 206/ 575-3928.

InterSect CDR 74

An external CD ROM drive that uses NEC's proprietary MultiSpin technology. According to the company, the Intersect CDR 74 transfers data at a rate of 300 KBps when retrieving text, graphics, and video information and at 150 KBps when playing audio tracks. The company says the drive's average access time is 280ms. \$712. NEC Technologies, 708/860-9500, 800/366-3632; fax 708/ 860-5812.

Kidz Mouse

A pointing device for children that resembles an actual mouse (the rodent) but is smaller than the standard Apple mouse, to fit in small hands. The Kidz Mouse has two buttons



Kidz Mouse

that look like a mouse's ears. Both buttons function like the button on an Apple mouse. The device also has a pass-through port that allows another mouse to be connected simultaneously. \$79. Logitech, 510/795-8500, 800/231-7717; fax 510/792-8901.

L15 Personal Exposure Measurer

A battery-powered device for measuring carbon monoxide in the air with an accuracy that meets standards established by the Environmental Protection Agency; the product comes with a serial cable for connecting to a Mac and software for down-



L15 Personal Exposure Measurer

loading data to the computer. The device stores more than 30,000 samples and can take samples at a variety of intervals. Temperature is measured independently and is also stored in the device. \$1085. Langan Products, 415/567-8089; fax 415/

567-8089. LZR 1555

A laser printer that take paper sizes up to 11 by 17 inches, uses HPGL and PCL5 page-description languages, and prints at 300 by 300 or 400 by 400 dpi without using resolution-enhancement techniques. The printer uses a Motorola 68020 controller and RISC-based ASICs and prints at 15 ppm. The included paper trays (up to three) hold 250 sheets and the LZR 1555 comes with 4MB of RAM. Single-tray model \$5995; double-tray \$6495; tripletray \$6995. Dataproducts Corporation, 818/887-8000, 800/334-3174; fax 818/887-4789



LZR 1555

Media Converter

A converter that allows network managers to use 10Base2 cabling in a 10-BaseT environment. The unit supports daisy-chaining up to 24 devices on one coaxial segment. The unit has an external coaxial termination switch that allows users to connect the end of a coaxial segment directly to the Media Converter, to "T" the device to a previously installed segment, or to connect the converter directly onto a coaxial terminal. \$265. Transition

Engineering, 612/941-7600, 800/325-2725; fax 612/941-2322.

Pearl Controller

An interface device for controlling robotic components, called Lego Technics, from a Mac; a Lego Technics set includes lights, motors, sensors, and a controlling interface box along with standard Lego building blocks. The device allows users to control Lego-based robotics using HyperCard or Paradigm's Object Logo 2.6 software, \$195; with Object Logo 2.6 \$300. Paradigm Software, 617/576-7675; fax 617/576-7680.

SerialWay

A three-port serial server that allows all Macs connected to a network to share any RS-232 asynchronous serial device. No modification to communications, printer, or controller software is necessary. The product supports transfer rates of up to 57.6 Kbps, according to company literature. The included software can create encrypted passwords for any device, and a pooling feature enables the user to group devices by type. Support for Macintosh Communications Toolbox allows up to 16 devices to be run simultaneously from any Macintosh. LocalTalk version \$599; Ethernet version 5999. International Transware, 415/968-8888. 800/999-6387; fax 415/ 968-5525

Sierra MO

A 31/2-inch, 120MB rewriteable magneto-optical disk drive that comes with one cartridge, formatting software, and a SCSI cable. The company claims the drive has an average seek time of continues CLARIS FILEMAKER APPLE

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Arrays
A family of storage subsystems that utilize matched pairs of hard drives to increase the capacity, reliability, and performance of disk storage, and offer capacities of 100MB to 4000MB. The drives are available as internal or external devices and are capable of performing drive spanning, disk mirroring, and data striping. \$889 to \$14,089, depending on configuration. FWB, 415/474-8055; fax 415/775-2125.

Soft-Edit Pro-500

An offline, cuts-only video-editing controller that places an infrared reader in front of a consumer-grade VCR that connects to a Mac serial port. The package includes software that lets the user automatically edit videotape from the Macintosh and has an online help system. \$500. The Profusion Group, 818/752-1514; fax 818/ 752-3006.

Spectrum Scan II

A one-lamp, three-pass color flatbed scanner that has a maximum resolution of 2400 dpi in color mode and of 4800 dpi in line-art mode. The device scans 24 bits per pixel in color mode and has a scanning area of 81/2 by 14 inches. \$2995, Spark International, 708/998-6640; fax 708/998-8840.

Tape Vista Drive

A SCSI data-cassette drive that uses TEAC tape technology and stores up to 600MB on each cassette. The device backs up data at a rate



Tage Vista Drive

of 15MB per minute, Relax claims, and uses a TEAC dual-motor, servocontrolled mechanism. \$779. Relax Technology, 510/471-6112; fax 510/ 471-6267.

TokaMac ELC

A 68040 accelerator for the Mac LC based on the 25MHz 68EC040. The 68EC040 provides most of the performance benefits of the standard 68040, but does not indude an FPU or a PMMU. The accelerator can be controlled by the included software and allows users to automatically switch between the LC's 68020 and the board's 68040. \$1295. Fusion Data Systems, 512/338-5326; fax 512/794-9997.



TokaMac ELC

WorldBlazer

A high-speed modem that uses V.32bis and the company's TurboPEP technology to achieve throughput in excess of 70,000 bps, the company claims. The PEP (Packetized Ensemble Protocol) technology divides the voice bandwidth of a telephone line into 511 separate channels, analyzes the channels' datacarrying capability, and then selects the quantity of data to send to each



WorldBlazer

channel. The modern also supports V.42 error control and V.42bis data compression. \$1099. Telebit, 408/734-4333, 800/835-3248; fax 408/ 734-3333.

SOFTWARE

At the Zoo

A program built in Hyper-Card that is designed to help students learn foreign languages; the package is available in French, Spanish, German, and English versions. The software leads users through a facsimile of a zoo, and lets them click on any on-screen item to see the word for that object and hear it pronounced in the foreign language. As each new word is introduced, the program builds a dictionary that can be printed for further study. The package includes a testing module. 1MB min. memory. \$39.95. Gessler Publishing Company, 212/627-0099; fax 212/ 627-5948.

BackBurner

A distributed rendering package for use with the company's Infini-D software that lets a user divide a rendering job among many machines on a network. BackBurner, which controls the rendering and distribution of jobs, sends portions of a particular job out to machines that have BackBurner Engines installed and are not being used for some other task. BackBurner Engines return chunks of a rendered image to Back-Burner, which then assembles the portions into one final image. Auto-Burner also ships with the package and is a screensaver that enables a Mac to act as an Engine only when it is idle. 2MB min. memory. \$395; threepack \$695; five-pack \$995. Specular International, 413/549-7600; fax 413/549-1531.

Brainchild Shortlist

An integrated personalinformation manager and contact-management system that enables users to organize business and personal contacts. The program provides prospect and event tracking. time management, mail merge, label printing, phone dialing, time billing, and project management. 1MB min. memory. \$199. Brainchild Corporation, 513/831-8451; fax 513/831-7804.

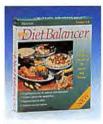
Correct Quotes

An application that lists more than 5000 quotations on 600 topics. Quotations are arranged alphabetically by topic, and the software includes an author list and cross-references that allow users to search by any word. The entries are compiled from more than 1500

sources and can be exported to any word processor. 512K min. memory. \$49.95. Wordstar International, 415/882-8000, 800/523-3520; fax 415/883-1629.

Diet Balancer

A software package for monitoring diets that allows users to view nutritional contents for over 1700 foods, analyze diet and meal plans, add new foods to the database, and save diet histories. The program also graphs weight loss and gain, calories, cholesterol levels, and fat consumption against target figures; and calculates weekly and monthly performance figures. 1MB min. memory. \$79.95. Nutridata Software Corp., 914/298-1308, 800/922-2988; fax 914/298-1785.



Diet Balancer

DownToBusiness

A set of FileMaker Pro business templates for use by small and medium-size businesses. The package produces detailed invoicing, manages receivables and payables, creates customer sales and employee commission reports, produces price lists and mailing lists, stores multiple addresses for a customer, and handles a variety of tax situations. Requires FileMaker Pro 1.0V2 or later. 1MB min. memory. \$149.95. Packer Software, 203/572-8955, 800/782-9955; fax 203/ 572-0765.



DownToBusiness

Hello

A modular software package for managing personal communications via written documents, telephone, fax, and electronic mail. The core modules are the Address Book—a database—and the Type-

writer, which is similar to a word processor. The program's architecture can be customized through a tool palette. A Hello Module Kit will also be available later this year so users can create custom applications. 1MB min. memory. \$99. Atelier, 415/285-1233; fax 415/285-1190.

Horizon

An application for graphing and analyzing mathematical data in x-y format; imports text files and prints graphs on any Macintosh-compatible printer. Data can be manipulated using standard numerical tools-including nonlinear least-squares-fitting routines-and the program produces scatterplots and stacked histogram plots. 1.5MB min. memory. \$430. Star Blue Software, 203/498-6043, 800/622-7274.

Individual Training for Microsoft Excel

A training package for Microsoft Excel 3.0 that provides step-by-step lessons, practice exercises, and quizzes on Excel features. The topics covered include basic skills, worksheets, formulas, databases, data forms, and charts. The program keeps track of the sections a user has completed, and a digitized voice guides users through the lessons. 1MB min. memory. \$69.95. Individual Software, 510/734-6767; fax 510/734-8337.

J & S Grade Book

A grade-book program that lets teachers weight grades, convert number grades to letter grades, and export and import data to and from spreadsheet and word processing programs. Users can design student-progress reports, update them at intervals throughout a term, and print or view histograms of student averages and other activities. 1MB min. memory. \$74.50. J & S Software, 516/944-9304.

Mac Landlord

Software designed to manage rental properties including apartments, shopping centers, and office buildings; allows users to track tenants' activities by rental unit, such as rent payments,



Mac Landlora

late fees, move-ins, move-outs, and lease expirations. A vendor list can be set up to track and pay recurring expenses, and automatic check printing is included. Built-in reports include rent roll, unit history, unit profile, vacancies, delinquencies, lease expirations, charges to tenants, and payments to vendors. 1MB min. memory. \$399. Illuminating Software, 313/ 562-6247.

Microsoft Excel Engineering Worksheets and Macros

A set of Microsoft Excel worksheets, macros, and charts for use by engineers. Subject areas include signal analysis, filters, communications systems design, statistics, real-time and frequencyresponse analysis, and components. Requires Excel version 2.0 or later. 1MB min. memory. \$15 to \$50 depending on modules ordered. Engineering Solutions, 818/ 772-7231.

Milon Plus

A desk accessory that is a 250,000-word Hebrew-English dictionary, synonym finder, and spelling checker; users can also enter their own words. The program translates from English to Hebrew and from Hebrew to English. 1MB min. memory. \$99. Davka Corp., 312/465-4070, 800/621-8227.

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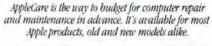
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ies. Users can create as many as six pull-down menus that contain the names of items in the presentation. These items can then be accessed directly through Multimedia Presentation Manager's pull-down menus, or user-defined scripts, which are built using the program's script editor. 4MB min. memory. \$450. Educational Multimedia Concepts, 612/379-3842.

