Presentations: The Best Hardware and Software for the Perfect Pitch

MacUser

PostScript Printers for Everyone

- Personal
- Corporate
- DTP

Monitors
The New Gray-Scale Champs

Shareware
Instant Library of Instant Classics

Plus Reviews of
MacDraft
MORE 3.0
RasterOps Video
Spyglass
C•A•T III
Audiomedia
and more!!!
Consistently, people who work with numbers have some noticeable traits. They're intelligent, organized and thorough — buttoned up, if you will.

Which explains why Microsoft Excel has been the spreadsheet standard for Macintosh ever since it was introduced in 1985. Today, 90% of Macintosh spreadsheet users do their calculating, manipulating, analyzing and presenting with it.

And while Microsoft Excel has always been easy to learn and use, it can now perform all the complex functions you perform, but with labor-saving benefits.

You can easily build complex models, and conveniently link multiple sheets with a simple point and click.

So the left hand knows what the right is doing, we've added a feature that will tie your data into Microsoft Word documents. Then update that same data automatically, when

With Microsoft Excel you can create impressive documents, choosing from 256 fonts and colors, variable row height and shading.

### WinMark Copiers

#### Profitability by division

##### WxC 2000

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<td>Actual</td>
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<td>($3,969)</td>
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| Gross Profit     | $6,552| $9,102| $10,425| $6,438| $10,140| $21,300|

##### WxC 1000

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<td>118%</td>
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it's been changed in Microsoft Excel.
To insure data integrity, we've even built in alerts that will warn you of such grievous errors as circular references. In fact, Microsoft Excel is so bright, it will actually review your worksheet and flag any formulas that don't fit an established pattern.
Furthermore, the search and replace function can make corrections on a global scale. And customized number formatting lets you bend the rules, allowing you to create everything from a 3-digit account code to a 17-digit part number.
Now, we've left a lot out in this short discourse, but Microsoft Excel hasn't. So be sure to ask your dealer for a complete explanation of its capabilities. And you'll see how Microsoft Excel will make your job easier and better.
Or, if you look at it a different way, you'll become a more effective manipulator. And a more efficient calculator.

Microsoft
Making it all make sense

Then you can Paste Link those worksheets and charts into your Microsoft Word documents and update them automatically.

WinMark Copiers

MEMO:

TO: Shannon Pitts
FR: Peter Cohen
DT: November 13th, 1989
RE: Presentation to the Board

In preparation for the annual meeting, I've created a 20-minute slide presentation on our successful entry into the small printer market.
The presentation will explain to the shareholders that, on a basis of sound marketing strategy, reinforced with our knowledge of the printer business at other levels, we have been able to grow from a 2 percent share of market, to 9 percent in 18 short months.
To the right is an excerpt of the presentation which illustrates our growth. Anticipated concerns will probably center around quality of service and the ability to meet market demand over the next year.
We should be able to squelch any fears by explaining that our small printers have a very low (4%) field repair call requirement at present.
And our assembly resources here in the United States will enable us to deliver to the market on time.

Revenue (In Thousands)

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<td>$1,947</td>
<td>$3,500</td>
</tr>
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With a very respectable 9 percent share after only 18 months, we feel we can reach 15 percent by the end of the next fiscal year (see six month projection).
Start Up

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Guy Kawasaki lists the top ten reasons to dump the Mac for Win3 — and another ten not to. Plus the latest industry news, rumors, updates, reviews of the hottest new products, and more.

Bobker’s Dozen ...................... 48
BY STEVEN BOB KER
Quick looks at 13 little-known products: MultiClip multiplies Clipboards for graphics applications, FastLabel designs and prints iconic labels, and Hyper Toolkit provides lots of HyperCard development tools and XCMDs. Plus Bridge, miniWriter, INITPicker, HyperSpeller, Reunion, Media Letter, 3-Meg Static RAM Card, Number Munchers, Dietician, and File Director.

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RasterOps Video ColorBoard 364: RasterOps’ new card combines terrific 24-bit color with live video. 59
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BY KURT W. G. MATTHIES AND THOM HOGAN
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Help Folder
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33 Unsung Shareware Programs
BY ROGER GILBERT
Beyond today’s shareware hits, a host of new (or simply undiscovered) programs awaits you, including ASCII Chart DA, Blessier, Color Bits, Dir-Acta-Ry, and BundAid. Plus: How to join Zmac and access an instant shareware library. .................. 244

Beating the System
BY MICHAEL SWAINE
Discover the Slow switch and other tricks for trapping INIT problems, find out about the man at MITS, and get a lesson in keeping your wits about you until System 7 arrives. ................. 255

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Readers send us their favorite tips, tricks, and undocumented features for DesignStudio, Adobe Illustrator, QuarkXPress, StuffIt, PageMaker, HyperCard, Word, Finder, and others. .... 297
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A Digital Portrait Montage
BY THE EDITORS OF VERIUM MAGAZINE
This step-by-step guide shows you how to take scanned and modified photos in order to create a striking montage that has an embossed 3-Dish look. ................... 214

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BY KEITH BAUMANN AND AILEEN ABERNATHY
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The NeXT Cube Almost Gets a Mac Floppy-Disk Drive
BRIDGES BY STEPHAN SOMOGYI AND THE MACUSER NETWORKSHOP STAFF
MacUser NetworkShop evaluates three products that let you transport files on Mac floppies into floppy-free NeXT machines. .................. 220

Coming Soon to a Mac Near You: ISDN
BY STEPHAN SOMOGYI
Apple is jumping on the ISDN (Integrated Services Digital Network) bandwagon, which zips along 26 times faster than a 2,400-bps modem. This is the future of voice/data communications, and it's here today — sort of. ...................... 227

Work Groups or Work Teams?
BY KURT VANDERSLUS
Now you can forget all about the organization chart: Here are three ways to design E-mail networks that can satisfy real-life interdepartmental requirements. ...................... 234

MacUser Labs

Buyer's Guide: The Letter-Perfect PostScript Printer
BY BRUCE FRASER, PAUL YL, AND THE MACUSER LABS STAFF
MacUser Labs rates 19 popular PostScript printers for image quality, speed, ease of use, and true PostScript compatibility. We help you pick the printer that's best for you, whether you need a compact personal printer, a network workhorse, or a desktop-publishing tool. Plus five new personal PostScript printers that are on the horizon and our complete guide to testing PostScript printers yourself. .................. 69

Power Presentations
BY PETER POLASH, KATHLEEN TINKEL, AND HOWARD BORNSTEIN
Use the latest hardware, software, services, and techniques to make your next slide show a hit. In "The Hidden Persuasion," you'll find 30 ways to exploit Aldus Persuasion. "The Best Picture Show" tells you how to make slides on the Mac and helps you break through the barrier between Macs and slide-imaging programs. And "Running the Show" helps you get the most out of LCD overhead-projector panels and video-projection systems. .................. 191

The Golden Age of Gray Scale
BY OWEN W. LINZMAYER AND THE MACUSER LABS STAFF
Large gray-scale displays (monitors paired with NuBus cards) have improved greatly in quality and value over the past year. The Labs tests four new ones, comparing factors such as focus, MTF, screen geometry and brightness, gray linearity, and nuisance factors. .................. 150

What a Color Retouching Program Can Do for You
BY KEN MILBURN
Color-image-retouching applications can put professional darkroom techniques at your fingertips. PhotoMac, Photoshop, and ColorStudio offer three very different solutions. ........... 172

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Cover Photo: Fred Stimson
When to buy

CANOPENER

You get a file created with a program you don’t have, so you can’t open it.
CanOpener will let you view text and pictures in the file, and copy what you need. So, just because you can’t open it, doesn’t mean you can’t use it.

You try to open an important WP or DTP document, but it’s damaged.
CanOpener will get you into the document, so you can recover valuable work. Which is probably why many of our users call CanOpener “a lifesaver.”

You’ve misplaced important text or pictures, and you need them now.
CanOpener will let you find files, folders or disks and locate text anywhere, even inside pictures. So, a snippet of text is all you need to find a missing drawing.

So buy CanOpener today, we think you’ll find it invaluable. And we’re not alone. MacUser magazine recently awarded CanOpener “4½ mice” and their famous Editors Choice Award for Best File-Management Utility.

CanOpener is available in all software catalogs, or visit your local dealer. If you need more information, call us at: 800-552-9157 or 914-747-4171.

ABBOTT SYSTEMS
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It's like owning a disk drive with a bulletproof vest.

Introducing the Metro with SCSI Sentry

EMAC has found a way to prevent unnecessary Macintosh hard drive fatalities with SCSI Sentry, an engineering breakthrough in disk drive reliability. It protects your disk drive from damaging shorts that can trap data inside your hard disk. Which makes any drive with the SCSI Sentry substantially more reliable.

And only EMAC Metro drives have it.

Metros are zero-footprint disk drives - so they fit perfectly under a Mac Plus or SE. You can also stand Metro on its side next to any Mac II, keeping your desk free for papers, phones, or photographs.

But Metro's engineering goes far beyond pure aesthetics. With some of the most stringent testing in the market - and mean-time-between-failures ratings of 50,000 to 70,000 hours - these drives were built to keep you up and running. And, if your Metro drive ever does have problems, our modular design makes diagnosis and repair quick and easy.

When you add the SCSI Sentry to such reliable disk drives, you know your data's safe with Metro. If you want to own a disk drive with a bulletproof vest, call EMAC at 1-800-821-0806, extension 2222, (In Canada, 1-800-663-5161).

Please circle 154 on reader service card.
What’s Error-Free Writing Worth To You?

A happy customer. A promotion. A good grade.

The confidence of a well-written letter. Valuable time. Write better! Whether you write letters, term papers or business proposals, RightWriter® For The Mac makes your writing clearer, more concise, and more powerful. Write faster! In seconds, your document is edited for punctuation errors, wrong words, and grammatical problems. Right now! RightWriter For The Mac is the intelligent grammar checker that helps you write better and faster. Visit your local software retailer or order today. All for only $95.00. Write better. Write faster. Right now! Call 800-992-0244.

Ask about our 90-day money-back guarantee. RightWriter For The Mac is only $95.00 plus $6.50 shipping and handling. RightWriter. 11711 N. College Ave., Carmel, Indiana 46032

Please circle 26 on reader service card.
"If there's a problem, it's not your printer. Try your software."

"The network is fine. See if it's your laser printer."

"The software seems to be okay. Maybe it's your scanner."

"It's not your scanner. Did you check the network?"
If you have an AgfaCare™ Service Contract and your publishing system goes down, there's one thing you won't get from us. An excuse.

Let us integrate your whole pre-press environment, and we'll service every part of it. That includes other companies' products, too: your Macintoshes®, all popular publishing software—even our competitors' imagesetters! No more finger-pointing or buck-passing.

And, when you have a problem, we'll be in your shop within eight business hours. Guaranteed.

If we ever miss that deadline, we'll add a free month to your service contract. If we don't have you up and running within 16 business hours,
we’ll add a month. And if we miss on both
counts, we’ll add three free months.
That’s a promise no one else in our business
makes. (Call us for complete guarantee details.)
AgfaCare is more than field service. Our
PostScript® Technical Assistance Center provides
troubleshooting over the phone. And, you can
take advantage of AgfaCare training classes
scheduled at your convenience.
All of this comes from AGFA Compugraphic,
the company with the largest service and sup­
port staff in the industry. Which is why we can
offer a program like AgfaCare.
Instead of offering excuses.
Want to know more about AgfaCare? Call
us at 1-800-227-2780 (in Canada 1-800-387-9533),
extension 7595. AGFA
Explore these areas on Zmac:
• Download Library of Editors' Top Shareware Picks
• Zmac Buyers Guide Database
• Technical Tips and Hints Database
• Editorial Discussion Forum

GO ZMAC and discover
Any CompuServe subscriber can access Zmac by typing GO ZMAC at the exclamation point (!) prompt. If you don’t subscribe to CompuServe, sign up for Zmac on-line by following these directions.

How to sign up for Zmac
You’ll need a modem and telecommunications software. Set your format for 8 bits, one stop and no parity. Find your local access number:
Dial 1-800-FIND CIS (346-3247). When connected, press RETURN.
At Host Name prompt, type PHONES.
Follow instructions to locate access numbers in your area. Hang up.

Signing up for an account
Dial up using your local access number. When connected press RETURN.
You’ll see the following prompts on-screen. Your responses are printed in bold.
Host Name: CIS
User ID: 177000,5200
Password: Z*MAC
Agreement Number: Z12D0890
You will then be prompted for additional information including a credit card number for billing purposes. If you cannot bill to a credit card, call the CompuServe Customer Support line listed below.
Your new Zmac ID and password will be displayed on-line. Call again and explore Zmac. A new password will arrive in the mail within 10 days.

For assistance in membership, billing or passwords call CompuServe Customer Support at (800) 848-8199.

We believe folks should practice what they preach. For example, the writers of our Power Programming column, Kurt W. G. Matthies and Thom Hogan, have written their share of serious code. This month you can see for yourself, because we’re going to start making some of their programs available to you.

The first is MacUser’s Security. Kurt developed this product in conjunction with the September ‘90 Power Programming column (page 329), which documented the development of Loser, a utility that makes files invisible on the desktop. Two other security utilities, a file killer and a file locker, combine with the Loser file hider to make up the MacUser’s Security package.

Shredder, the file killer, obliterates deleted files by overwriting them completely. Not even commercial methods can retrieve files that Shredder has wiped out. Scrambler, the file locker, encrypts files by using a high-level security algorithm.

Kurt and Thom’s column will feature more do-it-yourself software in the future.

We’re giving this software away to encourage you to join Zmac. MacUser’s on-line companion. Zmac is available to CompuServe (CIS) users; just issue a GO ZMAC command at any ! prompt. If you’re not a CIS member, you can sign up for Zmac by following the directions in the Zmac ads found elsewhere in this issue.

Of course, Kurt and Thom aren’t the only programmers who contribute to MacUser. We’re going to make other MacUser coders’ creations available on Zmac as well. This month we’re also introducing two other programs: MiniFinder Finder and DiskBasher!.

MiniFinder Finder, written by David Drucker, a Cambridge, Massachusetts-based interface consultant, works with the MiniFinders HyperCard stack already available on Zmac.
MiniFinder Finder selects products in the stack according to several criteria. The code is open; therefore you can use it to explore HyperTalk nuances as well as to find the reviews you need.

Our third program, DiskBasher!, is used by MacUser Labs to measure hard-disk performance by writing, seeking, and reading a file on the disk. DiskBasher!, written by MacUser’s Stephan Somogyi, is the first in a series of MacUser Labs benchmark utilities.

So log onto Zmac now to get these three free programs. They’ll help you practice the proficient user’s work style that you too probably preach.
The first SQL database for Macintosh has enhanced connectivity and a new graphical Query Tool.

The first version of ORACLE for Macintosh was a big hit. Industry analysts gave it a thumbs up. Thousands of users gave it their support. And InfoWorld Magazine gave it Product of the Year.

Now Oracle announces ORACLE for Macintosh Version 1.2, with enhancements for both end users and developers.

Improved connectivity options make it even easier to access corporate data on servers, minis and mainframes. Version 1.2 supports virtually any network. Including Async, Apple’s MacTCP, Novell’s TCPort, Alisa’s TSSnet, DCA’s MacIRMA 3270 and Tri-Data’s Netway. The new HyperCard-based Query Tool, with the enhanced Application Generator and System Stack, lets users point and click to query data and then automatically transfer it to their favorite programs such as Excel, Wingz or Word. All without knowing SQL or writing code.

The Database Version includes the ORACLE database, Query Tool, Application Generator, System Stack, Hyper*SQL and Pro*C for $699. The Networkstation Version comes with everything but the database for only $299. And the Networking Option for Macintosh is just $299.

ORACLE for Macintosh Version 1.2 is backed by the largest database consulting and support organization of any software company.

Call 1-800-ORACLE1 Ext. 7692 and order today. And see a sequel that’s better than the original.
The Power of Shiva NetModems
Power is one Shiva NetModem doing the work of many modems
and phone lines on your LocalTalk network. Power is access
to network resources, even if you’re out of the office, just by
dailing in.

The Glory of NetModem V.32
Shiva’s new NetModem V.32 has all that power and the glory.
The glory of speed — up to 9600 bps with full V.32 compatibil-
ity. Plus the glory of freedom — freedom to bridge any two
remote networks and transparently create a wide area net-
work, so you can share files, mail, printers, or other network
resources, even if you’re halfway around the world. You could
purchase a software solution that simulates the NetModem’s
Dial-In Network Access feature, but that product requires
unwieldy file transfers and only accesses a single computer.
You could bridge remote networks by installing software that
acts like NetModem V.32’s remote router, but those applications
require a dedicated Mac and are vulnerable to system crashes.

Call Shiva for the Power and the Glory
Shiva’s NetModems are complete stand-alone solutions. So
if you have a LocalTalk network, ask us about the power of
NetModem V2400. And if you need speed or the freedom to
bridge remote networks, ask us about the glory of NetModem
V.32. Call Shiva at 1-800-458-3550.
Driving His Daisy Chain

Thanks for Thom Hogan's excellent article in the August MacUser ("A Beginner's Guide to Daisy Chains," August '90, page 243). He gave me the courage to do something I'd never heard anyone recommend—terminate only the last device in a SCSI chain. I'd never thought to deviate from the advice that most manuals offer: Terminate the first and last device. I have an external (internally terminated) hard-disk drive and a GCC Personal Laser Printer, and up to now, I've had to leave the printer on to mount my hard disk. By removing the termination on the PLP, I can mount my hard disk without the printer's being on.

Hogan's analogy to the black arts was right on; for me, too, SCSI chains have always seemed supernatural. In fact, I've always felt that computers are only an elevated form of superstition. Thanks for confirming my hypothesis.

Gib Veconi
New York, NY

ImageWriter's Bloc

Your review of color printers ("Color on the Page," May '90, Buyer's Guide page 56) omitted any reference to the ImageWriter. Your writers are arrogant in their commercialism and expertise, feeling flush with cash and the best of equipment. I have read that somewhere around 65 percent of Macintosh users also use the ImageWriter—a fact that one would never guess at all from your columns. Of course, the ImageWriter is not the fanciest and best of color printers, but for my purposes, it produces superb results.

A.S.W. Lamont
Picton, Ontario
Canada

Phil Brown of Austin, Texas, wants to see greener Apple:

"Today I unpacked a new Mac. In the box was a large foam package labeled 'Open Second.' A wraparound sheet of heavy glossy paper and the omnipresent shrink-wrap covered the box. A piece of clear plastic inexplicably covered the front of the wraparound sheet. Encased in the thick foam was not a disk drive, not a priceless vase, but manuals!

"It looks like marketing departments are completely out of control when it comes to packaging disks and books. This stuff wastes trees, clogs landfills, and is a royal headache to handle in the office."

Our review focused on printers that began their lives in color—any dot-matrix printer can be coaxed into color duty with the right ribbon. Even the proletarian ImageWriter can produce creditable color output, especially when helped by shareware gems such as CheapColor or Picture Colorizer (both available from our on-line service, Zmac).—RM

A Fool Warranty

After years of consumer whining, Apple has extended its product warranty to a full year. A victory for Mac users everywhere, right? I guess Apple has been cheating its customers out of nine months of warranty for the past ten years—or has it?

While IBM and the bulk of the PC world offer a one-year warranty, in most cases it is a one-year limited warranty with a 90-day full-service warranty. This means that, beyond the 90-day warranty, items that commonly fail (such as the power supply) are no longer covered while things that almost never fail (such as the system board and memory chips) are unconditionally guaranteed.

In the past, Apple's position has always been to offer people not satisfied with the 90-day warranty a comprehensive service-contract program called AppleCare that they could subscribe to in yearly or monthly increments. If anything goes wrong with your equipment while you are under AppleCare, take it to any authorized Apple dealer for repair, free of charge.

So we finally have our comprehensive warranty—but what have we given up? Well, for those of you who thought that Apple's products were on the pricey side, brace yourselves. With Apple's new commitments, expect a price increase. As you may have guessed, PC users have been paying for their puny limited warranties all along.

Scott Miller
Pensacola, FL

SPY's Like Us

While flipping through your May '90 issue, I was appalled to discover the spread on pages 36 and 37 ("A Power Play"). Your pillaging of SPY magazine goes beyond just concepts—you might at least have changed the artistic style of the caricatures. Am I accurate in visualizing your staff members (or maybe it's just that}

LETTERS

Compiled by James Bradbury

Phil Brown of Austin, Texas, wants to see greener Apple:

"Today I unpacked a new Mac. In the box was a large foam package labeled 'Open Second.' A wraparound sheet of heavy glossy paper and the omnipresent shrink-wrap covered the box. A piece of clear plastic inexplicably covered the front of the wraparound sheet. Encased in the thick foam was not a disk drive, not a priceless vase, but manuals!

"It looks like marketing departments are completely out of control when it comes to packaging disks and books. This stuff wastes trees, clogs landfills, and is a royal headache to handle in the office."

Our review focused on printers that began their lives in color—any dot-matrix printer can be coaxed into color duty with the right ribbon. Even the proletarian ImageWriter can produce creditable color output, especially when helped by shareware gems such as CheapColor or Picture Colorizer (both available from our on-line service, Zmac).—RM

A Fool Warranty

After years of consumer whining, Apple has extended its product warranty to a full year. A victory for Mac users everywhere, right? I guess Apple has been cheating its customers out of nine months of warranty for the past ten years—or has it?

While IBM and the bulk of the PC world offer a one-year warranty, in most cases it is a one-year limited warranty with a 90-day full-service warranty. This means that, beyond the 90-day warranty, items that commonly fail (such as the power supply) are no longer covered while things that almost never fail (such as the system board and memory chips) are unconditionally guaranteed.

In the past, Apple's position has always been to offer people not satisfied with the 90-day warranty a comprehensive service-contract program called AppleCare that they could subscribe to in yearly or monthly increments. If anything goes wrong with your equipment while you are under AppleCare, take it to any authorized Apple dealer for repair, free of charge.

So we finally have our comprehensive warranty—but what have we given up? Well, for those of you who thought that Apple's products were on the pricey side, brace yourselves. With Apple's new commitments, expect a price increase. As you may have guessed, PC users have been paying for their puny limited warranties all along.

Scott Miller
Pensacola, FL

SPY's Like Us

While flipping through your May '90 issue, I was appalled to discover the spread on pages 36 and 37 ("A Power Play"). Your pillaging of SPY magazine goes beyond just concepts—you might at least have changed the artistic style of the caricatures. Am I accurate in visualizing your staff members (or maybe it's just that...
Kawasaki Guy) working up material and compositions with SPY magazine lying open and well studied in the upper right-hand corner of their desk?

Scott Dunn
New York, NY

You’re right; Guy’s inspiration came directly from SPY (as he threatened in his debut column, March ’90, page 33), although he obviously made up the parts about Sculley’s review of Spindler, Campbell, and the Mac. The folks at SPY have seen the piece and have already threatened us with a “good-natured ribbing.” — JB

The Running Mac

In answer to John C. Dvorak’s statement that he’s amazed that the Mac “is so easy to get up and running” (“Joke, Reminiscence, Fact, History,” July ’90, page 302), as a consultant, I’m even more amazed at how the Mac gets up and running when it shouldn’t. I’ve seen numerous installations on the brink of disaster. Several Systems on a hard-disk drive, files in the System Folder that shouldn’t be (mystery INITs), or files not in the System Folder that should be. That the client’s Mac had been reasonably productive at all is truly a miracle that has no precedent in the world of the IBM PC clone.

SHAZAM! It even runs when you do it wrong!

Sharon Mendenhall
Las Vegas, NV

C’s the Light

I’ve been a C programmer for two years and was surprised to see how different Mac programming was. I had just begun my own C project on my Mac IIfx, and the tech talk was getting pretty dry.

Enter Kurt (I’ve got four initials) Matthies and Thom (no relation to Hulk) Hogan with excellent coding examples and a “we won’t be defeated” attitude. I must have said, “Oh! Now I understand!” at least ten times for each month’s article.

Way to go, guys! So when is your OOP coding article? My breath is bated!

Rocky Olive
Apex, NC

In “Scroll Your Own” (July ’90, page 238), Kurt Matthies and Thom Hogan write, “We’ve discovered a gaping hole in the Mac programming literature regarding scrolling, and we wonder why it exists.” Fact is, this hole has already been filled by myself and other contributors to MacTutor magazine.

My article “Window Scroll Bars” appears in the March ’89 issue; “All About Scrolling Windows” by John A. Nairn appears in the April ’89 issue. Both articles include full source code; mine in MPW Pascal and Nairn’s in THINK C.

Readers of your magazine who want to study the topic in more depth should have a look at these articles.

Joe Zufolletto
Cupertino, CA

Dear Mr. Sculley...

... When we asked readers to come up with some fresh marketing slogans for John Sculley and Apple, the response was immediate, although not always as fresh as say, the latest Apple org chart. Brian Manantz, of Irvine, California, for instance, suggested “The Macintosh Way.” Sorry, guy, that one’s taken. His other idea—”MII: Macintosh Interface Superiority”—is commendable pith, but we think some old-timers might take it amiss.

Tom Kraus, of Cazadero, California, suggests “Follow us!” Yes, but that presupposes that we know where the heck they’re going.

“You’ll Hate the Company, But You’ll Love the Machine” comes from B. Freer, Freeman, of Arlington, Virginia. So much for Apple’s warm, fuzzy corporate identity. But wait, Hal T. Curtis of Glendale, California, would have Apple heat things up a bit: “Using Windows 3 is like making love through a blanket. Crawl between the sheets with a Mac!”

We’re sure you meant spreadsheets, right, Hal?

Tom Krasner

Speak Up: What can John Sculley do to earn his salary this year?

Last year, Apple CEO John Sculley received $2.25 million in salary for services rendered to Apple Computer, making him the best-paid executive in the computer industry.

Send your thoughts to Dear Mr. Sculley, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.
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Don’t Trust Anyone ‘030

I knew that Macs were intelligent, but this is absurd. My wife just came in with a Mac price list and told me we should get a new Mac — my old model-T Mac died minutes later.

Now I’ve got a dilemma. Pluses and SEs are a micrometer from obsolescence; and SE/30s, along with IIs, use 68030 chips that may soon go the way of vacuum tubes, unless Hitachi and Motorola kiss and make up and drop their cross-lawsuits over 68030 chip technology [See Newsline, July ’90, page 47 for details on this suit — Ed.]. They will, won’t they? They aren’t that stupid, are they?

OK, they’ve already proved that they can be that stupid. My question is: If 68030s are outlawed, will only outlaws have 68030s?

Edward S. Margerum

Salem, MA

A Friend Indeed

I’ve been a loyal Apple user for the past five years and hope to continue using Apple products in the future. I’m not a computer wizard, but it looks as though the PC market is pushing the Macintosh aside. I’d like to know if it is still a safe investment to stick with Macintosh or if I should bite the bullet and join the PC market? I would appreciate any dirt you can give me!

Richard Earle

Washington, DC

C’mon, Rich, don’t throw away five good years for the first flashy GUI package to run on a PC. You don’t see Steve Mills (following letter) complaining — and he can’t even afford to buy beer! — JB

Put Up or Shut Down

This letter is to everyone who has ever complained about the Mac. Why don’t you just shut up and take the time to think about how wonderful the Mac really is? Would you rather be using an IBM PC? Why would anyone in their right mind want to learn hundreds of command names? And why would anyone want to use a copy of the real thing? I’m talking about IBM’s “alternative” user interface, the one that works like a Mac. You know, those ugly windows and huge mice? You can’t afford Apple’s prices? Well, just try bringing your lunch to work instead of eating out — and stop drinking all that beer. I bought my SE, printer, modem, and truckloads of software on the salary of a student (none) who worked weekends (not much). Now it’s paying for itself. It makes money for me. And the damn thing is still just as courteous and gracious as the day I took it out of its box.

Steven J. Mills

Coralville, IA

By the Numbers

It’s very frustrating when a magazine fails to print a page number on each page. In your March issue, for instance, only 113 out of 292 pages (39 percent) show numbers. Your magazine obviously isn’t the only example, but it’s my favorite, so that’s why I’ve written. What’s the story, guys?

Glenn R. Holland

Globe, Australia

With such a bent for statistics, it’s a shame you live in a country without major-league baseball. Seriously, the production and financial considerations that go into something that seems as simple as page numbering are mind-bogglingly complex. Suffice it to say, we aren’t deliberately trying to make it hard to find things. — JB

Cross Purposes

I hope that you’ll make the crossword puzzle you had in the April ’90 issue (page 318) a regular feature. I’ve waited until now to write in the hope that it would be.

Not only was the puzzle fun and funny, but it was informative as well. Please think about making this a regular feature. It will guarantee that readers will want to see the next month’s issue.

Consuela H. Allen

Rockville, MD

Sorry, the crossword puzzle was a one-shot deal. But if you’re looking for challenging MacUser puzzles each month, how about trying to calculate the exact percentage of pages with and without page numbers? — JB

Can’t Keep a GUI Mac Down

Journalists in the popular press have lamented the death of “the Macintosh difference” at the hands of Microsoft Windows 3. What disturbs me is that writers appear to be under the misguided conception that a GUI was all that distinguished the Mac from its competition — that the addition of windows, icons, and a mouse to any other machine makes it a Macintosh clone.

The Mac difference is not dead. But
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Let's Talk... lot of power...the interface is excellent!

MacUser 5 Sept 89

Stands out from the crowd... a super-Scrapbook. Publish! Aug 89

Pictures belong in PictureBook

Superb... the difference I refer to is one consisting of the standardization of application interfaces; a structured, five-level development platform that makes the integration of new printer drivers, network protocols, and System resources a comparative breeze; and yes, a rich, fully functional graphical user interface that spans all Mac applications and still operates successfully on a four-year-old, 8-megahertz, 68000-based Mac Plus.

Robin Gridley
Pasadena, CA

Up and ATM

In my ignorance as a new Mac user and non-typographer, I'm still trying to understand Thom Hogan's statement (“Font Basics and Beyond,” July '90, page 231) that "If you're an ImageWriter owner, you can pretty much ignore Adobe Type Manager (ATM), since it really doesn't offer you much."

It's pretty clear to me that ATM offers substantial improvement, even when only 10- and 12-point Roman styles of each bit-mapped font are installed. I spent a lot of time with MasterJuggler, ATM 1.2, and the Font/DA Mover trying to prove Hogan's statement, but I couldn't bring myself to believe that the non-ATM output was even close, except in one or two font styles.

Howard McCollister
Crosby, MN

I received several letters from ImageWriter/ATM users. One even sent me a four-color, TypeStyler-enhanced missive that was, indeed, pretty impressive. Perhaps I should have worded my statement as follows: "If you're an ImageWriter owner, ATM will print nicer-looking characters but will impose several penalties in exchange for a modest improvement over the best of the bit-mapped fonts."

The penalties are price, speed, screen readability, odd character spacing with some applications, the need to purchase and use expensive Type 1 fonts, and burdensome memory requirements. The only significant plus is better character-by-character Type 1-font output, especially at odd sizes and with emphasis (bold, for example).

Version 1.2 of ATM, which I hadn't yet seen at the time I wrote the article, does seem to do a better job with the ImageWriter than the version I looked at. —TH

Color Traps and Pitfalls

Your article “Prepress: Cures for Poor Registration,” (July '90, page 175) was very good. However, the key sentence is "You can use a Macintosh and an image-sequence device to produce prepress work and print pages directly to film." Sure you can, but do you really want to? For the unaware, there are pitfalls.

1. Cost. Because the professional illustration packages don't provide a dialog box for setting the desired trapping, this must all be done by hand. For many designs, traditional prepress work is actually less expensive.

2. Time. Customers have a tendency to change things up to the last minute (when it's in print), so it's not a good idea to trap too early. Unfortunately, that means you won't have time to trap correctly.

3. Color quality. To get the right colors, the service bureau must carefully calibrate and monitor the film's dot densities. Changes in chemistry can affect the dot density of the separations and thereby your final color output.

4. Responsibility. When printers do the prepress work, proper colors and registration are their responsibility. Printers have a much better idea than illustrators do of how much trap the paper and press require. If the prepress work is done by the illustrator, responsibility for proper color and registration shifts to the illustrator and service bureau.

Unless you can show a substantial cost savings and have resolved the other points through established work, you're better off doing the work on the Mac and having the prepress done traditionally.

Debbie Sautista
Wilmington, DE

Thanks for a great section on color prepress. I'd like to clarify one small item, though, concerning the statement that QuarkXPress and PageMaker 3.02CE and 4.0 “correctly apply all the traps in imported FreeHand or Illustrator images” (page 178).

It's been my experience, as a graphic-production manager and service-bureau operator, that EPS files created in FreeHand (2.02) or Illustrator 88 (1.9.3) that use separate fill and stroke overprints do not retain those separate overprint specs when imported into PageMaker or QuarkXPress but instead use the global color specs. I do hear that QuarkXPress 3.0 will have some trapping controls built in, and I look forward to seeing this in
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MacWrite II
Adobe Illustrator
Timeslips III
QuarkXPress
GREAT PLAINS

Atlas PageMaker
Adobe Type Manager
SUM II
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SAM

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All the Macintosh® applications above were developed in THINK C® or THINK Pascal®. Could it be coincidence? Think.
LETTERS

action, especially if it corrects the previous situation regarding EPS files.
Regarding the final paragraph about importing EPS photos into FreeHand or Illustrator and then exporting them as EPS again: Although this is theoretically possible, results at our service bureau indicate that EPS files within EPS files are very troublesome to print, taking too long or not printing at all.

Jungle Payne
Santa Barbara, CA

System 7-Celibate
Not only do the new people at Apple not know their products, but they also do not know their customers. They seem to think that the only entities that buy their products are large companies with interconnected networks and unskilled operators. System 7 seems to be optimized for this case at the expense of all other users. They don’t even know that the color monitor required to take advantage of all the System 7 features causes more operator fatigue (which is a contributor to low business productivity) than a monochrome monitor.

I’ve decided not to use System 7 and not to buy software that requires it. I’m going to coast with my present system (SE/30) for ten years and not buy any more Apple hardware that needs System 7. This ten-year figure is not all that preposterous when you consider that new IBM/XT clones are still being sold.

James Long
Sunnyvale, CA

Shhhhhame!
I was struck by the juxtaposition of two of the headings over letters on page 11 of the July ‘90 issue.
It’s ironic that the heading over Jim Everson’s letter (“Reader and Adviser”) would have been far more appropriate over librarian Jean A. Polly’s letter instead of the stereotypical cheap shot you used.

You should know how far from library reality that facetious “Shhhhh!” is (and how sensitive librarians are about it!).

Virginia Short
Sacramento, CA

Fax in the Box
It’s quite interesting to see all the comments over the past few years about the box everyone is waiting for. In “Special Delivery” (July ‘90, page 12), Joel McCoy says he expects the Japanese to come out with a fax-copier-printer-modem-scanner in one box.

It should be obvious to anyone that
1. It is easy to build this box.
2. It will never be done.

Why would a company such as Canon build one of these when it can sell essentially the same hardware to a company three or four times? The Japanese limit competition enough and are dominant enough that they will never have to build this box.

The only remote hope is that perhaps a...
Korean company will do it. And this is a very remote hope, as there has been a past case. I am speaking of video decks. The same situation occurred when about 10 million people realized that it would be handy to have a dubbing video deck for the home. Of course, the Japanese didn't build it. When a Korean company did, the Japanese froze it out of the parts market and it had to withdraw. Japan is now Korea's largest market and customer, so we probably won't see the magic one-box-does-it-all device any time soon.

John Elemans
Bellingham, WA

FUBAR Exam
I've just finished reading the August '90 programming column, "Under the Hood" (page 259), and am surprised to find the classic term foo defined as "a typically obscure name for a generic function."

Foo and its companion term bar are the syllables of the military acronym FUBAR (Fouled Up Beyond All Recognition; there is another word often used in place of Fouled, but MacUser is a family magazine) and are the two most commonly used generic variable or function names. Almost every college course in computer programming introduces its victims to these terms, usually without telling them how accurate and appropriate these names are for the code they are writing in the course.

I think the legion of MacUser readers who are discovering neat new ways to bring up the bomb box would appreciate knowing the true meanings of these terms.

Scott Forbes 70411,820
via Zmac
Most of them will probably be too busy coining colorful acronyms of their own, but thanks for the info. — JB

CLARIFICATIONS
"Spreadsheets to Go: Choosing a Spreadsheet" (July '90, page 162) contained incorrect mouse ratings for some products. The correct ratings (shown in parentheses) are Microsoft Excel 2.2 (5), Microsoft Works 2.0a (4.5), DeltaPoint Trapeze 2.1 (3.5), and Informix Wingz 1.1 (5). Also, the flowchart on pages 166 and 167 should have indicated that Wingz has a development language, not a macro language, and that it provides for dialog-box creation and screen control.

In "Networks: Under New Management" (August '90, page 226), we erroneously reported that version 1.0 of Neon Software's NetMinder Ethernet could not save or print collected network data.

The phone number for information on Microsoft foreign-language dictionaries (Help Folder, August '90, page 283) is no longer valid. The new number is (800) 426-9400.

The August '90 MiniFinders listing for Encore from Passport Designs was short one mouse. The listing should have featured the same 4.5-mouse rating that the program received when it was reviewed in May '90.
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thing to fix, but it's symptomatic of more-serious problems. And everyone knows that the personal-computer market doesn't usually wait around for people who don't get things mostly right the first time around. At least, not unless your name is Apple or IBM — and even then, you're pressing your luck.

Speaking of Apple, didn't it used to be in the packaged-software business? Remember when every Mac was like Crackerjacks, with MacPaint and MacWrite as the prizes that came in every box? Then Apple spurned that business into Claris, a supposedly independent subsidiary. Apple continued to develop software, though, but tried to differentiate what it is, as a company, created — System software — from what independent third-party developers, such as Claris, created.

Time passes. System software gets complicated. HyperCard becomes the new Crackerjacks prize, forcing Apple to speak with forked tongue: "Users, here's a great application to end all applications, and it's free! Aren't we a nice warm-and-fuzzy computer company?"

"Developers, we're not competing with your flat-file databases, application-development environments, appointment calendars, organizers . . . naaahhh! Those kinds of products come in boxes. All we're doing is enhancing the System software. Aren't we a nice warm-and-fuzzy computer company?"

More time passes. System software gets even more sophisticated. Armed with an arsenal of INITs and cdevs, savvy users can create a System file so robust that they hardly need any application software. (Well, almost.)

More time passes. Claris begins acting truly independent and starts making noises about developing software for Windows 3.0. The Macintosh Finder's evil twin on the PC side. Hardly any more time passes before Apple takes action — in an about-face, Apple decides that Claris will no longer be independent. Which leads some to wonder about the future of Apple's System software: Will it continue to be an unpackaged bundled product? Or will it be sold à la carte? Does Apple fear that HyperCard is looked down on because (unlike Plus, Super-

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**By Paul Somerson**

"They say you can't judge a book by its cover, and I agree. After all, that's what dust jackets are for. Packaging — whether for the latest best-seller or the newest page-layout program — is too often an overlooked part of the process of buying or selling products. It includes much more than mere dust-jacket puffery or back-of-the-box boasting.

I can't begin to tell you how many times I've watched a good, or even great, demo of a new product, only to cringe when someone proudly displays the planned packaging. What poorly designed packaging says to me is that the developers haven't successfully communicated the product concept to the marketers, who haven't communicated it to the designers. That's got to make you wonder whether the developers and marketers themselves really understand what they're working on — or its market.

Packaging really starts when a product's developers first decide what it is and what it isn't that they're creating — whether it's a Stephen King blockbuster or a Bill Gates marketbuster — long before it ends up inside its dust jacket or three-ring binder.

Sure, crummy packaging might seem like an easy thing to fix, but it's symptomatic of more-serious problems. And everyone knows that the personal-computer market doesn't usually wait around for people who don't get things mostly right the first time around. At least, not unless your name is Apple or IBM — and even then, you're pressing your luck.

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"Developers, we're not competing with your flat-file databases, application-development environments, appointment calendars, organizers . . . naaahhh! Those kinds of products come in boxes. All we're doing is enhancing the System software. Aren't we a nice warm-and-fuzzy computer company?"

More time passes. System software gets even more sophisticated. Armed with an arsenal of INITs and cdevs, savvy users can create a System file so robust that they hardly need any application software. (Well, almost.)