Pre-Dict-ate

A word-prediction program that is designed to be used by the physically disabled. Pre-Dict-ate enables users to input words by saying the millitary alphabet and choosing words from a program-generated list. With each letter the user says, the list gets smaller and smaller. Users choose the word they want by giving its location in the list—

for example, by saying "second word." If the desired word is not visible on screen, users narrow the list some more by giving the next letter of the word. The package includes software and Voice Navigator II hardware from Articulate Systems. 1MB min. memory. \$1095. Madenta Communications, 403/450-8926, 800/661-8406; fax 403/428-5376

Public Utilities

A maintenance and recovery program that is designed to prevent common disk and data errors. The software runs in one of two modes: in the first, problems are corrected automatically and a user is notified; in the second, a dialog box appears when a problem is detected, giving a user the option to fix the error. Diagnostic and repair functions scan for bad blocks and check for common disk problems such as damaged partition maps, drivers, and driver maps. The program also includes an optimization function. 1MB min. memory. \$149. Fifth Generation Systems, 504/ 291-7221, 800/873-4384; fax 504/295-3268.

Quick Page Pro

Software for use with alphanumeric pagers; allows users to send text messages from a computer. The software can run in the background. Users can create and store a directory of pager numbers, store canned messages, and make custom groups of pagers. Requires a Hayes-compatible modem, 512K min. memory. \$129.95. Desktop Paging Software, 408/736-9979; fax 408-736-9979.



Quick Page Pro

Smoothie

A graphics utility that converts images created in drawing and presentation applications into antialiased graphics. Smoothie can create stand-alone slide shows using documents from Aldus Persuasion, Microsoft PowerPoint, and other presentation package; a batch mode allows users to process a number of images successively. Batches can be converted to a QuickTime movie, a Smoothie slide show, or a scrapbook file. 2MB min. memory. \$149. Peirce Software, 408/244-6554; fax 408/244-6882.

Soundtracks for MIDI

for MIDI A collection of fully orchestrated multitrack MIDI sequences designed for use as background music in multimedia presentations and other applications. Categories include action/drama, jingles, horror, comedy, adventure, and suspense. Requires a MIDI keyboard and a sequencer. 512K min. memory. \$49.95. New Sound Music, 313/ 355-3643.

StudioAccess

A job-tracking and pro-

duction-management system designed for managers of print shops. The program can provide active job status information, job estimating and invoicing, cost and time reports for work in progress, and job-file searches with up to five years' worth of production data stored online. 4MB min. memory. Single-user \$1000; multiuser \$3000. **Business Communication** Design, 415/221-7698.

TeamAgenda

Software that allows networked users to create personal agendas; develop to-do lists; set reminders; view schedules in daily, weekly, or monthly formats; and set alarms for any commitment or to-do item. Users can also assign domains to track activities; domains are used to tag appointments and action items by project, customer, or product. Users can create a variety of repeating items and the program can search for items by date, domain, status, subiect, and other criteria. When the program is used across a network, users can share agendas, make multiple agendas, and see more than one schedule on screen at once. Users can also dial in to the net-work using AppleTalk Remote Access and update their schedules. 2MB min. memory. 599; five-user pack \$399. MacVonk, 215/660-0606; fax 215/668-4360.

TelePrint Express

An electronic catalog for ordering custom printing jobs of a variety of items, including business cards, letterhead, checks, signs, badges, T-shirts, posters. Users browse the catalog and then click on an item they would like to order; they can also paste custom artwork and text into the designs. The software automatically calculates pricing and discounts, and users then dial the company and upload their print order. 2MB min. memory. There is no charge for the software. TelePrint Systems, 217/ 359-9690, 800/336-7390; fax 217/352-8233.

TypeReader

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fessions where success depends on the persuasive communication of ideas.

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to retain page layout and document formatting, including margins, tabs, tables, and columns as well as type sizes, type styles, and thousands of typefaces. The software is based on Machine-Learned Fragment Analysis and also uses Hewlett-Packard's AccuPage technology to increase accuracy when used with the HP ScanJet scanner series. TypeReader offers

multiple-file processing, deferred processing with compression, and userdefinable templates for scanning custom forms. 4MB min. memory. \$695. ExperVision, 408/428-9444; fax 408/456-0823.

CD ROMS

AmericaAlive Guidisc A CD ROM-based guide that uses text, maps, photos, QuickTime movies, sounds, and music to teach users about American cities, attractions, and national parks. Users can search and print information by using maps, keywords, or topics, and the guide has information on transportation, accommodations, and dining for each area covered. The disc contains 75 maps, 50 movies, 1500 digitized photos, and

information on areas in all 50 states. 4MB min. memory. \$99. Media-Alive, 408/752-8500; fax 408/752-8501.

CD Stock

ACD ROM-based stockphoto research tool. The package includes a CD ROM drive, a searching system, and a library of about 20,000 images. The four-CD set has about 5000 images per



CD Stock

disc; each disc is compiled from a different stock photography house. The images are stored at 72 dpi in JPEG format and are compressed using Apple's QuickTime Compression Manager. Images can be searched by classification, name, or keyword, but are not of reproduction quality. When the user finds an image he or she likes. the user must order it from the appropriate stock house. 4MB min. memory. \$649. 3M, 612/ 733-1110, 800/447-5392; fax 612/736-3094.

Compton's Multimedia Encyclopedia

An encyclopedia on CD ROM that has over 32,000 entries, 13,000 visual images, 40 animations and QuickTime movies, and over 60 minutes of audio content. The CD also contains the entire Webster's Intermediate Dictionary and can be used over a network. Students can use the bookmark tool to mark and later return to chosen places on their research path, and an online dictionary and glossary provide access to word definitions. 4MB min. memory. \$895. Jostens Learning, 619/587-0087; fax 619/587-1629.

Wetlands

A CD ROM containing more than 350MB of data on wetlands, including information on 1111 animals, birds, and insects; 55 recorded animal sounds; and PICT, 8-bit, and 24-bit images. The information is cataloged using the multimedia organizer Mariah, and searches can be performed in several languages: French, German, Italian, Latin, or English. 2MB min. memory. \$299. Foundation Neocortex for Interactive Media in Education, c/o Audiovisual Service, University of Basel, University Hospital, Basel, Hebelstrasse 20 CH-4033 Basel, Switzerland.

ACCESSORIES

Phazer Net 20

A fiber-optic-based security system that protects up to 20 computers and peripheral devices from theft. The system includes metal fasteners that connect to any device to be protected, and an optical



Phazer Net 20

fiber circuit that carries a continuously monitored light-pulse signal. When the signal is interrupted, the software dials any phone numbers that have been entered by the system administrator. \$1600. Computer Security Products, 508/393-7803, 800/466-7636; fax 508/393-2296.

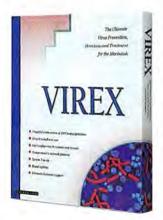
BOOKS

The Mac Made Easy A book written to help users become productive quickly on a Macintosh. Sections aimed at the beginner include learning about the different Mac models; a guide to the Mac's components; mastering the keyboard and mouse; using icons, buttons, files, folders, and disks. More-advanced topics covered are System 7 and the System Folder; fonts, printers, and printing; and a review of HyperCard. Written by Martin S. Matthews. \$19.95. Osborne/McGraw-Hill, 415/548-2805. m

> To have your product considered for inclusion in New Products. send an announcement with product name, description. minimum memory, peripherals required, pricing, company name, and phone number to New Products Editor, Macworld, 501 Second St., San Francisco, CA 94107. Macworld reserves the right to edit all product announcements.

Anti-virus software that's tough on viruses, not on you.

Computer virus problems within your organization can be a nightmare. New Virex*4 is a network mannework features enable Macintosh network managers to configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update individual user machines from a single Mac. Network managers can also gather information about virus attacks within the configure and update indivi-



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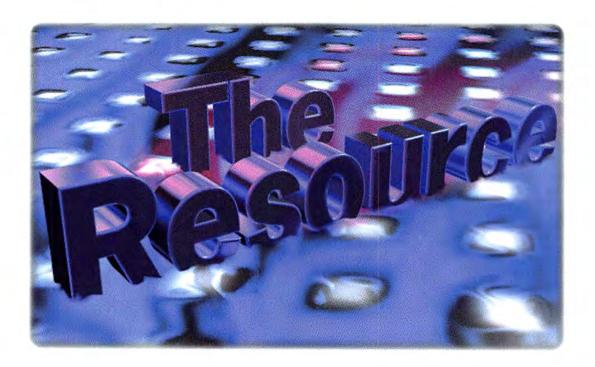
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Questions and Tips from Macworld Readers

BY LON POOLE

OU CAN STRETCH TYPE IN PageMaker 4.0 and later versions by pasting the type from a drawing program into Page-Maker as a PICT graphic, as described in last May's Quick Tips. Judith Laue of Silver Spring, Maryland, and several other readers suggested a simpler method-using the Scrapbook from the Apple menu. You type the text in PageMaker, copy it, and paste it into the Scrapbook. Then choose Place from PageMaker's File menu, and in the Place dialog box double-click the Scrapbook File (located in the System Folder). The pointer becomes an icon with a number in it. Click once and the text you pasted into the Scrapbook appears as an independent graphic in your PageMaker publication, ready to be stretched. If you click again you place the next item from the Scrapbook into your PageMaker publication. Click the arrow tool in PageMaker's toolbox to stop placing from the Scrapbook. To stretch type in graphic form, drag any of the graphic's handles.

LaserWriter Cabling Update

Another tip in the May issue said you could connect one Mac to a LaserWriter with a standard serial or null modem cable, such as the one used to connect an ImageWriter to a Mac. This tip worked for me on a LaserWriter IINT and on a Personal LaserWriter NT, but it didn't work for Steve Lowtwait of Savannah, Georgia, on his Personal LaserWriter NT. He ran into PostScript errors and could not print his documents reliably until he replaced the serial cable with two of Farallon's (510/596-9100) PhoneNet connectors and a length of telephone wire running between them.

Bernard M. Piller, an Apple dealer in Vienna, Austria, also warns against using serial cables, which he claims do not terminate network signals properly. He says he has seen Macs with serial ports damaged by serial cables that were used to connect a LaserWriter (or used for other network connections). For connecting only two machines, he suggests using two

Farallon StarConnectors (part PN301), which have only one jack apiece and consequently cost much less than two-jack PhoneNet connectors (part PN308). Later you can connect a third machine to the network with one dual-jack PhoneNet connector and additional machines with more PhoneNet connectors.

Keyboard Changes

The keyboard on my Classic II, which runs System 7.0.1, works differently than the keyboard on my Classic, which runs System 6.0.7. It seems that Apple changed the keyboard mapping in System 7. So far I've documented 11 changes. Are there more? How do I know if a font has the old keyboard mapping or the new mapping?