More time passes. Claris begins acting truly independent and starts making noises about developing software for Windows 3.0. The Macintosh Finder's evil twin on the PC side. Hardly any more time passes before Apple takes action — in an about-face, Apple decides that Claris will no longer be independent. Which leads some to wonder about the future of Apple's System software: Will it continue to be an unpackaged bundled product? Or will it be sold à la carte? Does Apple fear that HyperCard is looked down on because (unlike Plus, Super-

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**Box Scores**

Card, or HyperCard's PC-based counterparts) you don't have to pay for it? What about Apple's font technology (free) versus Adobe's (for sale)? Is one of the secrets of the success of DOS, Windows, and other PC operating systems the fact that you have to pay for them, automatically entitling them to a certain measure of respect?

I don't think so, but to explain why, I have to divulge one of the Big Secrets of the microcomputer industry. (So you have to promise to immediately zap your PRAM after you read this next sentence.)

Here's the Secret: Macs, IBM PCs, NeXTs, Suns, and most of the other big names in the personal-computer business aren't really what the makers of those machines are selling. They'll gladly sell you the box, but what they're really selling is the software. In Apple's case, it's selling System software. In IBM's case, it started selling PCs as a way to keep its "big iron" customers happily shelling out the bucks for IBM mainframe software and support.

The point is, the hardware box with the multicolored apple is not all that fundamentally different from the box with three blue-striped letters. Inside either box, you'll find a CRT (or a way to hook up a separate monitor box), a power supply, a Winchester drive, a floppy-disk drive, a keyboard, and a mouse. Even the motherboards have more similarities than differences. The more profound differences lie in the operating-system software. Although the differences may be less significant than the similarities, as with Coke and Pepsi, Toyota and General Motors, or men and women, it's these differences — rather than the similarities — that we focus on.

From the manufacturer's

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**There's a Crackerjacks prize in every Macintosh prize — System software — and it's a prize that's worth paying for.**
point of view, the box costs only a few hundred bucks to make. The difference between its cost and what you pay is, in a sense, a royalty for the System software. Of course, as all the boxes cost about the same to produce, that difference — the royalty — can vary from only a few hundred dollars (if you’re buying an SE) to several thousand (if you’re buying, say, an Ilfx) for exactly the same System software. But the Ilfx box can do more with that software than the SE box can, so Ilfx customers are willing to pay more. Econ 101, remember?

As software is what really brings in the big bucks, it shouldn’t be surprising that Apple wants to bring Claris back under its thumb — not so much for the revenue from Claris’ application software but to keep that competitive advantage out of Apple’s competitors’ hands.

What does all this mean for customers? Here are a few predictions:

- Apple will continue to give HyperCard away (for the foreseeable future) but will sell Claris-labeled HyperCard add-ons to compete against the extended functionality of Plus, SuperCard, and (on the PC side) ToolBook.
- Some aspects of System software currently under development — perhaps even parts of what once was intended for inclusion in System 7 — will be shuffled off to Claris to be transformed into commercial products that will compete with utilities such as font managers and macro languages.
- Claris’ focus will eventually be split into two areas: application software and System-level technologies that complement Apple’s interests (such as interapplication communication, interplatform communication, and multimedia).
- Personal-computer buyers will continue to happily pay a premium of hundreds, or even thousands, of dollars per machine for their “free” System software. Don’t get me wrong: Apple isn’t scamming us. The retail prices for Macs aren’t really that exorbitant. And when people argue about how Apple should sell Macs for less, they’re missing the point: The question is not whether Apple could sell Macs for less — it’s whether it could support System-software development in the style to which we’ve all grown accustomed if it sold Macs for less.
- “To Claris someone” will become a buzzword throughout Silicon Valley, meaning “To yank the rug out from under anyone whose attitude reminds you of Bart Simpson’s.”

So the next time you’re tempted to discount the importance of packaging, remember that this battle of the boxes might determine which operating system you’ll be using in the future.

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Unless you’ve been off the planet for the past six months, you’ve heard more about Windows 3.0 for the IBM PC than you ever wanted to know. In fact, if you took all the words written about Windows 3.0 and strung them together, they still wouldn’t make much sense, because so much hyperbole has been mixed in with the real information.

The DOS defenders have long sought ways to stave off the Mac attack, which began as a trickle and turned into a steady stream pouring into business. Now, some of them think Windows 3.0 is the weapon they’ve been praying for, and the DOS crowd has been brandishing it like a cross before vampires, chanting “Death to the Mac!”

Even some stock analysts picked up the refrain, and Apple stock fell as a result. But, like much of the hype and hoopla, the case has been overstated. Yes, Windows 3.0 provides a pretty good GUI (graphical user interface, pronounced “gooey”). And yes, it means some potential Mac sales will be lost to PCs running Windows.

But the Mac will endure. Windows 3.0 brings not death to the Mac but extended life to the PC.

DOS is old. Ancient in computer terms. It’s been around since the birth of the PC in 1981 and existed even before that in its larval stage, CP/M. And although DOS has gone through many changes, it remains good old DOS to the core.

Microsoft hopes OS/2 will supplant DOS, but OS/2’s bulkiness and substantial system requirements have slowed its acceptance. So Windows provides a viable alternative, a bridge between the old DOS and the new OS/2.

The problem Windows 3.0 presents to Mac users doesn’t spring from its being a Mac killer but from Windows’ being so derivative. In fact, Apple and Microsoft spent some time in court arguing about possible copyright infringement.

You could assert that Apple didn’t have all these ideas first either. But the Mac was undeniably the first mass-market computer to use a GUI (as the DOS dedicated insist on calling it), and the Mac started a revolution. People who had never considered a computer before bought Macs and loved them.

The Mac’s GUI enabled computer novices and illiterates to lay a hand on a mouse and become almost instantly productive. Moreover, the consistency of the interface meant that what they learned in one program they could use in another.

When you’ve finished using an application, you know exactly what to do to get out of it, because it’s the same in 99.9 percent of Mac applications: Select Quit from the File menu. And when you see a gray bar to the right of the window with arrows at either end and a little elevator, you always know you can get to more information by clicking on the bar. Consistency and simple visual cues make the Mac interface a very powerful GUI indeed.

Now along comes Windows 3.0, and a lot of people are ready to relegate the Mac to the scrap heap of technology. Why? Not because Windows improves on the Mac — working five minutes with Windows would convince any knowledgeable user it doesn’t.

No, they’re ready to trash it because Windows runs on IBM PCs, which makes it potentially cheaper (if you buy clones), faster (although few people have seen the 50-megahertz 80486 machines that the DOS dilettantes use for this argument), and more

Gooeys and Me-Tooeys

Although the Macintosh isn’t endangered directly by derivative products such as Windows 3.0, product innovation is.

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category. Once the product is firmly established (sometimes even as a "standard"), along comes Company B with a clone that doesn't require the innovation and research-and-development expense that Company A has to recoup. So Company B's knockoff usually costs far less and drives Company A's product out of the marketplace. To be fair, sometimes Company B's product improves on the original, and Company A just falls by the wayside. But often Company B's product is not superior, and this is where the consumer can get cheated.

In the new corporate Darwinism, creativity is not being selected. In fact, the reverse often holds true. Companies with me-too products often do better than the makers of the originals. Penny-pinching buyers pass over products whose pricing reflects their creators' need to recoup R&D costs.

The gutters beside the high-tech road are littered with ground-breaking products (and sometimes companies) that couldn't withstand the competition of copycats. CP/M and DOS. VisiCalc and Lotus 1-2-3. MacPublisher and PageMaker. The IBM PC and its clones. The Lisa and the Macintosh. WordStar and every other word processor.

Fortunately, not every attempt at cannibalizing someone else's market succeeds. Lotus 1-2-3 has fended off many competitors, and only the more innovative Microsoft Excel (primarily due to its GUI) has given it a 1-2-3 any real competition. PageMaker has remained at the top of the heap by continual revision. The word-processor wars actually aid consumers, as each player concentrates on adding new features to its program in a war of leapfrogging innovation.

What the computer industry needs is more GUIs and fewer me-tooey. Users should encourage creativity and not hastily abandon the innovative products and companies when the next wave of copycats comes along.

And don't start singing dirges for Apple just yet. If DOS has been able to hang on for ten years, surely the Mac can make it at least until 1994. By then, perhaps, some of the millions Apple has been spending on R&D will have borne fruit and the copycats will have to start all over again.
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Which turns a major production into a very short subject.
I've decided temporarily to stop evangelizing Macintosh and transfer my energies to a new cause: Singapore. I decided this during my visit to the Singapore Macworld Expo, sponsored by the good people at Diversitee, an Apple distributor in Singapore. This column is dedicated to convincing you to try the Singapore Way.

The Nordstrom of Airlines

Even before you arrive, you get an inkling of the Singapore Way if you fly over on Singapore Airlines. Beth and I experienced less stress on our 20-hour flight from San Francisco to Singapore via Hong Kong than on 3-hour flights to Chicago.

This is the Nordstrom of airlines: We got six hot towels during the trip. For the first time, I got off a plane cleaner than when I got on. Although, frankly, we were in no rush for the plane to land. If Singapore Airlines ever makes a computer, we should all switch. I'd rather have a Singapore Girl than a Knowledge Navigator running my computer.

The TLC we received in the air continued after we landed in Singapore. First, we ripped through customs faster than a Macintosh IIx can open windows. Then we were picked up at the airport by a Rolls-Royce.

I was puzzled by the fact that its rear end was dragging until I discovered that the Rolls was hauling a Macintosh Portable in its boot. Fortunately, the Rolls was air-conditioned. This counts for a lot in Singapore, because in contrast to America, where you have to pay for a steam bath, there you just have to go outside.

A Little Background

Singapore gained independence from Malaysia only 25 years ago. In that time, it has certainly kicked butt — its standard of living is second only to Japan's in Southeast Asia. Arguably, in many areas, it has accomplished more than the U.S. has in 200 years, Europe in 2,000 years, and Claris in 2 years. (Any similarity with Claris ends quickly, however, because there's no way that Malaysia is going to be able to buy Singapore back.)

The prime minister of Singapore is Lee Kuan Yew. He seems to be the quintessential evangelist, because he has sold the people of Singapore on the dream of a high standard of living. If he were president of Apple, in 25 days, Apple would be bigger than IBM and Cupertino would be a separate country.

Singapore is clearly an Asian country that's run like a company. (Apple, by contrast, is a company that's run like an Asian country.) Some people would counter that Singapore is a benevolent dictatorship and semipolice state. On the other hand, what do you think our lives would be like if Microsoft got any more powerful?

Macintosh in Singapore

The attitude toward Macintosh is delightful in Singapore. Singaporeans have been inculcated with the Macintosh dream of improving creativity and productivity with Macs. While hanging around the Expo and speaking to a Macintosh user group, I noticed that the questions, comments, and concerns about Macintosh are as progressive there as anywhere I've been. In fact, very few people are jaded about Macintosh the way many Americans are.

The Expo was held in the Raffles Convention Center — a combination hotel, shopping mall, and convention complex. The show was smaller than a Boston or San Francisco show but incredibly well run — for example, there were battalions of people making high-quality badges, and the air-conditioning was flawless. The exhibitors were a combination of U.S. companies who had sent U.S. personnel on a boondoggle (an Aldusian shall remain nameless here) and local developers. In all cases, the booth personnel's product knowledge was incredibly high — much higher than that of the typical Trixie-and-Biff content-free booth personnel we're used to.

The Singapore Way

Let me get back to raving about non-Macintosh aspects of Singapore. First, I loved the people. This is, after all, one of the few places on earth where I
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Second, the food in Singapore is amazing. It’s so good that even the clean restaurants are good. Many coffee shops in Singapore have better food than the best oriental restaurants in Silicon Valley. You won’t get sick eating it, because there are strict regulations and inspections. And the food is cheap. Satay sticks cost $2.50 Singapore per stick. That’s about $1.11 U.S. “Come for the Expo, stay for the food” is my new motto.

Third, Singapore is crime-free. I felt safer there than in lots of places in America. It must be because of the severity of punishment. For example, drug dealing is a capital offense. Drug possession gets you about 25 years and 20 lashes of cane whip called a rotan. Smoking in public, failing to flush the toilet, littering, and jaywalking carry penalties of more than $100 U.S. each. It sounds severe, but the results are stunning. At the least, you’ve got to rethink the U.S. legal system.

Fourth, English is the official language, so communication is very easy. Unlike in France, where people who understand English pretend they don’t, in Singapore people who don’t understand English still try to. I grew fond of the Malay language, however, because it is extremely descriptive. I even learned to speak a little. The first word I learned is the Malay word for IBM PC owners. It’s kayu. Literally it means wooden (really, no kidding). Its connotative meaning is someone who has wood for brains, if you know what I mean. Maybe I should move to Singapore and become the minister of computing. Then people who bought an IBM PC would get 20 lashes of a rotan. On the other hand, maybe owning a PC would be punishment enough.

Hey, don’t take my word about Singapore. Test-drive it yourself. Go to next year’s Macworld Expo, and charge the expenses to your company. (“Ask forgiveness, not permission” — that’s my new motto.)
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Apple's redoubtable Mac line is doomed by the marching millions of IBM PCs with their shining new Windows 3.0 interfaces — or is it? Guy Kawasaki lets you have it both ways this month.

By Guy Kawasaki

The Top 10 Reasons to Switch to Windows

1. So you can learn how to format disks again.

2. So you can understand why Andy Hertzfeld, Steve Capps, Bill Atkinson, et al. may never be equaled.

3. So you can help pay for Bill Gate's underground mansion by buying Microsoft products.

4. So that the money you would spend on Apple equipment isn't used to hire and terminate bozos.

5. So you can feel comfortable wearing a yellow paisley tie.

6. So you can give your Macintosh to your six-year-old kid to do desktop publishing.

7. So you can see for yourself how little industry analysts know.

8. So you can find out if an 80286 machine can really run Windows.

9. So you can help test the first versions of new applications.

10. So you can format disks again.
The Top 10 Reasons to Stick with Macintosh

10. So you can continue to get great customer support from Apple.

9. So you can help Apple debug System 7 — after it ships.

8. So you can buy a PostScript printer and help Adobe.

7. So you can continue to wear your BMUG tie-dyed T-shirt with pride.

6. So you can use the kind of software that Windows will have in two years.

5. So you can help send the Knowledge Navigator on to college.

4. So you can keep your MacUser subscription and not have to suffer through smelly perfume inserts.

3. So you can be on the leading edge of cool viruses.

2. So you can help pay for Bill Gates’ underground mansion by buying Microsoft products.

1. Because if Steve Bobker did Bobker’s Dozen for Windows, it would last only one issue.

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NewsLine
Reports and Analysis

APPLE REABSORBS CLARIS
CUPERTINO, CA — In one of the first tangible actions taken during the newly installed Michael Spindler regime, Apple Computer reacquired Claris in its entirety, turning the company into a wholly owned independent subsidiary. Apple had held an 80-percent share in the software company, and its purchase of the remaining employee-owned 20 percent preempted Apple’s original plans for Claris’ independence, which included public trading. No changes are expected in Claris’ product plans, although the company will be more involved in creating bridges for multiprocessor environments.

ATKINSON SAYS ‘ADIOS, APPLE’
CUPERTINO, CA — Bill Atkinson, the father of QuickDraw, MacPaint, and HyperCard, has joined fellow Apple alumnus Andy Hertzfeld and Mark Porat in a new Apple venture called General Magic. Hertzfeld and Atkinson have each reportedly invested $1 million in the venture to produce a line of products Apple is calling Personal Intelligent Communicators.

ASHTON-TATE DUMPS DBASE MAC
TORRANCE, CA — Ashton-Tate has sold dBASE Mac—the first Mac product, which has been on the market for three years—to the New Era Software Group of Miami, Florida, which plans to upgrade the product and take over support for all current users.

MOTOROLA AND HITACHI REACH ACCORD
SCHALMONT, IL — Under pressure from a U.S. District Court ruling that ordered a ban on the sale of Motorola 68030 microprocessors—the heart of the Macintosh line—Motorola and Hitachi have reached an out-of-court settlement in their fractious patent-infringement suit. Although no terms of the settlement have been made public, the tentative agreement apparently ensures that deliveries of the 68030 will not be disrupted.
**Bobker's Dozen**

**1 MultiClip 2.0**
MultiClip 2.0 is a much improved version of an already good product that lets you have, in effect, many Clipboards. This makes many graphics and page-layout applications easier to use.

Performance, reliability, and compatibility are all noticeably better than in previous versions, and ease of use has been enhanced considerably.

This version also features a host of new features. The one I find most useful is the ability to name and see the names of each ClipFrame (MultiClip's name for its Clipboards), which makes finding a frame much easier. You can also select ClipFrames by name from a submenu. (For a rundown on the program’s basic features and operation, see the review, September '89, page 82.)

Oldnaval, 7520 Red Road, Suite A, South Miami, FL 33143; (305) 665-4565. Version 2.0. $129.

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**2 FastLabel**
FastLabel is a very good volume label creator and printer. It has excellent tools for designing labels, which can include graphics and icons. There's even a built-in icon editor.

The program includes a small but useful selection of positioning and graphics tools to enhance labels, which can have two typefaces, each in different sizes.

You can combine labels into templates to make best use of your label stock. And you can print envelopes by treating them as large labels. FastLabel's printing performance is very good. It used a LaserWriter HNTX and a DeskWriter and got excellent results.

FastLabel's weakness is in its list handling. Only tab-delimited files can be imported, and only absolutely pure — that is, non-delimited — text files can be exported. Internal tools for list maintenance aren't powerful enough for users with lots of data. Vertical Solutions advises you to do list manipulation in a database that can export tab-delimited files.

Vertical Solutions, P.O. Box 7535, Olympia, WA 98507; (206) 352-2097. Version 2.0. $139.95.

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**3 Bridge**
My college minor was bridge. Getting four players together has become harder as the years have passed. Bridge, version 6.0, can usually provide a friendly game, however — just don’t expect to have good opponents.

Bridge wasn’t originally designed for the Mac and doesn’t support color or any of the niceties of the Mac interface. (For example, there are lots of modal steps to wade through.)

Bidding is usually reasonable, but the computer does have a tendency to overvalue distribution and rebid, repeatedly, truly awful holdings. You can make some of the impossible contracts, though, because the program isn’t a real good card player.

Bridge is playable, and it’s often the only game in town.

Artworx Software, 1844 Penfield Road, Penfield, NY 14526; (600) 826-8573 or (716) 385-6120. Version 6.0. $39.95.

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**4 Hyper Toolkit**
Hyper Toolkit is a large collection of HyperCard development tools and XCMDs. Using these self-documented tools, you can easily add color, pop-up menus, fancy dialog boxes, and much more to your stacks. The tools are generally easy to use, and all of them work as the documents suggest. Serious HyperCard developers will want to have a copy of Hyper Toolkit around.

Many of the Toolkit’s features come in a stack that you install. Following the simple installation process, a new menu with your options appears in HyperCard’s menu bar. The larger XCMDs are separate, and you install them into your stacks manually.

The main drawback is the lack of hard-copy documentation. All the necessary details are there on-line, but having to scroll through to find the information you need is tedious and an ineffective way to document development tools. Simply printing them doesn't help, as parts are linked to other parts. It's a case of HyperCard being too good for its own good.

5 INITPicker

An INIT and cdev manager is a basic power user’s tool. As new INITs and cdevs multiply, conflicts become common. If you lack a good manager, Mac usage can degenerate into chaos.

INITPicker is one of the best INIT and cdev managers available. It offers all the basic functionality you’ll ever need and lots more. You can drag INITs to the exact position in the loading-order chain you desire. Bomb Prevention, if enabled, automatically disables any INIT it catches conflicting with another one. There are audible as well as visual warnings and alerts.

INITPicker would be virtually perfect, except that you either have to set it to scan for new INITs every time you restart (a slow process for most people) or remember to manually scan and turn on newly installed INITs. That’s a pain. I often forget to do it and then wonder why my new INIT won’t load.


AppleShare 28k
BigThes He... 3k
Suitcase™ II 10k

6 miniWriter 1.6

Back in the days when MacWrite could handle only one open document at a time, many of us got to know David Dunham’s miniWriter very well. It was the only effective way to cut and paste between documents or to work on multiple files at the same time. Back then a handy DA text editor was a godsend, and miniWriter hasn’t lost its luster.

miniWriter is the best note-writing DA, far outshining Apple’s weak NotePad. Designed for dot-matrix printers, miniWriter has a custom font that looks unusually good when you use an ImageWriter; it prints very well on laser and inkjet printers too. Features include the ability to convert plain quotes (“”) to the better-looking curly, or printer’s, quotes (“”) and the ability to remove curly quotes (necessary for much telecommunications work). The Find feature works well. You can set the typeface and size for the whole document but not for individual words. Only files in text format can be opened and handled. If you want fancy formatting, you have to use your word processor rather than miniWriter.

Overall, miniWriter has a slick feel and is easy to use. I’ve tried fancier text-editing DAs, but I always go back to miniWriter.

Maitreya Design, P.O. Box 1480, Goleta, CA 93117. Version 1.6. Shareware, $12.

7 HyperSpeller

The one utility that HyperCard has been missing all along is a spelling checker. Interactive spelling checkers, such as Thunder II and Spell- ing Coach Professional, check your work as you enter it into a text field, but they’re no help in batch checking, which is usually what you require when creating a stack.

HyperSpeller adds this much needed feature to all HyperCard stacks. You can install HyperSpeller in any stack, and it checks the contents of text fields on all cards or any subset of cards. There’s no way to check just a particular field on a card, however; all fields must be checked.

Installation is easy, and HyperSpeller’s performance is excellent. Speed is more a function of HyperCard than of HyperSpeller (it’s sort of slow). HyperSpeller uses the same Microlytics dictionary that MacWrite II and other applications use, so you’ll be able to save considerable disk space if you already have it.

As a bonus, there’s a Find/Replace XCMD that can be installed in any stack.

Foundation Publishing, 14228 Shore Lane, Prior Lake, MN 55372; (812) 445-8986. $49.95.

8 Reunion

Reunion is one of the nicest genealogy programs I’ve seen. Although it’s based on HyperCard, it’s so well done that you don’t notice HyperCard’s size and performance limitations. The various cards link intelligently and automatically. Reunion supports GEDCOM and most of GEDCOM’s PAF implementation; the few minor exceptions are clearly noted.

Reunion is a complex program, but it is well served by its excellent manual. Using Reunion is easy, and data entry is logical. The program includes space and tools for adding digitized photos as well as an index and a birthdays file. Pedigree and descendant charts, which are too large for HyperCard, are created, displayed, and printed by a utility application called SuperChart. It works very well, printing out attractive charts quickly and with a minimum of fuss.

Leister Productions, 141 Hill Blvd., Mechanicsburg, PA 17055; (717) 697-1370. $129.
**9 Media Letter**

Interactive media and multimedia technologies are complex fields. Even if you think they’re more smoke than fire, they’re important to the Mac. Learning about them and gathering specific, useful information has, heretofore, been an arduous task. Several publications cover this area, but most of them are written for the already knowledgeable and committed.

*Media Letter* is different. This monthly publication covers both basic and advanced material and seems aimed at users of these technologies rather than at developers. Denise Caruso is the editor—she’s a superb writer as well—and she’s assembled an excellent group of contributing writers. Among the topics covered are the serious ethical issues the new media have exposed, application notes from differing areas, and some really good opinion pieces. *Media Letter* is a must if you plan to be or must be involved with multimedia and interactive technology. Even if you’re not creating any multimedia projects yourself, you’ll get something valuable out of *Media Letter*.

The Myriad Group, P.O. Box 5199, Belmont, CA 94002-9998; (615) 226-3504, (612) 481-3500. $84.95 per year.

**10 3-Meg Static RAM Card**

Technology Works’ 3-megabyte static-RAM card is an excellent, even necessary, addition to every Mac Portable. The static RAM uses no extra power and allows maximum operating speed. Many competing memory cards use low-power dynamic RAM to “fake” the effect of static RAM. In a side-by-side comparison, the Mac with the static RAM ran slightly faster and the battery lasted noticeably longer while in Sleep mode.

The card is easy to install, comes with an antistatic wrist strap to use during installation, and has a lifetime warranty. Technology Works, 4030 Drake Lane W., Suite 560, Austin, TX 78756; (800) 868-7466 or (512) 794-8533. $1195.

**11 Number Munchers**

Number Munchers is an educational arcade game. It’s aimed at grades 3 to 12, and it teaches a variety of basic skills. The categories are multiples, factors, primes, equalities, and inequalities. Difficulty levels are infinitely variable and easy for parents or teachers to set and adjust.

Number Munchers can be used at home or in a classroom setting, in which the teacher’s copy can serve as the master controller for all network copies. Play is reasonably exciting and will appeal to most students in the target age range. The easy levels are easy, and the hardest levels can challenge anyone. This program is a superb way to nurture children’s math skills, but they don’t have to know that. After all, why take the fun out of it?

MECC, 3490 Lexington Ave. N., St. Paul, MN 55126-2697; (612) 228-3594, (800) 782-9032 (in MN), or (612) 481-3500. $49.95.

**12 Dietician**

Dietician is a good tool for people creating or monitoring special diets. Working from a list of 778 basic foods and their nutritional components, you build menus. You enter a recipe’s components, and the program figures out the nutritional value of the number of servings you plan to eat. Dietician can also show diabetic exchanges, if desired.

The program is easy to use, although building menus takes an inordinate number of keystrokes and clicks. It doesn’t have enough built-in food data for most people, but you can add up to 7000 other items, if you can obtain the necessary data.

The data referenced in the manual is all fairly old, so you might want to update it (particularly the exchange data).

Alsoft, P.O. Box 827, Spring, TX 77383-0827; (713) 353-4080. Version 1.3. $94.95.

**13 File Director**

File Director is the new name for two updated and upgraded classic utilities. The package contains the old Disk Tools Plus package, including a nicely improved version of the world-class Disk Tools Plus DA. The other major component is PowerStation, which is now also called File Director.

The File Director application offers only minor improvements over the latest version of PowerStation. Most of the changes are in the Disk Tools Plus DA, which is a serious rival to the top-rated DiskTop 4.0. Overall performance has been improved, and batch copies and moves are possible. Files can be marked so they’re always easy to find. There’s an excellent Find function, and you can change Finder file attributes such as locked or unlocked.

File Director also provides phone dialing, RPN (reverse Polish notation) and scientific calculators, and calendar DAs.

Five Generation Systems, 10048 N. Reiger Road, Baton Rouge, LA 70809; (504) 291-7221. Beta. No price yet.
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    - Felix the Mouse...$117
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    - DoubleTime 16 doubles speed of SE199
  - BEST DATA
    - Smart One 2400...$143
  - CANON
    - Canon Still Video...CALL
  - CAYMAN SYSTEMS
    - GatorBox...$1890
    - GatorBox E/11 for Mac II...$300
    - GatorCard E/11 for Mac SE...$432
    - GatorUnit...$645

- **MACINTILT** $96
  - MacTilt's advanced Tilt/Swivel technology provides unprecedented 30° tilt and 360° rotation— the flexibility necessary to reduce glare and to ease eye, neck, and back strain.

- **TMON** $505
  - A multi-window, object level, symbolic debugger that reduces development time by tracking down implementation flaws in a program. The monitor is invisible to the user unless it is invoked by any system event, interrupt, or, TMON breakpoint.

- **ICD** $831
  - ICD: A perfect, low-cost, small tool for using your Mac for networking.

- **DYNAPERSPECTIVE 3D** $693
  - DynaPerspective 3D conceptual design program for powerful multimedia demonstrations. Enables designers to visualize and present complex ideas. Unique ability to display high speed animations without pauses.

- **MACPROOF** $104
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AUSTRALIAN MACWORLD

"Originally titled Red Ryder, this program has evolved into a slick, complete and easy-to-use program. A novice can have it running with little effort, yet it has almost all the features the big boys need. This is one of the few remaining companies whose president (the program's creator) answers phone calls and gives technical support. The manual is written in a colloquial style that's entertaining as well as informative."

CRAIG CROSSMAN, TECHNO-FILE

"For Mac novices, White Knight is the best all-around telecommunication program. For procedure writing, it is the simplest. For ease of use I strongly recommend this program."

ACTIVE WINDOW

"White Knight is one of the best values in communications software, and with Olyto thrown in (at a $39.95 value when purchased separately), it's an even better bargain. White Knight continues the tradition of supporting every possible feature that its users could want and then some and with RCMDS you can add features even Scott Watson couldn't think of."

MACUSER

"In the halls of Macintosh telecommunication, there is no name greater than Red Ryder...but now it's called White Knight 11. Many of the changes in this metamorphosis to White Knight will help the special-needs user... you'll find a lot of things to make your time online easier. While reading the expanded manual, you'll see dozens of features you may not think you'll use. Once you try them, however, they'll become indispensable. If you're new to the telecom adventure, you'll appreciate the thought that went into making things easier to learn; White Knight will even write procedures for you, if you'd like."

COMPUTER SHOPPER

"...White Knight is the precision tool of communications programs."

MACWORLD MAGAZINE

"The FreeSoft Co.'s White Knight 11 is priced at half the cost of Microphone. It's a powerful general-purpose telecom program that packs in almost every imaginable feature. It has a very capable scripting language that is now extensible via proprietary RCMDS and has an excellent range of file transfer protocols, including ZMODEM."

MacWEEK

Because we insist that White Knight be a COMPLETE communications package, we have decided to ship with each copy of White Knight a FREE copy of Olyto, a revolutionary Macintosh-to-Macintosh file transfer program, and a $39.95 value.

Even if you have never touched a modem, Olyto can have you transferring files ERROR FREE like a pro in just a few minutes, with the remote machine attended or unattended! Please call or write us, or contact your local dealer for full product information.

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Please circle 89 on reader service card.
Audiomedia

Kiss that studio goodbye: Audiomedia puts a CD-quality digital-recording facility on your desktop.

After years of development, the Mac has finally become the de facto medium of choice for professional audio applications and manipulation. In the forefront of this revolution are the products from Digidesign that turn the Mac into a self-contained, digital-recording studio.

Digidesign makes several interrelated products. At S995, Audiomedia is a more affordable version of the company’s S3,285 flagship product, Sound Tools. Each includes a NuBus card and a software package called Sound Designer II.

The main purpose of both Audiomedia and Sound Tools is to record analog sound digitally in real time. You can play back, edit, and mix the sound files and subject them to a variety of special audio effects. The process is similar to using Farallon Computing’s MacRecorder, but the sound quality is infinitely better.

Sound Tools takes a modular approach to sound and requires a separate analog-to-digital converter. It can be locked to SMPTE time code, whereas Audiomedia cannot. Audiomedia, however, has slightly better specs for sound quality, and the analog-to-digital conversion happens on the card itself.

Like most things in life, all this has a good side and a bad side: The good side is that Audiomedia needs only about 50K of RAM to run properly (although a 2-megabyte configuration is strongly recommended), thus leaving lots of room for MacroMind animations or other memory-intensive graphics that you may want to synchronize with the sound.

The bad side is that a typical sound file takes 10 megabytes of disk space per minute of sound. That’s because the sampling rate is 44.1 kilohertz (the same as a CD’s) and there are two channels of 16-bit sound for stereo. Contrast this with MacRecorder’s 22-kilohertz 8-bit sound (slightly worse than AM radio). The penalty for Audiomedia’s CD-quality sound is that it occupies huge amounts of hard-disk space. (MacRecorder records to RAM, not to the hard disk, which severely limits the maximum recording length.) Audiomedia also requires a hard-disk drive with a minimum access time of 28 milliseconds.

PRODUCT PROGENITOR Audiomedia has sparked a new industry. More than 75 third-party developers are now involved with Digidesign’s products, one of the most notable being Opcode Systems. Working with Digidesign, it has come up with Studio Vision, an adaptation of Opcode’s Vision sequencing program (see review, December ’89, page 82). Studio Vision lets users integrate MIDI sequences with digital audio tracks and edit both simultaneously. Sound mixing and shaping are totally automated, as are the recording, editing, and playback of two independent digital audio tracks. Master the finished product to a DAT tape, and you’ve got an album that could be sold directly by the author, much as shareware is now.

And for those who want to play these new digital sounds on the Mac directly from within applications, you can convert 16-bit stereo samples to the more familiar SND sound resource and have them play through a Mac’s speaker.

Audiomedia’s NuBus card has standard RCA jacks for inputs and outputs and a quarter-inch microphone jack above them. Because of space limitations, the RCA jacks’ functions aren’t identified, but once you get used to the setup, this isn’t a problem.

The manual is definitely one of the package’s strongest points. Not only does it guide new users through setup and trial runs, but it even has a chapter devoted solely to the theory of sound. Although I thought I already knew it all, I learned a lot. This chapter also contains a full discussion of the differing Mac sound-file formats. (Why should graphics people have all the confusion?)

Audiomedia combines software and hardware to turn your Mac into a digital-recording studio. The Sound Designer II software provides graphic control over sound through an easy-to-understand interface.

Turning on Audiomedia’s recording functions is as easy as using a cassette deck. The different sampling rates give you the option of playing your recorded sounds on any Mac with no external hardware.

MacUser October 1990 55
Broadcast-quality video is finally coming to the Macintosh.

Forget everything you've heard about Macintosh® video. With Intelligent Resources' Video Explorer, video will never be the same! We've invented a totally new kind of video card for the Macintosh, with incredible real-time video processing capabilities. The Video Explorer is a multi-synchronous card that supports all major broadcast video and computer graphic timing standards. On it you'll find a state-of-the-art custom chip set; one of the largest and most powerful ever produced for personal computers.

Since the Video Explorer is a programmable 32-bit digital video engine, there's almost no end to the broadcast-quality effects you'll be able to achieve. You'll have full control of video processing: frame by frame, line by line, and pixel by pixel. You'll be able to perform fades, wipes, dissolves, and digital video effects.

You can key on chrominance and luminance signals, combine multiple live video signals, and even overlay anti-aliased titles and graphics on live video.

The Video Explorer can simultaneously manipulate video signals from a variety of sources, both live and computer generated. By genlocking to a common sync signal, a Video Explorer can accept video from an external source as well as from internal sources cascaded through our digital video bus. This downstream capability allows linking of video bus-compatible cards for even more sophisticated special effects.

Soon, the power of this new video technology will be unleashed. Join us as the serious fun begins!

Phone (708) 705-9388 or Fax (708) 705-9410.
By following the tutorial section of the manual, I created a competent HyperCard stack within minutes, and I'm not a HyperCard expert by any means. (I did have some trouble creating new stacks but not modifying old ones or some of those that came with Audiomedia. When I changed my HyperCard version from 1.2.5 to 1.2.2, however, the problems disappeared. So much for progress.)

THE BOTTOM LINE For anyone who has ever wanted a high-quality professional recording system but couldn't afford $10,000 or more for a two-track digital recorder, I recommend Audiomedia. Whether you run a radio station, create audiovisual presentations, use sound in scientific research, or are just a musician with an ear for clarity, Audiomedia will more than fulfill your needs.

Considering the quality of the audio, Audiomedia is a bargain — especially for anyone who remembers shelling out several times that much for a reel-to-reel recorder that produced muddy tapes liberally laced with hiss.

— Ken Gruberman

### Get Info

**Audiomedia**

**Manufactured by:** Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025, (415) 327-8811.

**Version:** 1.2.

**List Price:** $995.

---

#### On DECK

For the budget-minded, Digidesign has come up with a software version of the ever-popular four-track cassette recorders popularized by companies such as Fostex and Tascam. Called DECK, the software is a discrete four-track digital-recording, -editing, and -playback unit for the Mac. It uses the same technology as do Audiomedia and Sound Tools but costs only $349, although you must have either Sound Tools or Audiomedia to run it.

On-screen, DECK looks just like a cassette-deck and mixing console, and it works in much the same way — only without the noise! You can "ping-pong" tracks back and forth until the cows come home, and no noise buildup will plague you. You can also get DECK with a MacProteus card ($855), a NuBus version of E-mu's popular sample player. MacProteus has 32 voices and 192 presets. With MacProteus and DECK, you become your own audio house and still have enough computing power left to take care of daily Mac chores.

Because the sound recording is being done inside a computer, there are things that DECK can offer that a four-track cassette recorder cannot, such as fully automated mix-down and equalization, built-in effects processing, and simultaneous MIDI-file playback.

With DECK's release, the days of the hiss-laden demo tape are numbered. (As we went to press, Digidesign had just begun shipping DECK. We'll have a full review in one of the next few issues. — Ed.)

---

#### MORE 3.0

Symantec has turned an outliner into Persuasion's equal.

MORE started out as a humble outliner, and then evolution took over. Presentation software, a hybrid of structured word processing (a.k.a. outlining) and graphics emerged from the primeval software soup. Somewhere along the way, MORE acquired some of those genes, and they're far from recessive. In fact, MORE 3.0 can now match — and in some cases beat — Persuasion, the former undisputed top of the class.

MORE BETTER MacUser's April '90 review (page 56) called Persuasion 2.0 "... simply the best in its class .... " At the time, I agreed. Now I'm not so sure. These two programs are in as close to a dead heat as any two I've ever seen. MORE has a richer feature set, but Persuasion's slide templates, especially the color ones, are better-looking. Of course, you can design your own templates, so the artistically inclined may find MORE's superior document capabilities, well, persuasive.

As with Persuasion, the principal tool for getting your thoughts down is the outliner. In Persuasion, your outline-formatting options are limited — the outline is just fodder for slides. In MORE, true to its roots, the outline itself can be the presentation (with all the inherent pitfalls of text-heavy presentations this implies).

You have a wide choice of labeling schemes (Roman numerals, letters, bullets, and so forth), and you can customize new ones. If, for example, you maintain a to-do list in MORE, you can set its labels to be check boxes, so you can check off your tasks on a printed form as you get finished with them. Indeed, not only can you maintain a to-do list in MORE but the program also comes with a template for such a list, along with dozens of other templates.

Outline templates are stored in "libraries" you can load by choosing Open Library from the Library menu. The program comes with seven libraries, and you can create your own.
This is your hard disk severely fragmented

This is how a typical fragmented hard disk looks. The abuse fragmentation can deal is a crime, and it's causing a national epidemic in offices everywhere. But the more you use your computer, the more your files are spread all over your hard disk. As a result, your disk has to work a whole lot harder than it has to. And increased head movement not only slows down your file access times, it will slow you down, too.

This is your hard disk defragmented

Even defragmentation software can't help much. Wimpy defraggers just place pieces of individual files adjacent to each other. Defraggers just don't have the intelligence to constantly monitor your file usage. So, any increases in performance are modest and only temporary, disappearing as soon as you use your computer again.

This is your hard disk with DiskExpress II

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Libraries contain more than just outline templates. They also contain objects, color sets, layouts, and rule sets. Objects are draw objects you can place in slides. The artwork is pedestrian, however, and if you need good art, you'll want to invest in a clip-art collection. Color sets are palettes of slide colors you can use in your slides. Layouts are like Persuasion's AutoTemplates; MORE's predesigned formats for slides (both 35mm slides and overhead foils) aren't as visually appealing as Persuasion's, though.

Rule sets are something else entirely. They're a way to format headlines (that is, any line in an outline) and comments — much as you use style sheets to format paragraphs in Word. But much as is the operative term; I couldn't figure out how they worked just by playing with them. The dialog box in which you edit rules is formidable and arcane until you work through the tutorial and read the reference manual carefully. Once you understand rule sets, though, they're powerful tools.

The program's slide-making tools are also formidable. Slides are called bullet charts, to distinguish them from tree charts, the program's other display type.

Tree charts are organizational charts on steroids. They have options for changing the way nodes are clustered; a staff tool for adding nodes that are not in the hierarchy; and as in bullet charts, complete control over colors, text, shadows, and the like.

Graphing is handled by a separate application, MOREGraph. It doesn't have any on-line help, but it's pretty easy to use. You import or enter it into a worksheet, and in a few keystrokes, you've got a chart in one of nine styles. You can even combine different chart styles, and you can save customized chart formats.

**THE BOTTOM LINE** Symantec has turned a respectable tool into a true solution with two intelligent features. Chart Tutor, on the Bullet menu, guides you step-by-step through the process of creating your presentation. It's hard to screw it up. And a separate 92-page manual, *Making the Most of MORE*, teaches you not only the finer points of MORE but also how to communicate more effectively.

If you're currently using Persuasion, you probably won't feel a pressing need to switch. But if you're still shopping for a presentation package, you've got a tough decision to make. Persuasion is good, but you may find you want MORE.

— *Tom Wrona*

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**MORE**

Published by: Symantec, 10201 Torre Ave., Cupertino, CA 95014-2132; (408) 253-9600.

Version: 3.0.

List Price: $395.

**MULTIMEDIA**

**RasterOps Video ColorBoard 364**

Combining 24-bit color and live video, the RasterOps 364 is an excellent performer — and a terrific value.