Harry J. Harm Philadelphia, Mississippi

In System 7 Apple changed the mapping of U.S. keyboards largely to make the caps lock key more consistent with the shift key. All versions of system software ignore the shift key if you simultaneously press the # key, and System 7 likewise ignores the caps lock

key when you simultaneously press the 3f key. System 7, unlike earlier system software versions, also ignores the caps lock key for option-key combinations that produce the eight symbols @ (option-G), (option-K), ® (option-R), † (option-T), √ (option-V), ∑ (option-W), ≈ (option-X), and Ω (option-Z). With System 7 you can directly type the accent produced by one of the five dead-key combinations— (option-), (option-E), (option-N), or (option-U)-by pressing the dead-key combination with the shift key or with the caps lock kev. As always, pressing a deadkey combination without shift or caps lock applies the accent to the next character you type. If you press a dead-key combination and then type a letter

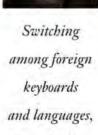
that doesn't take the accent, System 7 always produces the accent followed by the letter you typed. In contrast, System 6 substitutes a caret (^) for a circumflex (^) and an equivalence symbol (~) for a tilde (~), and produces the other accents correctly. The System 7 keyboard mapping lets you directly type four additional accents-"(option-shift-G), "(option-shift-T), (option-shift-X), and (option-shift-G)-but you can't apply them to other characters as you can the four dead-key accents. "System 7 Keyboard Changes" shows the characters affected by the new keyboard map and the key combinations that produce them in System 7 and in System 6. All fonts are subject to the new keyboard mapping, but many of the affected characters are missing from or different in a few fonts, notably Geneva and New York. Fixed-size bitmap versions of Geneva, Monaco, and other original Macintosh fonts named after cities replace Y with a graphic symbol such as a bunny, a sheep, or a robot.

ImageWriter Color Printing

I use an ImageWriter II printer and recently purchased a four-

color ribbon. I cannot find applications that support it. Can you suggest any word processor, spreadsheet, database, painting, and desktop publishing programs?

Al Lively Poughkeepsie, New York



ImageWriter

color printing,

and more

I tested 19 programs; 13 of them printed text and object-oriented graphics in color on an Image-Writer II with version 7.0 of Apple's standard ImageWriter driver software. Curiously, only ClarisWorks 1.0 printed pictures (bitmapped images) in color. For the complete results of my tests, see "What Prints Color."

Printed colors only approximate displayed colors. You can get a much closer continues

	System 6 Key Combination	System 7 Key Combinations
Â	option-shift-R	option-shift-M
	option-caps lock-R	option-caps lock-M option-I, then shift-
È	option-shift-I option-caps lock-I	option-*, then shift-E
Ê	option-shift-T option-caps lock-T	option-I, then shift-l
Ë	option-shift-U option-caps lock-U	option-U, then shift-
1	option-shift-G option-caps lock-G	option-*, then shift-I
Ù	option-shift-X option-caps lock-X	option-', then shift-t
0	option-shift-Z option-caps lock-Z	option-I, then shift-I
Ŷ	option-shift-	option-U, then shift-
0	option-G	option-G option-caps lock-G
	option-K	option-K option-caps lock-K
8	option-R	option-R option-caps lock-R
t	option-T	option-T option-caps lock-T
1	option-V	option-V option-caps lock-V
Σ	option-W	option-W option-caps lock-W
	option-X	option-X option-caps lock-X
Ω	option-Z	option-Z option-caps lock-Z
%a	option-shift-E option-caps lock-E	option-shift-R
4	option-shift-K option-caps lock-K	option-shift-K
\	option-shift-V option-caps lock-V	option-shift-V
	option-shift-W option-caps lock-W	option-shift-W
*	option-caps lock- caps lock-	option-shift-
	alone	option-caps lock-' caps lock-'
	*	* alone
•	option-E, then space	option-shift-E option-caps lock-E
_		option-E, then space
	option-shift-N	option-shift-I
	option-caps lock-N	option-caps lock-l option-l, then space
٨	option-I, then space shift-6	shift-6
	option-shift-M option-caps lock-M	option-shift-N option-caps lock-N option-N, then space
-	option-N, then space shift-	shift-*
7	option-U, then space	option-shift-U

match by using MacPalette II, a Chooser extension from Microspot USA (408/253-2000). Like Apple's ImageWriter software, MacPalette II goes in the System Folder (or System 7's Extensions folder). Neither the standard ImageWriter software nor the MacPalette II software can precisely duplicate displayed colors, but MacPalette II does a much better job of reproducing the range of displayed colors and prints better-looking text as well (using TrueType fonts or Adobe Type Manager with PostScript fonts).

Ending PostScript Font Mess

Why do I read in books that Post-Script fonts go in System 7's Extensions folder, when those fonts don't function if you put them there? Is there anything I can do to clear all those damn PostScript fonts out of my System Folder? Shayne Bowman Burlington, Vermont

You probably need to upgrade some of your application and utility software. For example, Adobe Type Manager (ATM) 2.0 and earlier versions can't find PostScript fonts in the Extensions folder; neither can Aldus PageMaker versions older than 4.2 or Aldus Free-Hand versions older than 3.1. More than one book mentions this situation, including my Macworld Guide to System 7 (IDG Books Worldwide, 1991).

No matter which version of software you use, you can keep PostScript fonts in folders other than the Extensions folder or System Folder if you install the Suitcase 2.0 system extension from Fifth Generation Systems (504/291-7221) or the MasterJuggler system extension from ALSoft (713/353-4090). (System extensions are called INITs or start-up documents in System 6.) Suitcase and MasterJuggler help you manage fonts, F-keys (function keys), and sounds in System 7, and those same items plus desk accessories in System 6. The Macintosh can find PostScript fonts in any folder containing a fixed-size (bitmap) font or TrueType font managed by Suitcase or MasterJuggler.

Foreign System Switch

Is it possible to simultaneously run both a European version of the system software and an American version so I can easily switch between U.S. and foreign application software? Do I have to restart my Mac each time I want to switch? Can I have both versions of the system software on one hard drive? Do I need special software to do this, and if so, how do I obtain it?

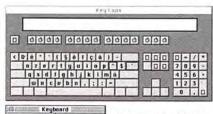
Gabrielle Johnson Pollock Pines, California

Application program	Text	Object-Oriented Graphics
Canvas 3.01	•	
ClarisWorks 1.0	•	•
Excel 3.0		•
FileMaker Pro 1.0v2		•
FreeHand 3.1	0	0
GreatWorks 1.0.1	•	•
MacDraw Pro 1.0v1		•
MacWrite II 1.1v2		•
Mathematica	•	•
Microsoft Word 5.0	•	•
PageMaker 4.2	•	•
Personal Press 1.01	•	•
Persuasion 2.1	•	•
PixelPaint Pro 2.0.1 *	NA	NA
Quicken 3.0	0	0
Resolve 1.0v2	0	•
Studio/8 1.0 *	NA	NA
SuperPaint 3.0		•
WordPerfect 2.5	0	•

• = yes; ○ = no. * These programs can have no true text, only images of text.

Some popular application programs cannot print text and graphic objects on an ImageWriter II equipped with a four-color ribbon. (All testing was done with Apple's ImageWriter driver software version 7.0 installed in the System Folder or in System 7's Extensions folder.) Only ClarisWorks prints color paint objects (pixel maps) in color. When printing in color, light-color text may not print properly or show up at all against a dark background.

With System 7 you can install multiple keyboard layout resources by dragging them to the System Folder (or to the System file, where they end up along with fonts and sounds). Once these resources are installed, you can switch among them with the standard Keyboard control panel and see the keyboard layout currently in effect using the standard Key Caps desk accessory (see "Keyboard Choice"). These keyboard continues



Vay Figure Rate

O O ® O O © O O ® O

Show Fast Off Leap short

Replaced Legand

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Keyboard Choice After installing additional keyboard layout resources in your System file, you can use the Keyboard control

panel to choose among them and use the Key Caps desk accessory to see which is currently in effect.



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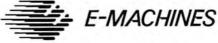
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Printing Tabloid Pages

If you want to print four 81/2-by-11-inch pages on tabloid paper (two pages on each side in landscape orientation) but you have a letter-size printer, don't despair. Try this method suggested by Sam Dwarakanath of Warren, New Jersey.



First, fold the 11-by-17-inch paper in half (making it letter size) and tape the edges together.



Print page 1 of your document, manually feeding the folded paper into the printer so that it prints on the side with the fold on the left. Next turn the paper over (so the fold is on the right) and print page 4.



Then unfold and refold the paper so that pages 1 and 4 of your document (printed) are on the inside and pages 2 and 3 (blank) are on the outside.



Print page 2 of your document on the side of the paper with the fold on the right, turn it over and print page 3 with the fold on the left. Voilà! No cut-and-tape assembly required.

layouts are available: Arabic, Australian, British, Croatian, Danish, Dutch, Farsi, Finnish, French, French Belgian and Luxembourgian, French Canadian, French Swiss, German, German Swiss, Greek, Hebrew, Hindi, Icelandic, Irish, Italian, Japanese, Korean, Maltese, Norwegian, Portuguese, simplified Chinese, Spanish, Swedish, Thai, traditional Chinese, and Turkish. Only keyboard resources for languages that use the Roman alphabetEnglish, French, German, Spanish, and so on-work properly with the U.S. version of the system software.

Working with a U.S. keyboard and a foreign keyboard layout can be disorienting because the labels on some of the U.S. keys don't match the accented characters the keys generate. Apple makes foreign keyboards but doesn't sell them in the United States. There is presently no official U.S. distribution channel for foreign keyboard layouts, so you have to try to scrounge one from a Macintosh developer or user group. Supplemental keyboard layouts and keyboards should be easier to get when Apple releases System 7.1, probably this fall.

With System 7.1 you will be able to install resources called script systems in the System file for languages that do not use the Roman alphabet. Each script system will supply fonts; keyboard layouts; rules for text sorting and word breaks; and rules for formatting dates, times, and numbers. Some script systems handle very large character sets and bidirectional or contextual text. With multiple script systems installed in your System file, a new menu called the Keyboard menu appears between the Help menu and the Application menu (see "Keyboard Menu") and you will be able to use it to switch script systems and keyboards. Script systems currently exist for Japanese, Arabic, traditional Chinese, simplified Chinese, Hebrew, Cyrillic, Thai, Korean, and most alphabets of India and Bangladesh, including Devanagari, Bengali, Gurmukhi, and Gujarati.

Clearing Clogged Jets

TIP For those of us who refill ink-jet cartridges, clogged jets are a recurring problem. Clogging is most common in cartridges that have not been used for a while. The cure: Fill the bottom of your ink-bottle cap-or any shallow vessel-with ink (Skrip brand has worked best for me) and place the jet end of the cartridge into the pool of ink. After soaking a half hour or so, the cartridge should be fine. This technique has kept my three cartridges alive for over two years now.