Television is as omnipresent (and sometimes as annoying) as pollen in spring. TV is in our homes, it's in our air, and it's creeping onto our Macs. In less than ten months, *MacUser* has evaluated three devices for getting live video onto the Mac's display (from Mass Microsystems, Aapps, and now RasterOps) and has seen three more units (from Radius, TrueVision, and Aapps again). Of the three systems we've tested so far, the RasterOps Video ColorBoard 364 is easily the best.

**SMOOTH AND SLIM** The RasterOps 364 is a single-width, single-slot NuBus card that comes with three disks' worth of software. Unlike the Mass Microsystems ColorSpace III/FX system (see review, March '90, page 39), the 364 is easy to install and is no problem to get running. Because it's both a 24-bit display card (for the Apple 13-inch RGB monitor) and a live-video digitizer, you don't need a separate display system to drive your monitor. The 364's construction quality is excellent, with only a few visible wires.
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that will probably be rolled into the circuit board in the next production run.

The 364 has only two video inputs: one RCA jack for composite NTSC and one four-pin DIN socket for S-video. It has no jacks for audio or NTSC out, but RasterOps was expected to start shipping two external boxes for NTSC output and an external ADB tuner shortly after press time.

The 364 comes with two programs for getting live video onto the Mac screen: a DA and an application. The DA, called 364 Video, has two interfaces: a resizable window with a colored title bar and a pseudo television set — complete with a simulated wood-grain cabinet.

The TV interface offers extensive controls for hue, saturation, brightness and contrast, and black-and-white levels plus direct control over the individual RGB signals, your choice of frame or field views (including selective viewing of the odd or even fields), speed control (full, quarter, or half), and video-source selection. You can also flip the image vertically or horizontally. The only significant missing option is a global "revert to original settings" — with all the available options, you can screw up the picture really quickly.

Frame captures require just a Command-key combination. You can choose whether to capture the current window size or the entire video image, and captures are saved to the Clipboard or to disk as 24-bit PICT files. It does not support multiple and timed captures.

The DA performed smoothly and well. Because the video is being displayed in 24-bit, however, system performance slowed noticeably. If you're displaying full-speed video, menus take forever to pull down. Because the 364 shares the same frame-buffer information as QuickDraw does, you can show live video without MultiFinder but the 364 seize the foreground window. As a result, menus and other QuickDraw graphics appear behind the video window. Because the menus are agonizingly slow with live video running, you'll probably stick to keyboard command equivalents anyway.

Grab that Image. The other program for video display, FrameGrabber 3.0, is an application. It has two windows: one for video display and the other for viewing your capture. You can select random rectangular image sizes, make frame captures on the fly, and make multiple captures to memory or to disk. You can save sequenced captures made to memory in PICS format for export to MacroMind Director, and you can view captured images as 8- or 24-bit graphics and save them as 24-bit or 8-bit dithered color files. The application supports custom CLUTs based on selected image areas and lets you save captured files in PICT or TIFF format. Extensive color controls let you modify your captures, and you can resize the image however you want, but again there is no Revert command — once you've altered the image's proportions, you're on your own.

Some of FrameGrabber's other features include horizontal and vertical flipping, rotation (in 90-degree increments), RGB inhibition (by channel), color inversion, full- or half-speed display, and background display in MultiFinder. Background display slows your active applications to a glacial pace, and the video freezes if its window overlaps the application's. Because FrameGrabber's recommended MultiFinder partition size is 3megabytes, it's pretty impractical to run in the background anyway.

FrameGrabber performed just as smoothly as the DA did, and my only reservations about it relate to its nonstandard interface. For example, it has a full-screen-display mode that centers a capture on the screen and sets everything else to black. (It's not a particularly useful feature, because you can show only one frame at a time.) You can drag the image around, but you can't cancel this mode with a click, a Command-period, or even a Command-Q. No, you have to use Return or Enter. Likewise, the grow box appears only when you hold the mouse over the video window's lower right corner — without experimenting (or God forbid, reading the manual), you might think the video window was a fixed size. Eternal vigilance is the price of a consistent interface.

The Bottom Line. The RasterOps Video ColorBoard 364 is an excellent dual-purpose video board with very good software. RasterOps even tosses in some extras, including a HyperCard stack with video XCMDs and a set of X-Objects for MacroMind Director. The HyperCard stack doesn't automatically build a video application, but you can copy and paste the scripts. You can also create an extended desktop of up to 2,048 x 512 pixels (only 16 colors, however), and with RasterOps' pan and zoom software, you get a hardware/software equivalent of Stepping Out. At a little less than $2,000, the RasterOps 364 is an excellent value, and if you're not allergic to TV, it should take care of your video needs now and in the future.

A word of warning: Because of the huge amount of data being transferred, the 364 requires a lot of RAM and application performance can slow to a crawl. Running the 364 with memory- and CPU-intensive applications is impractical on machines with less than 8 megabytes.

— Russell Itu

Get Info

RasterOps Video ColorBoard 364

Manufactured by: RasterOps, 2500 Walsh Ave., Santa Clara, CA 95051; (408) 562-4200.

List Price: $1,995.
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So order today,

**Silicon Beach** ... 60 day MBG
5100 SuperCard 1.5 ... $199.
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6371 Timbuktu/Remote Access Pack .... 845.
2202 PhoneNET to LocalTalk Adapter ...... 8.

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<td>6273 PhoneNET StarConnector 10-Pack</td>
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<td>5991 V9600 Baud Modem</td>
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<td>6265 2400EX with Quicklink II</td>
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<td>6767 Media Tracks Multimedia CD Pack</td>
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<td>6650 2400EX MNP with Quicklink II</td>
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<td>7058 SoftPC-AT/EGA Module</td>
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<td>6307 Smartmodem 2400</td>
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<td>6519 EtherGate</td>
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<td>6721 MailMaker 5 User Pack 1.1</td>
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<td>4308 BackFX (for Apple FAX modem)</td>
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<td>4598 TOPS FlashBox</td>
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<td>3723 TOPS Modem (100' MNP supply)</td>
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<td>7057 MacPrint TOPS Network Version</td>
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<td>6264 TOPS Networking Bundle 3.0</td>
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<td><strong>Traveling Software ... 60 day MBG</strong></td>
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<td>3729 LapLink Mac III Connectivity Pac</td>
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<td>6741 LapLink Mac III Network Pac</td>
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**Farallon Computing ... 30 day MBG**

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<td>Patented connectors run LocalTalk over ordinary telephone wiring</td>
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<td>2203 PhoneNET Connector (DIN-8)</td>
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<td>2206 PhoneNET StarController</td>
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<td>6697 PhoneNET StarController-EN</td>
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<td>7058 SoftPC-AT/EGA Module</td>
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**Intel Corporation**

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<td>3000 TurboNet ST (DIN-8)</td>
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<td>6691 14&quot; Color Monitor with Micron Xceed for Mac II (640 x 480)</td>
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<td>6949 OrchidFAX Modem−FAX or transfer data files in the background at 9600 baud with</td>
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<tr>
<td>OrchidFAX modems. Bundled with BackFX software, OrchidFAX is fast, easy-to-use and</td>
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<td>networkable.</td>
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Spyglass Transform and Spyglass View

Spyglass’ first products let you analyze huge arrays of numbers by viewing them as pictures.

If you’ve ever spent days staring at a spreadsheet with hundreds or even thousands of rows and columns, searching for a grain of meaning while you felt your brain going numb, the solution to your problem may be a family of products from Spyglass. Spyglass has released two packages, Spyglass Transform and Spyglass View — and two others, Spyglass Dicer and Spyglass Format, are on the way. These packages let you operate on your numbers and turn them into pictures that you can manipulate to enhance significant patterns that may otherwise remain hidden. Pictures are often worth much more than a thousand numbers.

**Spyglass Transform**

Let’s take a look at the whole process to get a better idea of how it works. First, you need data. Spyglass Transform would prefer to have it in a format called HDF (Hierarchical Data Format), a standard nonproprietary format for storing data in the form of floating-point numbers, images, and additional information in a single file. But if your applications don’t generate HDF files, Spyglass offers two solutions: Either employ the provided FORTRAN or C routines in your data-generating programs, or get your data into an Excel spreadsheet. Spyglass provides an Excel macro for converting the spreadsheet data into an ASCII file that can be read by the Import Text menu item in Spyglass Transform. If you don’t have Excel, it’s still a snap to produce the ASCII file with nothing more than a word processor. Once the data is inside Spyglass Transform, you can save it as an HDF file for later use.

Spyglass Transform displays data in a standard spreadsheet. Unfortunately, to change a single item, you have to double-click on the cell and fill in a dialog box. (Shame on Spyglass for this bad interface.) Every HDF file has an associated “notebook” in which you make notes about the data and, more importantly, make calculations. You perform operations on your data by entering standard FORTRAN-style statements and then choosing Calculate From Notes. With the built-in functions, this makes for a fairly powerful data-analysis tool. You can add, subtract, multiply, or divide by constants; perform logarithmic and trigonometric functions; and perform other transformations on the data in the table. You can also do operations with multiple data sets — subtracting one set of data from another to find the difference between them, for instance. All these operations produce a new resultant array, so your original data remains undisturbed. (You should do very complex calculations on your supercomputer before the numbers make it into Spyglass Transform.)

Once you have transformed the data, you can choose Generate Image, Interpolated Image (for producing a smoother graphic), Line Graph, or Polar Image (for angular data) from the Image menu to make a picture of the selected spreadsheet. Spyglass Transform provides a selection of default color palettes for viewing the resulting graphic. You can click on a number in the spreadsheet and see the clicked point in the graphic or vice versa, so you can easily go back and forth between graphical and numerical representations. Line Graph gives you a more traditional plot of a single highlighted row or column. You can also adjust the exact range of the data included in the graphic (in case you have a few “wild” points that mess up the color scaling). To adjust the colors properly, you’ll want to save your data and reopen the HDF file in Spyglass View.

**Spyglass View**

Spyglass View provides a variety of ways to view your data. It can also string a set of pictures (data sets) together and animate them, so
### Tech Support gratis.

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<th>Price</th>
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<td>MicroPhone II 3.0- New version of top-selling telecom software.</td>
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<tr>
<td>Support</td>
<td>XCMDs &amp; XFCNs, ZMODEM, icons, European languages, color &amp; sound</td>
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### Accessories

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<td>Hard Top Keyboards</td>
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Systat, Inc. ... 30 day MBG
7410 Systat 5.0—The most comprehensive statistical analysis and scientific graphics package is now fully menued enabling users to perform the most sophisticated procedures quickly and easily. ... $599.

Cutting Edge Hard Drives
Cutting Edge Hard Drives are fast and reliable with access times as low as 23 milliseconds and a mean time between failure rating of up to 100,000 hours. An outstanding combination of quality and low price. ... see line listing.

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Microsoft ... 30 day MBG
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Sopris Softworks ... 60 day MBG
4019 Mac SE & Ext. Keyboard Cover (navy). ... 15.
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4012 High Trek ImageWriter Carry Case. ... 49.
4013 High Trek Mac SE Carry Case. ... 59.
4014 High Trek Mac SE & Ext. Kybd. Carry Case. ... 69.
4862 SE Protection Pak (ext. keyboard). ... 75.

Targus ... 60 day MBG
3618 ImageWriter II Carry Case. ... 45.
3617 Mac Plus/SE Carry Case. ... 55.
4015 Mac SE & Ext. Kybd. Carry Case. ... 69.
6116 Mac Icx Carry Case. ... 75.

STORAGE MEDIA

Sony ... 60 day MBG
3297 3½” DS/DD Disks (10) ... 13.
6148 3½” DS/DD Disks 3 Pak (30) ... 30.
3298 3½” HD Disks 1.44 Meg (10) ... 22.
6375 3½” HD Disks 3 Pak (30) ... 56.
6659 GD2000 40 MB Data Cartridge ... 19.

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6375 3½” HD Disks 3 Pak (30) ... 56.
6659 GD2000 40 MB Data Cartridge ... 19.
Dear MacConnection,

Last month Control Data had the pleasure of hosting President Gorbachev. He and about 6,000 security agents, press, and on-lookers came to look at the new computers the Soviet Union bought from us. The day before the visit, someone realized we needed name badges in Russian and no one could get us the font we needed. That afternoon we placed a call to MacConnection. By 10 a.m. the next day the name tags were coming off the printer. Thanks to your ability to deliver product overnight, and by stocking a lot more than just mainstream applications, you really helped us. Thanks comrades!

Carol Morse
Control Data Corporation
Minneapolis, MN

"Thanks, comrades!"
EVEN YEAR, WE GIVE THE INDUSTRY A LESSON IN PRICE AND PERFORMANCE.

Two years ago, they called our Business Laser Printer "The future of PostScript." Last year, they gave our PLP II the MacUser Editors' Choice Award. But this time, we're really giving them something to study. Because now, we've done what was considered impossible. We've produced a printer that dramatically outperforms the Apple LaserWriter II, at half the cost: the $2399 Business LaserPrinter II (BLP II).

PostScript For Less.

This is the printer you've always wanted, at a price you never thought you'd see. With true Adobe PostScript and built-in AppleTalk, you and everyone else on your Macintosh network can immediately start producing the highest quality, 300 dots-per-inch (dpi) graphics and text using your favorite software. You even get the same 35 fonts as you get with the Apple LaserWriter. But now, the real lesson begins.

Better At Any Price.

Even if money were no object, the BLP II would still be the printer of choice. It has 2 megabytes of RAM, expandable to 4, plus a high-speed processor so it can image your document almost twice as fast as the IINT. And unlike the competition, the BLP II's SCSI port boosts performance and provides access to unlimited on-line fonts. Want more? How about a small footprint and silent sleep mode. Edge-to-edge printing. User-friendly LCD front panel display, cost-saving toner recycling system, and our advanced QuickEnvelope software that makes printing envelopes a snap. Still not enough?

The Fast Track: BLP IIS.

Maybe you have a large network, with a heavy print load. A network you thought required the speed, power and price tag of a LaserWriter II NTX. Well, think again.

Because the BLP IIS gives you performance rivaling the IINTX at less than half the cost: an 8-page-per-minute printer for just $2899. Whether you choose the BLP II or the BLP IIS, you get compatibility not only with Macintosh, but with IBM and compatibles, using PostScript or the optional LaserJet II emulation. And you get it fast.

Dealer or Direct: Your Choice.

Just call us toll-free. We'll give you the name of your nearest GCC Technologies dealer. Or order direct from us, with a 30-day money-back guarantee and $9 overnight delivery. The $2399 BLP II and $2899 BLP IIS. What else can we say, except "class dismissed."

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GCC TECHNOLOGIES Peripherals With Vision.

Please circle 95 on reader service card.
Spyglass View’s palette manager lets you design and save new palettes with a variety of tools. You can work in the RGB, CMY, HSV, or HSL color systems.

you can see not only a single picture of your data but also how it changes over time, in space, or with any other independent variable. The program can run these animations from memory (fast!) or, if memory is limited, from disk (slower but still fascinating to watch). Although Spyglass View can produce line, contour, and 3-D-surface plots, its color tools are what is special.

With a raster image opened, you get an interesting palette of tools to manipulate the colors. The eraser tool lets you erase any color value to white (or any other color you choose). The drag-color tool lets you drag a color from one place on the graphic and replace it with another color. The fiddle tool allows you to compress and shift the color table to your heart’s content. You can also draw lines and make selections with other tools.

If you like playing with palettes, you will love Spyglass View’s palette editor. You are able to graphically design and save a new palette in the RGB (red, green, blue), CMY (cyan, magenta, yellow), HSV (hue, saturation, value), or HSL (hue, saturation, lightness) color systems. The BOTTOM LINE These programs sound simple in principle, but they do require some knowledge of FORTRAN syntax. Because Spyglass products are for visualization of sizable blocks of data, most of the market for which they are designed (mainframe and supercomputer users) should have no trouble with FORTRAN. Spyglass Transform has some minor bugs and strangenesses (bad management of scrolling windows in the spreadsheet and awkward sizing of the line graphs), but I suspect Spyglass will fix these in future versions. You should have a large color monitor, but 8-bit color is sufficient — these are 8-bit, not 24-bit, programs.

If you’re into simulations or produce scads of numerical output, you’ll want the Spyglass products. They can greatly simplify the job of sifting through a silo of chaff to find that kernel of meaning you’ve been straining your eyes to find.

— Ron Hipshman

MacDraft 2.0 marks the triumphant return of an old favorite.

Introduced in 1985, MacDraft was one of the first object-oriented drawing programs for the Mac. It enjoyed early success with architects and designers, and at one time, it claimed a majority of the Mac CAD market. But the rapid evolution of 2-D CAD, paced by the increasing speed and power of Apple’s hardware, made good old MacDraft seem increasingly out-of-date, particularly when compared with competitors such as MacDraw II, Canvas, or Blueprint.

Last year, MacDraft’s publisher, Innovative Data Design, released a successful midpriced ($590) package called Dreams, which seemed to be the MacDraft replacement. The demand for simple, low-cost Mac CAD, however, is apparently strong enough to keep MacDraft alive. With the release of version 2.0, this classic program has caught up with the state of the art.
THE ULTRADRIVE 50R REMOVABLE HARD DISK. IT LEAVES THE COMPETITION IN THE DUST.

And therein lies the problem. Dust. Which has caused previous removable hard disks to be encumbered with reliability problems, such as file corruption, head crashes, and most importantly, complete loss of valuable data. We know this because we've spent the past two years in search of a removable hard disk that met our uncompromising standards of reliability.

Presenting the UltraDrive™ 50R from GCC Technologies, the first removable hard disk reliable enough to be called an UltraDrive.

Airtight Technology.

The reason for this great leap in reliability is UltraDrive 50R's airtight design. UltraDrive 50R is based on the latest breakthrough technology from Ricoh®, incorporating a contamination-free cartridge. Unlike the competition, these cartridges are manufactured in a "clean-room" environment, and are sealed to prevent interference from dust particles and everyday air contamination. No dust. No contamination. And no loss of data.

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UltraDrive 50R is just as easy to order. Simply call us toll-free and we'll give you the name of your nearest GCC Technologies dealer. Or order direct from us, with a 30-day money-back guarantee and $9 overnight delivery.

The $1299 UltraDrive 50R. Reliability, security, portability, and software. It's a clean sweep.

800-422-7777.
MICROSOFT WORD 4.0B is a "secret" update. Although Word 4.0B wasn’t blessed with a formal announcement, Microsoft is shipping this version, calling it a minor maintenance release. It has improvements such as better compatibility with the Mac IIci and IIx, as well as the enabling of the Fractional Widths option in the Page Setup dialog box when the ImageWriter driver is selected (a fix that makes Word work better on an ImageWriter with ATM). Other fixes solve problems with large selections, multiple-monitor configurations, and 24-bit-color displays. Microsoft, One Microsoft Way, Redmond, WA 98052-6399; (206) 882-8088. $395; free to registered owners who request it.

CAPTURE, Mainstay’s popular screen-capture utility, has had its second major upgrade. A total rewrite, version 5.0 now includes auto-scaling, which lets users specify the amount of scaling from 1 to 100 percent and gives the option of keeping the cursor visible. Mainstay, 5311-B Derry Ave., Agoura Hills, CA 91301; (818) 991-6540. $79.95; upgrades, $10 to registered owners or free if version 2.0 was purchased after April 15, 1990.

FONTOGRAPHER 3.1 now includes Type 1-font support. Altsys’ PostScript type-design package can produce ATM-compatible Type 1 fonts, EPS files in Adobe Illustrator 1.1 format, Adobe Bitmap Distribution Format files for creating screen fonts on machines other than the Mac, better hinting for both Type 1 and Type 3 fonts, and automatically generated and hard-bit fonts. Altsys, One Altsys Avenue F, Suite 100, Plano, TX 75074; (214) 424-4888. $495; upgrades, $30 to registered owners or free if version 3.0 was purchased after March 1, 1990.

QUICKLOCK 2.0 is the latest iteration of Kent Marsh’s screen-locking utility. Used in conjunction with the hard-disk-locking utility NightWatch, QuickLock can password-protect a screen and automatically pass control of the Mac’s hard-drive disk to NightWatch at either a specified time or after an unauthorized attempt to use the Mac. Kent Marsh, P.O. Box 460289, 1200 Post Oak Blvd., Suite 210, Houston, TX 77066; (800) 325-5587 or (713) 623-6610. $59.95; upgrades, free for registered owners.

ISHIDO, the Oriental strategy game we reviewed in May (page 71) will finally see a mass-market version. Accolade has acquired the rights to distribute the package, so you won’t have to pay the $29.95 limited-edition price. Accolade, 650 S. Winchester Blvd., Suite 200, San Jose, CA 95128; (408) 985-1700. $49.95.

MacDraft 2.0 marks the welcome return of one of the Mac’s first drawing programs. The interface is still simple. The shadowed palette conceals pop-up menus with additional functions. Version 2.0 supports 24-bit color and dimensioning lines.

A FILL PALETTE MacDraft sports a floating palette of 13 drawing tools. Tools are modal — one remains selected until you select another. Many of the tool icons have multiple options accessible through pop-up menus. The circle tool, for example, lets you select Diameter, Radius, or Three Points as the drawing mode; a letter next to the icon identifies the currently selected mode. Diagonal lines can be constrained to angles of 45, 30, 15, or 5 degrees. The program does not provide a tool for drawing with double parallel lines, which is a popular labor-saving feature for creating walls in floor plans. Round-cornered rectangles can be drawn with proportional, constant-radius, or elliptical corners, and by dragging an extra handle, you can modify the shape of the corners.

Curves can be drawn as splines (passing through every point you designate) or as sophisticated Bezier curves (defined by endpoints and direction-control handles). Object rotation is precise — you can rotate an object in increments of less than a degree. The program provides precision to four decimal places, which is perfectly adequate for most users.

MacDraft can access the full spectrum of 16.7 million colors for objects, fill patterns, and text. There are palettes for 65 default colors and 64 editable fill patterns in addition to ten "laser grays," which appear on-screen as dithered black-and-white patterns but print as smooth tones on a PostScript output device.

The Snap to Object feature, which lets the cursor snap to the nearest vertex or endpoint of an existing object, is essential for precision drawing. Drawings can be as large as 56.88 square inches, and there are simple, intuitive options for scrolling, panning, and zooming (with magnification up to 32x). You can name and save particular views and switch between them with keyboard command shortcuts.

LINES AND PICTURES The menu of line widths ranges from a fine hairline to 13 points. You can automatically add arrows, small circles, or other end marks to your lines and create any kind of dashed line. Best of all, you can create dimension lines, which include text that indicates the linear distance in the current drawing scale. The program can also report the total area of any selected objects, but there is no direct way to dimension angles — you have to create an arc that includes the desired angle and add the text. A Show Cursor Position option provides a continuous readout of the cursor’s x, y coordinates. There is also a Show Size option, which displays a small window with the horizontal and vertical dimensions of the object you are creating. This information disappears, unfortunately, as
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With the PLP IIS, you get all the breakthrough technology of the PLP II, only now, you get it at a swift 8 pages per minute, making it the perfect solution for anyone printing a high volume of output.

You also get one megabyte of RAM, which can save you valuable time. For example, while PLP IIS is printing, your Macintosh can be processing the next page of your document.

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PLP II $1399, PLP IIS $1899.
soon as you finish drawing the object.
In addition to saving your work in its own drawing and stationery formats, MacDraft can save it as a standard PICT file or in a proprietary format called PictScript. The latter combines the PICT screen image with PostScript data for high-resolution output to a laser printer or imagesetter. PictScript provides the same output quality as EPS, but it preserves more formatting attributes and allows for easier editing and manipulation of graphics that have been exported to another application such as a word-processing or page-layout program.

A well-illustrated, thoroughly indexed manual of more than 350 pages accompanies the program. There are two well-organized step-by-step tutorials, an organization chart, and a floor plan for beginners. Once you’ve discovered the comprehensive on-line Help system, however, you may never need to open the manual again.

Innovative Data Design sells plotter drivers for MacDraft 2.0 as a separate package ($129). The extensive list of supported plotters includes models from CalComp, Graphtec, Hewlett-Packard, Houston Instruments, Roland, and others. Symbol libraries are offered in three separate packages: Volume 1 ($69) includes people, vehicles, furniture, and trees; Volume 2 ($39) includes flowcharting symbols, office items, borders, and corners; Volume 3 ($99) is a comprehensive collection of architectural, mechanical, and electrical elements.

THE BOTTOM LINE Offering a rich set of features at low price, with excellent documentation and support, MacDraft 2.0 is a serious contender in the crowded market for entry-level Mac drafting programs. It is particularly appropriate for high school or college-level introductory CAD classes or for a small architectural or construction contracting business, where its simple, generally familiar interface will help everyone become productive quickly. After all the high-end CAD programs we’ve seen, it’s good to return to the basics with an old friend.
— Mike Markowitz

Get Info

MacDraft

Published by: Innovative Data Design, 2280 Bates Ave., Suite A, Concord, CA 94520; (415) 680-6818.
Version: 2.0.
List Price: $299.
Finally there's a Macintosh® printer that works as hard as you do to stay ahead of the game. With the WriteImpact® from GCC Technologies™ you can focus more on your business and less on your paper work. That's because WriteImpact is designed to handle the tough work loads associated with printing payroll checks, labels, large client mailings, and multi-part forms such as invoices and statements.

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To help customize your documents, we also offer several additional font packages, as well as support for Adobe Type Manager™, giving you access to literally thousands of fonts.

And to keep your work pace moving, there's also QuickSpool™ II, GCC's serial print spooler, as well as QuickEnvelope™ our envelope printing desk accessory.

Dealer or Direct: Your Choice.

To order WriteImpact just call us toll-free and we'll give you the name of the GCC Technologies dealer nearest you. Order directly from us and you'll receive a 30-day money back guarantee, and all in-stock orders will be shipped overnight for only $9.

The $699 WriteImpact. The new employee that just won't quit.

800-422-7777.
Welltris, Mission Starlight, Sky Shadow

Sequels aren't just for the movies, and these three arcade-style games prove it.

An old axiom in business goes something like this: Give the people what they want, and if they want it badly enough, repack it and give it to them again. This philosophy has brought us everything from countless movie sequels to a dozen different kinds of raisin bran. Also in keeping with this philosophy, three new arcade-style games — Welltris, from Spectrum HoloByte, and Mission Starlight and Sky Shadow, from Casady & Greene — clearly look to their predecessors for their inspiration.

Welltris Welltris is the sequel to Tetris, the Soviet smash hit of last year. Whereas Tetris asked you to maneuver falling shapes in 2-D, Welltris increases the challenge by demanding that same skill in 3-D. The setup is as follows: Different-shaped objects slide down the sides of a square well. You control the rotation of each falling object and its movement from one wall to another. At the well’s bottom is an 8 x 8 grid. Your job is to position the objects on the grid so that they form lines. Lines disappear as you complete them, and other pieces on the grid shift as space becomes available. As you move to each succeeding level of difficulty, the objects fall faster and their shapes become more complex.

Like Tetris, Welltris offers a musical accompaniment (thankfully, you can turn it off), randomly generated pieces, optional preview of the shape due to appear next, disks that contain both the color and black-and-white versions, and a top-ten score list. Unlike Tetris, Welltris is not available as a DA and includes a copy-protection scheme that requires users to refer to specific items in the manual in order to start the game.

For those enamored of Tetris, Welltris could become the new love of your life. You may find that while playing Welltris, you miss the mind-numbing, where-did-the-hours-go simplicity of your old

HP offers you the best things next

From input to output, Hewlett-Packard leads the way. With a full line of Mac-compatible printer and scanner choices.

For photographic-quality scanning, there’s the HP ScanJet Plus scanner. Combine that with one of HP’s high-quality printers. The DeskWriter, the new LaserJet III, the LaserJet IIIP, or the LaserJet IID. HP even has color printers. The PaintJet and the PaintWriter XL.

Plus, HP stands behind all their products with exceptional service and support. And a one year warranty. It doesn’t get much better than that.

There is a better way.
Mission Starlight is a throwback to Star Wars-type arcade games. In Mission Starlight, you swoop in low and fast, vaporizing foreign objects, while also attempting to lob missiles into the enemy power plant.

Welltris is the sequel to last year's hit Tetris. Each game level in Welltris is accompanied by an illustration reflecting changes made in the Soviet Union during the period of glasnost. The face in the pizza wagon looks vaguely familiar...

Mission Starlight, from Casady & Greene, harks back to traditional shoot-'em-up arcade games. You command a starfighter vaporizing foreign bodies and power plants on five different planets. Having successfully breached each planet's defenses and knocked out all power to the force field protecting the evil base station, you then challenge the evil leader, Adolf Blitter.
Sky Shadow is a take-off on several sources, starting with Defender. This isn’t an errant saucepan being pursued by a mutant flying pig — it’s Sky Shadow’s funky flying machine, kerchunking its way across a comic landscape.

Your weapons are the usual lasers and missiles, and your enemies are geometric shapes and — happily — smiley faces. Sound familiar? OK, we’ve seen it all before, but although Mission Starlight makes no real advances in the Star Wars arcade genre, the game is presented well. The ship’s movements are responsive, the action is fast-paced, and the graphics are intriguing if not downright playful.

Special credit goes to the creators for allowing us to hold down the assignable Fire key to get repeat action on the lasers. After all, why damage your wrist if you have unlimited firepower?

SKY SHADOW Remember Defender, the old arcade game in which your beleaguered spaceship blasts its way over a moving landscape? Take that idea, design a ship and colorful landscape owing more to R. Crumb and Krazy Kat than to George Lucas, add a boxful of hysterical sounds, force players to learn to land their vehicle, throw it all into the blender, and you’ve got Sky Shadow.

The premise: The dreaded Razorop­ers have invaded your home town. You pilot a ship resembling a piece of ancient Revere Ware and have at enemy forces on the ground and in the air. You are supplied with unlimited missiles, 30 bombs, and a protective force field. You accumulate points most quickly by accurately bombing enemy targets. To refresh bombs and supplies and to repair the ship, you must land your craft at the airstrip, a skill difficult to master at slow speed and nearly impossible in Mega-Mode (double speed and higher point values). To overcome the difficulty of landing and other obstacles to success, you can pick up various tokens that provide safe landings, continuous firing of missiles (oh, my aching wrist!), additional smart bombs, repair kits, and temporary invulnerability to attack.

With the HP DeskWriter, you can...
Warning: Sky Shadow is not the kind of game to be played quietly at the office. In this game, sound is everything. Important warnings and bonuses are prefaced with audible signals. As you blast away, you’ll want to hear everything from the pilot’s exuberant “yahoo!” that signals big points, to the whining cry of inadvertently slain compatriots. Grim, perhaps, but a wonderful game nonetheless.

**THE BOTTOM LINE** Sky Shadow is a must-have for anyone who appreciates fast action with a sense of humor. The addition of a game editor would be welcome (why should Crystal Quest players have all the fun?). If Sky Shadow seems a little too wacky and you’re the kind who likes refinement in traditional arcade-style games, Mission Starlight may be for you. If you’re more at home building structures than mowing them down, Welltris offers the challenge you’ve been looking for. Whichever you choose, you’re sure to find it more challenging and amusing than the latest Hollywood sequels.

— Christopher Breen

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**Personal Info Managers**

## C•A•T III

C•A•T III is a tamer beast, but it’s still far from domesticated.

Chang Labs calls C•A•T III “the relational database for professionals in sales, marketing and management.” It’s a program I’ve always wanted, something to manage my contacts, activities, and time. There’s nothing quite like it. C•A•T is a complete “contact management” program that is far more powerful than Activision’s Focal Point or anything you’d be likely to put together in Works or FileMaker. Unfortunately, C•A•T III is a brilliant solution that suffers in its execution.

A TAMER CAT Users of C•A•T 2.0 will be

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**Get Info**

### Welltris

**Published by:** Spectrum
HoloByte, 2061 Challenger Drive,
Alameda, CA 94501; (415) 522-1164.

**Version:** 1.0.
**List Price:** $39.95.

### Mission Starlight

**Published by:** Casady & Greene,
P.O. Box 223779, Carmel, CA
93922; (408) 624-8716.

**Version:** 1.1.
**List Price:** $49.95.

### Sky Shadow

**Published by:** Casady & Greene,
P.O. Box 223779, Carmel, CA
93922; (408) 624-8716.

**Version:** 1.02.
**List Price:** $49.95.

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The DeskWriter is also designed for easy use with your Macintosh, and has both serial and AppleTalk interfaces. It even includes scalable and outline fonts. Combine that with the DeskWriter’s whisper-quiet operation, and keeping it to yourself will be that much easier. So call 1-800-772-0900, Ext. 1004 for your authorized HP* dealer.

There is a better way.
relieved to know that as arcane as C•A•T III is, it's still an enormous improvement over C•A•T 2.0, whose structure can only be described as Byzantine. C•A•T 2.0 was simply the most user-unfriendly Macintosh program I've ever encountered. To its credit, Chang Labs must have listened to its users — if only it had listened more carefully.

The first little sign of trouble occurs when you launch the program. You're presented with a “name card” onto which you enter information on your “accounts” and “contacts.” With flat-file managers, you're never quite sure how to handle multiple contacts at a single company. Making a separate entry for each person wastes time and space, but trying to cram more than one individual’s name and extension into a single company entry is seldom satisfactory. Because C•A•T is a relational database, each account (a mailing address, which is typically the company’s location) can have an unlimited number of contacts, or individuals. You can have as many as 16 pages of notes for each account and for each contact associated with that account. In addition, there are two user-definable fields for each contact, and the note fields for contacts and accounts can contain an unlimited number of keywords.

The keyword feature is great. A car salesperson might enter a line such as “[present car=Honda Civic]” in a prospect’s contact notes and later create a standard letter that included a line such as “We can give you top dollar when you trade in your old car.” The [ ] identifies the keyword as coming from the contact notes. A identifies account information, and D identifies “document” information, such as the time or date of your last letter to the contact. Of course,

With the HP ScanJet Plus, you’ve

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That means 256 shades of gray for the hottest-looking output from your Mac. And it's so easy, too. At the click of a mouse, you can get negative or mirror images, as well as scaling in 1% increments from 400%. All for $2,190, about what you would expect to pay for a 4-bit scanner.

So if you want the richest, most detailed images from your Mac, you’ve got it made with Hewlett-Packard. Call 1-800-752-0900, Ext. 1005 for your authorized HP dealer.

There is a better way.
You can write letters with C•A•T's built-in word processor. It's much improved from earlier versions, permitting full control over fonts, justification, page breaks, and line spacing. But it's still limited. Like many other Mac users, I have what I call a run-time letterhead. My letterhead is actually a first header in a Word 4.0 document. I keep plain paper in my printer, and the letterhead prints with the letter. Previous versions of C•A•T couldn't perform this simple feat. C•A•T III does, but imperfectly. Because it lacks Word's Paragraph Borders command, I couldn't duplicate my letterhead exactly.

More importantly, C•A•T's word processor lacks many features I've come to take for granted, such as styles, style sheets, headers, footers, footnotes, hyphenation, columns, tables, and a spelling checker. The maxim that integrated programs are always weaker than stand-alone programs holds true with C•A•T.

Unlike most word processors, C•A•T lets you create drawings. With the integrated drawing program, you can prepare not only artwork but also forms and reports. That's because boxes drawn with the box tool can capture data from the database. You simply select a box and click on the Paste Ref option. You click on a radio button to specify which kind of data you want (the aforementioned account, contact, or document type) and proceed to choose the reference from a pop-up list. What's more, boxes can have names and can be set up to calculate simple math. The Total box of an invoice can have a formula such as "Total=Subtotal+Tax+Shipping."

Everything you create is stored relationally, so you can call up in a few
seconds a letter you wrote months ago; letters can have "tactics" that automatically generate follow-up letters after a specified number of days; there's a glossary for storing frequently used text and draw objects; and the program can even dial the phone for you.

**AN INDEPENDENT CAT** So what keeps C•A•T from receiving a higher rating?

There are a lot of little things, added to a few big things such as problems with the documentation and the interface. I had a hard time figuring out how to make things work properly. The program still has its predecessor's counterintuitive feel that only a programmer could love. It violates Apple's Human Interface Guidelines with boxes labeled Enter instead. If you

innocently browse to another name card before clicking on an Enter button, your changes will be lost without warning. You can't see the full width of your documents on a regular screen. The manuals are confusing, incomplete, and contradictory.

**THE BOTTOM LINE** C•A•T is a most appropriate name for this most feline of programs. Like a cat, it's intelligent and powerful as well as solitary, difficult to figure out, and maddeningly indifferent to humans.

— Tom Wrona

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There is a better way.

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**HP**

**HEWLETT PACKARD**

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**C•A•T III**

Published by: Chang Labs, 5300 Stevens Creek Blvd., San Jose, CA 95129-1038; (408) 727-8096.
Version: 1.0.
List Price: $495.
REVIEWS

Rumor Manager

Gossip, Guesses, and Goings-On

With System 7 still somewhere on (or over) the horizon, major software developers are taking it relatively easy and are considering their options — including the less-capable Windows 3.0. Hardware advances, therefore, continue to dominate the grapevine. Look for some of the new zoned drives to be available in Mac configurations shortly. If you haven’t heard of zoned drives, they’re optical storage media that contain separate areas with separate abilities. For example, a zoned drive might have a CD-ROM area with 50 megabytes of applications and data and another area with 100 megabytes of WORM storage, while the third zone contains 100 megabytes of erasable optical storage. Because each zone has advantages and disadvantages, you use the area that is best suited for a particular project.

Zoned media and drives appeal to the large software-publishing companies. Adobe, for example, could distribute Persuasion, FreeHand, and 40 megabytes of good clip art at little more than the cost of a standard CD-ROM. Users would get not only the art and applications but also several hundred megabytes of storage. Zoned media and drives should not be too expensive and could be the standard storage/distribution device by 1993.

Apple is about to take another leap in the microcomputer speed races. No, the wicked-fast 62-megahertz ILfx (which is coming) won’t be it. The next great racer will be something called a displayless processor. If the need to create and update screen images is removed, life on the motherboard will really move faster. Although this technology isn’t new, no commercially released Mac has ever used it. The reasons are severalfold, but the most important is that virtually no software can currently work with it. Applications will have to be specially written or modified. The performance benefits for massaging very large amounts of data, however, are large enough to warrant special versions of spreadsheets and CAD programs.

The displayless Mac will be expensive and not available through the regular dealer chain. It will be sold by Apple’s National Accounts Group and selected U.S. and overseas Apple Centers.

Many developers are hard at work creating all the utilities that will be needed to “plug” the gaps in System 7’s functionality. Among the more interesting are some font-modification tools and advanced virus-protection and -eradication tools.

Our U.S. Mail address is Rumor Manager, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404. Our electronic addresses are MacUser (on MCI Mail) and 72511,45 (on CompuServe). No calls, please.

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PostScript® laser printers used to be expensive, large and shared by the entire office.

Until now.
Finally, for less than $3,150,* you can have a true Adobe® PostScript laser printer right at your own desk. TI introduces its new microLaser — the perfect partner for your Macintosh®.

Small size. Lots of value.
When you place this printer next to your Mac, you'll be impressed by its small size and compact design. At only 13.4 inches wide and 14.2 inches deep, microLaser may be the small kid on the block, but it packs plenty of punch. This six-page-per-minute printer takes full advantage of virtually all of the software that runs on your Macintosh. That's because it uses the Adobe PostScript language, offers 35 PostScript typefaces, 1.5MB of memory and an AppleTalk® Interface.

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Because microLaser features the PostScript language, you can print fonts in a variety of typestyles, sizes, and orientations by scaling and rotating them to meet your exact specifications.

The PostScript language also gives you more graphics power so you can print precise lines and smooth curves. Integrating text and graphics is easy, and the microLaser can print even your most sophisticated page layouts and illustrations.

What's more, the PostScript language is the industry standard for higher resolution output devices. So you can proof your documents on the microLaser, then print on any typesetter with PostScript capability without recreating the document.

Capabilities that grow as your needs grow.
One of the best things about microLaser is that you only buy what you need. Memory is upgradeable in 1MB increments up to a total of 4.5MB, and you can upgrade it yourself, without tools or technicians. All you have to do to get additional fonts is download through software or plug optional microCartridges into two credit card-size slots.

Superior paper handling.
Part of what makes microLaser a truly personal, desktop laser printer that takes up so little room is its paper drawer, which slides inside. Because microLaser holds 250 sheets standard (it holds 500 when you add an optional paper drawer), you spend less time refilling paper and more time creating superb-looking documents.

This printer also handles a variety of paper sizes and types—from letter, legal, and executive to transparencies, labels and envelopes. For those times when you're facing a large mail merge task, just plug in an optional envelope feeder to alternate between letters and envelopes.

Your own PostScript printer is a call away.
To find out more about how you can have affordable PostScript printing for your Macintosh, call today.

1-800-527-3500.
THE
LETTER-PERFECT
POSTSCRIPT
PRINTER

Whoever you are — a single user, a corporate buyer, or a desktop publisher — choosing the right PostScript printer is a tough business.

When the printing job gets tough, the tough go shopping — for a PostScript printer. And for good reason: A printer that’s equipped with Adobe PostScript (or a competing clone) produces the highest-quality text, graphics, and images you can get from the desktop.

As PostScript celebrates its fifth birthday, the range of printers that use it continues to expand. You can find PostScript in inexpensive personal printers and in professional imagesetters, in both black-and-white and color printing. But PostScript and its clones have made perhaps their greatest impact on those devices usually lumped together under the name laser printers.

Fast, versatile, and increasingly inexpensive, such printers — whether they use actual lasers, liquid-crystal shutters, or LEDs (light-emitting diodes) — have made daisywheels obsolete and have relegated dot-matrix printers to second-class status (see “Fit to Print,” September ’89, page 178). As printers and printer features proliferate, the job of choosing the right printer for your individual needs becomes correspondingly more difficult.

BY
BRUCE FRASER,
PATด YI, AND THE
MACUSER LABS
STAFF
Accurate color scanning seems a simple enough goal. Yet in a flash of engineering brilliance, Epson designers have raised the standard by creating the ES-300C color scanner.

Using three separate light bars, Epson's innovative TruePass scanning system, does in one pass what most other color scanners require three passes to accomplish. The result is more precise images in less time.

Gone are registration difficulties, poor fidelity and color dropout.

The ES-300C is as impressive in black and white or grayscale as it is in color. 256 shades of gray complement 16.8 million colors.

Resolution settings can be
design a better scanner, 

... came on at once.

adjusted between 50 and 600 DPI to optimize output from any printer, or to any monitor. Compatibility is assured with a choice of easily installed Macintosh® or MS-DOS® interface kits, featuring the latest industry-leading scanning and editing software.

With a price as attractive as its image would suggest, the full color ES-300C costs about the same as most black and white scanners.

A demonstration of the Epson ES-300C will be an illuminating experience. Other scanners simply pale by comparison.

Engineered For The Way You Work™
PostScript Printers

That’s where we come in. MacUser Labs spent thousands of hours dissecting 19 of the most popular PostScript (and clone) laser printers available in today’s Mac market. We discovered that in the world of laser printers, one size definitely does not fit all.

Do you need a printer for your own personal Mac? If so, an easy-to-use bargain buy is probably your bottom line — and it should be small enough to sit on your desk too. Or are you buying for your company? Then you want a workhorse that fits on the network, one that’s easy to feed with paper and that can handle a lot of output. Or are you setting up a desktop-publishing operation? What you need is a well-rounded performer but one that’s also compatible with your service bureau’s equipment.

Regardless of what kind of user you are, we’re here to arm you for your foray into the printer-buying fray. As we tested each printer for image quality, speed, ease of use — and, for the clones, true PostScript compatibility — we asked ourselves: Could best use this particular printer? Is this one perfect for one type of user but inappropriate for another?

We kept these questions in mind as we took a first look at the latest technologies and as we revisited old favorites — and some old not-so-favorites. We tell you what we looked for and how we looked for it, and we spotlight the results for the three types of shoppers listed at this article’s outset. (We also gave the same MacUser Labs treatment to five new bargain models that weren’t shipping at the time of this review — see “The Next Wave of Personal PostScript Printers,” following this report.)

Overall, the news is good: No matter who you are, there’s a laser printer for you. If you’re positive that you fit the profile of one of our three user types, feel free to skip to the specific sidebar describing the printers that fit your needs. However, if you’re a first-time buyer, skeptical of taxonomy, or interested in the latest developments in the PostScript/laser-printer market, you’ll want to keep reading. But don’t worry — whether you skip ahead or read right through, we’ll help you ask the right questions to get the best answers.

**PostScript: Who Needs It?**

Good question. If you’ve never owned a PostScript printer, you may hope you can save yourself the expense of getting one. Maybe you can: There are ways to improve the output of a non-Postscript printer.

All printers put a pattern of dots onto a page, be it by pin and ribbon or

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**Living with TrueType and System 7**

When System 7 ships, Mac users will have the distinct pleasure of playing with some new tricks at the System level — from a more curious Finder to more intelligent multitasking. One of the latest and greatest innovations will be TrueType, Apple’s new font-rendering technology.

With TrueType, smooth QuickDraw screen and printer fonts will be daily desktop fare. Apple claims that these fonts will be superior to Adobe’s Type 1 fonts, ATM or no ATM, because TrueType fonts are described by quadratics and PostScript fonts are described by cubics (quadratics and cubics define the curves used in font design). The result? TrueType, with its new rasterizer, will be faster. If that explanation leaves you cold, you may be positively frozen by the smart guy in the back row who wants to know just one thing: Will TrueType work on PostScript printers?

He had to ask. Fact is, according to Apple, not only will it work — why were you so worried? — but it will work transparently, in the same way as fonts are downloaded today. Recall that when a PostScript printer doesn’t have a specific font available in its ROM, it asks for the font from your Mac’s System Folder and then downloads it over AppleTalk into the printer’s RAM. Or if the printer is attached to a SCSI drive holding the fonts, it gets the fonts from there. TrueType will add one wrinkle to this process: If the printer can’t find a TrueType font in its ROM and can’t substitute an equivalent one, it will download the font outline as well as the TrueType rasterizer’s software into its RAM and will work along with the Adobe PostScript-font rasterizer. It remains to be seen just how efficient this process will be.

It remains to be seen too what it will mean to have two font standards competing head-to-head. And the wise guy in the back row also wants to know if service bureaus will need two full sets of fonts to keep everyone happy? That’s a good question. Will there be differences in font metrics (dimensions) and kerning between TrueType fonts and Type 1 fonts of the same name? That’s another good question.

Wise guys can take heart in announcements such as that made by Bitstream that it’ll make TrueType fonts with the same metrics and...
by light and toner. Creating this bit map is called raster image processing, or "RIPing." The page, Inkjet, dot-matrix, and some low-end laser printers currently use QuickDraw — Apple's display manager and page-description language or PDL. These QuickDraw printers output an image of the screen document that has been RIPped by the Mac's processor for both text and graphics.

In most cases, PostScript is faster than QuickDraw at RIPping. A laser printer using Adobe's PostScript PDL — or a PostScript clone using a variant of it — does its own RIPping by interpreting a mathematical description of the page sent from your Mac in PostScript code. It does this with its own processor — a mixture of hardware and software called the PostScript interpreter. Because the printer does most of the processing, it both frees up your Mac and is freed from it. PostScript printers and clones — unlike QuickDraw printers, which rely on your Mac's processor — can therefore be networked. Just as important, though, is PostScript's effect on the printed image: Its resolution can be as high as your printer's interpreter can manage — 300, 600, or even 1,200 dpi (dots per inch).

For higher-quality text output on QuickDraw printers, you can use ATM (Adobe Type Manager) for printing PostScript Type 1 fonts (which are optimized for better output at low resolution and smaller point sizes). ATM gives you good-quality text, especially at odd point sizes, but it doesn't let you print PostScript graphics. For printing PostScript text and graphics on any non-PostScript printer, you can turn to software-only PostScript interpreters, such as TScript from Teletypesetting and Freedom of Press from CAI. But be prepared: Your Mac will be tied up for much longer periods than is usual for QuickDraw printing, and none of these solutions free your Mac from RIPping.

Which brings us back to the PostScript option, an issue further complicated by the fact that PostScript clones now compete head-to-head with Adobe-sanctioned printers. What's more, Apple will soon be among the clone makers, because the Microsoft TrueImage PDL, a PostScript variant, will be built in to future Apple laser printers. (See the "PostScript Evolution or Revolution" sidebar in "The Next Wave of Personal PostScript Printers.") To add to the confusion, Apple has announced that it will include its new TrueType QuickDraw font-rasterizing and -outlining technology in its upcoming System 7. In the future, Apple laser printers will use TrueType fonts kerning as existing Bitstream Type 1 fonts. Buyers of PostScript printers will also be comforted by the probable release of utilities that will convert Type 1 fonts into TrueType ones — and vice versa. What's more, PostScript diehards will be glad to know that Adobe has promised that Adobe Type Manager — which not only improves output on QuickDraw Manager but also improves screen fonts on your Mac for PostScript work — will be compatible with System 7.

In the meantime, don't wait until all the vendors are happy before you go out and buy your laser printer. With enough wise guys around asking questions, even unhappy bedfellows such as Apple and Adobe will continue to accommodate each other.

— Michael Miley and Paul Yi
Bright people have bright ideas. Not to mention bright ways of executing them. Now, thanks to NEC, they’ve got an absolutely brilliant way of presenting them.

Something’s wrong when bright people make dull presentations.

Because NEC has all the tools to help you create and print lifelike, full-color hard copy and transparencies with incredible ease.

Impressive graphics begin with the 16-inch MultiSync 4D color monitor. It offers digital controls, high resolution (from VGA up to 1024 x 768), and award-winning multiple frequency technology. And it's compatible with a wide range of graphics boards and computer systems. Meaning you can preview your work with crystal clarity before you print it out.

To make your presentations even more memorable, NEC CD-ROM readers and software let you spruce up your charts and overheads with hundreds of typefaces, stock photos, even 3D clip art straight from compact discs.

Then see your work come to life with the Colormate™ PS printer. Its powerful Motorola 68020 microprocessor and Adobe® PostScript® interpreter give you bright, colorful 300 dot-per-inch graphics.

The Colormate PS also comes with a substantial 8 MB of memory, so it can convert complex color art and photographs into either hard copy or transparencies in seconds.

NEC would like to help you with your next presentation. So call us at 1-800-NEC-INF0. (In Canada, call 1-800-343-4418.) We’ll send you all the information you need.

With NEC, you’ll never look brighter.
Actual output printed on an NEC Colormate PS. Call 1-800-NEC-INFO for a printed sample of your own.
Four of the printers we tested use different combinations of three techniques to increase the resolution of their laser-printer engines. The Printware 720 IQ Professional Laser Imageer, the LaserMAX 1000 Personal Typesetter, and the NewGen TurboPS480 boost their resolution to well above the original specifications. The HP LaserJet III boosts its resolution selectively to reduce the jaggies. All use varying implementations, but the underlying principles are the same.

To understand how laser printers boost their resolution, you have to know a little about how they work. A single laser beam scans across a photosensitive drum in patterns of electrical charge. The drum has a negative charge. A series of mirrors directs the beam onto the rotating drum while the laser is turned on and off. When the laser strikes the drum, it creates a spot with positive charge. The laser is turned on to print a dot and left off where there is no dot. The laser beam "writes" a horizontal line of positively charged dots along the surface of the drum. Negatively charged toner particles jump to the dots on the drum written by the laser beam.

When the laser has written a complete horizontal scan line to the drum, a stepper motor rotates the drum slightly to receive the next line, and the process is repeated until the complete image is recorded on the drum. Positively charged paper then passes through the printer and attracts the toner from the drum. As the drum rotates, the image is transferred onto the paper. Finally, the paper passes between heated rollers that fuse the toner to the page.

Turning the laser on and off faster produces more dots, spaced closer together along a horizontal scan line. Reducing the laser's intensity reduces the dots' size, yielding higher horizontal resolution. To increase the vertical resolution, the stepper motor is tweaked to move the drum in smaller increments; the horizontal scan lines move closer together.
Horizontal Enhancement
Turning the laser on and off faster produces more dots, spaced closer together along a horizontal scan line. This results in increased horizontal resolution. Reducing the intensity of the laser makes the dots smaller and gives thinner lines and smooths curves.

Vertical Stepper-Motor Adjustment
The stepper motor is adjusted to move the drum in smaller increments, making the horizontal scan lines closer together. The practical limit of this technique is around 600 lines per inch, which results in 600-dpi vertical resolution.

Shifting the Laser Vertically
Vertical resolution is further enhanced by shifting the vertical position of the laser beam while also moving the drum in smaller increments. The horizontal scan lines are even closer together.

Output Examples*

- **Apple LaserWriter IIINTX**
  This output is the best sample an enhanced 300-dpi laser printer can produce. The Canon engine yields a good-looking character, but once enlarged, the character isn't smooth and the dots making up the character are visible.

- **Hewlett-Packard LaserJet III**
  HP tweaks the laser dot size and placement to smooth text in the curves and joints. The LaserJet III is still only 300 dpi, but the variable laser beam produces a better-looking character than does the untweaked 300-dpi engine. The dots that make up the character are still visible.

- **Varityper VT600P**
  The Varityper gives an improved resolution of 600 dpi by horizontal enhancement of the laser beam and adjustment of the vertical stepper motor. The character looks smoother and less jagged than the untweaked 300-dpi character.

- **Printware 720 IQ**
  The Printware 720 IQ has improved engine resolution of 1,200 x 600 dpi. The character looks smoother and better defined than untweaked 300-dpi characters. Printware uses the most extreme horizontal enhancement of the laser beam.

- **LaserMAX 1000**
  LaserMAX has tweaked an engine to an improved resolution of 1,000 x 1,000 dpi. It adjusts the stepper motor and shifts the laser beam in a vertical direction. The text is smoother, and the curves are better defined.

*12-point text enlarged ten times.

MacUser October 1990 Buyer's Guide 13
OPTICAL STORAGE HASN'T LIVED UP TO ITS PROMISES EITHER.
UNTIL NOW.

Promises. Promises. Magneto optical drives have been a let-down. People thought they'd be fast (among other things); yet they're still too slow for even backup and on-line archiving. Well, you won't be disappointed anymore. Because the makers of Bernoulli® products are giving you the MO you've been waiting for. The Iomega® LaserSafe.

With the new LaserSafe, a fast MO is no longer an optical illusion. In addition to a 256KB, on-board, dual-ported caching system, LaserSafe utilizes an advanced technique called "asynchronous write." By freeing the Mac from waiting for the write operation, LaserSafe can nearly double your throughput. An Iomega first that raises the level of MO performance, making LaserSafe the fastest MO for your data-intensive storage applications. The difference is clearly visible.

The LaserSafe is a 650MB optical drive that's actually easy to use, too. It allows you to partition disks for easier file management. And it's the first MO that gives you off-line disk formatting, saving you up to 40 minutes per disk of otherwise wasted time. But more important, LaserSafe uses the same simple software interface for which Bernoulli is known.

LaserSafe was designed with an attention to detail unlike any other MO. Worldwide agency approvals, a sealed mechanism and positive airflow filtration set the industry standard for reliability and data integrity. And LaserSafe has convenient, external termination, 110/220 volt-age switching and SCSI ID — no panels to open, no resistors to remove, no hassles.

Above all, LaserSafe is made by the company that wrote the book on removable storage. The company that has an installed base of over 600,000 drives with 98 percent customer satisfaction. A company that will be there to support you in the future.

So get the rest of the LaserSafe picture. Call 1-800-289-4034 for free literature and specs (not the X-Ray kind). Look into it today. Because what you're really looking into is the future of optical storage.

INTRODUCING LASERSAFE BY THE MAKERS OF BERNOULLI.
PostScript Printers

and the TrueImage PDL.

What’s at stake here? A lot. Will Adobe PostScript continue to coexist with PostScript clones? Will both survive the coming of TrueImage? Or with Apple’s move to TrueType, will all PostScript printers, both Adobe and clone, soon be on the endangered-species list?

Don’t worry, keep printing. The good news is threefold. First, PostScript clones are becoming more compatible with Adobe PostScript and are getting faster and cheaper. Second, PostScript itself continues to evolve. Adobe has published some of its PostScript specs for the printer industry, encouraging clone manufacturers and furthering Type I-font compatibility. Adobe PostScript itself has recently evolved to Level 2, with color and compression built in—it’s a living language. And third, Apple assures us that TrueType will be compatible with PostScript printers (see the “Living with TrueType and System 7” sidebar).

In short, PostScript is still the sun around which laser printers revolve. The fierce competition and the ensuing drop in printer prices make this an excellent time to buy a PostScript printer, or even a clone, without fear of such a printer’s becoming obsolete. Indeed, PostScript clones remain a viable option for one primary reason: Their price/performance ratio is usually very competitive with that of their Adobe-sanctioned brethren. If, however, you’re looking to save money by buying a PostScript clone, be aware that some true Adobe PostScript printers, particularly the Texas Instruments microLaser PS35 and the Hewlett-Packard LaserJet IIIP, are now cheaper than some clones (although the IIIP’s speed leaves something to be desired).

That’s not to say that problems don’t persist with the current crop of clones in the area of font handling and, to a lesser extent, with PostScript applications such as Adobe Illustrator and Aldus PageMaker. For instance, although most PostScript clones don’t have a problem with Type 3 PostScript fonts, they do have a problem interpreting Type 1 fonts, which are encrypted. Adobe’s recent publication of some Type 1 specifications should help change this situation. Type 1 fonts, the current industry standard for type libraries, contain

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**Figure 1: Jury Results**

<table>
<thead>
<tr>
<th>Printer/Model</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Varityper VT600P</td>
<td>5</td>
</tr>
<tr>
<td>NewGen Turbo /PS+ /880</td>
<td>10</td>
</tr>
<tr>
<td>LaserMAX 1000 Personal Typesetter</td>
<td>15</td>
</tr>
<tr>
<td>Printware 720 IQ Laser Image</td>
<td>20</td>
</tr>
<tr>
<td>Hewlett-Packard LaserJet III</td>
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<tr>
<td>Kyocera 89010</td>
<td>10</td>
</tr>
<tr>
<td>Dataproducts LZR 12500</td>
<td>15</td>
</tr>
<tr>
<td>OMS PS-810 Turbo</td>
<td>10</td>
</tr>
<tr>
<td>MacProducts MagicPrint/Mirror Image</td>
<td>5</td>
</tr>
<tr>
<td>Hewlett-Packard LaserJet III</td>
<td>0</td>
</tr>
<tr>
<td>Apple LaserWriter UXT</td>
<td>5</td>
</tr>
<tr>
<td>Fujitsu RX7100PS+</td>
<td>10</td>
</tr>
<tr>
<td>Hewlett-Packard LaserJet I/O</td>
<td>15</td>
</tr>
<tr>
<td>Texas Instruments microLaser PS35</td>
<td>20</td>
</tr>
<tr>
<td>Agfa P3400PS</td>
<td>25</td>
</tr>
<tr>
<td>NEC Silentwriter LC 6900L</td>
<td>30</td>
</tr>
</tbody>
</table>

Figure 1: Our crack staff of jurors rated each printer’s quality in the areas of text, gray scale, line art, and PostScript art. The combined and averaged results are shown, with the text results highlighted. The Varityper VT600P finished on top, despite stiff competition from the enhanced-resolution printers. The NEC Silentwriter 290 consistently brought up the rear, with the worst image quality. The Hewlett-Packard LaserJet III had a slight advantage over the other 300-dpi printers.

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**Figure 2: Line Resolution**

<table>
<thead>
<tr>
<th>Printer/Model</th>
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</thead>
<tbody>
<tr>
<td>Fujitsu RX7100PS+</td>
<td>Better</td>
</tr>
<tr>
<td>Apple LaserWriter IINTX</td>
<td>Better</td>
</tr>
<tr>
<td>Hewlett-Packard LaserJet III</td>
<td>Better</td>
</tr>
<tr>
<td>Varityper VT600P</td>
<td>Better</td>
</tr>
<tr>
<td>Linotronic</td>
<td>Better</td>
</tr>
</tbody>
</table>

Figure 2: The criss-crossed circle tests line resolution. The 300-dpi Fujitsu RX7100PS+, with its LED engine, prints a finer line than does the laser-equipped Apple LaserWriter IINTX but has more curvature. The Hewlett-Packard LaserJet III does a better job in both respects, thanks to its Resolution Enhancement Technology. The Varityper, with its 600-dpi resolution, produces the best toner-based output. The Linotronic film, at 1,270 dpi, produces the best hairlines, superior to any toner-based image.
hints — special instructions for improving a font’s appearance when it’s printed on 300-dpi laser printers — whereas Type 3 fonts are unhinted. The Kyocera, NewGen, and Printware clones, for example, have figured out how to read Type 1 fonts but have not yet figured out how to use the hints (and Adobe isn’t telling). But as the latter two clones are higher-resolution printers, it’s arguable whether they need hints anyway.

Some clones also have problems with complex PostScript graphics and large bit-mapped images, because of rasterizer incompatibilities or insufficient RAM. The LaserMAX 1000 Personal Typesetter and the MacProducts MagicPrint failed to print our sample Illustrator and PageMaker documents, but the companies are expected to fix their rasterizer problems by the time you read this. And the Printware 720IQ failed the QuickDraw test — it was unable to print all the layers of our test document — probably because of insufficient RAM.

All problems aside, though, the fact that every Mac-compatible PostScript printer — whether it’s a clone or Adobe-sanctioned — is plug-and-play should convince even the worst cynics about the virtues of buying one.

Every printer we looked at was network-ready, complete with the necessary cables and connectors to hook up to your networked Macs (although the Varityper VT600P, a large and complex piece of equipment, is best installed by a professional trained to do the job). And a single Apple LaserWriter driver installed in those Macs can drive all PostScript printers — unlike in the DOS world, in which different printers and applications each have their own unique drivers. That’s not to say that Apple’s driver hasn’t been improved. Fujitsu and NEC offer special INITs that you can add to Apple’s driver for selecting between paper trays; Agfa’s and Dataproducts’ DAs do the same thing. Adobe itself is developing an improved PostScript printer driver that will better address printer-specific features such as stapling, multiple paper bins, and duplex printing.

But enough prelude. You should first define the type of printer you need — for personal, corporate, or desktop-publishing use. Then look...
Dear Jasmine Technologies,

Occasionally we win one.

On 11/15/89, as I was driving home from work, a tornado formed just to the west of me. I had enough time to pull into a safe parking lot and duck down. The “safe parking lot” turned out to be right in the path of the tornado. I was knocked out as the 200 MPH winds struck, flying my car—and me—nearly 300 yards. I woke up in the hospital with a severe concussion and blood loss. As part of the $250 million storm damage, my car was totalled and my computer was lost.

After I was released from the Hospital, my wife and I went to the Police Station where some “valuables” had been rescued from the disaster scene. There was my Macintosh SE with its Jasmine drive. The hardware was in sad shape; the front SE surface was bashed in, there was a big piece missing from the Jasmine Drive, and both were coated with a mixture of motor oil, antifreeze and water. The insurance company agreed that it was a total loss. But, realizing that the damage was finite, I began cleaning and straightening out everything. I jokingly powered up—IT WORKED! The bashed-in Jasmine drive booted the straightened out SE giving me a happy Mac, displaying the partitioned icons and sat there waiting! The clock was even right! So far, the drive has yet to fail.

I’m writing this letter (on the Jasmine drive) of appreciation to all of you in hope that you will be as pleased as I am that your products survived the forces of a major tornado that was blowing manhole covers around like frisbees. I don’t have the foggiest idea where the drive ended up, but judging from all the junk coating it, it must have been found under one of the piles of destroyed cars.

In summary: the car was totalled, I was almost totalled, but the Jasmine drive made it O.K. Congratulations on making some darn good stuff. I plan to take the scarred hardware to work and continue to use it there as a reminder of one of the positive aspects of that unfortunate experience.

Sincerely,

Gene Lawson
For the last four years Jasmine has continuously been the leader in the Macintosh hard drive market. We’re proud to announce that we are now a division of Chess, a dominant force in the European Macintosh market. With our new management we are producing the kinds of innovative products that we’ve become known for.

Jasmine’s Platinum Flower Service is focused on our Customers. Over 25% of our staff is dedicated to Customer and Technical Support. Each Jasmine drive is thoroughly burned in and tested before shipping and we include informative manuals and detailed troubleshooting guides to help with any problems that may arise. If you’re not satisfied with any aspect of your drive, you have 30 days* to return it for a full refund and, should your drive need help, the Platinum Flower line has a 2-year repair warranty.

Jasmine Technologies has consistently finished first in the MacUser Labs’ Buyers Guide and we’ve been praised in every major Macintosh publication for the quality of our drives and for the ease of use of DriveWare, our custom drive utility. Jasmine has earned more MacWorld and MacUser awards for Macintosh peripherals than all of our competitors combined.

Blue Flower Line

<table>
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<td>40 MB</td>
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Platinum Flower Line

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
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<td>90 MB</td>
<td>$699</td>
</tr>
<tr>
<td>180 MB</td>
<td>$999</td>
</tr>
</tbody>
</table>

For the last four years Jasmine has continuously been the leader in the Macintosh hard drive market. We’re proud to announce that we are now a division of Chess, a dominant force in the European Macintosh market. With our new management we are producing the kinds of innovative products that we’ve become known for.

Jasmine’s Platinum Flower Service is focused on our Customers. Over 25% of our staff is dedicated to Customer and Technical Support. Each Jasmine drive is thoroughly burned in and tested before shipping and we include informative manuals and detailed troubleshooting guides to help with any problems that may arise. If you’re not satisfied with any aspect of your drive, you have 30 days* to return it for a full refund and, should your drive need help, the Platinum Flower line has a 2-year repair warranty.

Jasmine Technologies has consistently finished first in the MacUser Labs’ Buyers Guide and we’ve been praised in every major Macintosh publication for the quality of our drives and for the ease of use of DriveWare, our custom drive utility. Jasmine has earned more MacWorld and MacUser awards for Macintosh peripherals than all of our competitors combined.

Go ahead, check out the competition. We could use cheaper parts and have the same kind of “too good to be true” prices as some drive makers, but remember, if it sounds too good to be true, it probably is. We’d rather spend a little more, not cut the corners, and produce a premium drive at a non-premium price. We’ve set the standards and we will continue to lead the industry now and in the future. Simply put, there is no substitute for the best.

To Order With Your Visa or MasterCard, Call 1-800-347-3228

*For domestic sales only
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Please circle 157 on reader service card.
Figure 5: Printing Speed

Word

Figure 5: To create benchmarks for the speed of each printer, we used five types of test documents: Word, Excel, Illustrator, MacDraw, and PageMaker. The 25-page Word file is a relatively simple text file that demonstrates the differences in rated engine speeds. With the exception of the Printware 720 IQ, whose speed is skewed by its enhancement techniques, the printers fall into groups based on engine speed: 4 ppm, 6 ppm, and so on. The other tests tax the printer's processor, so the groupings reflect the type of chip the printer uses: the Motorola 68000 or 68020 or the Weitek RISC chip in the MagicPrint and Mirror Image. Some of the clones had compatibility problems and failed to print some of the documents.
Figure 6: Printers cost money to run. Most printers come in at 3 cents per page in consumables cost — that's for toner, drum, and sometimes developer. The average Canon cartridge, toner, and drum, good for 4,000 copies, costs around $120. The LaserMAX is the most expensive to use, at close to 13 cents a page, because of its conservative page rating for its toner/drum cartridge, good for only 1,500 copies. The Printware is the least expensive, at a little more than a penny a page. The Printware's drum is rated at an impressive 100,000 pages, and toner is an affordable $39 for 5,000 pages.
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—InfoWorld, December 4, 1989

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Readers’ Choice Awards
—Publish, December, 1989
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closely at the performance issues just explained and the results of our tests in three areas — image quality, speed, and ease of use. Only then are you going to have all the information you need to make the best decision about PostScript.

Quality Imaging
The key to superior image quality is high resolution: The higher the printer’s resolution, the better the image. The printer-engine type also affects quality. In general, printers with the same engine but from different vendors produce similar-quality output. The PostScript interpreter — the mixture of software and hardware in each printer that processes the data from your Macintosh — seems to have relatively little effect on image quality: The document either prints or it doesn’t.

One factor that does make a difference to image quality is a printer’s ability to interpret hinted fonts. On 300-dpi printers, hinted fonts generally look better than unhinted ones. Clones that can’t handle hinted fonts are at a disadvantage compared with those that can.

To rate image quality, we assembled a jury of printer experts and experienced users. We showed them each printer’s version of a test page that we had designed to show strengths and weaknesses in printing type, lines, and gray scales. The jury awarded marks for each element on the page, and we totaled and averaged the results (see Figure 1).

The results were revealing — even controversial. The Varytype VT600P, at 600 dpi, consistently performed the best, even compared with PostScript clones such as the LaserMAX 1000 Personal Typesetter that have engines tweaked to give enhanced resolution (see the “How It Works: Enhancing Resolution” sidebar). But you pay for this quality. At $16,995, the Varytype costs nearly $9,000 more than the LaserMAX 1000 and $5,000 more than the Printware 720 IQ, two runners-up in image quality. Even though the LaserMAX 1000’s stated resolution of 1,000 dpi helped it win in the line-art and PostScript-image categories, our jury found its text and gray-scale quality to be the worst of the high-resolution printers (see Figure 2).

The enhanced-resolution printers,
with their higher dot density, had a
distinct gray-scale advantage over the
300-dpi printers (see Figure 3). Of
the four, the NewGen TurboPS/480
looked best (with the Printware 720
IQ a close second), perhaps because
of its special Hi-Resolution toner car-
tridge ($195), which NewGen claims
is optimized for finer dots. All the
high-resolution printers use special
toner that is ground to a smaller size
(9 microns) than normal toner (12
microns); such toner is available only
from the manufacturer.

The fourteen 300-dpi printers per-
formed on a par with each other in
terms of image quality, with the
exception of the NEC Silentwriter
LC 890XL, which consistently re-
ceived the lowest jury ratings. The
Hewlett-Packard LaserJet III — with
its Resolution Enhancement Tech-
nology, which uses variable dot size
and placement to obtain finer lines
and smoother curves (see the “How
It Works: Enhancing Resolution”
sidebar) — produced only slightly
better text (see Figure 4).

Text quality also depends on the
printer’s accuracy in rendering fonts.
Some of the clones had letterspacing
problems. The NewGen TurboPS/
480 produced characters that were
spaced differently from those of the
Adobe-sanctioned printers that use
the same downloaded fonts. How-
ever, we could detect little difference
between the clones’ handling of
Adobe Type 1 hinted fonts and their
handling of equivalent Bitstream
Type B hinted fonts. Subtle differ-
ences, such as character shape and
spacing, between some supposedly
equivalent font types do exist, so if
you plan to use a service bureau for
final output, make sure that it either
uses the same fonts or is willing to
use fonts that you supply. Otherwise
you may find differences in line
breaks and pagination between your
on-screen expectations and your
printed documents.

The Nimble Printer

Rating printer speed is a complex
business (see Figure 5). Engine speed
is not in itself a reliable indicator of
overall printer speed, because a fast
engine teamed with a slow rasterizer
usually results in a slow printer. Some
printers use RISC (reduced instruc-
tion set computer) chips in their in-
terpreters. These are generally faster

but the microLaser remains the one to beat.

Last, though certainly not least, of the personal printers are the
two from Hewlett-Packard: the LaserJet IIP and LaserJet III. Al-
though we eagerly anticipated testing all three LaserJets (including
the LaserJet IID, which we discuss in the “Many-on-One: The
Corporate Choice” sidebar), their performances were disappoint-
ing. The LaserJet IIP has one great feature: its low price. The version
we tested (with LocalTalk, Adobe PostScript, and an optional memory
upgrade) lists at $329, but you should find this printer at street
prices closer to $2,000. Also, inexpensive third-party PostScript-
clone cartridges and interface options from companies such as
Pacific Data Page, PCPI, and Computer Peripherals should push this
price even lower. These items will be available for all the Hewlett-
Packard LaserJets. The LaserJet III we tested lists for $4,105, a price
that includes Hewlett-Packard’s RET (Resolution Enhancement Tech-
nology) (see the “How It Works: Enhancing Resolution” sidebar). For
less money than the LaserWriter IINT costs, you get text resolution
that rivals that of higher-resolution printers — almost. All three
LaserJets add PostScript via a plug-in cartridge that also contains the
new ATM font rasterizer and 35 outline fonts. The processor and
RAM are in the printer. We tested the IIP and III with an additional 2
megabytes of RAM each.

The LaserJet IIP, with its 4-ppm Canon LBP-LX engine, was the
slowest of all the printers — with the exception of the Printware 720
IQ, whose improved resolution of 1,200 horizontal dpi x 600 vertical
dpi excuses its slow performance with text. In other, more graphics-
intensive, tests, all the LaserJets were consistently among the slow-
est of the printers. This slowness is less painful because the printers
buffer the page and then RIP it, thus returning the cursor quickly to
the Mac.

Overall, however, our disappointment in the Hewlett-Packard
LaserJets was counterbalanced by our pleasant surprise at the ele-
gant design, decent performance, and amazingly low list price of the
Texas Instruments microLaser. At a list price of $2,999, this truly
“micro” PostScript printer is our winner for today — but watch for
even better price/performance leaders in the near future (see “The
Next Wave of Personal PostScript Printers,” also in this issue).
Many-on-One: The Corporate Choice

A corporate laser printer is suited for a high-volume, medium-to-large network environment. The ideal corporate PostScript printer should have a fast engine for text-intensive output, should have a heavy-duty life cycle, and should offer extra paper bins with large capacity. (If your corporation has moved into the DTP arena with your own in-house publications, you may also want to look at the "All-in-One: The Desktop Publisher" sidebar.)

The single-bin contenders (background, left to right): Hewlett-Packard LaserJet IIID, Agfa P3400PS, Fujitsu RX7100PS+, and NEC Silentwriter LC 890XL

The dual-bin contenders (left to right): Hewlett-Packard LaserJet IID, Agfa P3400PS, Fujitsu RX7100PS+, and NEC Silentwriter LC 890XL

Although it did not fare well in the image-quality jurying, because its graphics rendering is not among the best, it's debatable whether the extra resolution is worth the high price of $9,995.

The Kyocera Q-8010 ($6,995) uses its own 10-ppm engine, a proprietary PostScript-clone PDL, and 5 megabytes of RAM to get speeds near those of the 12-ppm Agfa and Dataproducts printers. The C-8010 is, however, limited by a single paper tray with no options for envelopes or extra bins.

The Kyocera is the only printer we reviewed that can receive data through three active ports — serial, parallel, and LocalTalk — simultaneously and that lets you switch among different printer emulations. The printer processes data coming via the first port while buffering and sending wait signals to the other ports. The Kyocera also accepts either PostScript or PCL (Hewlett-Packard LaserJet PDL) languages. These are nice features for mixed PC/Mac networks. PCs use both serial and parallel interfaces, and they use mostly PCL. To change the emulations on other printers, you need to flip switches manually on the printer's front panel. The Kyocera was the first to offer automatic configuration, but we expect more printers will do so as more networks become mixed.

Both the Apple LaserWriter IINT and the IINTX can be considered qualified candidates to be corporate PostScript printers. In our tests, the IINT, with its 8-ppm Canon engine and Motorola 68000 processor, set the lower boundary for acceptable speed for printing text, but it was among the slowest spreadsheet printers, so we judged it too slow for network use. The Apple LaserWriter IINTX ($5,995) fared better and, with the QMS PS-810 Turbo ($5,495), came right behind the Dataproducts LZR 1260i in performance, quality, and price.

The LaserWriter IINTX and the PS-810 Turbo use the same Canon engine and a Motorola 68020 (the QMS runs at a faster clock speed), and both are consistently among the fastest printers. Unfortunately, although the IINTX has a SCSI port for a hard-disk drive, it lacks paper-feed options such as dual bins. An alternative solution, such as BDT's paper feeders, provide the IINTX with three, four, or even five extra bins, all accessible through a special Chooser-level driver. They're not cheap, though, costing $1,545, $1,945, and $3,490, respectively. QMS also offers a dual-bin version of the 810, the PS-820 Turbo, at $6,495.

The NEC Silentwriter LC 890XL ($5,995) is among the fastest of the printers we tested, but it consistently scored the lowest in image quality. It does offer two paper bins, which each hold 250 sheets.

The Fujitsu RX7100PS+ ($3,995) also offers two bins, each holding 150 sheets. It comes bundled with a Select-A-Bin IINT, for choosing the correct paper bin, and QuickLetter, a simple and convenient letter- and envelope-writing program — a nice combination for business users. However, the Fujitsu RX7100PS+ is not as fast as the LaserWriter IINTX's — too slow for heavy network use.

The Hewlett-Packard printers, although disappointing in performance (see the "One-on-One" sidebar), offer bottom-line business buyers too much for them to be ignored. The LaserJet IID is the ultimate paper handler, offering everything from two paper bins, each with a 200-sheet capacity, to duplex printing (automatic printing on both sides), a feature unique among all the printers we tested. The IID could use a more powerful processor than the Motorola 68000, but at a price of $5,360 (which includes the necessary upgrade to 2 megabytes of RAM, PostScript, and LocalTalk), the IID is a contender in the corporate market. The LaserJet III could also use more processor horsepower, but it is less of a contender.

Although the Dataproducts LZR 1260i is our first choice for corporate buyers because of its speed, corporations seeking high-quality output will put up with a slower printer to get it. Take a look at the "All-in-One: The Desktop Publisher" sidebar for an examination of the field of better-resolution printers.
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PostScript Printers

than printers that have interpreters based on the Motorola 68000 or 68020 (the same chips used in the Mac Plus, SE, and II—see "Chasing the IItx: Accelerators," August '90, page 84). At testing time, however, there were no RISC interpreters using true Adobe PostScript, so RISC-based printers, as with other clones, have some font incompatibilities.

More RAM in a printer can speed up printing of complex documents or documents containing downloadable fonts. Some printers, such as the Kyocera Q-8010, can divide memory so that half of it is buffering an incoming page while the other half is processing the existing page.

The presence of a hard-disk drive can also speed things up. Having a font on a hard-disk drive means that a font not resident in the printer’s ROM doesn’t have to be downloaded over an AppleTalk network (throughput via a SCSI cable is always faster than via LocalTalk cabling). Using disk-resident fonts is almost as fast as using ROM-resident ones.

Printers also use hard-disk drives for a performance-enhancing technique called font caching. Because PostScript fonts are stored as mathematical descriptions of each font’s outline, the PostScript interpreter scales the outline to the required size and then builds a bit-mapped image of the font in RAM. The bit maps are held in RAM as long as there’s room, but they often have to be flushed to free up RAM for other tasks. Here’s where font caching helps: If the same point size is required once more, the interpreter has to perform the scaling and rasterizing operations over again. With a hard-disk drive available, however, the bit maps can be written to the disk drive—cached—as they’re flushed from the printer’s RAM and then recalled from the disk drive as needed. This eliminates the time penalty associated with reimagining the font.

Keep in mind that a printer’s speed is affected by the kind of documents you typically print. For example, in our tests, the HP LaserJet IID and III finished in the middle of the pack when printing plain text, but they lost ground when printing just about every other kind of document. The

All-in-One: The Desktop Publisher

Desktop publishing requires a printer that’s an all-around performer, with enough RAM for complex pages, good image quality for graphics as well as text, and reasonable speed at all tasks. A 6CS1 port for a hard-disk drive is almost a necessity, since you’ll want to store fonts. Because output from imagesetters (ultrahigh-resolution equipment used in service bureaus) is often the final form of DTP documents and because the majority of service bureaus use Adobe Type 1 fonts, compatibility here is important. Some clones are compatible with Type 1 fonts, although they aren’t able to print the hints of such fonts, resulting in poorer quality for small point sizes.

Because you pay significantly more for higher-resolution printers, which put more dots on the page, we compared printers of like resolution. Keep in mind that these printers are really not substitutes for professional imagesetters, regardless of their claims. A toner-based printer is simply not in the same category as a photographic-film-based typesetter such as a Linotronic, even when it has similar resolutions.

In our tests, the clear winner in the 300-dpi realm was the Dataproducts LZR 1260P. In overall speed, it was rivaled only by the Apple LaserWriter IIINXT and the OMS PS-810 Turbo, but in straight text output, its 12-ppm engine gave it the edge. Its image quality was consistently above average in its class. A hard-disk drive is available as an option for greater font flexibility. Costing $5,995, it boasts a heavy-duty Toshiba engine with a rated life of 600,000 pages and a monthly duty cycle of 25,000 pages—great for busy desktop publishers. For PC/Mac mixed-platform shops, it has a parallel interface in addition to serial and LocalTalk ports. The toner, developer, and drum need to be replaced independently of each other. Of course, the cost is straightforward, with the OMS PS-810 Turbo being the best buy.

The remaining two 300-dpi contenders are the Texas Instruments microLaser PS35 and the NEC Silentwriter2 290. The Texas Instruments microLaser offers such an attractive price/performance bargain that even with its slow speed, it warrants some discussion in this category. (You could afford two microLasers, at a list price of $2,999 each, for one LaserWriter IINXT.) The microLaser also offers a parallel interface and is expandable to 4.5 megabytes of RAM. It has outstanding on-board diagnostics, and the consumables are easy to replace. At a list price of $3,995, the NEC Silentwriter2 290 is also worth noting, because it was the fastest of the “personal” laser printers in our tests. But the OMS PS-810 Turbo was still two to three times as fast for graphics.