> Paul Smith Anaheim, California

Faster Built-in Video

TIP If you want to noticeably speed up a Macintosh IIsi when using built-in video, set the Disk Cache to 768K in System 7's Memory control panel. In System 6, set the RAM Cache in the General section of the Control Panel to 768K. After restarting, you'll find the 256-color setting in the Monitors control panel al-



Keyboard Menu After installing language script systems in a System 7.1 file (slated for fall delivery), you will be able to use the Keyboard menu to choose among them and among their associated keyboard layouts. Here Hebrew is the active script system.

most as fast as the 16-color setting used

Erik Bailey Providence, Rhode Island

System performance suffers if built-in video must compete with programs for access to the 1MB soldered to the Ilsi's main circuit board. Because a 768K Disk Cache together with the built-in video completely occupy the soldered-on memory, the system software and your programs are forced into the Ilsi's four SIMMs

The same procedure speeds up a Mac Ilci with 5MB, 9MB, or 17MB of RAM. To get the performance boost, four 256K SIMMs-a total of 1MBmust be in memory bank A (the four sockets nearest the disk drive), and the higher-capacity SIMMs must be in bank B. This trick doesn't work with other Ilci RAM capacities, such as 8MB, because in those configurations bank A contains at least 4MB, and you can't set the Disk Cache high enough to make it and the built-in video fill all the RAM in bank A. Disk Cache settings don't affect the speed of the Macintosh LC, LC II, or Quadras, which don't use the main memory for built-in video because they have dedicated video memory (VRAM) .- L.P. m

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LON POOLE answers readers' questions and selects their tips for this monthly column. His two most recent books are Amazing Mac Facts (Microsoft Press, 1991), a collection of the best published tips; and Macworld Guide to System 7 (IDG Books Worldwide, 1991).

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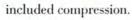
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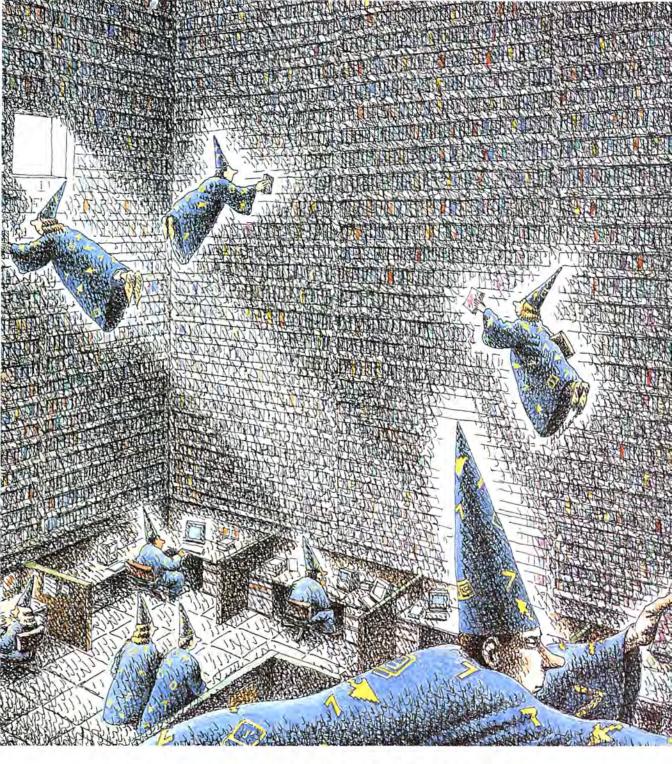
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QuickTime

BY JIM HEID

HE MACINTOSH WAS THE first affordable computer that made it easy to combine text and graphics in the same document. Apple's QuickTime software extends this innovation to include dynamic, time-based data—animation, video clips, and sound. (Still images and text are static data—you can't "play" a scanned image or text.)

QuickTime isn't an application program that you double-click and run; it's an addition to the Mac's system software—an extension—that application programs can tap into so you can cut, copy, paste, record, and play dynamic data, which in QuickTime's world are called movies.

A genuine innovation, QuickTime may well be a preview of the way we'll use computers in the future. But it also requires a color Mac with at least 4MB of memory; its appetite for hard drive space is astounding. And to produce your own QuickTime movies from video clips or a video camera, you need to buy additional hardware and software—and it helps to have some film—or video-production skills. "QuickTime on a Shoestring" describes some free or inexpensive software you can use to experiment with QuickTime.

QuickTime on the Move

AS WITH ANY MEDIUM, QUICKTIME'S effectiveness depends on how it's used. Here are some application scenarios.

- EDUCATION Software such as Knowledge Revolution's Fun Physics—The Original Interactive Physics uses animation to illustrate scientific concepts. History software can show clips of historic events and speeches. Some such products existed before QuickTime's debut, such as the ABC News Interactive series (see "Getting Started with Multimedia," Macworld, May 1991). But they require laserdisc players to store their video and sound. With QuickTime, the video and sound clips can be stored along with the navigational software itself, usually HyperCard, on a hard drive or CD ROM disc.
- ELECTRONIC PUBLISHING Imagine an electronic version of your favorite magazine—you're not only reading its text, you're double-clicking on illustrations and watching them come to life. Double-click

on a photo in a movie review to see a preview, a music-note icon to hear a snippet of a new hit song, a photo in an interview to see the actual interview, or a stock market graph to see the trends animated. If you have Microsoft Word 5.0 or Word-Perfect for the Macintosh 2.1, you can experiment with electronic documents yourself (see "Words and Movies").

- TV AND FILM PRODUCTION Current Macs lack the processing punch to create professional-quality movies. But broadcasting and film professionals can still use QuickTime to create animated storyboards that show camera angles and scene progressions, and to create mock-ups of animations that will be produced using high-end video animation and titling equipment. Some broadcasters also use QuickTime to create electronic catalogs of film and videotape libraries.
- ENTERTAINMENT QuickTime is nothing if not fun. In The Voyager Company's Baseball's Greatest Hits, you use a HyperCard stack to explore hours of sound and video clips of baseball's greats (see "QuickTime for Baseball"). It's also easy to digitize snippets of home videos, and it's fun to play director and piece them together into your own productions. I guarantee you won't bore friends and neighbors:QuickTime movies use so much disk space that most of your productions will be over within minutes if not seconds.
- MACINTOSH TRAINING Products such as Farallon's ScreenRecorder (part of

the MediaTracks package) let you record what's taking place on screen and then save it as a movie. A Mac trainer can exploit this capability to create customized training software for specific tasks or programs. Or, the movie could be part of a program's on-screen help system. Instead of reading about how to resize an object, you could play back a movie that shows you how.

PRESENTATIONS Programs such as Aldus Persuasion enable you to create on-screen slide shows. Because Persuasion supports QuickTime, its presentations can also incorporate sound and motion. A medical presentation can con-

tain an animated sequence that illustrates a new discovery. An architect's presentation can include an animated walkthrough of an unbuilt building. An attorney's presentation can include video clips of the scene of the crime.

 SCIENCE AND ENGINEERING The data transmitted by seismic equipment is dynamic; a QuickTime movie could record this data so that seismologists could play it back at various speeds to study an earthquake and its aftershocks. Meteorologists could record data from weather instruments or photos from satellites for later analysis or animation. Scientific programs such as Wolfram Research's Mathematica can create animated sequences from data you supply.

As these examples show, you can approach Quick Time from two perspectives: as a viewer working primarily with commercially produced education or entertainment software, or as a producer creating your own Quick Time movies. The path you choose (and you might tread both) will influence your shopping list.

Required Equipment

TO USE QUICKTIME, YOU NEED AT least a Mac LC, System 6.0.7 or later, and a hard drive. The 8-bit (256-color) video hardware built into most color Macs will do, but for the best image quality, you need 24-bit video—the kind built into the Quadra family and available via expansion boards for other Macs. QuickTime runs

on the PowerBook 140 and 170, but color movies are little more than recognizable on their monochrome screens. As for RAM, 4MB is a reasonable minimum, but 8MB or more delivers better performance when recording and saving movies. And don't expect any help from virtual memory, the System 7 feature that lets the Mac treat part of a hard drive as RAM. QuickTime movies may play back poorly when virtual memory is turned on, and you can encounter disconcerting delays when recording.

You also need the Quick-Time extension itself, available free through user groups and continues



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drive—here
comes dynamic
data

online services. Or you can buy Apple's QuickTime Starter Kit, a \$169 package that includes extra utilities and a CD ROM disc packed with video clips you can use in your own productions.

CD ROM drives-those data-oriented cousins to compact disc playersaren't required for QuickTime, but most commercial QuickTime-based software (like Baseball's Greatest Hits) is distributed on CD ROM. Several companies, including Macromedia, Alpha Technologies Group, and MediAlive, also offer CD ROM libraries of canned video clips, sound effects, and animations. (Beware: some clip CD ROMs are candidates for America's Hokey Home Videos. Try a few before buying-or make sure the company has a money-back guarantee.) With street and mail-order prices falling below \$500, CD ROM drives are becoming mainstream add-ons. Some future Mac models may even include them.

Some Quick Time-oriented programs also come with clip discs. Motion Works' ProMotion animation package includes a collection of animations called Prime-Time (which is also sold separately), while DiVA VideoShop includes The Image Bank's Footage, Volume 1—the best of the clip collections I've seen.

The fact that QuickTime performs its playback magic with no additional hardware means your Mac's processor does all the work. As a result, your machine's speed determines how many video frames QuickTime is able to display per second. A slow color Mac such as an LC can show about 10 frames per second (fps)-a rather slow frame rate that gives movies a jittery feel. A Mac IIsi can play about 15 fpsjust shy of the frame rate (18) used by Super 8 movies (remember them?)—while a Quadra can approach 30 fps, the U.S. television industry standard. QuickTime usually manages to keep the sound and video synchronized, thus conquering one of the problems that has traditionally plagued multimedia producers.



Words and Movies You can add QuickTime movies to documents created in WordPerfect 2.1 and Microsoft Word 5.0. To work with movies in Word (shown here), you need Microsoft's QuickTime plug-in module, Movie PIM, released in May and available for \$7.50 to registered users (call 800/426-9400 for details) as well as through user groups and online services. The badge, the small movie icon in the movie's lower-left corner, distinguishes a movie from a still graphic.

QuickTime on a Shoestring

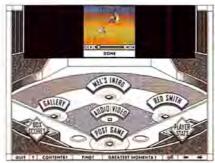
If you have a color Mac with enough memory and a hard drive with enough space, you can try out QuickTime with little investment by using the software listed here, which is available—along with hundreds of QuickTime movies—through user groups and online services.

- QUICKTIME EXTRAS 1.1 This disk contains the QuickTime extension itself as well as an extension called Wild Magic, which lets you use movies in almost any program (technically, in any program that supports PICT images). A program that plays movies is also included, as are some tiny sample movies.
- POPCORN This free program from Aladdin Systems lets you play movies as well as cut, copy, and paste portions of them. It's an easy way to test the waters of digital video editing.
- HYPERMOVIE PLAYER This \$5 shareware HyperCard stack by Kevin Harris plays movies. (Claris sells a set of HyperCard XCMDs that let you add movie-playback features to your own stacks for \$15; call 408/727-8227 to order.)
- MOVIES IN THE DARK This free module by Maurice Volaski lets Berkeley Systems' After Dark screen saver play QuickTime movies.

Before you buy an accelerator board to boost a sluggish frame rate, note that some accelerators are incompatible with the sound track of QuickTime movies. Install a board like the Radius Rocket, and you'll end up with fuzzy, distorted sound. (For details on accelerators and compatibility, see "The Need for Speed" and Lab Notes, Macworld, June 1992.)

Not only are QuickTime frame rates on the slow side, but the size of a Quick-Time movie isn't exactly Panavision. A QuickTime movie normally plays in a window that measures 160 pixels wide and 120 pixels tall—smaller than a business card. You can resize a movie to fill more of the screen, but frame rates slow dramatically and image quality suffers.