We also looked at two higher-resolution PostScript printers, the 400-dpi Agfa P3400PS and the 600-dpi Xantech WT600P. The P3400PS was among the fastest printers we tested, but it got a low score for image quality, because it consistently printed too light (even after we replaced the drum with a new one) — and it has no density control to compensate for this flaw. We felt that the difference between 300 dpi and 400 dpi didn’t justify its high price of $9,995.

With a list price of $16,995, the Xantech WT600P, a large industrial-strength beast, was the most expensive printer we tested. It received the highest overall score for image quality, beating printers that claimed resolutions of up to 1,000 dpi. For straight text output, it was one of the fastest. In the page-layout test, it was somewhat slower, however, falling behind the LaserWriter IINXT and IINXT. Bear in mind that the 600-dpi VT600P must process four times as much information as a 300-dpi printer does, because its area resolution is four times that of a 300-dpi printer. It’s the least expensive printer for preparing camera-ready copy for newsprint-quality jobs.

Finally, we looked at three enhanced-resolution PostScript-cloned printers, so called because they take existing engines that would normally print at 400 and 600 dpi and tweak them to yield higher resolutions (see the “How It Works: Enhancing Resolution” sidebar). The LaserMAX 1000 Personal Typesetter claims an “effective resolution” of 1,000 dpi both horizontally and vertically. The NewGen TurboPS/480 claims 800 horizontal dpi x 400 vertical dpi, and the...
message here is that you should examine speed results with an eye to the kind of user you are — personal, corporate, or desktop publisher — and the kind of documents you usually print. You should weigh speed against image quality and price. Corporate users who output primarily text and spreadsheets might be happy with the DataProducts LZR 1260i, consistently one of the fastest printers, whereas DTP experts might be satisfied with the Printware 720 IQ, run-ner-up to the VariTypey VT600P in image quality (and much cheaper), although it was consistently the slow-est printer in the pack.

We ran a battery of speed tests to emulate different ways in which printers are used. Using the printer’s built-in fonts, we printed a 25-page Word 4.0 document. The results of this test largely reflected engine speed: the processor has minimal effect because it’s rendering fonts only in 8-, 10-, and 12-point sizes.

A 10-page Excel spreadsheet, also using built-in fonts and with the grid lines visible, tested the processor as well as the engine, because the processor is called on to rasterize grid lines and cell formats as well as fonts.

We used a 1-page Adobe Illustrator graphic to test each printer’s PostScript interpreter and, in the case of the clones, compatibility. The DataProducts LZR 1260i, QMS PS-810 Turbo, and Apple LaserWriter IINTX were fast; the Hewlett-Packard LaserJet3 and the Printware 720 IQ were slow. The MacProducts MagicPrint (with firmware 3.00) and the LaserMAX 1000 failed to print the page at all. MacProducts and LaserMAX were working out their compatibility problems as we went to press.

A 1-page MacDraw file containing many layers of circles filled with different patterns proved to be the acid test for a printer’s processor. It took the Apple LaserWriter IINT, an average-speed printer with a Motorola 68000 processor, some 40 minutes to print the page. The Hewlett-Packard LaserJets were even slower. The MacProducts MagicPrint and Mirror Technology’s Mirror Image blew everyone away by finishing in 12 minutes. Their RISC processors
are much faster than the average Motorola versions. The QMS PS-810 Turbo, running a Motorola 68020 at 20 megahertz, followed close behind at just under 14 minutes.

A 7-page PageMaker document tested the overall processor speed and printer throughput: the speed with which the printer accepts information through the AppleTalk connection. The document contained a 100-dpi scanned (TIFF) image, text (resident fonts), EPS art and patterns, and hairlines. The 686K TIFF file, in particular, taxes printer throughput. (For an explanation of these and other equally obscure file formats, see the "MacUser Guide to Graphics Formats" poster in the September '90 issue.)

Finally, to test font-download capability, we printed a single PageMaker page containing 17 downloadable fonts, using either Adobe Type 1 or Bitstream Type B fonts, depending on which worked best on each printer. This tests the speed of the processor and the efficiency of the printer's PostScript page-description language (or variant) in switching fonts in and out of RAM.

**Easy Does It**

Finally, no matter how crisp your printer's images are or how fast it can churn them out, it must still be easy to live with, especially if you're a personal user responsible for its maintenance. When we judged printers for their ease of use, we considered three areas: ease of setup, day-to-day use, and maintenance requirements. If a printer had a complex setup, we noted whether installation was included in the purchase price. Although we didn't assign numbers in our ease-of-use category, the numbers factored into our overall judgments of a printer and are reflected in the mouse ratings.

In day-to-day use, we considered features such as noise level, variable density settings for tweaking the resolution of your output, warning lights for paper jams and toner depletion, and extra features such as envelope feeders and multiple paper bins. Font and application compatibility were important factors in our clone ratings. We also considered the day-to-day cost of using the printers (see Figure 6).

Our maintenance judgments cover replacement of consumables such as toner and developer and replacement of the drum. The sidebars mention where a printer is exceptionally good or bad in this area. Note that Table I gives the monthly duty cycle of a printer — important for busy corporate users — the number of copies you can expect from a cartridge, and the cost for replacement. (As an aside, Canon provides users with a socially responsible way to recycle toner cartridges, called the Clean Earth Campaign. Canon includes a collection kit with each toner cartridge. You merely put the used cartridge into the prepaid UPS envelope and, at Canon's expense, ship it to the factory, where the cartridge will be recycled. A nice touch — but remember that some companies buy your used toner cartridges.)

As you decide which printer to purchase, keep in mind that a new generation of PostScript printers (and Apple's TrueType equivalent) is right around the corner. If you think that the low-cost Texas Instruments microLaser PS35 is a hot printer for the personal user or that the speed of the Dataproductions LZR 1260i makes it the one for the corporate buyer or that the high-quality, high-priced Vanityper VT600P produces the ultimate in superb DTP output, you're in for a shock with the upcoming Quome and QMS printers (see "The Next Wave of Personal PostScript Printers," following). In the world of PostScript printers, quality and speed are improving daily and prices are dropping overnight.

Bruce Fraser believes that the keys to a successful relationship with your PostScript printer are Type 1-font compatibility and easy access to the espresso machine. Paul Yi is a former project leader in MacUser Labs; this is his first report in his new role as an associate editor.

**The Bottom Line**

Three types of users can benefit from the crisp text and precise graphics produced by a PostScript printer: the personal user, the corporate buyer, and the desktop publisher. Each requires different features from a printer, so we recommend a different printer for each.

The clear winner in the personal-printer category is the Texas Instruments microLaser PS35 ($2,995), the first Adobe PostScript printer with a list price of less than $3,000. Its design is elegant, and it offers the smallest footprint of any laser printer. It gives you more bang for the buck and outperforms all its competitors in most performance tests.

The Dataproductions LZR 1260i ($5,995) wins both in the corporate-buyer and the desktop-publishing categories. In our previous look at PostScript printers (see "Fit to Print," September '89, page 178), it tied with the Apple LaserWriter IINTX in performance but lost to it in bulkiness and price. This year's model is more compact, sports a SCSI port for attaching a hard-disk drive, and still offers more paper options than any other printer. With a 12-ppm engine and a Motorola 68020 processor, it was the fastest printer we tested for text and spreadsheets. The Dataproductions LZR 1260i is our favorite among favorites.

A close second favorite in the desktop-publishing category is the QMS PS-810 Turbo ($5,495). It produced the fastest graphics times, with its Motorola 68020 processor running at 20 megahertz. For those desktop publishers who need a high-resolution printer, the winner is the Vanityper VT600P ($16,985). Although it's pricey, it's the only viable solution for camera-ready PostScript output when less-than-magazine quality is acceptable. Our jurors ranked it the best in image quality, although it faced stiff competition from some high-resolution clones.

Bruce Fraser believes that the keys to a successful relationship with your PostScript printer are Type 1-font compatibility and easy access to the espresso machine. Paul Yi is a former project leader in MacUser Labs; this is his first report in his new role as an associate editor.
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## PostScript Printers

**Table 1: Features of PostScript Printers**

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<th>Agfa P3400PS</th>
<th>Apple LaserWriter INT</th>
<th>Apple LaserWriter IINTX</th>
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<td>NA</td>
<td>25,000</td>
</tr>
<tr>
<td>Resolution, with enhancements</td>
<td>400 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
</tr>
<tr>
<td>Microprocessor, clock speed</td>
<td>Motorola 68020, 16.7 MHz</td>
<td>Motorola 68000, 12 MHz</td>
<td>Motorola 68020, 16.7 MHz</td>
<td>Motorola 68020, 16.7 MHz</td>
</tr>
<tr>
<td>Pages per minute</td>
<td>12 ppm</td>
<td>8 ppm</td>
<td>8 ppm</td>
<td>12 ppm</td>
</tr>
<tr>
<td>RAM (standard, max., upgrades)</td>
<td>4 MB</td>
<td>2 MB</td>
<td>optional, prices vary</td>
<td>optional</td>
</tr>
<tr>
<td>Hard-disk drive (standard, opt.)</td>
<td>20 MB, 100 MB</td>
<td>none</td>
<td>optional, prices vary</td>
<td>optional</td>
</tr>
<tr>
<td>Interfaces</td>
<td>parallel, serial, LocalTalk</td>
<td>serial, LocalTalk</td>
<td>serial, SCSI, LocalTalk</td>
<td>parallel, serial, SCSI, LocalTalk</td>
</tr>
<tr>
<td>Printer emulation</td>
<td>HP LaserJet II, Diablo 630</td>
<td>Diablo 630</td>
<td>Diablo 630</td>
<td>HP LaserJet+</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of fonts in ROM, type</td>
<td>13, Adobe (hinted)</td>
<td>35, Adobe (hinted)</td>
<td>35, Adobe (hinted)</td>
<td>35, Adobe (hinted)</td>
</tr>
<tr>
<td>Fonts supported</td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
</tr>
<tr>
<td>Bundled software</td>
<td>tray-selector DA</td>
<td>Apple printer utilities</td>
<td>Apple printer utilities</td>
<td>tray-selector DA</td>
</tr>
<tr>
<td><strong>Paper handling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper output (image up, down)</td>
<td>up, down</td>
<td>up, down</td>
<td>up, down</td>
<td>up, down</td>
</tr>
<tr>
<td>Paper stock min./max. (points)</td>
<td>16/24 lb</td>
<td>16/36 lb</td>
<td>16/36 lb</td>
<td>16/21 lb</td>
</tr>
<tr>
<td>No. of trays, page capacity (each)</td>
<td>2, 250</td>
<td>1, 200</td>
<td>1, 200</td>
<td>1, 250</td>
</tr>
<tr>
<td>Paper sizes</td>
<td>letter, legal, A4, B5</td>
<td>letter, A4, B5, legal</td>
<td>letter, A4, B5, legal</td>
<td>letter, A4, A5, B5, legal</td>
</tr>
<tr>
<td>Other features/options</td>
<td>facetime exit tray and paper: backup paper tray</td>
<td>legal tray, $89; upgrade to IINTX, $3,699</td>
<td>legal tray, $89</td>
<td>legal tray, $89; dual-input cassette, $899; LZR 2665 25 ppm, 11 x 17; $18,790</td>
</tr>
<tr>
<td>Envelope tray (capacity, option)</td>
<td>none</td>
<td>15, optional, $89</td>
<td>15, optional, $89</td>
<td>100, optional, $1,095</td>
</tr>
<tr>
<td><strong>Replacement supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPC (drum)/copies</td>
<td>$600/30,000</td>
<td>$119/4,000</td>
<td>$119/4,000</td>
<td>$326/25,000</td>
</tr>
<tr>
<td>Toner/copies</td>
<td>$50 (3 pack)/3,000</td>
<td>NA</td>
<td>NA</td>
<td>$31.5/3000</td>
</tr>
<tr>
<td></td>
<td>$60/30,000</td>
<td>$1,095 (developer)</td>
<td>$188/40,000 (developer), $188/80,000 (fuser)</td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H, in.)</td>
<td>21 x 21 x 21</td>
<td>20 [26&quot;x] x 19 x 9</td>
<td>20 [26&quot;x] x 19 x 9</td>
<td>19 x 20 x 18</td>
</tr>
<tr>
<td>Weight</td>
<td>102 lb</td>
<td>45 lb</td>
<td>45 lb</td>
<td>107 lb</td>
</tr>
<tr>
<td>Warranty</td>
<td>90 days</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year, 90 days on-site</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Agfa Compugraphic</td>
<td>Apple Computer, Inc.</td>
<td>Apple Computer, Inc.</td>
<td>Dataproducts Corp.</td>
</tr>
<tr>
<td></td>
<td>200 Ballardvale</td>
<td>20525 Mariani Ave.</td>
<td>20525 Mariani Ave.</td>
<td>6200 Canoga Ave.</td>
</tr>
<tr>
<td></td>
<td>Wilmington, MA 01887</td>
<td>Cupertino, CA 95014</td>
<td>Cupertino, CA 95014</td>
<td>Woodland Hills, CA 91367-2499</td>
</tr>
<tr>
<td></td>
<td>(508) 658-5600</td>
<td>(408) 996-1010</td>
<td>(408) 996-1010</td>
<td>(818) 887-6000</td>
</tr>
</tbody>
</table>

*With tray.*
You can't get any brighter than this.

If you want the brightest, boldest color money can buy, you want a Tektronix color printer. No other printer on the market can make you look this good.

And our prices will make you wonder why you ever used black and white. Printers start at $2495. You can get 300 dpi certified PANTONE® Color that's compatible with PostScript language and Adobe fonts for only $7995.

The PostScript-language compatible printers come with at least 6Mb of memory, a high-speed processor and 35 resident fonts. Everything you need to create output that will get you noticed in the flash of a page.

And for even more options, our printers give you 16.7 million colors to choose from. You can print on paper or transparencies, using a PC, Mac or workstation. And all of our printers come with an on-site warranty.

If it's great color you're after, it's Tektronix you want. No other printer will make you look this brilliant. For information or the dealer nearest you, call 1-800-835-6100, Dept. 10A or fax 1-503-682-2980.

Tektronix®
The best and the brightest.

Please circle 43 on reader service card.
## Table 1: Features of PostScript Printers, continued

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$3,395</td>
<td>$3,695 for test, $3,360</td>
<td>$1,495 for test, $3,205</td>
<td>$2,395 for test, $4,105</td>
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<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Printer type</strong></td>
<td>PostScript</td>
<td>PostScript option, $595</td>
<td>PostScript option, $595</td>
<td>PostScript option, $595</td>
</tr>
<tr>
<td><strong>Engine type</strong></td>
<td>Fujitsu, LED</td>
<td>Canon SX, Laser</td>
<td>Canon SX, Laser</td>
<td>Canon SX, Laser</td>
</tr>
<tr>
<td><strong>Engine life (pages)</strong></td>
<td>180,000</td>
<td>300,000</td>
<td>150,000</td>
<td>300,000</td>
</tr>
<tr>
<td><strong>Monthly duty cycle (pages)</strong></td>
<td>3,000</td>
<td>16,000</td>
<td>6,000</td>
<td>16,000</td>
</tr>
<tr>
<td><strong>Resolution, with enhancements</strong></td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
</tr>
<tr>
<td><strong>Microprocessor, clock speed</strong></td>
<td>68000, 12.5 MHz</td>
<td>68000, 10 MHz</td>
<td>68000, 10 MHz</td>
<td>68000, 10 MHz</td>
</tr>
<tr>
<td><strong>Pages per minute</strong></td>
<td>5 ppm</td>
<td>8 ppm</td>
<td>8 ppm</td>
<td>8 ppm</td>
</tr>
<tr>
<td><strong>RAM (standard, max.; upgrades)</strong></td>
<td>4 MB</td>
<td>640 K, 2 MB, $795</td>
<td>512 K, 1 MB, $495</td>
<td>32 MB, 1 MB, $495</td>
</tr>
<tr>
<td><strong>Hard-disk drive (standard, opt.)</strong></td>
<td>none</td>
<td>parallel, serial; LocalTalk</td>
<td>parallel, serial; LocalTalk, $275</td>
<td>parallel, serial; LocalTalk, $275</td>
</tr>
<tr>
<td><strong>Printer emulations</strong></td>
<td>HP LaserJet II</td>
<td>HP LaserJet II</td>
<td>HP LaserJet II</td>
<td>HP LaserJet II</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of fonts in ROM, type</strong></td>
<td>35, Adobe (hinted)</td>
<td>14, Adobe (hinted)</td>
<td>14, Adobe (hinted)</td>
<td>14, Adobe (hinted)</td>
</tr>
<tr>
<td><strong>Fonts supported</strong></td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
</tr>
<tr>
<td><strong>Bundled software</strong></td>
<td>QuickLetter, Select-A-Bin</td>
<td>special printer driver</td>
<td>special printer driver</td>
<td>special printer driver</td>
</tr>
<tr>
<td><strong>Paper handling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paper output (image up, down)</strong></td>
<td>down</td>
<td>up, down</td>
<td>up, down</td>
<td>up, down</td>
</tr>
<tr>
<td><strong>Paper stock min./max.(pounds)</strong></td>
<td>17/28 lb</td>
<td>16/35 lb</td>
<td>16/28 lb</td>
<td>16/36 lb</td>
</tr>
<tr>
<td><strong>No. of trays, page capacity (each)</strong></td>
<td>2, 150</td>
<td>2, 200</td>
<td>1, 50</td>
<td>1, 200</td>
</tr>
<tr>
<td><strong>Other features/options</strong></td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Envelope tray (capacity, option)</strong></td>
<td>15</td>
<td>50, optional, $350</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td><strong>Replacement supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OPC (drum)/copies</strong></td>
<td>$185/6,000</td>
<td>$125/4,000</td>
<td>$95/3,500</td>
<td>$125/4,000</td>
</tr>
<tr>
<td><strong>Toner/copies</strong></td>
<td>$15/30,000 or 1 year</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions (W x D x H, in.)</strong></td>
<td>16 x 16 [27&quot;] x 7 [18&quot;]</td>
<td>12.3 x 18 x 35</td>
<td>8 x 13 x 25</td>
<td>18 x 19 x 8.5</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>44 lb</td>
<td>74 lb</td>
<td>22 lb</td>
<td>50 lb</td>
</tr>
<tr>
<td><strong>Warranty</strong></td>
<td>1 year</td>
<td>1 year, specials available</td>
<td>1 year, specials available</td>
<td>1 year, specials available</td>
</tr>
<tr>
<td><strong>Manufacturer</strong></td>
<td>Fujitsu America, Inc.</td>
<td>Hewlett-Packard</td>
<td>Hewlett-Packard</td>
<td>Hewlett-Packard</td>
</tr>
<tr>
<td></td>
<td>3055 Orchard Drive</td>
<td>19310 Pruneridge Ave.</td>
<td>19310 Pruneridge Ave.</td>
<td>19310 Pruneridge Ave.</td>
</tr>
<tr>
<td></td>
<td>San Jose, CA 95134</td>
<td>Cupertino, CA 95014</td>
<td>Cupertino, CA 95014</td>
<td>Cupertino, CA 95014</td>
</tr>
<tr>
<td></td>
<td>(800) 626-4686</td>
<td>(800) 752-4900</td>
<td>(800) 752-0900</td>
<td>(800) 752-0900</td>
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<tr>
<td></td>
<td>(408) 432-1300</td>
<td>(415) 857-1501</td>
<td>(415) 857-1501</td>
<td>(415) 857-1501</td>
</tr>
</tbody>
</table>

*With tray.
1 Tested with optional 2 megabytes of RAM, PostScript, and LocalTalk.
2 Minimum RAM required for PostScript.
3 Minimum of 4 megabytes of RAM required for "duplex" (front/back) printing.
Adapt to Changing Environments
With Microtek's Color/Gray Scanner.

At last, a scanner that adapts to your changing needs.

The Microtek MSF-300Z Color/Gray scanner reproduces everything from 24 bit color to 8 bit gray-scale to black and white line art. All at 300 dpi. Making it the one image capturing device that's ideal for desktop publishing, multimedia projects, presentations, even pre-press work. And at just $2,695, it's ideal for limited budgets, too. Especially when you consider it includes some of today's most sophisticated color and gray-scale image editing software. What's more, you can work in the operating environment of choice. Whether it's with the MSF-300Z for your IBM PC or PS/2, or the MSF-300ZS for the Macintosh. Call 800-654-4160 or in California, 213-321-2121 for all the details. And get the one scanner that adapts to whatever you're trying to capture.
### Table 1: Features of PostScript Printers, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>Kyocera Q-0810</th>
<th>LaserMAX 1000 Personal Typesetter</th>
<th>MacProducts MagicPrint</th>
<th>Mirror Technology Mirror Image</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$6,995; for test, $7,515**</td>
<td>$7,995</td>
<td>$2,500</td>
<td>$2,997*</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>Fast text. Slow graphics. Intelligent port and emulation switching.</td>
<td>Compatibility problems. Improved image quality not up to 1,000-dpi claim.</td>
<td>Good buy if you don't need Type 1. Avoid firmware revision 3.00.</td>
<td>Good buy if you don't need Type 1. Incompatibilities.</td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Printer type</td>
<td>PostScript clone</td>
<td>PostScript clone</td>
<td>PostScript clone</td>
<td>PostScript clone</td>
</tr>
<tr>
<td>Engine, type</td>
<td>Kyocera, laser</td>
<td>Canon, laser</td>
<td>Casio LCS-130, LCS</td>
<td>Casio LCS-130, LCS</td>
</tr>
<tr>
<td>Engine life (pages)</td>
<td>indefinite†</td>
<td>300,000</td>
<td>300,000</td>
<td>300,000</td>
</tr>
<tr>
<td>Monthly duty cycle (pages)</td>
<td>10,000</td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Resolution, with enhancements</td>
<td>600 dpi</td>
<td>proprietary</td>
<td>Weltek RISC 8200, 4 MHz</td>
<td>Weltek RISC 8200, 4 MHz</td>
</tr>
<tr>
<td>Pages per minute</td>
<td>10 ppm</td>
<td>8 ppm</td>
<td>6 ppm</td>
<td>6 ppm</td>
</tr>
<tr>
<td>RAM (standard, max.; upgrades)</td>
<td>1 MB + RAM, 1 MB, $520</td>
<td>6 MB</td>
<td>3 MB</td>
<td>3 MB</td>
</tr>
<tr>
<td>Hard-disk drive (standard, opt.)</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>Interfaces</td>
<td>parallel, serial, LocalTalk</td>
<td>video (LaserMAX custom NuBus)</td>
<td>parallel, serial, LocalTalk</td>
<td>parallel, serial, LocalTalk</td>
</tr>
<tr>
<td>Printer emulations</td>
<td>Diablo 630, HP LaserJet II</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of fonts in ROM, type</td>
<td>35, Bitstream (hinted)</td>
<td>135, NA</td>
<td>39, Bitstream (hinted)</td>
<td>39, Bitstream (hinted)</td>
</tr>
<tr>
<td>Fonts supported</td>
<td>Type 1, 3</td>
<td>Type 1</td>
<td>Type 3</td>
<td>Type 3</td>
</tr>
<tr>
<td>Bundled software</td>
<td>none</td>
<td>printer drivers</td>
<td>Altsys' Metamorphosis</td>
<td>printer utilities</td>
</tr>
<tr>
<td><strong>Paper handling</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Paper output (image up, down)</td>
<td>down</td>
<td>down</td>
<td>down</td>
<td>down</td>
</tr>
<tr>
<td>Paper stock min./max. (pounds)</td>
<td>16/24 lb</td>
<td>16/35 lb</td>
<td>16/24 lb</td>
<td>16/22 lb</td>
</tr>
<tr>
<td>No. of trays, page capacity (each)</td>
<td>1, 250</td>
<td>1, 200</td>
<td>1, 100</td>
<td>1, 100</td>
</tr>
<tr>
<td>Paper sizes</td>
<td>letter, A4, BS</td>
<td>A4, letter, legal</td>
<td>letter, legal, A4, BS</td>
<td>letter, legal, A4, BS</td>
</tr>
<tr>
<td>Other features/options</td>
<td>simultaneous ports, three IC font cards; 1,000-sheet feeder, $895</td>
<td>none</td>
<td>extra tray, $24</td>
<td>none</td>
</tr>
<tr>
<td>Envelope tray (capacity, option)</td>
<td>none</td>
<td>none</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td><strong>Replacement supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPC (drum/copies)</td>
<td>$179.95/10,000</td>
<td>$195/1,500</td>
<td>$199/20,000</td>
<td>$257/20,000</td>
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<tr>
<td>Toner/copies</td>
<td>$39.95/3,000</td>
<td>NA</td>
<td>$100 (3-pack)/6,000</td>
<td>$125 (3-pack)/6,000</td>
</tr>
<tr>
<td>1,000-sheet feeder, (developer)</td>
<td>$169.95/50,000</td>
<td>NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dimensions (W x D x H, in.)*</td>
<td>16.3 x 17.7 x 12.6</td>
<td>18 x 19 x 9.1</td>
<td>15.7 x 13.4 x 9.1</td>
<td>15.7 x 13.4 x 9.1</td>
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<td>Weight</td>
<td>57.3 lb</td>
<td>38 lb</td>
<td>35.2 lb</td>
<td>35.2 lb</td>
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<tr>
<td>Warranty</td>
<td>90 days</td>
<td>engine, 90 days; controller, 1 year</td>
<td>1 year, specials available</td>
<td>1 year, 90 days on-site</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Kyocera Unison, Inc.</td>
<td>LaserMAX Systems 7150 Shady Oak Road</td>
<td>MacProducts USA, Inc. 6303 Mopac Expwy</td>
<td>Mirror Technology 2644 Patton Road</td>
</tr>
<tr>
<td></td>
<td>1321 Harbor Bay Parkway, Alameda, CA 94501 (800) 367-7437 (415) 748-6680</td>
<td>7150 Shady Oak Road, Eden Prairie, MN 55344 (612) 944-9696</td>
<td>6303 Mopac Expwy, Suite 218 Austin, TX 78759 (800) 622-3475 (512) 343-9441</td>
<td>2644 Patton Road Roseville, MN 55113 (800) 654-5294 (612) 833-4450</td>
</tr>
</tbody>
</table>

*With tray.

**Tested with optional 68881 math coprocessor and 1-megabyte RAM upgrade.

†Kyocera will replace any and all engine parts as required.

---

*October 1990 MacUser*
MAXimize Your Macintosh...

Until recently, high-resolution output also meant high cost. Not anymore.

Personal Typesetting by LaserMAX lets you maximize your Macintosh — at an affordable price.

**LaserMAX 1000 Personal Typesetter**
- Produces camera-ready type on plain paper.
- Delivers precise 1000 x 1000 TurboRes output.
- Eliminates the use of toxic chemicals, photo paper and the expense of traditional typesetting.
- Includes 135 world-class typefaces.
- Affordably priced at $7,995.

**LaserMAX MX6 Printer Controller**
- Produces Near-Typeset Quality on plain paper from your Apple LaserWriter™.
- Delivers crisp 800 x 800 TurboRes or 400 x 400 TurboRes output.
- Three models to choose from: 2, 4 and 6MB of RAM. All models are upgradeable to the LaserMAX 1000 Personal Typesetter.
- Prices start at only $2,795.

**Plain Paper**
Our TurboRes technology gives you camera-ready copy on plain paper. This means no more last-minute trips to the Lino shop. No more hoping the Lino shop is still open. No more special paper, messy bottles and toxic chemicals. And no more costly typesetting bills.

**No Jagglies**
Our LaserMAX 1000 Personal Typesetter provides 1000 x 1000 TurboRes output at an affordable $7,995. Or if you already own any Apple LaserWriter™, our MX6 printer controllers upgrade your output to either 400 or 800 dots per inch.

**High Performance**
If low cost and high resolution are not enough, then consider our printing speed. Using our Advanced Printing Mode, our products communicate directly with applications and can print up to 20 times faster than a PostScript™ printer.

**135 Typefaces**
Every LaserMAX Personal Typesetter includes 135 typefaces and Adobe Type 1 font support. The LaserMAX 1000 and MX6 printer controllers work with the entire Macintosh II line of products (II, IIX, IIXx, IICl, IIcx, and beyond).

**Apple Laserwriter**
(300 x 300)

**MX6 Controller**
(800 x 800 TurboRes)

**LaserMax 1000**
(1000 x 1000 TurboRes)

Abc

Abc

Abc

All text for this ad was printed from a LaserMAX 1000 Personal Typesetter at 1000 x 1000 TurboRES.

For more information, Call LaserMAX at (612) 944-9696 Dept. #138

SEE US AT SEYBOLD BOOTH #1716

First in Personal Typesetting
7150 Shady Oak Road Eden Prairie, MN 55344
612-944-9696 FAX 612-944-9151
### Table 1: Features of PostScript Printers, continued

<table>
<thead>
<tr>
<th>Feature</th>
<th>NEC Silenwriter LC 980XL</th>
<th>NEC Silenwriter2 290</th>
<th>NewGen TurboPS/480</th>
<th>Printware 729 IQ Professional Laser Imager</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$5,995</td>
<td>$3,995</td>
<td>$7,495</td>
<td>$11,990</td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Printer type</strong></td>
<td>PostScript</td>
<td>PostScript</td>
<td>PostScript clone</td>
<td>PostScript clone</td>
</tr>
<tr>
<td><strong>Engine, type</strong></td>
<td>NEC LC 800, LED</td>
<td>Canon UX, laser</td>
<td>Canon SX, laser</td>
<td>Printware, laser diode</td>
</tr>
<tr>
<td><strong>Engine life (pages)</strong></td>
<td>600,000</td>
<td>300,000</td>
<td>300,000</td>
<td>1,200,000</td>
</tr>
<tr>
<td><strong>Monthly duty cycle (pages)</strong></td>
<td>5,000</td>
<td>5,000</td>
<td>5,000</td>
<td>20,000</td>
</tr>
<tr>
<td><strong>Resolution, with enhancements</strong></td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>800 dpi x 400 dpi</td>
<td>1,200 dpi x 600 dpi</td>
</tr>
<tr>
<td><strong>Microprocessor, clock speed</strong></td>
<td>Motorola 68820, 16.7 MHz</td>
<td>Motorola 68820, 16.7 MHz</td>
<td>Intel 68860 8B RISC, 20MHz</td>
<td>Motorola 68600, 19.6 MHz</td>
</tr>
<tr>
<td><strong>Pages per minute</strong></td>
<td>8 ppm</td>
<td>8 ppm</td>
<td>8 ppm</td>
<td>8 ppm</td>
</tr>
<tr>
<td><strong>RAM (standard, max.; upgrades)</strong></td>
<td>4 MB, 8 MB max.</td>
<td>2 MB, 4 MB max.; 2 MB, $995</td>
<td>5 MB</td>
<td>4 MB, 8 MB max.; 4 MB, $1,990</td>
</tr>
<tr>
<td><strong>Hard-disk drive (standard, opt.)</strong></td>
<td>20 MB optional</td>
<td>none</td>
<td>none</td>
<td>20 MB</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>parallel, serial, SCSI, LocalTalk</td>
<td>parallel, serial, LocalTalk</td>
<td>parallel, serial, SCSI, LocalTalk</td>
<td>parallel, serial, SCSI, LocalTalk</td>
</tr>
<tr>
<td><strong>Printer emulations</strong></td>
<td>HP LaserJet+, Diablo 630</td>
<td>HP LaserJet+</td>
<td>HP LaserJet II, Epson LO-800, HPGL plotter</td>
<td></td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of fonts in ROM, type</strong></td>
<td>35, Adobe (hinted)</td>
<td>35, Adobe (hinted)</td>
<td>35, Bitstream</td>
<td>35, Bitstream</td>
</tr>
<tr>
<td><strong>Fonts supported</strong></td>
<td>Type 1, 3</td>
<td>Type 1</td>
<td>Type 1, 3</td>
<td>Printware fonts, Type 1, Type 3</td>
</tr>
<tr>
<td><strong>Bundled software</strong></td>
<td>drivers, utilities</td>
<td>drivers, utilities</td>
<td>drivers, utilities</td>
<td>utilities</td>
</tr>
<tr>
<td><strong>Paper handling</strong></td>
<td>up, down</td>
<td>up, down</td>
<td>up, down</td>
<td>up</td>
</tr>
<tr>
<td><strong>Paper output (image up, down)</strong></td>
<td>16/24 lb</td>
<td>16/34 lb</td>
<td>16/35 lb</td>
<td>16/24 lb</td>
</tr>
<tr>
<td><strong>Paper stock min./max. (pounds)</strong></td>
<td>2, 250</td>
<td>1, 200</td>
<td>1, 200</td>
<td>1, 250</td>
</tr>
<tr>
<td><strong>No. of trays, page capacity (each)</strong></td>
<td>letter, legal, A4, B5</td>
<td>letter, legal, A4, B5</td>
<td>letter, legal, A5</td>
<td>letter, legal, A5, A4, B5, 8.5 x 5.5 in.</td>
</tr>
<tr>
<td><strong>Other features/options</strong></td>
<td>250-sheet face-down stacker; face-up exit tray, $85</td>
<td>none</td>
<td>none</td>
<td>spot color&lt;sup&gt;38&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Envelope tray (capacity, option)</strong></td>
<td>none</td>
<td>15, optional, $89</td>
<td>15, optional, $89</td>
<td>none</td>
</tr>
<tr>
<td><strong>Replacement supplies</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OPC (drum)/copies</strong></td>
<td>$145/7,000</td>
<td>$125/4,000</td>
<td>$123/4,000&lt;sup&gt;14&lt;/sup&gt;</td>
<td>$615/100,000</td>
</tr>
<tr>
<td><strong>Toner/copies</strong></td>
<td>$24/3,000</td>
<td>NA</td>
<td>NA</td>
<td>$39/5,000</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions (W x D x H, in.)&lt;sup&gt;*&lt;/sup&gt;</strong></td>
<td>19 x 21 [25&quot;] x 11 [20&quot;]</td>
<td>24.5 x 17.3 x 11.4</td>
<td>18 x 25.3 x 9.1</td>
<td>18.5 [38&quot;] x 19.25 x 12</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>68 lb</td>
<td>49 lb</td>
<td>46 lb</td>
<td>80 lb</td>
</tr>
<tr>
<td><strong>Warranty</strong></td>
<td>1 year, 90 days on-site</td>
<td>1 year, 90 days on-site</td>
<td>1 year</td>
<td>90 days</td>
</tr>
</tbody>
</table>

<sup>*</sup>With tray.

<sup>14</sup>NewGen also sells a Hi-Density Black toner cartridge ($195 for 4,000 copies) and a Hi-Resolution toner cartridge ($195 for 4,000 copies).

<sup>38</sup>Spo t color can be added on a second pass through the printer, using a second red, blue, or brown toner station.
You know the company. We've been creating quality images for a long time. But you may not associate us with peripherals. The fact is, for years we've been supplying components for printers, scanners and optical disks. As well as copiers and fax machines.

Our expertise stems from 70 years of design in optics and electronics. Plus recent innovations such as a split-head design in optical disk drives for faster access times. A unique, single-piece folded optics scanning head to improve scanner image quality and reliability. And laser scanning technology that's the heart of several of today's popular laser printers.

Now, we have our own line of peripherals. Including a desktop scanner, a continuous-feed laser printer, an optical disk sub-system and barcode readers. So when you need peripherals, remember the company with 70 years of experience in developing quality images. Pentax Technologies.

100 Technology Drive, Broomfield, CO 80021.
Phone 303-460-1600.
FAX 303-460-1628.

© 1990 Pentax Technologies
## Table 1: Features of PostScript Printers, continued

<table>
<thead>
<tr>
<th></th>
<th>QMS PS-810 Turbo</th>
<th>Texas Instruments microLaser PS35</th>
<th>Varityper VT680P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>List price</strong></td>
<td>$5,495</td>
<td>$2,999</td>
<td>$16,995</td>
</tr>
<tr>
<td><strong>Comments</strong></td>
<td>Faster than NTX.</td>
<td>Small, elegant design.</td>
<td>Highest-quality output.</td>
</tr>
<tr>
<td></td>
<td>Slightly better image quality.</td>
<td>Best price/performance for personal market.</td>
<td>Hard to maintain.</td>
</tr>
<tr>
<td><strong>Specifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Printer type</strong></td>
<td>PostScript</td>
<td>PostScript</td>
<td>PostScript</td>
</tr>
<tr>
<td><strong>Engine, type</strong></td>
<td>Canon SX, laser</td>
<td>Sharp Ipa, laser</td>
<td>NA, laser</td>
</tr>
<tr>
<td><strong>Engine life (pages)</strong></td>
<td>300,000</td>
<td>200,000</td>
<td>600,000</td>
</tr>
<tr>
<td><strong>Monthly duty cycle (pages)</strong></td>
<td>5,000</td>
<td>3,000</td>
<td>15,000</td>
</tr>
<tr>
<td><strong>Resolution, with enhancements</strong></td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>600 dpi</td>
</tr>
<tr>
<td><strong>Microprocessor, clock speed</strong></td>
<td>Motorola 68020, 20 MHz</td>
<td>Motorola 68000, 12.5 MHz</td>
<td>Motorola 68020, 16.5 MHz</td>
</tr>
<tr>
<td><strong>Pages per minute</strong></td>
<td>8 ppm</td>
<td>6 ppm</td>
<td>12 ppm</td>
</tr>
<tr>
<td><strong>RAM (standard, max., upgrades)</strong></td>
<td>2 MB, 8 MB max.; 1 MB, $595; 2 MB, $995</td>
<td>1.5 MB, 4.5 MB max.; 1 MB, $495</td>
<td>6 MB</td>
</tr>
<tr>
<td><strong>Hard-disk drive (standard, opt.)</strong></td>
<td>opt. 20 MB, $999; 40 MB, $1,499</td>
<td>none</td>
<td>20 MB, 42 MB</td>
</tr>
<tr>
<td><strong>Interfaces</strong></td>
<td>parallel, serial, SCSI, LocalTalk</td>
<td>parallel, serial, LocalTalk</td>
<td>parallel, serial, LocalTalk</td>
</tr>
<tr>
<td><strong>Printer emulations</strong></td>
<td>HP LaserJet+, HPGL, plotter</td>
<td>HP LaserJet II</td>
<td>none</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Number of fonts in ROM, type</strong></td>
<td>39, Adobe (hinted)</td>
<td>35, Adobe (hinted)</td>
<td>35, Adobe (hinted)</td>
</tr>
<tr>
<td><strong>Fonts supported</strong></td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
<td>Type 1, 3</td>
</tr>
<tr>
<td><strong>Bundled software</strong></td>
<td>setup utilities</td>
<td>none</td>
<td>Print Master utility</td>
</tr>
<tr>
<td><strong>Paper handling</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Paper output</strong></td>
<td>up, down</td>
<td>up, down</td>
<td>up</td>
</tr>
<tr>
<td><strong>Paper stock min/max (pounds)</strong></td>
<td>16/25 lb</td>
<td>16/24 lb</td>
<td>16/20 lb</td>
</tr>
<tr>
<td><strong>No. of trays, page capacity (each)</strong></td>
<td>1, 200</td>
<td>1, 250</td>
<td>1, 200</td>
</tr>
<tr>
<td><strong>Paper sizes</strong></td>
<td>letter, A4, legal</td>
<td>letter, legal, A4, B5, executive</td>
<td>letter, legal, A4, B4</td>
</tr>
<tr>
<td><strong>Other features/options</strong></td>
<td>BigBin Sheetfeeder, $795</td>
<td>none</td>
<td>image-density control</td>
</tr>
<tr>
<td></td>
<td>(1,000-sheet), 820 model with two paper bins, $8,495</td>
<td></td>
<td>legal tray, $139; A4 tray, $119; B4 tray, $139; 11 x 17 model, $22,995</td>
</tr>
<tr>
<td><strong>Envelope tray (capacity, option)</strong></td>
<td>15, optional, $75</td>
<td>40</td>
<td>none</td>
</tr>
<tr>
<td><strong>Replacement supplies</strong></td>
<td><strong>OPC (drum/copies)</strong></td>
<td><strong>$198/40,000</strong></td>
<td><strong>$189/24,000</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Toner/copies</strong></td>
<td><strong>$198/40,000</strong></td>
<td><strong>$189/24,000</strong></td>
</tr>
<tr>
<td></td>
<td>NA</td>
<td>$999/3,000</td>
<td>$18/2,000 (8 micron)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$149/25,000 (developer)</td>
<td>$149/15,000 (developer)</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Dimensions (W x D x H, in.)</strong></td>
<td>18 x 25 x 9.1</td>
<td>13.4 x 14.2 x 10.9</td>
<td>23 (43&quot;) x 21 x 19</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>44 lb</td>
<td>33.5 lb</td>
<td>171 lb</td>
</tr>
<tr>
<td><strong>Warranty</strong></td>
<td>1 year</td>
<td>1 year</td>
<td>90 days or 5,000 prints</td>
</tr>
<tr>
<td><strong>Manufacturer</strong></td>
<td>QMS, Inc.</td>
<td>Texas Instruments, Inc.</td>
<td>Varityper</td>
</tr>
<tr>
<td></td>
<td>1 Magnum Pass</td>
<td>P.O. Box 292230</td>
<td>11 Mount Pleasant Ave.</td>
</tr>
<tr>
<td></td>
<td>Mobile, AL 36618</td>
<td>Austin, TX 78720-2230</td>
<td>East Hanover, NJ 07936</td>
</tr>
<tr>
<td></td>
<td>(800) 631-2692</td>
<td>(800) 527-3500</td>
<td>(800) 631-8134</td>
</tr>
<tr>
<td></td>
<td>(205) 633-4300</td>
<td></td>
<td>(201) 887-8000</td>
</tr>
</tbody>
</table>

*With tray.
Let NewGen satisfy your hunger for high-resolution with an affordable 800 dpi printer!

Add powerful applications like PageMaker®, FreeHand® and Adobe® Type Fonts to produce typeset quality output at your own facility.

The NewGen TurboPS/480 can produce PostScript® language compatible output at 800 x 400 dpi, nearly four times the resolution of other laser printers. And when we say PostScript compatible, we mean it, including Type 1 fonts, special effects and EPS files from all your favorite applications and programs.

The NewGen TurboPS/480 is a complete printer with built-in AppleTalk®, parallel and serial ports. And unlike some printers, it works in mixed Mac-PC environments, and it doesn’t require an internal PC processing board or dedicated server.

To show you how confident we are that you’ll be impressed with 800 x 400 dpi output, we printed this page at actual size, including the menu which was output as color separations.

What does all this resolution and compatibility cost? Very little. The TurboPS/480 – with 800 x 400 dpi and RISC performance – lists for about 25% to 50% less than its competitors, while our TurboPS/400, TurboPS/360 and TurboPS/300 laser printers cost less than slower 300 and 400 dpi PostScript language printers.

If you have an appetite for high-speed, high-resolution PostScript language printing, call 714/641-8900 today to get your TurboPS evaluation kit.

Dealer inquiries welcome.

TurboPS/300

For information about its production, contact NewGen Corporation.

End users please circle 55 on reader service card.

Dealers please circle 54 on reader service card.
The Next Wave of Personal PostScript Printers

On the horizon: five fast, affordable printers that bring

the precision of PostScript to your desktop

When shopping for your own personal PostScript printer, you don't ask for much, right? You'd be satisfied with excellent image quality, speedy printing, durable construction, and precise PostScript performance. And you want to spend only a couple of thousand dollars, max. One problem, however, is that affordable high-quality

BY PAUL YI AND THE MACUSER LABS STAFF

Five beta personal PostScript printers (clockwise from left): the Abaton LaserScript, the Apple Personal LaserWriter NT, the Qume CrystalPrint Publisher II, the QMS PS-410, and the GCC Business LaserPrinter IIS.
Introducing the Kodak Diconix M150 plus printer. It travels with any portable or desktop Mac computer, so you can print anytime, anywhere.

Just think of all the things you can do if you carry a Diconix printer with your Macintosh computer. Those last-minute improvements on the presentation. The letters and reports that could be on their way right now. And, because it's so small and quiet, it works as well on the desktop as it does on the road.

It's all easy with the new Kodak Diconix M150 plus printer. It's easy to carry (3.1 lbs.), prints PostScript®-quality outline fonts using Adobe Type Manager™ software, as well as presentation graphics. No printer in the world is quieter, smaller or lighter. Go ahead, give in to temptation, call for the name of your nearest dealer in the U.S. or Canada: 1 800 344-0006.

Macintosh computer and new Kodak Diconix printer

WHAT'S ONE WITHOUT THE OTHER?

KODAK

Please circle 168 on reader service card.
PostScript printers are few and far between.

But help is on the way. As the MacUser Labs staff was preparing "The Letter-Perfect PostScript Printer" (in this issue), we discovered five soon-to-be-released printers that will please the most discriminating — and frugal — shoppers. At that time, these beta beauties weren't ready to ship (most should be shipping by the time you read this), but we acquired prerelease units and put them through our exhaustive suite of PostScript-printer tests.

The results were astonishing — so much so that we decided not to wait until all five were available at your friendly neighborhood computer store before we gave you the good news. So here's a first look at the Qume CrystalPrint Publisher II, the QMS PS-410, the GCC Business LaserPrinter IIS, the Apple Personal LaserWriter NT, and the Abaton LaserScript. Each should sell for less than $3,000 at street prices and should outpace others that sell for twice as much. That's right: faster and cheaper. Just how do they do it?

Taking the RISC

Some PostScript printers are now using a RISC (reduced instruction set computer) chip as their processor. A RISC printer is faster than a non-RISC printer because RISC technology favors speed over versatility. RISC processors perform a simpler set of low-level instructions faster than do the 68000 series of Motorola processors used in all Macs and current Adobe PostScript printers. Because they're faster than 68000s, you can expect to see more RISC printers in the near future. Although today's RISC printers are clones that use only nonstandard PostScript, expect true Adobe PostScript to be available on RISC printers from companies such as Dataproducts by the first quarter of 1991.

Front-runner in the new crop of RISC-based personal printers is the 300-dpi Qume CrystalPrint Publisher II (CPP II), the fastest PostScript printer MacUser Labs has ever seen. Based on a Weitek RISC processor and a non-Adobe PostScript interpreter (the combination of hardware and software that turns PostScript commands into a printable bit map), the Qume CPP II blasts through graphics files faster than does the QMS PS-810 Turbo, the fastest graphics printer in "The Letter-Perfect PostScript Printer." The 6-ppm (pages per minute) CPP II is slower than the 8-ppm QMS PS-810 only when printing simple text and spreadsheet documents that don't require complex interpretation. On any other printing job, the CPP II is the clear speed champion.

In addition to speed, the CPP II corrects two of the main deficiencies found in its predecessor, the CrystalPrint Publisher I, in that it provides Adobe Type 1 compatibility and manual feed. Although it uses a Bitstream rasterizer and Bitstream fonts, the new CPP II can now accept Adobe Type 1 fonts (minus the hints necessary for perfect rendition of fonts, device-independent color spaces, and support for printer-specific features).

Level 2's compression algorithms will provide a data compression of up to 50 to 1 for some files. Fewer bytes will be sent over AppleTalk, greatly speeding up color work, in which files can be tens of megabytes in size. Halftoning algorithms will improve the look of color separations. Form and pattern caching will allow user-defined base forms to be cached between the printing of pages, for more efficient and faster production of business documents such as insurance forms. Composite fonts will allow more foreign languages to be supported, such as the Japanese kanji alphabet, which is made up of basic characters that combine to form new characters. Color consistency will be ensured by the use of a CIE-based color model that can be defined objectively, independent of the color range of any device. And a new universal printer driver will be able to address different printers' idiosyncrasies.

Adobe's first response to this challenge is PostScript Level 2: leaner and meaner than the original PostScript; available on more processor platforms; and compatible with the new, fast RISC-based printers. Dataproducts, for example, recently announced a PostScript Level 2 printer using a Weitek RISC processor that it plans to ship in the first quarter of 1991.

But speed is not everything. PostScript Level 2 printers promise additional features such as data compression, new pattern and form caching for greater speed, new halftoning algorithms, composite...
SuperLaserSpool makes "Waiting for LaserWriter®" a thing of the past, and lets everyone get back to work immediately. Because it takes care of printing in the background, while you take care of business in the foreground.

SuperLaserSpool comes complete with the LaserQueue™ desk accessory for efficient document handling—to prioritize or redirect documents to other printers. It includes document preview, and notifies users when print jobs are complete. Plus SuperLaserSpool works with just about any printer your Mac can drive. It also supports virtually all Macintosh® applications, including PageMaker®.

No wonder it's the single most popular spooling utility available for Macintosh.

So go to your nearest dealer and pick up a copy of SuperLaserSpool. Or an economical five-pack. Then get back to work immediately.

SuperLaserSpool is now published by Fifth Generation Systems. Call 1-800-873-4384 for further details.

FIFTH GENERATION SYSTEMS
The Creators of FastBack

Please circle 60 on reader service card.
Beta PostScript Printers

Figure 1: Printing Speeds

We tested each printer's speed when printing a simple 25-page Microsoft Word document.

- Faster than Apple LaserWriter IIINT and thousands of dollars less expensive.
- The same processor as the LaserWriter IIINTX but half the price. Performance may improve before the LaserScript ships.
- A fast RISC processor provides excellent performance. Fast time for a printer that uses the same processor as the Apple LaserWriter IIINT.
- The fastest PostScript printer MacUser Labs has ever tested.

Our test MacDraw document contained hundreds of layers—a severe test of a printer's processor.
The Art&Type Vendor CD ROM is a desktop type store containing a 600-typeface library. We've developed licensed typefaces in cooperation with the International Typeface Corporation (ITC), the Van Gelder Corporation (VGCI), the ATF, and the Foundation Tipografico Neufville SA. This library is also available in digital form as Image Club PostScript typefaces.

To view the entire library of 600 fonts, call for your free catalog. Whether you buy fonts on diskette, from the Art&Type Vendor CD-ROM, or the whole library on the letterpress CD-ROM, our pricing and discount schedule make it easy.

Each font $25. Minimum purchase $50. Please note that typeface families are covered as a group.

Discount schedule:
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To view the entire library of 600 fonts call for your free catalog. The Image Club typeface library is also available from your dealer or directly from Image Club.

For Prices & Discounts, please go to www.imageclub.com.
some small type sizes), so desktop publishers will no longer need to
shelve their Adobe font collections if they buy a Qume. Unfortunately, the
CPP II doesn’t have a SCSI port for attaching a font-laden hard-disk drive,
but at a list price of $3,995 (and a probable street price well below that),
still will be a best buy in the personal printer category.

Three Personal Motorola

The second-fastest beta printer we tested was the QMS PS-410, which
uses a Motorola 68020 processor running true Adobe PostScript. For
half the price of other 68020 Adobe-sanctioned PostScript printers on the
market, the PS-410 gives you equivalent speed, and it uses the latest
Adobe font rasterizer and font outlines. For full compatibility with
high-end Adobe PostScript imagesetters, the QMS PS-410 has an edge over clones such as the CPP II. The QMS PS-410’s lack of a SCSI
port is offset somewhat by its 45 resident fonts (2 additional typefaces — Garamond and Helvetica Condensed — each in 5 styles, instead of the usual 35 standard fonts in Apple’s LaserWriter IIs and many others).

What’s more, the QMS PS-410 has an important solution for network
printing: simultaneous multiprinter emulation and multiport access. Although other PostScript printers offer
three interfaces — LocalTalk, serial, and parallel — most let you use only one interface at any one
time. The PS-410, on the other hand, like the Kyocera Q-8010 PostScript clone discussed in “The Letter-Perfect PostScript Printer,” can accept data through all three active ports simultaneously — you never have to leave your desk to switch ports or emulate manually. This feature offers
networks with mixed Macintosh and PC populations an elegant solution for painless printing.

The third-fastest new printer is the GCC Business LaserPrinter IIS (BLP IIS), which uses a Motorola 68000 running true Adobe PostScript. Helped by an 8-ppm Okidata LED engine and the latest Adobe font rasterizer, the BLP IIS is the fastest personal 68000-based printer we’ve
seen. It’s also the only personal printer to offer a SCSI interface as one choice in an innovative modular-interface solution: You can choose a LocalTalk-and-SCSI board or a serial-and-parallel one. This approach recognizes that most Mac users won’t need the PC connections, although they might want to attach a hard-disk drive.

Apple’s Personal LaserWriter NT is the slowest of the new personal
printers. It uses a Motorola 68000 and a 4-ppm Canon engine, the same used in the Hewlett-Packard LaserJet IIP and the QMS PS-410. The Personal LaserWriter NT is much faster than the LaserJet IIP but significantly slower than the PS-410. It is, however, faster than the earlier Apple LaserWriter IINT when printing graphics, even though the LaserWriter IINT uses an 8-ppm Canon engine.

The Personal LaserWriter NT is the only printer that uses Apple’s new LocalTalk interface chip (the same chip the Mac IIx uses) to improve LocalTalk speed by cutting down communications overhead. This chip’s effectiveness was proved in our page-layout test, which included an enormous, 686K gray-scale image. When we removed this large image from the document, the Personal LaserWriter NT’s performance advantage over its earlier cousin, the LaserWriter IINT, was reduced from 12 percent to 3 percent. The Personal LaserWriter NT also uses Adobe’s latest and fastest font rasterizer, which further improves performance over that of the earlier Apple machine.

Table 1: Comparison of Page-Description Languages

<table>
<thead>
<tr>
<th>Rasterizer</th>
<th>Adobe PostScript Level 1</th>
<th>Adobe PostScript Level 2</th>
<th>Microsoft TrueImage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fonts</td>
<td>Adobe font rasterizer (ATM*)</td>
<td>Adobe font rasterizer (ATM)</td>
<td>Apple’s TrueType</td>
</tr>
<tr>
<td>Font description</td>
<td>cubic</td>
<td>cubic</td>
<td>quadratic</td>
</tr>
<tr>
<td>Pros</td>
<td>Industry standard.</td>
<td>Faster than Level 1.</td>
<td>Uses TrueType.</td>
</tr>
<tr>
<td></td>
<td>Type 1 fonts widely used.</td>
<td>Four compression types.</td>
<td>Compatible with Type 1.</td>
</tr>
<tr>
<td></td>
<td>Compatible with existing</td>
<td>Printer-specific support.</td>
<td>Multi-processor support.</td>
</tr>
<tr>
<td></td>
<td>PostScript programs.</td>
<td></td>
<td>Cheaper printers.</td>
</tr>
<tr>
<td>Cons</td>
<td>Cannot rasterize TrueType.</td>
<td>Cannot rasterize TrueType.</td>
<td>Potentially incompatible with PostScript Level 2.</td>
</tr>
<tr>
<td></td>
<td>Incompatible with Level 2.</td>
<td>Incompatible with Level 2.</td>
<td>Specific features unannounced.</td>
</tr>
<tr>
<td></td>
<td>Dated and slow.</td>
<td>Dated and slow.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heavy Adobe royalties.</td>
<td>Heavy Adobe royalties.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Limited processor support.</td>
<td>Limited processor support.</td>
<td></td>
</tr>
</tbody>
</table>

*ATM (Adobe Type Manager) was first included in early 1990.
Your data is your data. And to keep it that way Kensington introduces PassProof™ — the first complete data protection system for the Macintosh.

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BRIEF

to hit the Mac market. The Bauer clone is significant because Microsoft is employing it as the foundation for TrueImage, the new PostScript clone that Apple will use in its future PostScript printers (see the "PostScript Evolution or Revolution?" sidebar).

TrueImage will use Apple's new font technology, TrueType, which Apple claims has faster performance than Adobe's font-rasterizing technology (see the "Living with TrueType and System 7" sidebar in "The Letter-Perfect PostScript Printer").

The Abaton LaserScript uses a National Instruments processor and a 6-ppm TEC laser engine. The LaserScript's performance times were between those of the Apple Personal LaserWriter NT and the GCC BLP PS-410. We measured no PostScript-compatibility problems with the LaserScript — it's a clean clone.

Abaton also plans to offer upgrades to TrueImage when it arrives.

Paul Yi is an associate editor at MacUser.

The Bottom Line

We can't give you the final, definitive word on these printers (they hadn't shipped by press time, and final tweaks are inevitable), but from our preliminary tests, the Qume CrystalPrint Publisher II and OMS PS-410 look like standouts. Their high performance and low price will shake up the entire PostScript-printer market.

But — as usual — time waits for no PostScript printer. By the time you read this, Qume should be shipping the CrystalPrint Express. This speedster will employ a 6-megahertz Weitek RISC processor running a 12-ppm Sony engine. (The CrystalPrint Publisher II, the fastest of the new printers we tested, uses a 4-megahertz processor running a 6-ppm engine.) We expect the Express to live up to its name and emerge as the fastest of all PostScript printers for both text and graphics. And besides speed, the CrystalPrint Express will also improve horizontal resolution from the normal 300 dpi to a tweaked 600 dpi. Its list price will be $5,595.

Table 2: Features of Beta Personal PostScript Printers

<table>
<thead>
<tr>
<th>Printer type</th>
<th>Abaton LaserScript</th>
<th>Apple Personal LaserWriter NT</th>
<th>GCC Business LaserWriter II</th>
<th>OMS PS-410</th>
<th>Qume CrystalPrint Publisher II</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$2,995</td>
<td>$3,299</td>
<td>$2.699*</td>
<td>$2,795</td>
<td>$3,995</td>
</tr>
<tr>
<td>Comments</td>
<td>First Bauer clone.</td>
<td>Large paper tray.</td>
<td>SCSI option.</td>
<td>Fast graphics output.</td>
<td>Fastest graphics.</td>
</tr>
<tr>
<td>Engine manufacturer</td>
<td>TEC</td>
<td>Canon</td>
<td>Okidata</td>
<td>Canon</td>
<td>Casio</td>
</tr>
<tr>
<td>Imaging method</td>
<td>laser</td>
<td>laser</td>
<td>LED</td>
<td>laser</td>
<td>LCD</td>
</tr>
<tr>
<td>Pages per minute</td>
<td>6 ppm</td>
<td>4 ppm</td>
<td>8 ppm</td>
<td>4 ppm</td>
<td>6 ppm</td>
</tr>
<tr>
<td>Resolution (dots per in.)</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
<td>300 dpi</td>
</tr>
<tr>
<td>Microprocessor</td>
<td>NS32CG16</td>
<td>Motorola 68000</td>
<td>Motorola 68000</td>
<td>Motorola 68000</td>
<td>Weitek XL-8200 RISC</td>
</tr>
<tr>
<td>Clock speed (megahertz)</td>
<td>15 MHz</td>
<td>12 MHz</td>
<td>16.67 MHz</td>
<td>16.67 MHz</td>
<td>4 MHz</td>
</tr>
<tr>
<td>Interface options</td>
<td>serial, parallel</td>
<td>serial</td>
<td>serial, parallel</td>
<td>serial, parallel</td>
<td>serial, parallel</td>
</tr>
<tr>
<td>Number of fonts</td>
<td>35</td>
<td>37</td>
<td>35</td>
<td>45</td>
<td>39</td>
</tr>
<tr>
<td>ROM fonts</td>
<td>Bitstream</td>
<td>Adobe</td>
<td>Adobe</td>
<td>Adobe</td>
<td>Bitstream</td>
</tr>
<tr>
<td>Type 1 support</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes (no hinting)</td>
</tr>
<tr>
<td>Paper trays</td>
<td>1 tray, 150 sheets</td>
<td>1 tray, 250 sheets</td>
<td>1 tray, 200 sheets</td>
<td>1 tray, 50 sheets</td>
<td>1 tray, 100 sheets</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>Abaton</td>
<td>Apple Computer, Inc.</td>
<td>GCC Technologies, Inc.</td>
<td>OMS, Inc.</td>
<td>Qume</td>
</tr>
<tr>
<td></td>
<td>48431 Millmont Drive</td>
<td>20525 Mariani Ave.</td>
<td>580 Winter St.</td>
<td>OMS, Inc.</td>
<td>500 Yosemite Drive</td>
</tr>
<tr>
<td></td>
<td>Fremont, CA 94538</td>
<td>Cupertino, CA 95014</td>
<td>Wallingham, MA 02154</td>
<td>OMS, Inc.</td>
<td>Milpitas, CA 95035</td>
</tr>
<tr>
<td></td>
<td>(800) 444-5321</td>
<td>(408) 996-1010</td>
<td>(617) 890-0880</td>
<td>OMS, Inc.</td>
<td>(800) 522-2479</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OMS, Inc.</td>
<td>(800) 223-2479</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OMS, Inc.</td>
<td>(408) 942-4000</td>
</tr>
</tbody>
</table>

*A 4-ppm version, the BLP II, is available for $2,399.

*Emulation Sensing Technology, which automatically detects the necessary emulation and switches accordingly.

*This processor is manufactured by National Semiconductor.

Table 2: Features of Beta Personal PostScript Printers

- **Printer type**: Abaton LaserScript, Apple Personal LaserWriter NT, GCC Business LaserWriter II, OMS PS-410, Qume CrystalPrint Publisher II
- **List price**: $2,995, $3,299, $2,699, $2,795, $3,995
- **Comments**: First Bauer clone, large paper tray, SCSI option. Fast graphics output. Concurrent active ports. EST.
- **Engine manufacturer**: TEC, Canon, Okidata, Canon, Casio
- **Imaging method**: Laser, LED, Laser, Laser, LCD
- **Pages per minute**: 6 ppm, 4 ppm, 8 ppm, 4 ppm, 6 ppm
- **Resolution (dots per in.)**: 300 dpi, 300 dpi, 300 dpi, 300 dpi, 300 dpi
- **Microprocessor**: NS32CG16, Motorola 68000, Motorola 68000, Motorola 68000, Weitek XL-8200 RISC
- **Clock speed (megahertz)**: 15 MHz, 12 MHz, 16.67 MHz, 16.67 MHz, 4 MHz
- **Interface options**: Serial, Parallel, Serial, Serial, Parallel
- **Number of fonts**: 35, 37, 35, 45, 39
- **ROM fonts**: Bitstream, Adobe, Adobe, Adobe, Bitstream
- **Type 1 support**: No, Yes, Yes, Yes, Yes (no hinting)
- **Paper trays**: 1 tray, 150 sheets, 1 tray, 250 sheets, 1 tray, 200 sheets, 1 tray, 50 sheets, 1 tray, 100 sheets
- **Warranty**: 1 year, 1 year, 1 year, 1 year, 1 year
- **Manufacturer**: Abaton, Apple Computer, Inc., GCC Technologies, Inc., OMS, Inc., Qume

For more details, see the "PostScript Evolution or Revolution?" Sidebar in "The Letter-Perfect PostScript Printer."
A lot of manufacturers say they have the best trackball, but only the Kensington Turbo Mouse® has the awards to prove it.

MacUser gave it the coveted Five Mice. And the readers of Macworld magazine voted it “Best Input Device” — not just once but four years in a row.

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Do-It-Yourself
Printer Testing

Become an honorary MacUser Labs technician with these easy steps
to judging PostScript-printer perfection.

Not many people have their own private lab for product testing. Even if you’re prepared to wrestle with a few products on your own before you buy, chances are you can’t thoroughly test the whole range of products in a given category.

That’s where we come in. For this issue, MacUser Labs tested 24 PostScript printers (19 released and 5 beta) for speed, image quality, and ease of use. We’ve drawn our own conclusions, which you can read in “The Letter-Perfect PostScript Printer” and “The Next Wave of Personal PostScript Printers” in this issue. But you don’t have to be from Missouri to have a show-me, see-for-yourself attitude — in this article, we give you the tools and techniques you need to make your own decisions.

BY MICHAEL MILEY AND PAUL YI
Figure 1: The MacUser Labs PostScript-Printer Test Page

Gray-scale image. Look carefully at this 200-dpi gray-scale image containing 256 levels of gray. Check for details in the map, flower, and binoculars. Check the shading of the mountains in the background.

Gray ramp. Check for distinct levels of gray that change at an even rate from black to white.

Text. Examine the 72-point type, noticing especially the serif in Times and the bold strokes in Helvetica. Then read the 12- and 18-point type for character spacing and smoothness. Check 6-point text for dropouts and clumping of characters. (You may want to use a jewelers' loupe.)

Art. Check the woman's face for curves and subtle shades of gray. Shadows and highlights should be just that, not smudges and wash outs.

Circles, squares, and pointing finger. Check the circles within squares for good hairline definition and geometry. The pointing finger should have solid blacks with little spreading beyond the image's boundaries.

If you've narrowed down your options with the help of our recommendations, you may still want to do some of your own on-site testing at your dealer. We're providing you with the same PostScript-printer test page we used in our Labs research so that you can do your own image-quality testing. This test is designed to let you examine precisely, on one convenient page, a range of output elements, from lines to gray scales (see Figure 1).

You'll find this test page on MacUser's on-line service, Zmac, in the download area. We've provided it in two forms: as a PageMaker file that you can open directly from PageMaker (versions 3.02 or later) and as a PostScript file that you can download to any PostScript device with a PostScript-file downloader, such as Send PS from Adobe. (We've also provided a sample of our test page at the end of this article, output from a 1,270-dpi Linotronic imagesetter. Although it's at a resolution a normal toner-based laser printer can't match, you can use it as a yardstick of what to shoot for.) We've compressed both files with StuffIt — which is also available on Zmac — but they're still big. Be prepared to tie up your modem and Mac for some time, even at 2,400 bps. (Because the test files are too large to fit on a floppy disk, you may want to ask your dealer to download them directly.)

Once you've done that, it's time to print the test page on your prospective PostScript-printer purchase. But first, have the dealer print out half a dozen completely black pages to prime the printer. This little trick will better prepare the printer than letting it warm up for the recommended half hour.

After you've printed your test page, carefully examine the output — we use a jewelers' loupe, or magnifying glass — to spot tiny details. Consider the individual quality of the various images on the page and any flaws you can detect in the overall printing quality.

Text, Lines, Grays, and Flaws

The higher the resolution of the printer you're testing, the better its image quality will be. An a printed at 600 dpi looks sharper and smoother than the same letter printed at 300 dpi. But resolution aside, other aspects of a printer's technology...
Have you ever noticed the way your colleagues use graphics? How they seem to make their reports and presentations come alive?

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And don't be surprised if you advance quickly, either. MacDraw II works like you think. So the feel is totally natural.

But why not see for yourself. Just ask a colleague to show you MacDraw II. Or stop by an authorized Claris dealer to find out how effective you can be at the art of business.
PostScript Printers

Figure 2: What's Wrong with This Page?

Poor image quality. This could be the fault of the paper you are using. If you want the highest-quality output possible on any laser printer, you should be using special "laser" paper (left) that is smoother and accepts toner better than does normal copier paper (right). The result of using laser paper is consistent blacks and better detail due to less spreading of toner.

Ragged text. There's nothing wrong with this sample. It's about the best 300-dpi output you can get. To improve on it, you would need to go to a higher resolution, such as 400 or 600 dpi.

There are some tricks, such as better kerning (spacing between letter pairs) and leading (spacing between lines), that can compensate for the ragged curves of 300-dpi text.

Streaking. Streaking and errant black marks on a page indicate that something is wrong with either the printer's drum or its fuser. A loose particle or scratch on the drum or fuser roller can cause streaks on the page. Check both and make sure they are clean, taking care not to touch the drum or hot fuser roller with your fingers. The drum is sensitive to light, so don't let light shine directly into the printer.

Light or dark prints. Prints that come out too dark or too light indicate a density problem — too much or too little toner is going onto the paper. Printers that have density controls let you fix this. Adjust the density control to be either lighter or darker until the prints come out more to your liking. If you find the results are still unacceptable, replace the toner cartridge.

Affect how it handles text, PostScript art, and gray scale. We designed our page to test all three things.

The test page's text is in Times and Helvetica, to expose how well a printer handles serif and non-serif typefaces, respectively. Both typefaces are industry standards and should be included with any PostScript printer you test. We tested the type in 6-, 12-, 18-, and 72-point sizes to let the printers show their prowess at producing small and large type. Note that printing 6-point type is tough, even if the printer uses hinted fonts that have been specially designed for rendering at small sizes and low resolutions.

For PostScript art, we chose a drawing of a person, created in Aldus FreeHand, and two others — a pointing finger and circles within squares — created in Adobe Illustrator. The person is an excellent example of the power of PostScript to create complex and beautiful images, and your printer will have to flex its muscles to do a good job in this case. The pointing finger taxes the printer's blacks. The circles-within-squares drawing reveals how well a printer can produce a hairline — a one-pixel-wide line at the resolution of the printer. (On a 300-dpi printer, that's a line 1/300 inch wide — skinny enough to show deficiencies in the printer's marking technology or any inaccuracies in the tracking or stepping of the drum.)

The test page also includes two elements that show a printer's gray-scale abilities: a gray ramp laid out both vertically and horizontally and a gray-scale image scanned in at 200 dpi with 256 levels of gray. The gray ramp shows a printer's available gray levels — around 26 for most 300-dpi printers. Here you should look for a gradual ramp of distinct levels of gray from white to black and watch for the washing out of highlights and lowlights. The scanned image should help you determine a printer's trade-off between subtler grays and sharper images. Typically, printers that give you sharper images may appear washed out in the subtle areas of white to light gray and of dark gray to black, whereas those with great grays may lose out on detail.

Finally, look for flaws in the printed image caused by defects in the toner, drum, or fuser. Scratches on the drum can cause streaking, and unmixed toner can cause clumping of characters — flaws that a new printer shouldn't have. If there are image flaws, ask for a new cartridge, and then print again.
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Thanks to powerful new driver software, Sharp's JX-730 Color Ink-Jet Printer now supports 32-bit QuickDraw, prints 16.7 million colors, and uses scaleable outline fonts (35 LaserWriter Plus fonts included). It offers a choice of 7 dithering patterns to maximize smoothness and create effects. Sharp's superior ink-jet technology delivers vivid color, without “banding”, on plain paper or transparencies—up to tabloid size. Call 1-800-BE-SHARP for more about the perfect color printer for your Mac.

“1989 Best Word Processor” MacUser U.K.

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Nisus 3.0 has a robust list of features—but more important to you—benefits. Working with Nisus 3.0 is like discovering that a good friend has an increasing level of substance when put to the test. So why don't you put Nisus 3.0 to the test. Discover for yourself how an elegantly intuitive word processor could convert mainframe files, do graphics, automatically index a book, or simply write a memo. To find out, call

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THE GOLDEN AGE OF
Gray Scale

A quartet of new gray-scale display systems offers professional features and lower prices.

In the past year, the quality of gray-scale Mac display systems has jumped from merely adequate to simply superlative. And the good news gets better: While quality continues to go up, prices are still coming down. If your work involves page layout, graphic design, or image processing — and color is not a necessity — welcome to the Golden Age of gray.


We subjected these newcomers to the same tests we used for our comprehensive gray-scale-display-system report of October 1989 ("Grading the Grays," page 182). We again checked focus, MTF (modulation transfer function, an objective test of image sharpness), screen geometry and brightness, gray linearity, and nuisance factors. All the tests were performed on a Mac II; only the RasterOps ClearVue/GS can be paired with a card designed specifically for the Mac SE/30. (Because they don’t have color QuickDraw, the Mac 512K, Plus, SE, and Portable can’t drive gray-scale display systems.)
In general, the average price for a complete Mac II large-screen gray-scale display system has dropped significantly since the last time we surveyed the market. For example, the price of the top pick from last October — the 19-inch PCPC Shadowgraph — has been cut by more than one-third, to $1,728. The gray-scale display systems evaluated in this report range in price from $2,195 for the 19-inch RasterOps ClearVue/GS to $3,195 for the CalComp DrawingCard GrayVision. Of course, these are manufacturers’ suggested retail prices; actual street prices may be substantially lower.

Is Bigger Better?

The 11 monitors we tested last year had tubes with diagonal measurements ranging from 12 to 21 inches. This time around, the four monitors are evenly divided into 19- and 21-inch models; both sizes are commonly referred to as two-page displays.

Two-page display is one of those ubiquitous phrases that have lost much of their original meaning. Strictly speaking, a two-page display should be able to show two entire letter-sized pages at 100 percent. Only 21-inch displays actually approach this requirement. However, 19-inch displays can often show most of the active area of two letter-sized pages at “actual size,” because most page layouts normally include nonactive margin areas. Using the Fit in Window option built into virtually all desktop-publishing software, a 19-inch display produces a scaled-down image that should be acceptable to most users.

Screen size is not the only factor that affects image quality. Pixel dimensions (pixels are picture elements, the dots that make up the image on the screen) are more important than a monitor’s diagonal measurement in determining how much information can be displayed. A monitor’s pixel dimensions are the height and width of its screen as measured in pixels. With 1,152 x 882 pixels, the Radius Two Page Display/21 is the big-screen leader, able to display 30 percent more information than either of...
Gray linearity measures how accurately the display showed the range from black to white. Most monitors have no problem displaying a true black, but pure white depends on maximum screen brightness, and the accuracy of intermediate grays is the true test of linearity.

Focus is a subjective evaluation developed for each monitor by our jury. The RasterOps and SuperMac monitors displayed perfect focus even at the normally fuzzy edges.

MTF sharpness, a purely objective test measuring contrast between thin black and white lines on screen, confirmed our jury's subjective appraisal of focus.

Lack of nuisance subjectively rates a monitor for freedom from the combined nuisance factors of glare, flicker, jitter, electronic "noise," and uneven brightness/color.

Gray Levels
Since the four monitors in this lab report are driven by 8-bit video cards, they are all capable of displaying the full range of 256 gray levels that is required for photographic-quality images. Furthermore, all but one of the video cards (CalComp DrawingCard) are color-capable — nice to know if you anticipate upgrading to a color monitor.

Ideally, a block of 50-percent gray should register half as bright as white. A monitor with poor gray linearity does not represent different shades of gray accurately and may display dark grays as pure black (see Figure 1). To evaluate gray linearity, we employed a Minolta LS-110 luminance meter to find out how well the monitors were able to display proportional levels of brightness. The CalComp DrawingCard GrayVision's linearity rating matched that of last year's linearity leader, the PCPC Shadowgraph. The other displays' linearity ratings were near the average ratings of the large-screen displays we
evaluated in last year's gray-scale-display-system lab report.

In addition to having excellent gray linearity, the CalComp DrawingCard GrayVision is the only display that allows you to select different gamma tables. A gamma table allows you to tweak colors and gray levels to achieve optimum accuracy on different monitors; if your particular monitor doesn't represent a specific shade of gray correctly, then the adjusted gamma table will change the signal going to the CRT display. Too bad this feature in the CalComp monitor doesn't compensate for its poor focus.

If you require, and are therefore willing to pay for, exact gray linearity, you can automatically adjust the gamma table of the Radius Two Page Display/21 with the $695 Radius PrecisionColor Calibrator (see the Color Buyer's Guide, May '90, pages 15 and 27). Our test of the Radius monitor with the optional Calibrator produced 100-percent-perfect gray linearity.

Special Software

The Radius Two Page Display/21 comes with a cdev that contains a nice collection of utilities. Among the features are tear-off menus, which eliminate the need to return the cursor all the way to the menu bar at the top of the Display/21's large screen to select commands. Also, you can enlarge the type on the menu bar to 16 points for easy reading. The Radius software allows you to capture cropped screen dumps in PICT2 format (a feature also available in third-party utilities such as Capture from Mainstay and Exposure from Preferred Publishers). The Radius cdev also lets you center dialog boxes and windows automatically behind the cursor.

Both the RasterOps and SuperMac display systems have hardware-based virtual desktops that trick programs into thinking the screen is much larger than their 1,024 x 768 pixels. Even if you can't see everything at all once with a virtual screen, you can move the cursor to the edge of the screen (instead of using the scroll bars) and the

The Golden Age of Gray Scale

On the Horizon

Even as we were tearing down our test equipment and packing up the four display systems tested in this report, seven other display systems were on their way to market. Some are familiar two-page displays, whereas others support new features such as QuickDraw acceleration and antiblur protection.

Nutmeg Systems' new 19" Gray Scale is a true WYSIWYG 8-bit display system that should be flicker-free, due to its high 75-hertz vertical refresh rate. Its antiglare screen meets tough European ergonomic standards. Bundled with Ending Out II, the Nutmeg 19" Gray Scale lists for $1,899. Nutmeg Systems, Inc., 25 South Ave., New Canaan, CT 06840; (800) 777-8439 or (203) 966-3226.

Now from Generation X Technologies, Inc., 333 W. El Camino Real, Suite 310, Sunnyvale CA 94087; (408) 739-4570. MegaGraphics now offers an improved MegaScreen Greyscale Display that has been redesigned for better focus, linearity, and MTF sharpness than the model we tested in our October 1989 report. The newer system has a lower price too: $2,698 for the Mac II (includes MegaScreen 2008 video card) and $2,948 for the SE/30 (includes MegaScreen 3008). MegaGraphics, Inc., 439 Calle San Pablo, Camarillo, CA 93012; (805) 494-3799.

PCPC has updated its Shadowgraph to 75-hertz vertical refresh to eliminate flicker. The new Shadowgraph II features the same Kegami monitor and, sans flicker, should offer performance similar to that of the original Shadowgraph. PCPC now sells direct at $1,725 for the complete system. Personal Computer Peripherals Corp., 4710 Eisenhower Blvd., Building A-4, Tampa, FL 33634; (813) 884-3092.

SuperMac's recently announced 21-inch Platinum Two Page Display ($1,799), combined with the Spectrum/8 PDQ video card ($1,899), gives you a fast paper-white display with 8-bit QuickDraw acceleration. The 21-inch display features the same bonded antiglare panel as that of the 19" Platinum Display reviewed in this report and, thanks to the PDQ, promises snappier performance. The Spectrum/8 PDQ video card drives the 19" Platinum Display, all SuperMac color displays, and Apple's High-Resolution RGB Monitor.

Sigma Designs now offers for an additional $300 an antiblur option for all its monochrome and gray-scale display systems. The antiblur SwitchView gray-scale system lists for $2,939 and features improved shielding and an OCLI antiglare coating. The standard SilverView was evaluated in our October 1989 report, earning a three-mouse rating and high marks for gray linearity. Sigma Designs, Inc., 46501 Landing Parkway, Fremont, CA 94538; (415) 770-0100.

Digital Technology International has the answer for tabloid-and broadsheet-newspaper-page layout. Its SpeedView is a 21-inch, 72-dpi portrait display that shows 870 x 1,152 pixels and 256 grays. The SpeedView lists for $3,195. Digital Technology International, 500 W. 1200 S., Orem, UT 84058; (801) 226-2984.

— Jeff Pittelkau

The 21-inch Digital Technology SpeedView can display a tabloid page at actual size — more than twice the viewing area of a standard portrait display (represented by the black rectangle).
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Figure 3: Focus

Figure 4: Geometry

entire screen image pans fluidly over to reveal what was hidden beyond the border. Although reliable software-based virtual screens, such as Stepping Out II from Berkeley System Design, are available, they work more slowly and less smoothly.

With the RasterOps and SuperMac displays, you can also zoom in to magnified Fat Bits mode with the press of a key. Hardware pan and zoom are slick features that must be seen to be appreciated, but the more video memory you devote to these features, the less is available for defining levels of gray.

Seeing Is Believing

No matter what the specifications tell you, the most important consideration when buying a monitor is what your eyes see. To judge subjective monitor characteristics — focus, geometry, glare, and other nuisance factors — we assembled a panel of experts to eyeball these four monitors (see Figure 2).

A monitor’s sharpness, or focus, can make the difference between a finely striped graphic design and a featureless blob. Basically, focus determines how well you can see precise features. Focus is rarely uniform in all areas of a large CRT screen simultaneously, and focus is rarely as good at the edges of a monitor as it is in the center.

To our judges’ experienced eyes, both the RasterOps and SuperMac monitors have perfect focus. Text characters are razor sharp right to the edges of the screen. The Radius monitor is very good but has a few weak areas near the edges; reducing the brightness does seem to eliminate these trouble spots, however. The CalComp monitor suffers noticeably from poor focus in large patches at both sides (see Figure 3).

For a more objective test of screen sharpness, we measured the horizontal and vertical MTF of each monitor, using a custom-built 300-dpi CCD (charge-coupled device) array. In nontechnical terms, this simply means we compared the contrast of thin black and white lines with that of large black and white areas. A monitor with perfect MTF sharpness (100 percent) would display stripes with the same contrast as that of larger areas. The MTF results correlated well with our subjective focus ratings.

Squares, Eggs, and Eyestrain

Large monitors often have geometry problems, especially at the outer edges of their displays. Some have a slight inward or outward curve at the edge of the screen, or a screen image that tilts to one side. Others, particularly the larger models, display circles as ovals and squares as rectangles. Obviously, this is unacceptable when you’re working with graphics, and distorted text can contribute to eyestrain.