Slow frame rates and tiny movies aren't flaws in QuickTime, but limitations of current Macs. As the Mac family gets faster, these drawbacks will vanish. Moreover, QuickTime doesn't have to rely on the Mac's processor for everything. QuickTime is designed in a modular way



QuickTime for Baseball Hank Aaron connects for home run 715 in The Voyager Company's Baseball's Greatest Hits. This \$79.95 CD ROM is packed with movies, still images, and sounds of baseball lore, hosted by Mel Allen. Many columns by legendary sportswriter Red Smith are also included, as are recorded interviews with hall-of-famers. Standard QuickTime controls at the bottom of the movie let you pause, adjust sound volume, and step forward or back through the movie.

that enables it to take advantage of specialized coprocessor hardware designed for the demands of digital video and audio. One such product is New Video Corporation's \$2495 EyeQ Delivery System for the Quadra and Mac II–family machines (except the IIsi). EyeQ uses two expansion boards to allow recording and playback of full-screen—640 by 480 pixels—movies at 30 fps. The boards handle CD-quality stereo recording and playback; they're compatible with any application that supports QuickTime. Less-expensive coprocessor boards should be available soon from other video vendors.

QuickTime's modular design is one of its best attributes. It's what allows you to create movies on one machine and play them back on others—even ones with different performance and video capabilities. QuickTime's extensibility has other benefits I'll describe shortly.

Making Your Own Movies

TO MANY PEOPLE, MAKING QUICKTIME movies means digitizing video from a camcorder or videocassette recorder. To do this, you need a video-capture board, which accepts an analog video signal and translates it into digital data.

Many major video-board manufacturers offer video-capture boards, but the most popular is SuperMac Technology's VideoSpigot series, which starts at \$499 for the Mac LC, and goes up to \$1599 for the VideoSpigot NuBus Pro, which works with Quadras and other Mac II-family machines and also provides accelerated 24-bit video circuitry. All versions include a program that lets you view live video on the screen, record clips, and edit them by changing their beginning and end points.

The VideoSpigot package also includes Adobe Premiere, a video-editing program that lets you assemble movies, continues

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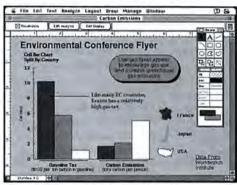
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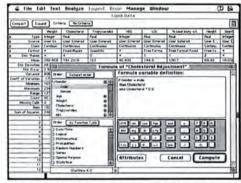
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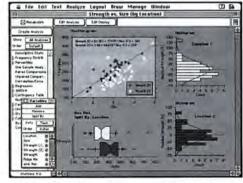
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edit them, add sound tracks, and specify transitions such as dissolves and fades (see "Now Premiering"). Premiere also provides filters that alter the appearance of clips—for example, you can distort a scene to look as if it were reflected in a glass globe. If you've used Adobe Photoshop, Premiere's filters will be familiar; indeed, Premiere can use Photoshop filters. (Premiere lists separately for \$495.)

Another video-editing program is DiVA's \$599 DiVA VideoShop (see Reviews, Macworld, July 1992). The program's Finder-like desktop lets you preview movies without opening them. VideoShop can also record video directly from a video-capture board, it can record Mac screens, and it includes a utility for playing movies within HyperCard.Video-Shop also supports Photoshop filters.

Both editing windows in Premiere and VideoShop graphically illustrate how a QuickTime movie consists of tracks, usually a video track and a sound track. Future enhancements to QuickTime will support additional types of tracks, such as MIDI data that would let a movie control music synthesizers as it plays. When these enhancements become available, you'll install them by simply dragging files into the System Folder. The new features will be available to QuickTime-savvy pro-

grams immediately, so you will not need to upgrade your application software—there's another benefit of QuickTime's expandability.

You can also make QuickTime movies using animation programs such as Macromedia's Macro-Mind Director and Magic and with 3-D graphics programs such as Dyna-Ware USA's Dyna-Perspective. These and other

such programs work with PICS files, which contain the series of frames that make up an animation. You can convert PICS files to QuickTime movies by using Apple's Movie Converter utility, included in the QuickTime Starter Kit. This utility also converts other types of files—including ones created on the IBM PC—into movies.

Squeeze Play

THE BIGGEST PROBLEM FACING QUICK-Time movie producers is insufficient disk space. A five-second movie with recorded sound uses almost 10MB of disk space that's 2MB per second. When you run out of hard disk space minutes after installing

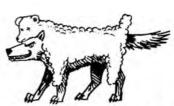
Compressor	Best Used for	Comments
Photo	Still images	Compression and decompression require at least several seconds
Animation	Animated sequences, including recorded Mac screen activity	Yields poor results with digitized color video
Video	Digitized video	Very fast decompression
Graphics	8-bit (256-color) still images and movies	Provides better compression but slower playback speeds than the animation compressor

a video-capture board, you realize just how ill-equipped most Macs really are for the digital video revolution.

Fortunately, you can dramatically reduce disk space requirements by taking advantage of QuickTime's compression features: a file can be compressed to use less disk space, and then decompressed when you want to use it. QuickTime decompresses movie frames as it goes along—while a movie plays. That QuickTime can decompress and display 10 to 30 color images per second with no additional hardware is a remarkable feat, and a testament to the talent of QuickTime's team of programmers.

continues





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Each of QuickTime's four compressors provides a different degree of space savings and image quality (see "Comparing Compressors"). Compression often means trading image quality for disk space, but the results are still more than adequate for most applications. By using the video compressor at its lowest-quality setting, QuickTime can squeeze that same 5-second, 10MB movie down to 722K—almost a 15-fold savings. Compression can also allow for faster playback frame rates on slower Macs.

QuickTime's compression is modular, too. Adding new codecs—compression/decompression extensions—to the System Folder enhances QuickTime's compression capabilities. (Some video-capture boards include codecs that provide better compression than Apple's.) Apple is also reportedly working on codecs that will allow for larger movies and faster frame rates on existing Macs.

A Revolution?

THERE'S NO QUESTION THAT QUICK-Time is an impressive piece of software technology and that it paves the way for new forms of computer-based entertainment and education. But will it change the way you work? If you already use animation software, yes—you'll want to take ad-



Now Premiering Adobe Premiere lets you assemble QuickTime movies into larger movies, called projects, complete with special visual effects. At the lower left, the project window lists available movies along with their characteristics. You include a movie in a project by dragging it from the project window to the construction window, at top. This construction window shows a two-second dissolve between two movies—one movie fades out as the second fades in. To create such an effect, simply drag two movies into position and then drag the desired effect from Premiere's effects window (not shown). The clip window at lower right lets you view and modify individual movies.

vantage of QuickTime's standard movie file format. (Apple is even working on software that will enable IBM PCs and other machines to play back QuickTime movies.) If you create presentations, you may want to experiment with making them more dynamic, adding animated charts, for example, or clips from a CD ROM. If you're a film or broadcasting pro, you'll want to get in on the ground floor of what promises to be as big a revolution for your industry as desktop publishing was for the print media.

But if you primarily work in word processors, spreadsheets, and database programs, QuickTime may not have much to offer you. Dynamic data is a slick concept, but most people still work primarily with static data. It served us well for centuries—until movies, television, and sound bites came along.

In the end, what may delay the era of dynamic data is that most Macs just aren't up to its demands. We need faster processors, more coprocessors, higher-capacity floppy disks and hard drives, and better compression. As you watch a movie ooze onto the screen on a Mac that previously seemed fast, you realize that in many ways, QuickTime is ahead of its time. m

See Where to Buy for contact information.

Contributing editor JIM HEID looks at a different aspect of Mac fundamentals each month. His latest books are Macworld Complete Mac Handbook (1991) and Macworld Guide to Microsoft Word 5 (1992), both published by IDG Books Worldwide.

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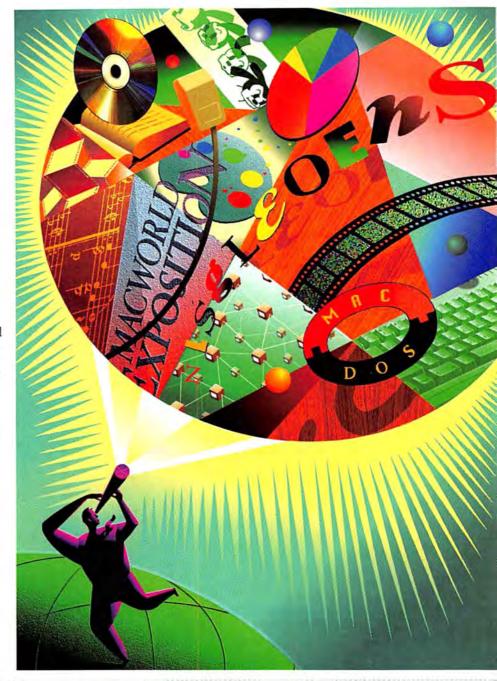
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HOW TO CLARISWORKS

BY HELMUT KOBLER

Getting Top Performance from This Jack-of-All-Trades

If you're using ClarisWorks, you probably fall into one of two classes: perhaps you're a Mac beginner who likes the program's easy approach and low price, but you haven't vet discovered its finer details. Or you might already be seasoned with stand-alone word processors, databases, and spreadsheets, but you picked Claris-Works (available from Claris Corporation, 408/727-8227) because its seamless integration of those programs' features makes it the best allaround working environment.

Either way, you should find value in these tips compiled with the help of Bill Marriott of Claris's technicalsupport staff, and Laurie Love, author of the new book, *Using* ClarisWorks (\$22.95, Addison-Wesley, July 1992).

Shortcuts by Keyboard

It's easy to tell when Claris-Works menu items have kevboard shortcuts (they're always listed in the menus), but it's not as clear that you can use keyboard shortcuts in dialog boxes too. For instance, if you're in Works' spelling the first letter of the word in a button to invoke that button's function-#-C chooses the speller's Check button, #-S chooses Skip, #-L chooses Learn, and so on. Likewise, in some ClarisWorks dialog boxes, you can use # plus the numbers 1 through 9 to choose radio buttons, check boxes, and other controls. Pressing 36-1 in the Open dialog box, for example, calls up ClarisWorks' file-importing options.

Here's a final keyboard shortcut: when you launch ClarisWorks, the program normally opens the New File dialog box, assuming you'd like to start a document from scratch. Hold down the option key while ClarisWorks is loading, however, and it presents you with the Open File box, so you won't have to create a new document before loading others.

Polishing Spreadsheet Charts

The spreadsheet module in ClarisWorks makes easy work of creating data charts, but sometimes you wish you had more control over how these charts look. ClarisWorks doesn't give you direct control over a chart's visual elements, but it does let you dissect charts you've already created, and then use the program's drawing features to rearrange them to your liking. To do this, select an existing chart and then copy and paste it into a graphics document. Select the pasted copy and choose Ungroup Picture from the Arrange menu. This breaks the chart into simple graphic elements, which you can further ungroup and modify like any graphics (see "Polishing ClarisWorks Charts" for an example). Don't do this, however, until you're sure the chart data is final; once you ungroup a chart, it no longer updates when its spreadsheet numbers change.

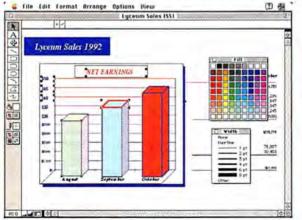
Mail Merges

ClarisWorks' mail merge feature is unique in that it's not limited to the word processor module-vou can also do a merge in a spreadsheet to utilize that module's math functions. This ability is helpful if, for instance, you're sending invoices to customers. You can bring various data in from a database, such as orders for different products, price quotes, purchase dates, and so on, and then use the spreadsheet to figure volume discounts, calculate sales tax, and tally up the entire order.

First, paste the mail merge fields into a spreadsheet. Then set up formula cells to perform calculations on the merging data. If you're not producing a customer letter, or some other document where you want to use text formatting, then just merge name and address information directly into the spreadsheet. If you're creating a more formal document, paste the spreadsheet cells into Works' word processor. When you're all done, choose Print Merge from the File menu and follow the merge steps as you normally would.

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Polishing ClarisWorks Charts



By ungrouping ClarisWorks' charts, you can customize them to your liking. In this example, a chart has been dissected, and its various elements have been given different colors, fills, line widths, and fonts.

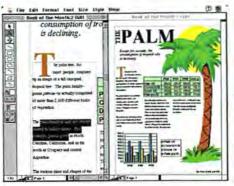
Seeing Double

ClarisWorks has a helpful feature that lets you work with the same document in two different views simultaneously. You might want to do this, for instance, when you're designing a database in layout view and want to see how the layout will look in browse mode. With the document open, choose New View from ClarisWorks' View menu to create a second window showing the same document (see "Two Views"). Set this window to the other mode you'd like to work with (Browse or Layout, for instance), and then choose Tile Windows from the View menu to arrange the two views so they're both visible on the screen. Now you can work in whichever view is appropriate, and see the changes made to one window reflected in the other.

This technique, by the way, works throughout all of ClarisWorks, not just its database module. You could, for instance, use different window views to fine-tune a graphic at 200 percent, and see the results in actual size simultaneously. Or you might edit text in a document at actual size, and use another window to see a full-page layout.

Setting Up Custom Documents

As you become familiar with ClarisWorks, you develop preferences for the way you want the program to workmaybe you like the word processor to start with a font like 12-point New Baskerville, or you want communications files to open with particular modem settings. You can teach Claris-Works such preferences by way of its Options files. First, set up a document using the preferences you want to savepage size, margin boundaries, fonts, graphics settings, modem options, or anything else. Then save the document as ClarisWorks Stationery (using the Save As command), under the name ClarisWorks XX Options where the letters XX



to Works' New View command, you can set up different window views of the same document. In this example, the left window magnifies a newsletter's 10-point text for editing, while the right gives a reduced shot of the whole page.

Two Views Thanks

become WP for a word processing document, GR for graphics, SS for spreadsheet, DB for database, and CM for communications. Put those files in your ClarisWorks folder and they'll serve as templates for new documents you create thereafter.

Copying Data Summaries

If you work much with Claris-Works' database, you probably use its Summary fields to break down various types of information-for instance, in a database of invoices, you might use Summary fields to rank sales by salesperson, or by your hottest products. It's a handy feature, but few people know that you can also bring summarized data into a spreadsheet document for further number-crunching or charting. In the database's Browse mode, just choose Copy Summaries from the Edit menu, and paste the data into your spreadsheet. This is the only way to get these summaries into a calculable form, short of typing them in yourself. Unfortunately, Works can't link this pasted data, so if your database changes, you have to copy and paste the summary figures again.

Automated Address Books

Most telecommunications programs let you create "address books" of the online services and bulletin boards you call often, storing phone numbers, modem settings, passwords, and more. ClarisWorks lacks such a feature, but you can

simulate it by creating a macro for each online service you call. Instead of manually setting modem preferences, dialing phone numbers, and typing in your password each time you call a particular service, just do it once and record your actions (choose the Record Macro command from the File menu to start, then stop recording when you've finally logged on to the service, or press #-shift-J). Next time you're ready to call the service, just run the macro and let Works handle the rest. When you record the macro, however, be sure to check the Record Pauses option, which keeps ClarisWorks in sync with the computer on the other end of the phone. Without this option, communications macros play back poorly, if at all.

Quasi Style Sheets

The word processor in Claris-Works is competent, but one feature that you might miss is style sheets, which make quick and easy work of text formatting. By using macros, however, you can teach Works to mimic some style-sheet functionality. To create a quasi style sheet, highlight some text and choose Record Macro from the File menu (or hit #-shift-J). Make sure that the Record Pauses macro option is not checked.

While the macro records, choose the desired typeface information from ClarisWorks' menus—use keyboard shortcuts, such as #6-B for bold, whenever possible. When you've made all the selections, stop the macro. Now highlight

some text, and play the macro back for fast formatting.

Remember, as well, that you can use such style-sheet macros to format text throughout ClarisWorks, not just in the word processor.

Making Power Macros

If you'd really like to get daring with ClarisWorks' macros, here are some special techniques to keep in mind. For starters, you can nest macros within each other; when you play one macro, it calls on others you've already created. To do this, just play an existing macro while you're in the process of recording a new one. You might use multiple macros to copy a recurring zip code in a database field (this would be macro #1), and then paste it into the zip code field of all the records in the database (macro #2). Each time macro #2 is run, macro #1 is called to copy the zip code again.

In other power-macro news, ClarisWorks has a littleknown database function called Macro (macro-name), which when pasted into a cell plays the macro named in parentheses. There are a number of applications for this macro function; one possibility is to use it to merge information from one database into another. For instance, you might create a macro that checks to see if a database field is empty, and if so, calls up an existing macro that opens another database, finds a specific record, copies a specified field, and then pastes the data into the first database's empty field.

Send Your Tips

If you've got a valuable Claris-Works tip, technique, or shortcut, share it with other Macworld readers by sending it to Quick Tips, Macworld, 501 Second Street, San Francisco, CA 94107. m

HELMUT KOBLER is the author of *The*Little Mac Word Book (Peachpit Press,
1992), which covers Microsoft Word 5.0.
He is using ClarisWorks to run a small
software start-up in Berkeley, California.

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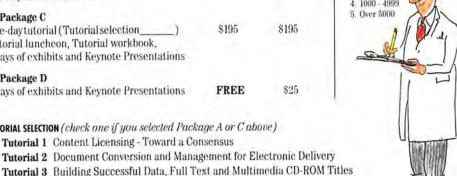
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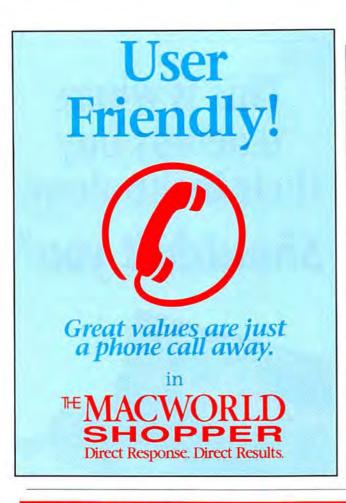
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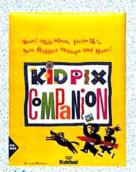
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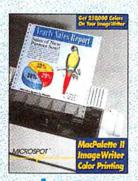




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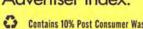
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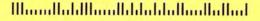
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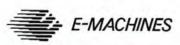
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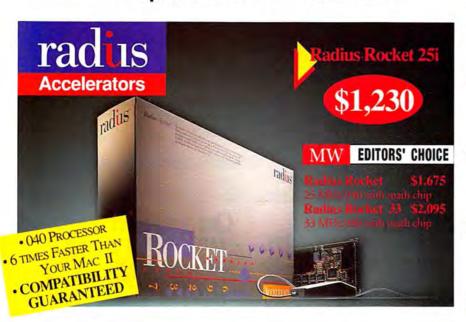
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425mb	M2623SA	3.5" Half Height	9ms	405mb	\$995	\$1055
520mb	M2624SA	3.5" Half Height	9ms	496mb	\$1199	\$1259
645mb	M2263	5.25" Full Height	16ms	640mb	\$1259	\$1359
1.2GIG	M2266	5.25" Full Height	14.5ms	s 1029mb	\$1899	\$1999
2.0GIG	M2652SA	5.25" Full Height	11ms	1665mb	\$2995	\$3095
Eullian 2 Et l	Jah madaman	as CCCI ataly divine foot				

• 10MB/s data transfer rate • 6.82 ms average latency • 240 KB read-ahead cache buffer

Fujitsu 5.25" high performance SCSI Winchesters disk drives features:

• Embedded SCSI interface • As fast as 14.5 ms positioning time • Up to 4.8 MB/sec SCSI data transfer rate Fujitsu drives include a 5 YEAR Limited Warranty

Quantum

Capacity	Model	Model Product Description		Actual MAC Capacity	Internal	External	
52mb	LPS50*	3.5" Low Profile	9ms	49mb	\$215	\$275	
80mb=	Go. Drive	2.5" Low Profile	16m	80mb	\$419	\$479	
105mb		3.5" Low Profile		100mb	\$335	\$395	
120mb	LPS120	3.5" Low Profile	10m	s 116mb	\$409	\$469	
210mb		3.5" Half Height	10m	s 199mb	\$629	\$689	
240mb		3.5" Low Profile	10m	s 234mb	\$649	\$709	
425mb		3.5" Half Height	8ms	406mb	\$959	\$1019	

Quantum Drives feature:

- Ave. seek times of 25ms or less
 MTBF of 100 000 250 000 hrs
 TWO Year Warranty
- NOTE: "3.5" Low Profile, Low Power drives (25ms) for Mac Classic, LC & Ilsi.
- · (Internal Drives: Add \$10 for Quadra 900)
- △ Quantum's Go•Drive features:
- · Fast, lightweight 2.5° form factor drive designed to meet the requirements of batterypowered notebook computers • MTBF of 150,000 hours • ONE Year Warranty, ClubMac recommends installation by an authorized dealer to preserve warranty

Maxtor®

			_			
Capacity	Model	Product Descrip	otion	Actual MAC Capacity	Internal	External
80mb	7080	3.5" Low Profile	17ms	80mb	\$289	\$349
120mb	7120	3.5" Low Profile	15ms	121mb	\$349	\$409
207mb	LXT-213	3.5" Half Height	15ms	202mb	\$595	\$655
330mb	LXT-340	3.5" Half Height	15ms	324mb	\$969	\$1029
535mb	LXT-535	3.5" Half Height	12ms	510mb	\$1219	\$1279
645mb	XT-8760S	5.25" Full Height	16.5ms	639mb	\$1349*	\$1449
1.2GIG	PO-12S	5.25" Full Height	13ms	997mb	\$1799*	\$1899
1.7GIG	P1-17S	5.25" Full Height	13ms	1433mb	\$2349*	\$2449

- Maxtor 3.5" Drives include a ONE Year Warranty
 Maxtor 5.25" Drives include a TWO Year Warranty
- Maxtor 80 and 120 are perfect for the Mac Classic, LC and IIs
- Internal Full Height Drives fit the Mac II, IIx & Quadra 900 only (Add \$10 for Quadra 900 Bracket)