We checked geometric precision with a modified version of Larry Pina’s shareware program Test Pattern Generator (see Figure 4). Among other tests, it displays an image consisting of a large circle in the center of the screen and smaller circles in the corners; on good monitors with rectangular screen images, it displays five perfectly round circles. Poor monitors show severe pin-cushioning (inward curvature of the active screen edges), shrinking at the corners of the screen, or egg-shaped circles. The Radius and SuperMac monitors have the best geometry, and the RasterOps has the most distorted screen, with squashed circles in the corners and pincushioning along the right-hand side.

Brightness determines how intensely a pure-white image is projected from the screen, and contrast is the relative difference between dark areas and light areas. A bright screen image can assist in combatting glare, so make certain your monitor has a brightness range adequate to your needs. At 34 footlamberts, the Radius Two Page Display/21 was the brightest of the four monitors, and all the monitors were brighter, on average, than last year’s crop.
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Capsule Reviews

CalComp DrawingCard

GrayVision

This expensive display system has few unique features and performed poorly on several of our tests. Even if CalComp were to reduce its price and provide a bunch of useful utilities, the monitor’s display problems would be too serious to ignore.


Cons: Somewhat expensive. Below-average MTF-sharpness ratings. Not true WYSIWYG. No 2-bit (four gray levels) mode. No glare protection.

Manufactured by: CalComp, Inc., 2411 W. La Palma Ave., Anaheim, CA 92803; (800) 458-5888 or (714) 821-2000.
List Price: $3,195.

Radius Two Page Display


Cons: Below-average linearity and geometry.

Manufactured by: Radius, Inc., 1710 Fortune Drive, San Jose, CA 95131; (800) 227-2795 or (408) 434-1010.
List Price: $3,190.

RasterOps

ClearVue/GS

A flicker-free flogam tube explains this system’s admirable performance. Its enormous virtual desktop and pan and zoom features combine to provide flexibility. The screen’s chemical etch provides good glare protection without reducing brightness. Only poor linearity and geometry detract from this attractively priced system.


Cons: Below-average linearity and geometry.

Manufactured by: RasterOps, 2500 Walsh Ave., Santa Clara, CA 95051; (800) 468-7600 or (408) 592-4200.
List Price: $2,195.

SuperMac 19” Platinum Display

This monitor leaves us searching for suitable superlatives. It performed so well in our benchmark tests and has such a complete feature set that we can’t find fault with this exceptional display system.


Cons: None.

Manufactured by: SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086; (408) 245-2202.
List Price: $2,399.

Display/21

This monitor may not present perfect WYSIWYG, but it does display a lot of information. It performed well on all tests except MTF sharpness. Its lack of glare protection is a trade-off for its high brightness. A nice collection of utilities makes working with the large screen easier.


Cons: Somewhat expensive. Below-average MTF-sharpness ratings. Not true WYSIWYG. No 2-bit (four gray levels) mode. No glare protection.

Manufactured by: SuperMac, 485 Potrero Ave., Sunnyvale, CA 94086; (408) 245-2202.
List Price: $2,399.

No Nuisance Is Good News

MacUser Labs uses a unique nuisance factor to evaluate monitors. Our jury examines each display for lack of glare, flicker, jitter, noise, regulation, bandwidth, and uniformity problems. These observations are averaged into a single lack-of-nuisance rating from 0 to 5.

The SuperMac monitor was deemed nuisance-free, with a perfect rating of 5. The RasterOps display received excellent ratings in all categories except uniformity (the center of the screen had a yellowish tint, and the corners appeared darker). The Radius monitor also rated well, but the absence of glare protection caused the screen surface to imitate a mirror (you can correct this with one of the many third-party glare filters available from Kensington Microware, NoRad, and others). On the Radius unit, images also jittered a bit.

The CalComp display had the most problems. Tiny horizontal lines (noise) ran through white display areas, strong ghosting and shadows indicated bandwidth problems, and the silica coating provided only moderate glare protection.

Conclusion

Gray-scale display systems have improved noticeably in the past year. Overall performance and features have been enhanced and prices slashed. To find out how these four newcomers perform against last year’s contenders, see the “Bottom Line” and “Capsule Reviews” sidebars.

Although he has a weakness for gray-scale monitors, Owen W. Linzmayer is a free-lancer whose life is so colorful that not even 32-bit QuickDraw can do it justice.
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*Unfortunately, not all drive companies offer trial periods.
The Golden Age of Gray Scale

Table 1: Features of Gray-Scale Display Systems

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<td>19 in.</td>
</tr>
<tr>
<td>Active screen (diagonal, inches)</td>
<td>18.75 in.</td>
<td>19.5 in.</td>
<td>17.75 in.</td>
<td>17.25 in.</td>
</tr>
<tr>
<td>Pixel dimensions (W x H)</td>
<td>1,152 x 870</td>
<td>1,152 x 882</td>
<td>1,024 x 768</td>
<td>1,024 x 768</td>
</tr>
<tr>
<td>Resolution (dots per inch)</td>
<td>72 dpi</td>
<td>74 dpi</td>
<td>72 dpi</td>
<td>72 dpi</td>
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<tr>
<td>Gray levels</td>
<td>2, 4, 16, 256</td>
<td>2, 16, 256</td>
<td>2, 4, 16, 256</td>
<td>2, 4, 16, 256</td>
</tr>
<tr>
<td>Vertical scan rate (hertz)</td>
<td>75 Hz</td>
<td>70.4 Hz</td>
<td>75.02 Hz</td>
<td>74.93 Hz</td>
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<tr>
<td>Horizontal scan rate (kilohertz)</td>
<td>70 kHz</td>
<td>64.8 kHz</td>
<td>60.241 kHz</td>
<td>60.241 kHz</td>
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<td>Color-capable card</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
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<td>Software</td>
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<tr>
<td>Pan</td>
<td>no</td>
<td>no</td>
<td>yes</td>
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<tr>
<td>Zoom</td>
<td>no</td>
<td>no</td>
<td>2x, 4x</td>
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<td>Virtual desktop</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
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<tr>
<td>Tear-off menus</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
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<tr>
<td>Pop-up menus</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
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<tr>
<td>Screen saver</td>
<td>no</td>
<td>yes</td>
<td>no</td>
<td>no</td>
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<tr>
<td>Enlarged menus</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>no</td>
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<tr>
<td>Screen capture</td>
<td>no</td>
<td>no</td>
<td>no</td>
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<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Glare treatment</td>
<td>silica coating</td>
<td>none</td>
<td>chemical etch</td>
<td>OCLI coating</td>
</tr>
<tr>
<td>Tit/swivel stand</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Brightness/contrast controls</td>
<td>front</td>
<td>front</td>
<td>side</td>
<td>front</td>
</tr>
<tr>
<td>Dimension (W x H x D, inches)</td>
<td>18.25 x 18.25 x 20</td>
<td>20 x 19.25 x 16.5</td>
<td>19.25 x 19 x 15.75</td>
<td>19 x 17.5 x 17</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>55 lb</td>
<td>60 lb</td>
<td>57 lb</td>
<td>40 lb</td>
</tr>
<tr>
<td>Warranty</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
<td>1 year</td>
</tr>
<tr>
<td>Manufacturer</td>
<td>CalComp, Inc. 2411 W. La Palma Ave. Anaheim, CA 92803 (800) 458-3888 (714) 621-2900</td>
<td>Radius, Inc. 1710 Fortune Drive San Jose, CA 95131 (800) 227-2705 (408) 454-1010</td>
<td>RasterOps 2900 Walsh Ave. Santa Clara, CA 95051 (800) 468-7500 (408) 662-4200</td>
<td>SuperMac Technology 485 Pomerio Ave. Sunnyvale, CA 94086 (800) 6246999, ext210 (408) 245-2202</td>
</tr>
</tbody>
</table>

The Bottom Line

In our October 1989 lab report, SuperMac’s 19” Gray Scale Monitor came in a close second to the PCPC Shadowgraph. Both used an Ikegami tube and performed admirably in every way, their only flaw being a slight flicker. PCPC has since dropped the price of the Shadowgraph and increased the vertical scan rate to eliminate the flicker (see the “On the Horizon” sidebar). The new SuperMac 19” Platinum Display ($2,399), on the other hand, switched to a Philips tube that has proved to be even better than the Ikegami. OCLI glare coating is standard, as are pan and zoom with a large virtual desktop. The SuperMac system is flawless and priced competitively.

The specifications of the Radius Two Page Display/21 ($3,190) are nearly identical to those of the 19-inch Radius Gray Scale Display we reviewed last October. Although this CRT size is two inches larger, the pixel dimensions remain 1,152 x 882, yielding an almost-WYSIWYG 74 dpi. Also, the TPD/21 equaled or outperformed its 19-inch sibling in every benchmark test. If you can afford it, you won’t be disappointed by this excellent display system.

The RasterOps ClearVue/GS ($2,195) makes good use of the aforementioned 19-inch Ikegami tube. If you can live with less-than-perfect linearity and geometry, consider the RasterOps as an alternative to the slightly more expensive SuperMac 19” Platinum Display. It has many of the same neat software features, plus pop-up menus. The ClearVue/GS is also one of the few gray-scale monitors that can be purchased with a card for use with a Mac SE/30.

The CalComp DrawingCard GrayVision ($3,195) is an undistinguished product. Although it performed below average in the MTF-sharpness, focus, and nuisance benchmark tests, it does have a few features worth noting: a paper-white, semiglare tube, and gamma correction. The CalComp display is overpriced, considering its spartan feature set.
It's hard to believe, but for a limited time only, dBASE Mac is available from MacWAREHOUSE for only $49. That's right $49 — not much more than a cheap game, and less than many utilities.

It's dBASE power with a friendly Mac face.

dBASE Mac makes it easy to understand and use a fully-relational database. Working with the intuitive Mac interface, files and their relationships are displayed visually — right on your Mac screen — so you can take full advantage of the program's power to manage information, even if you've never used a database before.

Unsurpassed flexibility.

With dBASE Mac, entering, viewing and accessing data is a breeze. Multiple views of your files let you find exactly the information you need — when you need it! Then, use the layout templates provided (or make your own) to create professional-quality reports and forms. You can even have multiple fonts, sizes and styles!

Compatible and versatile.

dBASE is the industry standard for database management, so compatibility is never a worry. dBASE Mac easily accesses data from dBASE II, III and Plus. You can also import or export data from Microsoft Excel, Microsoft File, Omnis 3, and Double Helix for maximum versatility.

Overnight delivery only $3.00!

Combine this special low price with MacWAREHOUSE's great service, and you just can't miss. Order before 12:00 midnight (E.S.T. weekdays), and we'll ship dBASE Mac to you overnight for only $3.00. But hurry — this offer is only good while supplies last!

System Requirements:

To use dBASE Mac, you'll need a Mac Plus or higher, and a hard disk drive. If you've been waiting for just the right opportunity to buy a hard disk drive, the time is now! See our special offer below.

dBASE Mac
MacWAREHOUSE Special Price: $49

BONUS OFFER!

To use dBASE Mac, you'll need a hard disk drive. Now's your chance to take advantage of these MacWAREHOUSE Sale prices!

Power User 20MB Hard Drive ...... only $309!
Power User 45MB Hard Drive .......... only $399!
A MacWarehouse Memory Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable, overnight service will have your Kit in your hands tomorrow!

MORE BRAIN POWER FOR YOUR MAC

Never again will you have to quit your word processor just to answer a question about a spreadsheet. Install extra memory and you can leave your letter open while you refer to last month’s sales figures. 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.

PLUG IN INSTALLATION

Adding memory doesn’t require technicians in lab coats. Just open your Mac, slide out the main circuit board and plug in your SIMMs. Our FREE video will give you STEP-BY-STEP installation instructions. Every type of Mac is covered and we think we’ve made it a breeze.

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@$69 each).

THE CHART EXPLAINS EXACTLY WHAT YOU NEED TO ACHIEVE THE DESIRED LEVEL OF PERFORMANCE.

<table>
<thead>
<tr>
<th>Memory Amount</th>
<th>Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 MB</td>
<td>Remove all four existing 256K SIMMs, install two 1M SIMMs, leave future expansion.</td>
</tr>
<tr>
<td>2½ MB</td>
<td>Remove only two 256K SIMMs, install two 1M SIMMs.</td>
</tr>
<tr>
<td>4 MB</td>
<td>Replace all four 256K SIMMs with four 1M SIMMs.</td>
</tr>
<tr>
<td>4 MB</td>
<td>Remove all four existing 256K SIMMs, install four 1M SIMMs, leave remaining sockets for future expansion.</td>
</tr>
<tr>
<td>5 MB</td>
<td>Keep existing 256K SIMMs, install four 1M SIMMs in remaining sockets.</td>
</tr>
<tr>
<td>8 MB</td>
<td>Remove all four 256K SIMMs install eight 1M SIMMs.</td>
</tr>
</tbody>
</table>

To open your Mac Plus or SE, 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 SIMM card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products. Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 120 ns SIMMS is $69. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billions of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor needs 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Place your order by 12:00 a.m. (E), weekdays and we’ll deliver overnight for just $3.00. There’s never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

MacWAREHOUSE
1-800-255-6227
Call toll-free
Twenty-four hours a day, seven days a week.
Inquiries 1-908-367-0440
Fax 1-908-905-9279
© Micro Warehouse Inc.

MACWAREHOUSE 30 DAY MONEY BACK GUARANTEE

If, for any reason, you are dissatisfied with your MacWarehouse 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 the 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.

SIMM prices vary. Call for latest information.

Limited Offer! Free video with purchase of 2 or more SIMMs.
If You Can Find A Better Deal In Hard Drives . . .

Between now and September 30th, MacWarehouse is offering savings on every hard drive we sell. So, if you're thinking of buying a new hard drive, your timing couldn't be better. Check out our sale prices and your savings, compared to our December 1989 prices, in the chart. We offer drives by leading manufacturers like Cutting Edge, C.M.S., Quantum, Power User, PLI Infinity Turbo and others - all at unheard of low prices.

Let our helpful sales staff take the hassle out of buying a drive. They'll tell you which drive mechanism uses. They'll also tell you about access speed, reliability, software and the manufacturer's warranty.

### MONEY BACK GUARANTEE
They'll tell you which drives come with the MacWarehouse 30-day money back guarantee. Try one at home. And if, for any reason, you're not 100% satisfied, just return it to us within thirty days and we'll refund your money.

Then there's the MacWarehouse Loaner Drive Program. Buy from MacWarehouse and if you ever have a problem, you won't be without a drive for more than a few hours.

### READY TO USE
A hard drive from MacWarehouse couldn't be easier to use. We'll tell you which ones come pre-formatted — ready to use right out of the box. You just plug in, turn on your Mac and go!

If you do need any help, the MacWarehouse Technical Support staff is standing by our toll-free lines to assist you.

### LIMITED TIME OFFER
MacWarehouse sale prices, based on capacity, are shown in the chart. Also shown are the savings from pre-holiday prices. (This is a limited time offer, valid through September 30, 1990.) Overnight delivery is just $3, anywhere in the Continental United States.

So call us now and tomorrow morning you'll be up and running with the best hard drive deal in the business!

### Chart

<table>
<thead>
<tr>
<th>Type</th>
<th>20+ MB</th>
<th>30+ MB</th>
<th>40+ MB</th>
<th>60+ MB</th>
<th>80+ MB</th>
<th>100+ MB</th>
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<tbody>
<tr>
<td>Cutting Edge</td>
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<tr>
<td>CMS, MacStack</td>
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<tr>
<td>Power User</td>
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<tr>
<td>PLI, Infinity Turbo</td>
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<tr>
<td>Quantum Internal</td>
<td></td>
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</tr>
</tbody>
</table>

*Quantum drives are for internal installation and require a 3.5 internal Drive Kit for $75. **40 Meg Removable Cartridge Drives come with 1 cartridge. Additional cartridges available.

Savings are calculated from MacWarehouse December 1989 published prices.

Call toll-free 24 hours a day, 7 days a week.
Inquiries 1-908-367-0440
Fax 1-908-905-9279
© Micro Warehouse Inc.

MacWarehouse 30-Day Money Back Guarantee
Many of our drives come with the MacWarehouse 30-Day Money Back Guarantee. If, for any reason, you're not completely satisfied, call us within thirty days of receipt for a return authorization number and full refund of the purchase price.
**Guarantee**

Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

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**Accounting & Personal Finances**

<table>
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<tr>
<th>Product</th>
<th>Price</th>
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<tbody>
<tr>
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<tr>
<td>Payroll 3.5</td>
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<td>Absolute Solution</td>
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<td>Computerized Classic Accounting</td>
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**Business & Presentation**

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<td>Survivor</td>
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**Accessories**

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<tr>
<td>Dust Covers</td>
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<tr>
<td>Mac II and ext. keyboard</td>
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<tr>
<td>Mac IIx/IIx Monitor Stand</td>
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<tr>
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<tr>
<td>Utility Pads</td>
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<tr>
<td>Computer Gear</td>
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<tr>
<td>Mouse Pads</td>
<td></td>
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<tr>
<td>Command Center</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Entraptron</td>
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</tr>
<tr>
<td>Mac/Tir SE</td>
<td></td>
</tr>
<tr>
<td>Mac/Tir II-RRG</td>
<td></td>
</tr>
<tr>
<td>I/O Design</td>
<td></td>
</tr>
<tr>
<td>ImageWarrior II Carrying Case</td>
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<tr>
<td>MacIware Carrying Case</td>
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<tr>
<td>MacIware Mac II Carrying Case</td>
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<tr>
<td>MacIware Plus Carrying Case</td>
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<td>Montana/Over Apple RGB Case</td>
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<td>The Ultimate SE Carrying Case</td>
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<td>The Neon Ultimate Carrying Case</td>
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</tr>
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**Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus)**

Famper your Mac with a Targus case made of silicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Choose from among five colors for your desk. Choose from White, Black, Green, and even a colorful California Girl or Vollely Ball Hunk over your desk. Charter new designs included. $10. (accessories)

---

**Adobe Illustrator 3.0 (Adobe Systems, Inc.)**

The page creation and layout solution! Features include technical illustration, freehand sketching, automatic scanned image tracing, blending tools, and more. New text-handling tools allow direct, on-screen entering and manipulation of text. Use it to choose any number or style of typefaces in a single text block and gain complete character control. The new graphics tool lets you automatically create, manipulate, and customize presentation quality charts and other graphics. Includes FREE copy of Adobe Type Manager (desktop publishing). $349.

---

**FreeHand 2.0 (Aldus)**

The Graphics companion to PageMaker. FreeHand 2.0 delivers the power of the best drawing software and works directly in PostScript to give printed artwork a clean, sharp appearance. New features include a blending tool, transparent, customizable patterns, TIFF support, PICT to PostScript conversion and more! FreeHand displays in color and can produce separations for spot and process color with full PMS support. Flexible page layout tools and text-handling complete this outstanding graphics package. (programs) $329.

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<table>
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<tr>
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<tbody>
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<td>Checkwriter II 2.8</td>
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<td>Payroll 3.5</td>
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<td>Absolute Solution</td>
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<td>Computerized Classic Accounting</td>
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**Accounting & Personal Finances**

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<th>Product</th>
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<td>Computerized Classic Accounting</td>
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**Accessories**

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<td>Dust Covers</td>
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<td>Mac II and ext. keyboard</td>
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<td>Mac IIx/IIx Monitor Stand</td>
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<tr>
<td>Universal Laser Printer Stand</td>
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<td>Utility Pads</td>
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<td>Computer Gear</td>
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<td>Mouse Pads</td>
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<td>Command Center</td>
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<td>Computer Tool Kit (52 pc.)</td>
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<td>Entraptron</td>
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<td>MacIware Plus Carrying Case</td>
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<td>MacIware SE Carrying Case</td>
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<td>Montana/Over Apple RGB Case</td>
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<td>The Neon Ultimate Carrying Case</td>
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<td>PowerBacker 360 UPS Line</td>
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<td>SE Radiation Shield</td>
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<tr>
<td>System Saver Mac</td>
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**Macintosh SE/Plus w/Extended Keyboard Carrying Case (Targus)**

Famper your Mac with a Targus case made of silicone treated nylon to give you waterproof durability and an impact absorbing high-density foam layer with a soft protective lining for complete protection. Choose from among five colors for your desk. Charter new designs included. $10. (accessories)
Version 4.0, the very latest edition of Steven Bobker's Power User's Tool Kit is available now. Eight great programs on one handy disk. There's Tidy-It-Up! - a great utility to tidy your System Folder and Disk Doubler Expand - to extend all those compressed files.

The POWER USER'S TOOL KIT 4.0 is FREE from MacWAREHOUSE when you order from us. If you want the disk, you pay only $1.50 for shipping and handling. The programs are shareware, so you can try them free of charge. If you wish to continue using them, some authors ask that you pay a fee ($10-$35). Many are absolutely free. All of the details are explained on the disk, which is yours to keep.

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Inquires: 908-367-0440

Fax: 908-905-9279

Timbuktu/Remote 2.0 (Farallon)
Timbuktu/Remote 2.0 enables you to remotely connect your Mac to another Mac to control, observe, send or exchange files over telephone lines or ISDN links. Observe the remote Mac's screen in a window on your desktop. Additional security features include a unique privilege password protection scheme and security call back. Timbuktu/Remote 2.0 now supports CCL modem control language for users with non-Hayes compatible modems. (networking). $125.

Freedom of Press 3.0 (Custom Applications, Inc.)
Feel free to take new PostScript printing liberties with updated Freedom of Press. Freedom of Press lifts the costly restriction of requiring a PostScript printer to print PostScript-language files. Now, in addition to the 40 non-PostScript printers currently supported, Freedom of Press can print PostScript of the Apple line of Quickdraw printers. It includes 35 scalable fonts and supports any additional PostScript font including Type 1 fonts from Adobe. Now compatible with all Mac systems. (utilities) $255.

Freedom of Press Professional 1.0 (SuperMac)
The first "true-color" advanced graphics program that is designed to grow with you. Freedom of Press Professional gives you the intuitive tools to do your work easily. Use powerful features like advanced masking, fill effects, dithering, anti-aliasing and transparency control for advanced graphics effects and photographic-quality images. New 2.0 version coming soon! Buy 1.0, register and receive a free upgrade (graphics). $389.

I'M FREE!

NEW! Includes:

Disinfectant 2.0,
Public Folder and
SmartKeys!

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I'M FREE!

NEW! Includes:

Disinfectant 2.0,
Public Folder and
SmartKeys!
Microlytics
Inside Information .................................. 69.
Prefered Publishers
Database 1.5 .................................. 68.
Vantage 1.5 .................................. 52.
Solutions
SmartScraper & The Clipper 2.0 ........ 45.
Vision Software
Format Layout .................................. 35.

DESKTOP PUBLISHING
Adobe Systems, Inc.
Adobe Illustrator 3.0 ...................... 349.
Adobe Illustrator 66 1.9.3 ................. 275.
Aldus
PageMaker 4.0 .................................. 498.
PrePrint .................................. 329.

FontShare 2.0
FontShare allows up to 32 network users to access downloadable PostScript printer fonts without having to store them locally. It works with AppleShare and TOPS. Includes Net Counter utility and is ATM compatible. $149.

NFL Challenge
(XOR Corporation)
Its time for NFL challenge - the "Superbowl" of football simulations! NFL challenge is the most realistic NFL football simulation in any arena. It's also the only one officially recognized and licensed by the NFL. The game uses actual stats from the latest NFL season and offers over 60 offensive and defensive plays. Test your strategy against the computer or battle it out in head to head competition with a friend. (entertainment) $55.

Personal Press
(Silicon Beach)
Personal Press creates professional layouts for you. Forget the long, steep learning curve, because Personal Press has AutoCreate to assemble stories and graphics into templates. It includes a full-featured word processor with spelling checker and thesaurus, controls for scanned images, spot color separations, posted notes, link navigator, extensive page previewing, and on-line help. (desktop publishing) $199.

Peripheral Land, Inc.
Infiniity Dual 40 Meg Turbo .......... 1875.
Infiniity Turbo 40 Meg ................. 2599.
Power User
20 Mac Drive .............................. 309.
30 Meg Drive .............................. 359.
45 Meg Drive .............................. 399.
60 Meg Drive .............................. 499.
80 Meg Drive .............................. 499.
44 Meg Removable Drive ............... 679.
Quantum
Quantum 40 MB Raw Drive .......... 399.
Quantum 80 MB Raw Drive .......... 649.
RasterOps
RasterOps Colorboard 264 ............. 699.

The Neo Ultimate
Carrying Case
(U/I Design)
Here's the latest in fashionable outerwear for the active Macintosh. It's the NEW "Neo Ultimate" SE in fluorescent green, hot pink and brilliant yellow neon accents! Pumps and protect your Plus or SE with its high density foam padding & durable DuPont Cordura nylon exterior. Secure all your peripherals in its roomy padded inner compartments & two exterior pockets. FREE matching disk wallet with every purchase. (accessories) $69.

MacFix Monitor Stand
Mac Fix Monitor Stand, from Basic Needs, saves desktop space while protecting the fix from the weight of a heavy monitor. Your fix or fit right underneath the stand and the 16 gauge steel frame provides solid support for any size monitor. Platinum $40.

MacPrint 1.2
MacPrint displays your printer's fonts for true WYSIWYG performance and prints text & graphics at maximum resolution. Completely transparent in operation. FREE copy of MacEnvelope 4.0 with each purchase of MacPrint. Limited Supply. $95.

MaxFax Modem
An incredible package deal! A 2400 bps full speed modem & 9600 bps send and receive line. Add a dynamic software duo (MAXKNOWLEDGE and MaxFax) and a cable for the most convenient, easy to use and competitively priced fix/modem on the market. EXCLUSIVE GRAY SCALE SUPPORT! $309.
CasinoMaster (5 pack) .................. ............. 49.
CasinoMaster Deluxe Mac II version . 55.
MicroLeague Sports ................. ............ .............. 38.
Softstream ......................... ............ .............. 22.
Tetris ................. ............ .............. 22.
Wellness ......................... ............ .............. 19.
The Software Toolkit ....... ............ .............. 39.
ChessMaster or Life Deluxe ..... ea. 32.
Cribbage & Gin King ......... 39.
The Hunt for Red October .. 20.
Three Sixty .............................................. 36.
Sands of Fire ......................... ............ .............. 32.
Toyogo's Nemesis ............ ............ .............. 30.
Go Master ....................... ............ .............. 99.
Joseki Genius ..................... ............ .............. 30.
Deluxe ....................... ............ .............. 99.
Visionary Software .............. ............ .............. 39.
SyncThex ................. ............ .............. 39.
XOR .............................................. 39.
Lunar Rescue or MacGolf 2.0 .. 34.
MacGolf Classic .. ............ .............. 52.
Road Racer ......................... ............ .............. 39.
NFL Challenge ................. ............ .............. 65.

WIZ (CalComp) Everything else is just a mouse! It's a full featured mouse system, compatible with all mouse driven packages. Not only do you have mouse features, but the ability to draw and trace with accuracy, because WIZ has 1000 dpi. absolute positioning and comes with a cross hair pointer on the WIZ mouse. Define macros, minimize user movement with adjustable pad scaling. Optional software templates for over 30 software packages, lets you by-pass pull down menus, making command selection a one click process. Requires Mac II/SE. 5 year MFG. warranty. (input/output) WIZ tablet $159, Optional templates available. Optional 2 button pen $57.

MacProof 3.2.1 (Lexpertise) You'll never get a second chance to make a first impression! MacProof 3.2.1 is your English proofreader. Without leaving your document, it proofreads all text written on your word processor: business, educational, personal and professional. MacProof is a desk accessory for the Macintosh Plus, SE, II, IIx, IIcx. Checks: mechanics, word usage, writing style and structure. You can customize the usage and the spelling dictionaries to your specific requirements. Requires MacWrite II/V, 1.0, MacWrite V, 4.0 & 5.0, Microsoft Word 4.0, PageMaker 3.0/3.01/3.02, w/2mb memory, MindWrite V.1 and V.2. (spelling) $115.

Deneba Canon 2.1 .................. 189.
Digital Vision ..................... ............ .............. 125.
Computer Eyes B&W ............. 199.
Computer Eyes Pro Color ....... 349.
Dream Maker ..................... ............ .............. 27.
Clippers, Vol. 1, 2, 3 .......... ea. 89.
MacPaint ....................... ............ .............. 76.
Electronic Arts ................. ............ .............. 96.
Studio 1 ....................... ............ .............. 295.
Studio 2 ....................... ............ .............. 295.
Farallon ......................... ............ .............. 189.
MediaTracks ..................... ............ .............. 319.
Dreams 1.1 ..................... ............ .............. 189.
MacroMind ..................... ............ .............. 49.
MacroMind Director ............. ............ .............. 49.
Metro ImageBase (Full Line Available) ..................... ............ .............. 248.
Art Deco or People .......... ea. 85.
Newsletter Maker or Business ea. 85.

Dubl-Click .............................................. 28.
Menu Fonts 3.0 ..................... ............ .............. 28.
Letraset .............................................. 275.
LetraStudio ............................................. 275.
LetraFonts (various) .......... ea. 69.
Tactic Software ................. ............ .............. 50.
Art Fonts ....................... ............ .............. 50.

Direct Mail Its your personal mail room! Direct Mail is the complete correspondence solution for labels, envelopes, adresses, form letters and telephone dialing. It easily searches, sorts and mails address files for select mailing, merging or exporting. Direct Mail can be used as a DA or application $54.

Andrew Tobias' Managing Your Money 3.0 The most innovative personal finance package for the Mac. Its six main divisions remind you of important dates, maintain income and checking, manipulates tax returns, evaluates future plans, manages your investment portfolio. Requires MacII/SE. 5 year MFG. warranty. $122.

Graphix & Design 3G Graphics Graphic Symbols .............................. 60.
Business 1 or Accents & Brders 1 ea. 65.
Adobe Illustrator 3.0 .................. 349.
Photoshop ................................. 399.
SmartArt I, II, III, or IV ea. 89.
Streamline ....................... ............ .............. 225.
Addl ............................... ............ .............. 235.
Freehand 2.0 ..................... ............ .............. 399.
Aperture Technology Aperture Visual InformationMgr. ........ 599.
Bright Star Technology HyperAnimator 1.5.1 ........ 98.
Hyper-FACE ....................... ............ .............. 249.
Broderrand ......................... ............ .............. 119.
TypeStyler 1.0 ..................... ............ .............. 119.
Clarion ....................... ............ .............. 289.
MacDraw II ......................... ............ .............. 92.
MacPaint 2.0 ..................... ............ .............. 35.
Sports-ROM ......................... ............ .............. 35.

MicroPhone II 3.0 MicroPhone II 3.0 scripting language makes using electronic mail services an automatic operation. Other types of file transfers are equally effortless. MicroPhone II 3.0 now supports the hot new 2MODEM, transfer protocol (in addition to XMODEM, YMODEM, KERMIT, and MacTerminal 1.1) and can operate modern at any speed from 50 to 57,600 baud. $215.

NEW! The DataDesk Switchboard (Datadesk International) Finally, a keyboard that puts power and comfort within reach! The Switchboard is the first user-configurable keyboard. It allows users to arrange the Alpha, Cursor and Numeric keypads into the most comfortable positions for individual computing needs. Additional input devices (trackball, vertical function keys, digitizer tablet & macro keys) replace existing keypads or can be added. Switchboard's flexibility allows it to evolve with your specific computing needs while preserving desktop space. Modules available. (input/output) $175.
Quark XPress 3.0

New measurement and page palettes provide interactive on-screen access. A library stores frequently used items, and a pasteboard provides a work area next to each page. Rotate text and graphics in 0.001 degree increments up to 360 degrees. $519.

RightWriter

Clear, concise and powerful writing means increased profits, customer satisfaction and career advancement. RightWriter works with your word processor as an expert grammar instructor applying over 4,500 rules directly to your documents. Use your word processor to make the appropriate changes; then remove its comments. $35.

Hyperware

Bantam
Complete HyperCard Handbook ..... 22.
Beacon Technologies
HyperCard International Version ..... 175.
HyperBible King James Version ..... 145.
DataDesk International
HyperDialer
MicroMaps
HyperAtlas
Silicon Beach
SuperCard 1.5
Softstream International
HyperHit 2.2
Symmetry
HyperDA 1.2

SoftStream
Relational Object ........................ 149.
Somak
Laser Art CD-ROM #1 or #2 ... ea. 59.
Sharp Up ................................. 59.
Strata
StrataVISION 3d ....................... 375.
Strategic Mapping, Inc.
Atlas Map Maker 4.5 ............ 375.
StudioTronics
Colorset 1.5 ....................... 229.
SuperMac
PixelPaint 2.0 .................. 225.
PixelPaint Professional ........ 385.

Tactic Software
Art Clips, Vol. 1 or Vol. 2 ................. Call.
T/Maker
Draw Art Business Images .............. 32.
EPS Illustrations .................. 85.
Business Cartoons ................. 33.
Zedcor
DeskPaint & DeskDraw ............... 115.

HARDWARE & PERIPHERALS

Aapps
DiVidi Video B&W ...................... 399.
DiVidi Video Color .................. 699.
Cor Star
Label Writer .......................... 185.
Cutting Edge
19" Two Page Monitor ............... 959.
Howlett Pac Systems
HP Deskwriter 227EA .................. 850.
Logitech
ScanMan ............................. 319.

Metro ImageBase Electronic Art
(Metro ImageBase)
From the world's leading publisher of ready to use art come 14 exciting and logically-grouped image packages. Use them to enhance layouts, brochures, bulletins, ads, reports, newsletters and more! This high-resolution art, created by leading illustrators is digitized at 300 dpi in TIF format to meet the demands of today's desktop publisher. 100 images per package-one large image per file. Includes Newsletter Maker, Business Graphics, Computers & Technology, Report Maker, Borders & Boxes and 9 others. (graphics) $58. each

Callcomp
WIZ Tablet ......................... 159.
WIZ Pen ................................ 57.
WIZ Templates ..................... Call.

LANGUAGES

Digitalk, Inc.
Smalltalk/V MAC .............. 125.
Microsoft
QuickBasic ........................ 64.
Shana Corporation
Inside Out .......................... 86.
Symantec
THIN K'S C 4.0 or Pascal ...... ea. 165.
Zedcor
ZBasic 5.0 .......................... 88.

The Microsoft Office (Microsoft)
The Microsoft Office gives you everything you need to increase productivity, word processing (Microsoft Word), spreadsheet (Microsoft Excel), desktop presentations (Microsoft PowerPoint), and electronic mail (Microsoft Mail) - in one compact package! Each program is a top-selling stand alone product, and when used together, will make your entire office more efficient and productive. (business) $325. Also available on CD-ROM $589.

The Microsoft Office (Microsoft)
MEMORY UPGRADES/ACCELERATORS

1 MEG SIMMS
Low Profile, 120ns High Quality
Single In-Line Memory Modules for MacPlus, SE, II, llx... Low... $799.
MacSnap 524... $185.
MacSnap 524S... $239.
MacSnap 548S... $499.

MODEMS/FAX

Abaton
InterFax 12/48... $265.
InterFax 24/96... $419.
Best Data Products
SmartOne 2400/1200... $129.
Dove (full line available)
Marathon 530 Accelerators... $199.
MacSnap 2S... $399.
MacSnap 8S... $799.
MacSnap 524E... $185.
MacSnap 524S... $239.
MacSnap 548S... $499.

MUSIC AND SOUND

Altech
MIDI Interface... $59.
Coda
MacDrums... $31.
Perceptive
Electronic Arts
Deluxe Music Construction 2.5... $85.
Deluxe Recorder... $99.
Farallon Computing
MacRecioer 2.0 (record sounds)... $159.
Password Designs
NoteWriter II 2.3... $325.
Passport MIDI Interface... $89.
Prime Software
Different Drummer... $59.
Repertoire
Music Publisher... $359.
Resonate
Listen 2.0... $62.
Tactile Software
Sound Clips Vol. 1, 2, 3, or 4... ea. $49.

AutoSave II (Magic Software)
This very important utility is a CDEV. Just drag it into your system folder, and AutoSave II will issue a periodic Save command to the running application. You can set the interval between saves from one to 99 minutes. AutoSave II keeps a current work safe on disk. (utilities) $28.

SECURITY & VIRUS PROTECTION

ASD Software, Inc.
FileGuard 2.5... $145.
FileGuard Office 5-pack... $435.
FileGuard Office 10-pack... $685.
SmartOne 2400/1200 Modem (Best Data Products)
For beginners and experienced modem users. If you need a 2400 baud modem, the SmartOne 2400 Modern provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/origin, 300, 1200 and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes software and cable. (modems) $145.

STATISTICAL ANALYSIS

Abacus Concepts
StatView II... $279.
StatView SE+Graphics... $175.
SuperANOVA... $309.
Wolfram Research
Mathematica (SE)... $450.

UTILITIES

Abbott Systems
CanOpener 1.1... $64.
Chess 1.0... $63.
Aladdin Systems Inc.
Programmer's Assistant... $57.
StuffDeluxe... $46.
ALSof
DiskExpress II 2.04... $57.
MultiDisk... $34.
Master Juggler... $64.

SPELLING/DICTIONARY THESAURUS CHECKERS

Deneba Software
BigThesaurus... $64.
Spelling Coach Pro 3.1... $124.
Electronic Arts
Thunder II... $49.
Lexiprint
MacProof 3.2... $115.
LifeTree
Correct Grammar... $49.
Microlytics
Word Finder 2.0... $34.
Sensible Software
BookEnds or Sensible Grammar... $51.

Coda
MacDrums... $31.
Perceptive
Electronic Arts
Deluxe Music Construction 2.5... $85.
Deluxe Recorder... $99.
Farallon Computing
MacRecioer 2.0 (record sounds)... $159.
Password Designs
NoteWriter II 2.3... $325.
Passport MIDI Interface... $89.
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Different Drummer... $59.
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SECURITY & VIRUS PROTECTION

ASD Software, Inc.
FileGuard 2.5... $145.
FileGuard Office 5-pack... $435.
FileGuard Office 10-pack... $685.
SmartOne 2400/1200 Modem (Best Data Products)
For beginners and experienced modem users. If you need a 2400 baud modem, the SmartOne 2400 Modern provides an economical alternative. For less than the cost of some 1200 bps units, you get a Hayes compatible modem with auto answer/origin, 300, 1200 and 2400 baud operation, pass-through phone jack, speaker with programmable volume, and a manufacturer's two-year warranty. All user options are stored in non-volatile memory. Includes software and cable. (modems) $145.

STATISTICAL ANALYSIS

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StatView SE+Graphics... $175.
SuperANOVA... $309.
Wolfram Research
Mathematica (SE)... $450.

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DiskExpress II 2.04... $57.
MultiDisk... $34.
Master Juggler... $64.

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Thunder II... $49.
Lexiprint
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LifeTree
Correct Grammar... $49.
Microlytics
Word Finder 2.0... $34.
Sensible Software
BookEnds or Sensible Grammar... $51.

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MacDrums... $31.
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NoteWriter II 2.3... $325.
Passport MIDI Interface... $89.
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WHAT A
Color-Retouching
PROGRAM CAN
DO FOR YOU

BY KEN MILBURN

Figure 1: Before and After
Very picture tells a story. If you don’t like the way the story’s told, true-color image-processing software can help you retell it. Despite the introduction of myriad new technical features, these packages can benefit anyone who uses a Mac to publish, make presentations, or do animation or graphic design. The upgraded PhotoMac 1.5 from Data Translation, Adobe Photoshop (see review, July ’90, page 53), and Letraset’s ColorStudio extend both the functionality and the ease of bit-mapped-image processing, whether the image is a scanned photo, a captured video frame, or an electronic painting.

You can use these programs to make a photo look its best or to create fantastic — yet realistic — montages involving hundreds of separate pictures.

PhotoMac, Photoshop, and ColorStudio have the same raison d’être, but they differ in price, user interface, features, and flexibility.

To give you a better idea of how these three programs work, I show how each one handles the major functions of color image-processing software and point out the differences in how they deal with often-used techniques.
What a Color-Retouching Program Can Do for You

I tested the three programs' capabilities by tackling a common problem in newsletter, brochure, and small-magazine publishing: getting a color photo of a particular subject when working under a tight deadline. This is a situation in which a color image-retouching application comes into its own. It gives you many tools that let you manipulate what you have into the image you want.

The objective of my tests was to produce a color photo of a company CEO in a couple of hours. I started by searching the files for any photographs of him. I found only one in color—a head-and-shoulders snapshot, which was inappropriate; it would've been better if he had been sitting in his office or behind a desk. My next search revealed a color photograph of another man seated behind a desk. It wasn't a perfect photograph, but it was near enough to the ideal setting. ColorStudio, PhotoMac, and Photoshop let you combine elements of two photographs to produce the picture you need. I used all three programs to test the capabilities, interface, and features of each.