TOSHIBA

Capacity	Model	Product Description	Internal	External	
600mb	XM3301E	CD-ROM	325ms		\$519
600mb	XM3301B	Internal CD-ROM (Q900/950)	325ms	\$479	100
830mb	MK438FB	3.5" Half Height	12.5ms	\$1599	\$1659

Toshiba CD-ROMs include a ONE YEAR Warranty Toshbia Hard drives include a FIVE YEAR Warranty

Seagate

Capacity	Model	Proc	fuct	Descri	ption	Actual MAC Capacity	Internal	External
420mb	ST1480N	3.5" Half	Ht		14ms	406mb	\$1099	\$1159
525mb	ST1581N	5.25" Full	Ht		14ms	N/A	\$1198	\$1258
320mb	ST4385N	5.25" Full	Ht	W-R	10.7n	ns 315mb	\$1249*	\$1349
645mb	ST4766N	5.25° Full	Ht	W-6	15.5n	ns 632mb	\$1285*	\$1385
645mb	ST4767N	5.25" Full	Ht	W-R	II 11.9r	ns 634mb	\$1549*	\$1649
1.2GIG	ST41200N	5.25" Full	Ht	W-7	15ms	989mb	\$1749*	\$1849
1.6GIG	ST41651N	5.25" Full	Ht	W-8	15ms	1350mb	\$2169	\$2269
1.6GIG	ST41600N	5.25" Full	H	E-1	11.5n	ns 1307mb	\$2549*	\$2649
2.1GIG	ST42100N	5.25" Full	Ht	W-9	12.9r	ns 1900mb	\$2949	\$3049
2.4GIG	ST42400N	5.25" Full	Ht	E-2	11ms	2050mb	\$3649	\$3749

Seagate Drives include a ONE Year Warranty
"Internal Full Height Drives fit the Mac II, IIx, IIIx, and Quadra 900 only. (Add \$10 for Quadra 900 Bracket)

Tape Backup Systems

Dunaica With HE II	1001 201 (1.1	.00)
Teac MT-2ST/N 50	155mb	\$539
WangDAT 1300XL	2.0GIG	\$1329
WangDAT 3200 DDS-DC	3-5GIG	\$1549
Exabyte 8200	2.2GIG	\$2049
Exabyte 8500	5.0GIG	\$3299
HP 2.0GIG DAT Drive (35470	A)	\$1389
HP Compression DAT Drive		\$1819

All ClubMac tape backup systems include a ONE YEAR Warranty, one cassette, RETROSPECT (v. 1.3c) backup software, and all necessary cables

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RasterOps 24XLi	\$1929
RasterOps PaintBoard 24	\$1539
RasterOps PaintBoard Li	\$829
RasterOps 24Sx	\$615
RasterOps 8XLi	\$925
RasterOps 8XL	\$459
ColorBoard 264/SE30	\$685
ClearVue/GSXL	\$445
Multimedia	
MediaTime	\$1539
RasterOps 24STV	\$769
RasterOps VideoTime	\$1149
RasterOps Video Expander II	\$459
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20° Trinitron	\$2315
19" Color Hitachi	\$1539
ClearVue/SD 21 (with Cable)	\$1389
21" Mono/Gray Scale	\$999
19" Mono/Gray Scale	\$769
16" Color Monitor	\$1149
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SuperMatch 20" Color	\$1549
SuperMatch 17" Multimode Color	\$999
21" Platinum (Black and White)	\$999
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Spectrum 24 Series III	\$Call
Spectrum 8 • 24 PDQ / PDQ si	\$979
Spectrum 8 Series III	\$559
Monochrome Card	\$339
Digital Video Boards	
Video Spigot (NuBus / Mac Ilsi or Mac	LC) \$499 / 415
Video Spigot Pro (NuBus / Mac Ilsi)	\$1335 / 1295
Spigot and Sound	\$749
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MultiSync 4FG (15") with AccuColor	\$759
MultiSync 5FG (17") with AccuColor	\$1359
MultiSync 6FG (21") with AccuColor	\$2799
Mac FG 8X Interface Card	\$719
Mac FG 24X Interface Card	\$1519
CDR-74 CD-ROM Gallery Bundle	\$695
CDR-37 CD-ROM Gallery Bundle	\$529

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 6 ppm
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- · AppleTalk, Parallel, Serial Interface, PLUS Built-in SCSI Port

\$1995 Epson EPL-7500 Laser Printer

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- High-speed RISC processor
- 6 ppm 300 dpi 35 fonts 2 MB RAM, up to 6 MB
- Parallel, Serial, AppleTalk Interface
- 250-sheet paper tray standard

\$1495 QMS -PS 410 Laser Printer

- Emulation Sensing Processor
- 4ppm 300 dpi 45 fonts 2 MB RAM, up to 6MB
- · AppleTalk, Serial, Parallel Interface

ACCELERATION

PowerCache

(Mac LC, SE/30, II, IIx, IIcx I, IIsi, IIci)	17
33 MHz PowerCache	\$639 *
33 MHz PowerCache with 68882 math chip	\$839*
40 MHz PowerCache	\$839*
40 MHz PowerCache with 68882 math chip	\$1069*
50 MHz PowerCache	\$1299*
50 MHz PowerCache with 68882 math chip	\$1579*
†Some models of the licx do not provide a socket for the 68030, soldered into the motherboard. Price includes socket installation motherboard by DaySlar and return shipping UPS Blue.	it is on the Nox

Price does not include Cache Adapter Card Cache Cards

(Ilsi model includes DualPort adapter)	
FastCache Ilsi	\$285
FastCache Ilsi with 68882 math chip	\$349
FastCache Ilci	\$255
FastCache 040 (128K cache for Quadra700 & 900)	\$345
Expansion Boards for The Mac LC and Mac	lsi
PowerMath LC	\$109

\$195

\$259

Equalizer LC (includes 68882 math chip) radiis

Equalizer LC (virtual memory upgrade)

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4mb x 8 - 80ns	\$105
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Mac Ilfx Memory	
1mb x 8 - 80ns	\$38
4mb x 8 - 80ns	\$122
16mb x 8 - 80ns	\$599
Quadra Memory	
Low Profile 16mb	\$589
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MISCELLANEOUS	
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3C 2400 Baud Modem (includes software & cable)	\$97
DoveFax Desktop 24/96 Fax Modem	\$239
DoveFax Plus with Voice Mail	\$325
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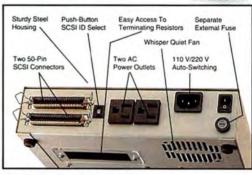
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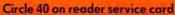
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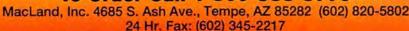
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& Accelerators

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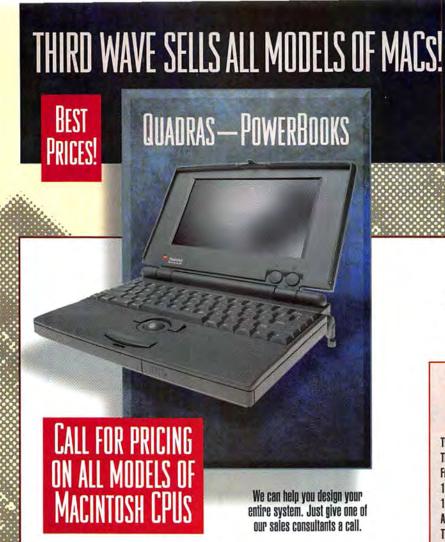
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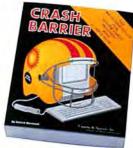
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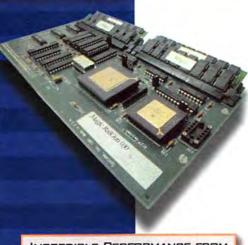
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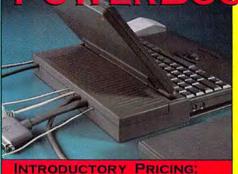
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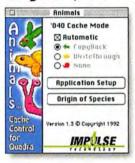
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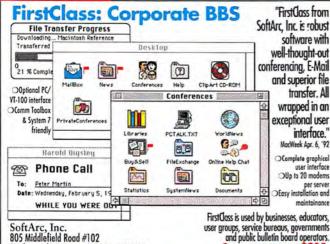
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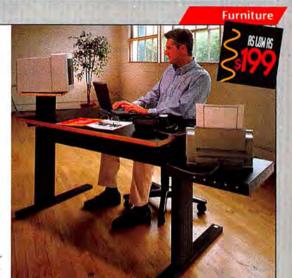


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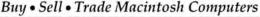
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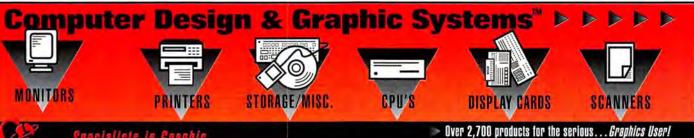
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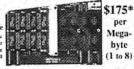
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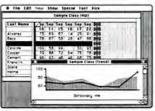
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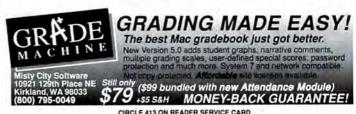
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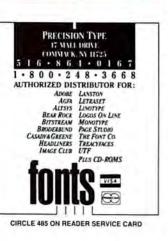
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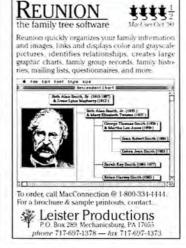
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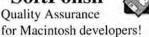
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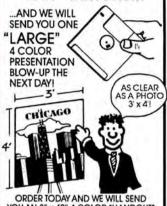
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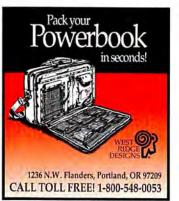
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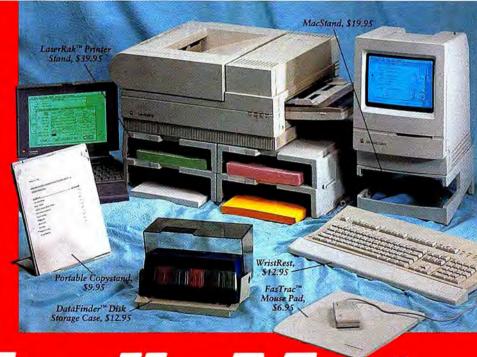
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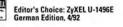
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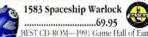
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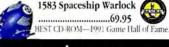
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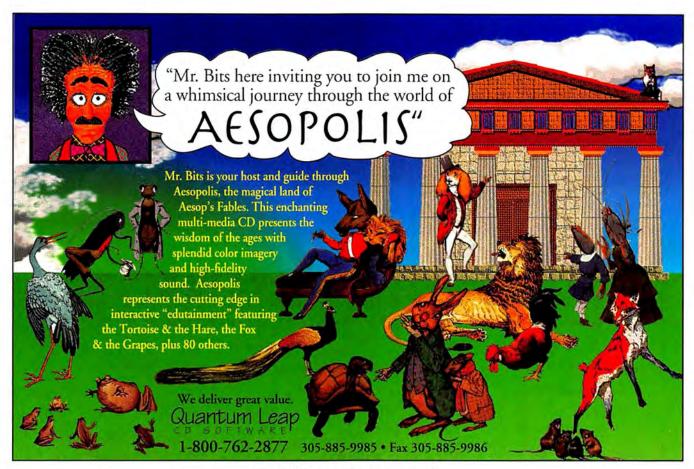
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BGG-SG-SEPTEMBER 1992

Months on chart Last month This month

Business Software

79 3 1 Microsoft Excel
Microsoft Corporation
88 1 2 Microsoft Word

Microsoft Corporation

10 2 3 Microsoft Office

Microsoft Corporation

40 12 4 WordPerfect for the Macintosh WordPerfect Corporation

9 7 5 MacDraw Pro
Claris Corporation
40 5 6 FileMaker Pro

Claris Corporation

9 14. 7 Aldus Persuasion
Aldus Corporation

66 4 8 Microsoft Works
Microsoft Corporation

2 8 9 ClarisWorks

Claris Corporation

26 6 10 Quicken Intuit

75 9 11 Aldus PageMaker Aldus Corporation

19 13 12 MacProject
Claris Corporation

3 14. 13 1-2-3 for the Macintosh

Lotus Development

Corporation

64 10 14 MacWrite II

Claris Corporation

63 - 15 MacDraw II Claris Corporation

Education Software

- 55 1 1 Reader Rabbit
 The Learning Company
- 22 2 Where in Time Is Carmen Sandiego? Brøderbund Software
- 41 3 3 Where in the World Is Carmen Sandiego? Broderbund Software
- Broderbund Software
 Where in the USA
 Is Carmen Sandiego?
 Broderbund Software
- 66 4 5 Math Blaster

 Davidson & Associates

Months on chart Last month This month

Entertainment Software

53 1 1 Microsoft Flight Simulator Microsoft Corporation

28 4 2 Tetris
Spectrum HoloByte

17 5 3 Crystal Quest

Casady & Greene

Spectrum HoloByte

16 – 5 SimEarth Maxis

Network/Data Communications

34	1	1	PhoneNet
			Farallon Computing
57	2	2	AppleShare
			Apple Computer
3	3	3	AppleTalk Remote Access
			Apple Computer
19	5	4	White Knight II
			FreeSoft Corporation
11	_	5	SmartCom II

Add-In Boards

Macintosh Ilsi NuBus

Hayes Microcomputer Products

77.		1	Adapter Card
			Apple Computer
21	2	2	Macintosh Display Card 8-24
			Apple Computer
3	4	3	Macintosh II FDHD Upgrade
			Apple Computer
1	_	4	MacCon3 Ethernet Card
			Asanté Technologies
10	5		Pivot

Radius

Months on chart Last month This month

Utility Software

16 1 1 After Dark
Berkeley Systems

22 4 2 Norton Utilities for Macintosh Symantec Corporation

17 3 3 Virex

Microcom 27 2 4 SAM

Symantec Corporation

6 5 5 More After Dark Berkeley Systems

The AmCoEx Index of Used Mac Prices

Machine/RAM/ Hard Drive	Average Sale Price	Monthly Change
Mac Plus/1MB/none	\$325	-\$25
Mac Plus/2MB/20MB	\$550	+\$50
Mac SE/2MB/20MB	\$825	-\$50
Mac Portable/1MB/40MB	\$1150	\$0
Mac Classic/2MB/40MB	\$775	-\$25
Mac SE/30/2MB/40MB	\$1650	\$0
Mac LC/2MB/40MB	\$1050	\$0
Mac II/4MB/40MB	\$1775	-\$75
Mac IIsi/3MB/40MB	\$1850	-\$50
Mac IIcx/4MB/80MB	\$2425	-\$50
Mac IIci/4MB/80MB	\$2950	-\$150
Mac IIfx/4MB/80MB	\$3900	-\$100
Apple 12-inch B&W	\$250	\$0
display/board		
Apple 13-inch RGB	\$625	-\$25
display/board		
LaserWriter Plus	\$1000	-\$50
LaserWriter IINT	\$1750	\$0

Index provided by the American Computer Exchange of Atlanta, Georgia. It reflects sales during week of June 15. Configurations include keyboard and exclude monitor and display board for noncompact models.

Source: Exclusive Audits & Surveys research from more than 250 Macintosh retailers and selected mail-order vendors. Covers sales during May 1992.

Mirror Introduces

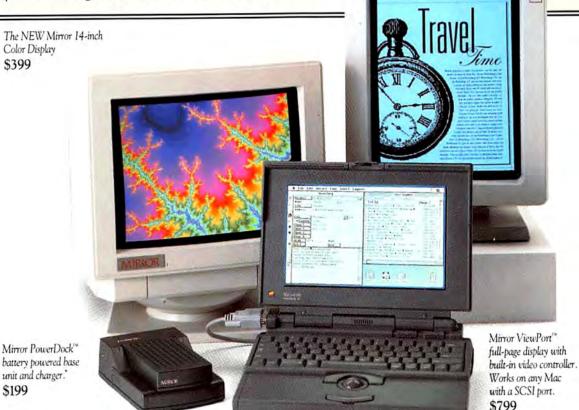
With Mirror's exciting new peripherals, your PowerBook can function just like a desktop machine, with a high resolution monitor and

plenty of storage.

The Mirror PowerVision, an internal video board for the PowerBook 140 or 170, works with a variety of standard monitors, including our NEW 14-inch Color Display and 15-inch Grayscale Display. With 0, 2 or 4 MB of on-board RAM, the PowerVision's pass-thru connector lets you use existing RAM, and our installation video

makes setup a snap (professional installation also available).

The Mirror ViewPort is a 15-inch monochrome display with a built-in SCSI video controller and QuickDraw acceleration for performance rivaling internal video boards. Ideal for PowerBooks, the ViewPort brings big screen power to any Mac with a SCSI port. (continued)



PowerVision internal video adapter board includes

Systems including PowerVision board and display from \$948'

tools and a comprehensive installation video.

Mirror Pocket Hard Drives \$449 4

\$649

40 MB

80 MB

from \$549'

herals For The Desktop.

Drive and DAT Tape Drives, Mirror offers the capacities, speed, features and prices you want.

Once you've used a Mirror high resolution display, you'll wonder how you ever lived without it. Our monochrome full-page and two-page displays deliver bright, sharp screen images for word processing, spreadsheets, database management and publishing.

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The top-rated Mirror Color Scanner makes it easy

to add sharp, vivid color images to your work at an unbeatable Mirror price; just \$1199 including Adobe Photoshop.

If you need a printer, take a close look at the MirrorImage 309 Laser Printer and the MirrorImage 415 Tabloid Laser Printer. With Postscript Level 2, RISC processors, sophisticated paper handling and durable, high-speed printing engines, these printers work hard, so you don't have to.

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MirrorImage 415, Tabloid Laser Printer, features dual paper trays and a 15 pagesper-minute print engine. Leases available.

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19-inch Two-page Display w/ monochrome video card \$799 \$799 21-inch Two-page Display



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The NEW Mirror 14-inch Color Display is the latest version of our best selling color monitor. Designed to work with the built-in video of your Mac LC, Ilsi, Ilci, or Quadra--or with Mirror's PowerVision video board for

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\$339

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Drives

45 MB

50 MB (Q)

PowerBooks; this display features razor-sharp focus and brilliant color and it's still only \$399!

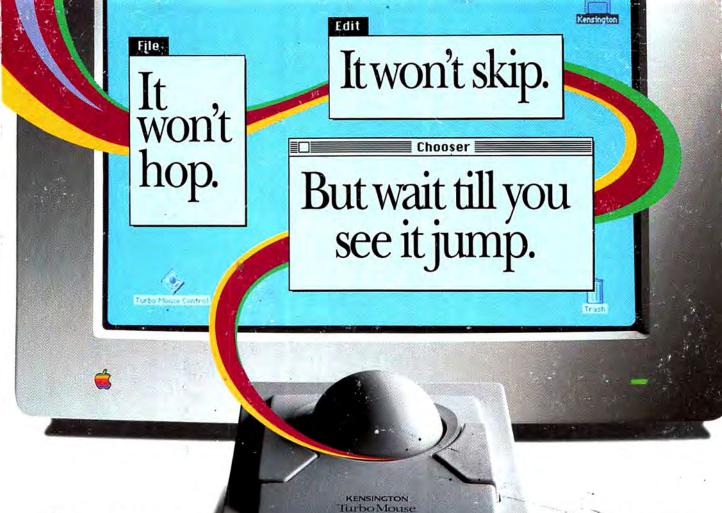
Mirror PowerDock** redefine storage convenience. For moving data between machines, or to expand your PowerBook's capacity, these tiny drives fit anywhere. Slip the Pocket Drive into the PowerDock and use a standard PowerBook battery to power the drive while you travel. When you're back home, the PowerDock does double duty and charges your spare battery.

Whatever your need, whatever Macintosh model you use, Mirror has high performance peripherals to match.

	105 MB (Q) \$419 \$479 120 MB (Q) \$469 \$529 210 MB (Q) \$689 \$749 240 MB (Q) \$739 \$799 330 MB N/A \$1,199 425 MB N/A \$1,299	The Mirror Our Pocket Hard Drives any task.	complete line of From our criticall	nance peripherals to p storage systems can ly acclaimed hard dr formance 128 MB (handle rives and
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•	NEW Lower Price!	or 600 Color Scanner,		The NEW Mirror 14-inch Color Display	\$399°

\$1,199

with Adobe Photoshop



While the cursor may hop or skip with some trackballs, Turbo Mouse® has always been known for its ultrasmooth movement.

Now, the latest version of Turbo Mouse is known for something else—jumping. Our new Brilliant Cursor technology makes it possible.

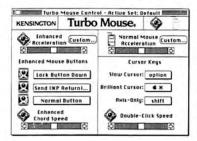
With it, you can move the cursor instantly to predefined HotSpots on the screen, such as the File and Edit menus and the Trash icon.

First, you define your HotSpots. Then, click a button and move the ball in the direction you want to go. The cursor automatically jumps to the predefined HotSpot. You can even program in different HotSpots for different applications and for different users.

And Brilliant Cursor technology is not all that's new with Turbo Mouse 4.0. Also new is advanced acceleration with three levels of control and Enhanced Mouse Buttons that let

Introducing Turbo Mouse 4.0

With the all new Brilliant Cursor™technology, you can actually make the cursor jump to any spot on the screen.



you execute one of seven programmable commands. For example, send a Print command with just one click using Send String. Or move the cursor with ultra precision using Slow Cursor. Even save different combinations of commands for each of your favorite programs.

Then there's the award winning Turbo Mouse hardware. Hardware that has won more awards than any other input device. Hardware that has consistently been voted "Best Input Device" by Macintosh

users worldwide. Features include a large comfortable ball, "easy-click" buttons, long-lasting precision stainless steel bearings, and two ADB ports for chaining other devices.

Turbo Mouse 4.0 is fully System 7.0 compatible. To receive information by fax, call 800-535-4242, dial 82 and request document 320. For general information, call 800-535-4242. Outside the US, 415-572-2700.

See us at MacWorld Expo, Booth #5328 in the World Trade Center.