First I scanned both photos (see the scanners lab report, September '90, page 132). Once the images were on-screen, it was easy to see that they each had several problems. Since they were shot under different lighting, their contrast and color balance didn't match. The CEO's picture was a close-up snapped outdoors in late-afternoon light; the other was shot in the greenish glow of office fluorescent lighting. The photos were different sizes and needed to be scaled to matching proportions. The snapshot of the CEO was dirty and wrinkled, and the skin flaws were too obvious. The wall decorations and other paraphernalia behind the seated man were focused somewhat more sharply than he was, drawing attention away from him.

To retouch the photographs' flaws and to manipulate the images, I needed to use four basic photo-retouching techniques: darkroom procedures, retouching, pictorial effects, and image compositing.

Darkroom procedures include adjusting the color balance and setting brightness and contrast, which are...
also referred to as gamma controls. Retouching involves adding detail, controlling sharpness, and eliminating blemishes. Pictorial effects allow you to alter an image's style — you can make a photo look like a pointillist painting, for example, or make it partially negative. Image compositing is creating a new picture from two or more existing images.

**Darkroom Procedures**

Image-processing programs are known as electronic darkrooms because they mimic — indeed extend — the controls used in traditional photographic printmaking, such as those that balance colors, highlights, and shadows.

The first step in combining the pictures is to match their overall color balance by adjusting the red, green, and blue values of each picture so that the two correspond to each other. It is also necessary to match the two pictures' brightness; contrast; and tonal range, or gamma curve.

Adjusting the color balance, contrast, and brightness with an image-processing program is enough to

---

**Selecting and Masking**

Often the elements you want to alter in an image are irregularly shaped and have vague edges, so hand-tracing with the lasso tool can be painstaking and subject to errors. When buying an image-retouching program, you need to consider its flexibility in isolating areas of images. Not only does flexibility allow you to get a more professional finish, but accurate area selection makes spot color easier to apply.

ColorStudio, PhotoMac, and Photoshop all have auto-select tools that let you precisely select hard-to-trace shapes simply by clicking on them. You can determine how much of a selection the tool affects by setting a range of tones and then clicking within that selection. Any contiguous pixels with tonal values that fall within the designated range are automatically selected.

The three programs differ, however, in the flexibility and ease with which you can set auto-select options. You can set PhotoMac's options by dragging the Autoselect tool across as many tones as you want to include — easy to do, but you also tend to pick up tones you don't want.

In Photoshop, you type a range into the selection tool's dialog box, which allows you to define only a brightness range with values from 1 to 256, not specific colors.

ColorStudio lets you type in several choices in the Options dialog box, including Exact Color, Exact Mask, Close Hues, and Value (brightness) Range. In addition, you can specify ranges of colors to select by example and through a dialog box. This plethora of methods gives professionals plenty of flexibility but is likely to intimidate novices.

No auto-select tool can choose exactly the area you want every time. Fortunately, all these packages let you manually add to or subtract from a selection. In addition, these programs can automatically feather or blend a selection's edges so that when you paste in a Clipboard image, you can get around hand-retouching ragged edges and avoid sharp breaks in shade or tonality.

ColorStudio and Photoshop allow you to control numerous edge-blending elements. These include border depth (the number of pixels adjacent to the selection marquee that will be blended with those in the border of the underlying image), edge vignette (how gradually the selection's border fades to transparent), and blending with underlying shades (the number of pixels used in the dithered pattern that blends the selection border with the background).

Another helpful technique in all aspects of image retouching is masking. Masks delineate an area so that you can't accidentally alter it. In PhotoMac and Photoshop, everything but a selected area automatically becomes a mask. Photoshop has a command that lets you paste into or behind a selection and lets you store masks permanently in as many as 13 separate 8-bit (256-color) layers.

ColorStudio has its own approach to masking. There is a single mask layer for the image, but a separate mask accompanies all incoming Clipboard images. You can use the mask from the Clipboard, the original's, or both. This lets you use the selection's mask and the document's mask in a variety of combinations by including the masked regions of the selection and the document in the final effect or excluding them.

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![Figure 2c:](image) Photoshop provides separate slide-control dialog boxes for adjusting color balance. When brightness and contrast are adjusted, all colors are affected simultaneously but only in highlights, middle tones, or shadows. To affect overall balance, you can use the Levels dialog box or a graphically manipulated gamma curve similar to ColorStudio's.
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He didn’t want just any colors. No, that wouldn’t do. They had to be perfect. Pantone® perfect. His color monitor was a limitation. He knew that. Then along came this thing called Radius. It had colors down cold. The colors he saw on his display were the colors he got. A special PrecisionColor® Calibrator made certain of that. When his proofs got back from the printer, there weren’t any surprises. He hated surprises. He hated gunplay, too. Now he had more time for his passion. No, not Brenda. Color.
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What a Color-Retouching Program Can Do for You

dramatically improve an image’s appearance. And because you generally get instant feedback on the results, even a novice can learn how to use these controls quickly. In addition, you save considerable turn-around time and money by doing your custom photo processing in-house, especially if the photos need retouching.

Although it is often necessary to heighten photographs’ contrast to add drama, it is important not to get carried away, because too much contrast can obscure details of highlight and shadow. By using color-balance controls, you can alter the orange cast that appears in photos shot at sunrise or the greenish cast that appears in pictures shot under fluorescent lights. You select a specific area and then use the color-balance controls to play down, eliminate, or replace colors. This color-balancing technique also works for tinting or colorizing black-and-white photos.

Photoshop and ColorStudio give you the option of arbitrary gamma control, which lets you manually control the hue (color), saturation (intensity), and value (brightness) of colors in specific portions of an image’s gamma curve. Arbitrary gamma control lets you add drama to a picture by boosting contrast in the middle tones while maintaining detail in the deep shadows and bright highlights. Being able to control a color’s hue, saturation, and value makes it possible to tint the picture or replace one color with another in a selected area. You can use arbitrary gamma controls to create several effects, including posterizing, which involves reducing or eliminating the range of shading in each color so that all colors are flat. If you want to use the image as a template for tracing, you can use arbitrary gamma controls to reduce large areas to solid colors, simplifying tracing.

All three color programs can reverse each color to its complement (the hue opposite it on a color wheel), so you can directly convert a scanned film negative to its true-color positive version. Only PhotoMac, however, can do it while compensating for the orange mask usually present on color negative film, such as

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**Figure 3a**: ColorStudio’s color-mixing palette provides five shapes for feathering the edges of paint as you lay the paint down. One powerful painting option is the ability to pick up and paint with a pattern from any selection.

**Figure 3b**: PhotoMac’s retouching capabilities stick to the basics but cover the needs of midlevel users. Brush options are limited to size, shape, and transparency (chosen from the Options menu). There’s no way to adjust paint so that it only lightens or darkens or to paint with the texture of another portion of the image.
Kodacolor. If you try to convert a scanned color negative in ColorStudio or Photoshop, you'll have to correct the color manually to eliminate the orange mask.

The last darkroom procedure is to scale the two images to the same proportions and to rotate them if necessary.

**Retouching**

Once I had set the color balance and completed the equivalent of conventional darkroom work on my two example images, it was much easier to retouch small flaws in the photos. There were several in the portrait: a white speck on the subject's lip, ruddy and blotchy skin, and uncombed hair.

The traditional techniques for repairing these flaws would require several expensive hours of an airbrush artist's time, even if the photos were only black-and-white. The methods for retouching color by hand are even more painstaking and costly.

With "electronic darkrooms," repairing small imperfections simply means painting over them or blending them into the background. With experience, you can use painting and blending techniques to accomplish even more elaborate retouching, such as removing a coffee stain or getting rid of tree branches that appear to be growing out of a subject's head.

The trick is to retouch the photo so that the results look natural — or at least don't draw attention to your handiwork. This skill requires practice: Painting over subtle shading changes with a flat or slightly mismatched color can make the cure worse than the disease. If you're a beginner, you'll need to take some time to learn and practice the kind of retouching you see in my sample photos. Once you have the skills, however, a job like this one takes only about an hour — or less with the brush-blending, tinting, and transparency options in ColorStudio and Photoshop.

Image-processing software provides tools for picking up colors and texture patterns, such as wood grain, hair, or grass, making it relatively easy to match precisely the colors and shades of the areas surrounding a

---

**The Alternatives**

Do you — and your budget — really need all the features and options that color image-processing programs provide? After all, paint programs such as SuperMac's PixelPaint Professional, Deneba's UltraPaint, and Electronic Arts' Studio/32 generally cost less and have many similar capabilities.

These three paint programs feature versatile brushes that can smudge, lighten, darken, and pick up color. PixelPaint Professional has special Emboss and Trace Edges features. But most paint programs have no user controls for overall color balance and contrast. UltraPaint is the exception, but it lets you change only overall lightness and contrast and it doesn't work with 16- or 24-bit-color images.

Paint programs are getting better at the business of image creation and painting, but they aren't optimized to do photo retouching. They can't blend or smooth as subtly, and it's virtually impossible to do color balancing with them.

Paint and photo-retouching applications make good partners. Paint programs can each help in their own way with retouching spots, blending edges, and even combining multiple images. Indeed, they may well suit your needs fully if you don't need to balance brightness, contrast, and color or go directly to high-end prepress. You can also use them to compensate for the creative weaknesses of a high-end retouching program.

---

*Figure 3c: Photoshop's brush options are more than adequate for all but the most demanding image-processing tasks. Although the dialog box is less intimidating than ColorStudio's, it can't stay on-screen while you work. The rubber-stamp tool lets you pick up part of the picture in one area of the screen and brush it into another area. The finger (smudge) tool lets you blend pixels together.*
What a Color-Retouching Program Can Do for You

defect. With Photoshop and ColorStudio, you can pick up whole parts of an image and then brush them into another area. Where possible, I used this technique to repair the CEO's skin blotches, remove shadows, and fill in the hairline.

To make a touch-up unobtrusive, you have to blend its edges into its surroundings. Virtually all image-processing-software toolboxes contain brushes for smudging, blurring, or sharpening edges. Photoshop and ColorStudio also give you the option of automating all brush-stroke blending. Both applications let you specify the degree of anti-aliasing (shading pixel edges to make diagonal lines appear smooth rather than jagged) and feathering (making the edges of a selection slightly translucent so that it merges smoothly with the area onto which it's placed). You can also use a brush to lighten, darken, or tint an area. Photoshop and ColorStudio let you specify that your brush color be used only on colors lighter or darker than it. All three programs let you specify the degree of transparency of colors.

To prepare the portrait for pasting into the office setting, I decided to eliminate the portrait's background. ColorStudio, PhotoMac, and Photoshop make this easy by letting you reverse a selection — that is, you can deselect what's currently selected and select what was previously unselected. All I needed to do was carefully lasso the subject's head, reverse the selection, and press the Delete key to delete the background and isolate the head.

Image Compositing

Once I had made the two photos look their best, I needed to combine them into one picture. The camera may never lie, but image-processing applications can sure make it look as if it did. Giving a jogger the feet of a jackrabbit or placing the Taj Majal in Times Square are well within these programs' scope.

Image compositing is the most complicated of the four image-processing functions. It requires at least four steps: selecting, cutting, manipulating, and pasting.

Although the process of creating

Figure 4: Composite Images

Figure 4a: Unlike Photoshop, ColorStudio has no Paste If command (which determines which portions of a floating image will affect the target image), so some composites require complex masking operations (see the Mask Options box at the right of the screen). Masks can be applied to both the image and the floating selection. You can change the transparency setting (under the icons at the top of the vertical scroll bar) by typing a number from 1 to 10.
an intricate composite can be challenging at first, the basic techniques are fairly easy to apply. In this case, I seamlessly replaced Mr. X’s head with the CEO’s head. I laid the foundation for this step at the darkroom stage by scaling and rotating the two images so that they would fit together and by making them match in color and intensity.

To create my composite image (also known as a photomontage), I opened both files simultaneously — which is possible in all three applications — and then selected the CEO’s head and neck, copied it to the Clipboard, switched to the office-setting file, and pasted the Clipboard image in. The CEO’s head floated above the office scene until I dragged it to the right place and deselected it, dropping it permanently into position.

Depending on how carefully you have outlined the selection in a situation like this, you may have to do some retouching such as smudging together poorly matching edges, reconstructing a detail that got lopped off during the original copy operation, or taking other steps to make the pasted item blend naturally with the background. In a simple case such as this, blending is no problem. In composing several images, however, the way a program allows you to blend selections becomes vital (see the “Selecting and Masking” sidebar).

Both ColorStudio and Photoshop have very powerful masking abilities. Masking uses one or more layers to protect or affect specific portions of an image and even specific aspects of an image, such as color only or brightness only. The extent of a photoretouching program’s masking abilities is a good measure of its overall power and of the time you save when using it.

All three applications allow users to specify the transparency of pastes and fills. Transparent fills let you quickly add shadows to combined images to make the combination look natural and unified. A transparent fill is especially effective in combination with feathering or gradient-shape fills in making the edges of shadows fade out. (A gradient fill smoothly blends the shading of two or more colors over a specified distance. A gradient-shape fill makes the blended tones conform to the shape of the selected area.)

To get finished composites to look realistic, you often have to rotate, slant, and size incoming images to match the target photo’s perspective before the final pastedown. Photoshop and ColorStudio let you type precise vertical and horizontal dimensions to specify sizes and exact degrees of rotation. Photoshop also has on-screen rulers, which are a big help when you’re scaling a selection to fit precisely into its place in the underlying image.

Sometimes you need to combine two or more images created in different applications or on different computers. The three image-manipulation applications make combination possible without the dramatic shifts in color that result when the images’ color palettes do not match. There are
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What a Color-Retouching Program Can Do for You

two true-color models: One is the cyan, magenta, yellow, black (CMYK) model, in which colors are created by combinations of cyan, magenta, yellow, and black and which is used for images that are printed on light-reflecting media such as paper. The other model is RGB (red, green, blue), in which all colors are combinations of red, green, and blue; it is used for images that are viewed by transmitted light, such as on a monitor, TV, or color slide (see “Color Techniques and Technologies,” May '90, Buyer's Guide, page 4).

Typically, CMYK is best for images that are to be conventionally printed, because it matches the number and colors of the printing plates used and it enables you to deal with printing houses. It’s desirable for an image-retouching program to work in these and several other color models so that it can adapt to your working style and output needs.

Finally, if you want to put images together, it should be easy to import them into the color-retouching application you use. As long as the image is a TIFF, PICT, or PICT2 file, you won’t have any trouble.

Of the three, Photoshop has the most-flexible options for file conversion, making it possible to send images to and from almost every popular graphics file format for either the Mac or DOS machines.

Pictorial Effects

The fourth and easiest part of using image-processing software is producing pictorial effects. The most common effects let you blur, sharpen, or posterize; you can also get interesting results by using filters, which change an image or selection’s style by altering the relationship of one pixel’s color and size to another’s.

A filter that “adds noise,” for example, gives images a high-contrast, grainy, “documentary” look; a filter that makes small shaded areas look like dabbed brush strokes gives them a painterly look.

With 22 options on its menu plus five third-party filters, Photoshop is the specialist in pictorial effects. Both Photoshop and ColorStudio accept plug-in filters from third-party vendors, and Photoshop lets you create...
Table 1: Color-Retouching Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Letraset ColorStudio</th>
<th>Data Translation PhotoMac</th>
<th>Adobe Photoshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price</td>
<td>$1,995</td>
<td>$795</td>
<td>$895</td>
</tr>
<tr>
<td>Comments</td>
<td>A full-featured package suitable for those who want control over every aspect of photo retouching.</td>
<td>A reasonably priced package for anyone with basic photo-retouching needs.</td>
<td>Plenty of options and intuitive interface make this a good package for novice and expert.</td>
</tr>
</tbody>
</table>

**Editing**

- Auto-select multiple shades/colors
- Reverse selection
- Gradient fills
- Transparent paste/double exposure

**Image control**

- Transparent paint
- Specify transparency
- Paint on lighter/darker colors

**Brushes**

- Predefined shapes: 38 per brush
- Custom shapes
- Anti-alias brush
- Brush with part of image

**Special effects**

- Filters: 13
- Third-party plug-ins: 2

**Other**

- File formats: 6
- Enter text
- Calibration

**Manufacturer**

- Letraset ColorStudio: Letraset USA
  40 Eisenhower Drive
  Paramus, NJ 07653
  (201) 846-5800

- Data Translation PhotoMac: Data Translation, Inc.
  100 Locke Drive
  Marlboro, MA 01752
  (508) 485-3322

- Adobe Photoshop: Adobe Systems
  P.O. Box 7900
  Mountain View, CA 94039
  (415) 961-4400

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Figure 5c: Photoshop allows for plug-ins, but it also provides 22 special-effects filters such as Facet and Mosaic (see the Effects menu in screenshot). You can make custom filters by typing numbers into the matrix of boxes at the right of the screen.

Directory

- **Adobe Systems, Inc.**
  1585 Charleston Road
  P.O. Box 7900
  Mountain View, CA 94039
  (415) 961-4400
  **Photoshop 1.0, $395**

- **Blue Solutions, Inc.**
  3039 Marigold Place
  Thousand Oaks, CA 91360
  (805) 492-9973
  **PhotoPress, $295**

- **Data Translation, Inc.**
  100 Locke Drive
  Marlboro, MA 01752
  (508) 485-3322
  **PhotoMac 1.5, $795**
  **PhotoMac Edit (with-out color-separation capabilities), $495**

- **Deneba Software**
  3305 N.W. 74th Ave.
  Miami, FL 33122
  (305) 622-6827
  **UltraPaint 1.0, $199**

- **Electronic Arts**
  1820 Gateway Drive
  San Mateo, CA 94404
  (415) 571-7171
  **Studio/32, $595**

- **Letraset USA**
  40 Eisenhower Drive
  Paramus, NJ 07653
  (201) 846-5800
  **ColorStudio 1.1, $1,995**
  **ImageStudio 1.5, $495**

- **Micro Frontier, Inc.**
  7650 Hickman Road
  Des Moines, IA 50322
  (515) 270-8109
  **Enhance 1.01, $375**

- **Public domain**
  **Image**, available from user groups and online services

- **Silicon Beach Software, Inc.**
  9770 Carroll Center Road, Suite J
  San Diego, CA 92126
  (619) 695-6956
  **DigitalDarkroom 1.1, $395**

- **SuperMac Technology**
  485 Paterno Ave.
  Sunnyvale, CA 94086
  (408) 245-2202
  **PixelPaint, Professional 1.0, $699**
What a Color-Retouching Program Can Do for You

your own filters.

Using obvious pictorial effects, such as posterizing or mosaic patterning, would have been inappropriate for the composite portrait of the CEO. Instead, I blurred the background slightly to make the subject seem more prominent.

All in all, I was able to produce a usable image out of materials at hand with a little experience and a minimum of effort and expense.

Retouching for Everyone

Adobe’s Photoshop is a good product for all levels of image retouching. It has an intuitive and easy-to-learn interface, even for new users, and its extensive arsenal of tools and features makes it possible to produce just about any effect.

Letraset’s ColorStudio is a more complex product. Its market is graphics professionals, especially in the prepress arena, who desire precise control over every aspect of the darkroom, retouching, and output process. It has especially strong retouching options, such as blending and masking. At just under $2,000, ColorStudio is clearly aimed at the professional prepress market. By the time you read this, Shapes, an annex to ColorStudio, should be available. It

Gray-Scale Retouching

If you work only with gray-scale images, you don’t need an image-retouching application with color capabilities. Retouching gray-scale images requires many of the same tools as color-image manipulation does, but it avoids the complexity of dealing with separate color layers.

Early versions of gray-scale editors displayed only 64 or 128 shades of gray, but current versions show the complete range of 256 shades of gray possible in an 8-bit image. Unless you plan to work with 24-bit-color images, any one of the applications mentioned here should fit your needs.

Digital Darkroom 1.1 is the current version of Silicon Beach Software’s pioneering image-editing application. Digital Darkroom introduced innovative features such as the magic-wand tool, which makes selections based on gray levels, and transparent pasting, which for the first time lets users blend a pasted selection into a target image (see Figure A). Digital Darkroom also introduced gray-level masking, which locks all the pixels of a particular shade or range of gray, preventing them from being altered while the mask is in effect. And Digital Darkroom was the first package to offer an auto-trace function, converting gray-scale images to a collection of Bezier-curve outlines that you can edit in applications such as Adobe Illustrator or Aldus FreeHand.

Digital Darkroom displays 256 shades of gray, although its palette has only 128 grays, and can open only one image at a time. It can save images in PICT2, TIFF (1-bit dithered, halftone, advanced halftone, and gray-scale), ThunderScan, MacPaint, and its own compressed archive format, and it can export its auto-traced objects as Illustrator-compatible PostScript files. It can open files in PICT, TIFF (1-bit, halftone, and gray-scale), MacPaint, and ThunderScan format. Version 1.1 adds an Image Preview feature, which displays a thumbnail version of the image in the Open dialog box and shows the size and resolution of the image.

Unlike the other gray-scale editors, Enhance 1.01 from Micro Frontier requires System 6.03 and 32-bit Color QuickDraw, even though it’s limited to working with 8-bit images. Enhance is more than a gray-scale editor — it’s also an 8-bit-color editor, and it sports a respectable set of image-analysis tools.

Enhance’s main benefit is its speed: Its filter operations are much faster than those of any of the other applications. It also offers sophisticated contrast and brightness controls, including gamma correction.

Enhance lets you use up to three image buffers per image, so you can use one for the original image, one for the altered image, and the third for masking. Area masking is quite simple — it changes only the mask’s black pixels. You can use area masks in painting and in pasting operations. Enhance’s various tool options let you designate

Figure A: Precision is the key to successful image retouching. Digital Darkroom’s Paste functions offer ample control over blending and overlaying images.

Figure B: Enhance’s Paint Options dialog box offers user-selectable gray-level masking.

Figure C: Image has a useful set of filters for improving gray-scale images, although it’s primarily a tool for quantitative analysis of medical and scientific images.
Ken Milburn, a former advertising and editorial photographer, writes about Mac and IBM computer graphics.

gray levels (or ranges of levels) on which the tools will have no effect, providing a second level of masking (see Figure B).

Enhance has a nonstandard interface, but context-sensitive help is always available. You can open up to four images at once, making it good for montage work. It can open PICT, TIFF (compressed and uncompressed), and text files, and it can save images as PICT, TIFF, text, or EPS files.

Image is a public-domain software package written by Wayne Rasband of the National Institutes of Health. It’s primarily a tool for numerical analysis of scientific and medical images, but it has some useful features for photo retouching, such as contrast enhancement and gray-level equalization, which allows you to change the distribution of gray levels. It also contains filters for sharpening, blurring, tracing edges, and reducing noise (see Figure C).

Image directly supports two frame-grabber cards for acquiring images from video sources: The Data Translation QuickCapture card and the Image Systems Technology Video Image 1000. With the latter card, it can capture frames in real time at 30 frames per second.

Letraset’s ImageStudio was the first full-fledged image-processing package for the Mac. It introduced the fingertip (smear) tool and the water-drop (blur) tool. It was also the first application to offer masking and basic filters for sharpening, blurring, and diffusing. ImageStudio favors tools such as brushes, fingertip, and water drop over more-technical controls (see Figure D).

ImageStudio 1.5 displays all 256 shades of gray, but it has a palette of only 16 grays plus black for editing. You can define which shades of gray appear in the palette by entering a percentage, or you can select the gray shade you need from the image surface itself.

ImageStudio’s masking options are limited to protecting the current selection from modification, and it lacks some amenities such as auto-scrolling and the ability to open multiple documents. ImageStudio is also particularly weak in selection-handling abilities, lacking a polygon, an oval, and selection-refinement options. It’s also unable to rotate a selected area arbitrarily. It does, however, offer a wide range of brush effects, including the ability to paint on only lighter or darker pixels than the currently selected shade. There’s also a Fade option that mimics a brush’s running out of paint at the end of a stroke.

ImageStudio can open files in uncompressed TIFF, MacPaint, ThunderScan, and Letraset’s own RIFF format. It can save images as RIFF, TIFF, MacPaint, or EPS files.

Blue Solutions’ PhotoPress is a straightforward gray-scale editor with 8-bit-color capabilities. It can open and save PICT2 and uncompressed TIFF images. The number of open images is limited only by available RAM. It lacks Digital Darkroom’s and Enhance’s sophisticated gray-level masking and variable paste operations. However, it offers workable area masking: a user-definable gray map, and a useful set of filters, including Dither (to produce a high-quality black-and-white image), Focus, Soften, and Blend (see Figure E).

PhotoPress can convert color images to gray-scale and grayscale images to black-and-white line art. PhotoPress has one unique feature: a Slide Show command that lets you view several images one after the other. All the applications mentioned here offer good control over halftoning, including screen frequency and angle, and a choice of line or dot screens.

— Bruce Fraser
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As catchphrases go, desktop presentations never really caught on — but that didn’t stop presentations from becoming a desktop staple. Combine the Mac's graphic and color capabilities with special presentation software, and you have all the tools you need to create stunning presentations.

The following three articles take you on a tour of the state of presentations today, starting with software. In presentation programs, it’s a two-horse race between Microsoft and Aldus. “The Hidden Persuasion” looks at one of the leaders — Aldus Persuasion — and offers 30 tips and techniques for enhancing your persuasive powers. (For a look at Microsoft's PowerPoint, see "The Presentation Pitch," December '88, page 244.)

If you’ve ever wanted to make 35mm slides rather than overhead transparencies, turn to “The Best Picture Show.” You’ll get the inside scoop on working with slide-imaging centers as well as tips on how to create professional-looking slides without unpleasant surprises. The article also includes a synopsis of your options in presentation software.

And if you thought slides and overheads were the only tools for giving a presentation, think again. “Running the Show” showcases the latest technogoodies — from LCD panels to remote controls — that let you project the Mac’s screen in living color without tying you to the keyboard.

We can’t give your presentation for you, but the information in these articles will help you make the perfect pitch.
THE HIDDEN PERSUASION

There's more to Aldus Persuasion than meets the eye. The program's developer reveals 30 surefire ways to enhance your persuasive powers.

6 Ways to Automate Format Changes

1. Make changes to body text, organization charts, and so forth on the slide master rather than on individual slides. All slides that use the master will be updated instantly.

Most people change the formatting for existing slides one at a time right on the slide, but one of Persuasion's unique features is that you can reformat all your slides simultaneously by making changes to the slide master. All slides based on the master immediately reflect the changes. This works for any placeholder change, including font, style, size, position, and fills. (Placeholders are markers that define the size, format, and location of objects on a master.)

2. Change the master for some but not all of its associated slides.

You can't do this, but Persuasion's multiple masters can produce the same result. Simply create a new slide master based on the old one by choosing Go to Master on the View menu and New from the submenu. Then select any subset of slides (by Shift-clicking) in the Outline or Slide Sorter view, and apply the new master. Reformat the new master to suit your needs, and you've finished.

3. Switch AutoTemplates to give your slides a new look.

Use the AutoTemplates command to quickly change the formatting of an entire presentation (see Figure 1). This is a convenient way to alternate between black-and-white overheads and 35mm color slides. Persuasion automatically replaces masters with the same names, reformats all slides, and replots charts to match the new design. The new AutoTemplate format also overrides any previously applied color schemes and defined text and chart formats.

4. Restore master formatting to an individual slide element.

Problem: You've made several changes to the body text of a slide—italicized some words and moved and resized the text block—but you don't like the results and want to restore the master's formatting.

Solution: In Slide view, use the pointer tool to select and delete the entire text block. Leave Slide view, and then return to it. Volia—your body text has been reformatted and repositioned based on the master.

This shortcut works for any text that's linked to the outline, including titles, subtitles, and body text. For an organization chart, just select and delete the whole chart. (Note: A quick way to leave and return to Slide view is to click on the slide icon at the upper right corner of the window.)

5. Restore master formatting to an entire slide.

The fastest way to remove all local overrides—such as format and position changes to the title, subtitle, or body text—is to select None for the...

Figure 1: Using the AutoTemplates command, you can quickly reformat an entire presentation. This presentation is being changed from an AutoTemplate for color 35mm slides to one for overheads (shown in the thumbnail view). Persuasion automatically reformats all the slides and replots all the charts to match the new masters.
Idus Persuasion 2.0 lets you create a presentation with minimal effort. You simply choose one of the 36 AutoTemplate formats, type (or import) your ideas into the outline, add graphics if you desire, and print the finished presentation as overhead transparencies or 35mm slides (or show it on-screen by using the Slide Show option). Each AutoTemplate has a distinctive design and contains six slide masters — one for a title slide, two each for text and graphics, and one for an organization chart — that help you format a presentation instantly. Persuasion can even produce audience handouts and speaker notes automatically.

Because Persuasion 2.0 is so easy to use, many users never discover how powerful it really is. It's the old 80/20 rule: 80 percent of the users use 20 percent of the features. With very little extra effort, however, you can harness Persuasion's power and produce more-polished presentations. You too can rearrange a presentation with the Slide Sorter, build sequential layers on a single slide, produce chart overlays, add transition effects such as wipes and dissolves, and modify the existing AutoTemplates or create your own.

Now that I've whetted your appetite, here are 30 tips and techniques that are guaranteed to improve your Persuasion productivity.

master and then reassign the original master.

1. Use chart placeholders.

You don't have to use chart placeholders, because you can plot a chart directly to any slide regardless of which master you're using, but you can easily use a chart placeholder by assigning a master containing one to the slide before you plot. A chart placeholder offers two benefits:

- You can adjust the size, positioning, and formatting of charts on several slides at once simply by changing the master.
- If you switch AutoTemplates, all the charts will automatically be replotted, resized, and repositioned to reflect the new template design.

7 Time-Saving Tips

1. Use “selective” Select All to choose all objects of a given type.

In Slide view, you can select all the objects created with a specific tool by choosing that tool and then using the Select All command (Command-A). If you choose the rectangle tool and choose Select All, for example, all rectangles are selected. Choose Select All again, and all objects on the slide are selected.

In Outline view, the Select All command has three levels of operation: Issuing the command once selects all the text in a single heading, twice selects all headings of the same level that share the same superior heading, and three times selects all the visible headings in the outline.

2. Take advantage of the temporary and permanent defaults for drawing tools.

Permanent defaults are saved with your document. You can change them by selecting the pointer tool and choosing line styles, colors, or patterns from the Effect menu. (Make sure no objects are selected, or they will be affected by the changes.)

You can set temporary defaults by clicking on a drawing tool and then making selections from the Effect menu. The temporary defaults affect all the objects you draw until you choose another tool.

3. Edit the text in grouped objects such as charts, tables, and organization charts without ungrouping them.

Choose the text tool, click on the text in any group or chart — no matter how deeply nested it is — and proceed with your editing. You can also change the type style and apply superscripts or subscripts. (Note: Text changes you make to chart labels are automatically

Figure 2: You can create slides that preview other slides in Outline view (top) by turning subordinate headings into slide titles. In this example, the first slide (middle) contains the titles for the next two slides. The following slides repeat the titles and present the relevant body text (bottom).
Power Presentations

A preview slide gives an overview of a set of slides by listing their titles (see Figure 2). You create preview slides in the Outline view by using the Set Heading As command from the Outline menu to turn subordinate headings into slide titles. The subordinate slide title then appears twice, once as body text in the preview slide and again as the title of its own slide.

Let Persuasion keep your text blocks and organization charts centered on the slide. You might want to keep a text block centered on the slide even if the text within the block is aligned on the left. Use the Anchor Placeholder command to do this. Few of Persuasion's AutoTemplates use center anchoring, so this feature is largely unknown.

Go to the slide master, select the placeholder for body text or organization chart, and choose Anchor Placeholder from the Master menu. Select both Center options, and you've finished. Now all the text that's contained in the placeholder, regardless of its size and alignment, is vertically and horizontally centered relative to the placeholder.

Create slide builds (or layers) automatically.

A build reveals a slide's text and graphics one layer at a time. To create builds (or layers) for all text slides, go to the slide master, select the body-text placeholder, and use the Build Layers command. Choosing 1 in the dialog box, for example, means that every first-level paragraph becomes a new layer in the build.

A build reveals a slide's text and individual characters and topics. Define drawing-tool defaults for patterns, colors, and line styles. Create your own color schemes. Save a collection of drawing objects or clip art on an unused slide, a notes page, a handout master, or the gray area of any slide (in other words, anywhere they won't print).

Create slide builds (or layers) specifically for the Outline view (you can always override the styles for individual characters and topics). Define drawing-tool defaults for patterns, colors, and line styles. Create your own color schemes. Save a collection of drawing objects or clip art on an unused slide, a notes page, a handout master, or the gray area of any slide (in other words, anywhere they won't print).

5 Best-Kept Secrets

1. You can create an entire presentation without using the Outline and still make full use of AutoTemplate formatting.

The key here is to choose New from the Slide pop-up menu. This gives you a brand-new slide with a title and body text based on the slide master. Use the text tool to select the dummy text, and type in new text. You can use the Move Right and Move Left commands on the Text menu to alter the heading level of a paragraph, and the font and style automatically change to reflect the new level (if it is different on the master).

2. You can assign a different type and color to each of the six levels of body text on a master.

Use the text tool to select one or more paragraphs of body text, and then choose the desired styles and color from the Text menu (see Figure 4). You can mix tall and wide overheads in the same presentation. Slide or overhead orientation is always based on the orientation of the master and is usually horizontal (wide). If you prefer an overhead with a vertical orientation, make a new master, don't give it a background (select None from the Background pop-up menu), and choose Tall Orientation from the Master menu. Any slide using this master is now tall instead of wide. This technique always works for overheads, but it's less reliable for slides, because some film recorders can't handle a tall orientation.

3. You can replace the default AutoTemplate without reinstalling the program.

When you install Persuasion, you have the option of installing one AutoTemplate as the default presentation; this file is called Persuasion Pref and resides in the Aldus Folder (inside the System Folder). If you later want to make another AutoTemplate the default, you don't have to reinstall the program. Instead, just create a presentation and adjust the various settings to meet your needs. Save the file as a presentation called Persuasion Pref and store it in the Aldus Folder, where it replaces the original file.

4. Persuasion does animation.

You can use Persuasion's layers to achieve animation effects. Say, for example, that you want to have a ball bouncing across the screen. First, copy and paste the ball at different positions on successive layers of the slide. On each layer, hide the ball from the previous layer by using a solid rectangle whose fill is the same color as the background. Similarly, you can build text word by word (or letter by letter) by sending the appropriate characters of
the text block to different layers.
Note: When you paste or draw new objects, they always go to the current drawing layer. You can change the drawing layer by choosing it from the Layer pop-up menu when no objects are selected.

5 Charting Tips
1. Let your chart data go through the roof.
You can emphasize expanding sales figures by changing a chart’s plot range so that the largest numbers literally go off the chart (see Figure 5). Select the chart, and then choose Axes from the Chart menu and Value Axis Format from the submenu. When the dialog box appears, reduce the value for Plot Range Maximum. Now the longest bars (or highest points) will extend beyond the chart axes.
2. Use Persuasion’s “warm” links to quickly repplot charts linked to external spreadsheets.
You can open a spreadsheet from another program (if it’s saved in text or WKS format and use it to plot selected information. Persuasion maintains a link to this external file, enabling you to update a presentation quickly if data in the original spreadsheet changes.
Simply use the Data Sheet command to open the external spreadsheet, select the data to be replotted, and click on the Replot button on the menu bar.
3. Spice up your charts with some variety by treating them as drawing objects (which they are).
You can flip charts vertically or horizontally and reposition legends and pie slices by double-clicking and dragging (see Figure 6). You can add round corners to bars via the Round Corners command on the Draw menu as well as ungroup any chart and alter the individual elements.
4. Improve the appearance of a resized chart, using the Redraw Chart command.
When you stretch or resize a chart, the screen image may become distorted. If you select Redraw Chart from the Chart menu, the chart will be recalculated based on its new size and replotted, giving you a clean image.
5. Highlight key data points by enhancing individual chart elements.
You can change patterns, colors, and line styles for a single data element as well as for an entire series (see Figure 6). You can double-click on a bar to alter its appearance without affecting other chart elements. Similarly, you can alter the tops and sides of bars, pie slices, and so on: make independent changes to major grids, minor grids, and tick marks; and enhance text for individual category and legend labels.
(Notes: You can use one triple-click instead of two double-clicks to select an individual chart element.)

7 Keyboard Shortcuts
1. Move between slides by holding down the Command key and pressing either the up arrow key (to go backward) or the down arrow key (to go forward).
2. Move between the Outline, Slide, and Notes views by holding down the Command key and choosing the right or left arrow key.
3. Use the Command key to make rescaling easier.
You don’t have to use the selection handles to resize selected objects. Just hold down the Command key and drag the mouse anywhere on the slide. You can also use the Option key while holding down the Command key and dragging to make selections according to the Option key.
4. Resize text blocks without leaving text-editing mode.
Just hold down the Command key and drag the text block. This applies to all text blocks, including those in groups and charts.
5. Select objects behind other objects by using the Option key.
Sometimes you can see an object but can’t select it because another object is in front of it. If you hold down the Option key and drag, you can select an object behind the frontmost object.
On another keyboard shortcut to select several unreachable objects in succession.
6. Change the default text style for one or more levels of the outline without using the Outline Styles dialog box.
Hold down the Option key while you choose any font, size, style, or color from the Text menu, and all the headings on the same level as the selected one will change simultaneously. All the new headings have the new formatting, but local style overrides are preserved.
7. In the Outline view, you can show only first-level subordinates of a heading and hide all deeper levels by holding down the Command key and double-clicking on the heading icon. To re-expand all the subordinates of the heading, hold down the Option key and double-click on the heading icon.

Software developer Peter Potash created versions 1.0 and 2.0 of Aldus Persuasion. A transplanted New Yorker, he is currently working on other software projects in his adopted city, Seattle.
THE BEST PICTURE SHOW

There's more to making great-looking slides than the right presentation software. Here's how to get the best out of both your Macintosh and your slide-imaging center.

Figure 1: After creating slides on your Mac, you export the presentation in one of several file formats — PICT file, Scrapbook file, Autographix, Genigraphics, or PostScript — and send it to your slide-imaging center. The center's software, usually running on a PC, images your slides through a film recorder. The exposed film is processed, cut into slides, and mounted.
olorful, portable, professional-looking—these are just a few of the adjectives that come to mind when you think of 35mm slides. If you also think that making slides on your Mac is easy, you're only partly right, but the good news is that it's getting easier every day.

On paper, the process of making a slide from the desktop looks straightforward (see Figure 1). You create slides on your Mac, using special presentation software such as Microsoft's PowerPoint or Aldus Persuasion (although special software isn't always necessary). When you're satisfied with the presentation you've created, you export it in one of several file formats—Autographix (AGX), Genigraphics, or PostScript, or as a PICT or a Scrapbook file—and send it to a slide-imaging center.

The center's software, usually running on a PC, images your slides through a special camera called a film recorder (for more information about film recorders, see "Graphics on the Slide," November '89, page 156). The exposed film is processed, cut into slides, mounted, and delivered to you, usually within 24 hours. In most cases, the slides look like your screen image.

The complicating factor is that slide-imaging systems and the Mac speak drastically different languages. For a long time, there were few ways to translate between them; now, however, there are solutions that work pretty well, and PostScript promises even smoother processing in the near future.

<table>
<thead>
<tr>
<th><strong>Pros</strong></th>
<th><strong>Cons</strong></th>
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<tbody>
<tr>
<td>PICT, Scrapbook</td>
<td>• Separate PICT files can be hard to keep track of.</td>
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<tr>
<td>• Small files.</td>
<td>• Limited to LaserWriter Plus font set.</td>
</tr>
<tr>
<td>• Can make slides from a wide variety of programs.</td>
<td>• Can be hard to find an imaging center that takes PICT or Scrapbook files.</td>
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<tr>
<td>• Scrapbook lets you store entire slide show in a single file.</td>
<td>• Cumbersome to rescale overhead format to 35mm format.</td>
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<td></td>
<td>• Can be confusing to use.</td>
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<td></td>
<td>• Limited to LaserWriter Plus font set.</td>
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<td></td>
<td>• Limited to Autographix imaging centers.</td>
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<tr>
<td><strong>Autographix</strong></td>
<td><strong>Genigraphics</strong></td>
</tr>
<tr>
<td>• Works with all presentation programs and MacDraw II.</td>
<td>• Good manual.</td>
</tr>
<tr>
<td>• Works consistently with all programs.</td>
<td>• Each slide is a separate document.</td>
</tr>
<tr>
<td>• Automates slide-making process.</td>
<td>• Takes time to print PostScript to disk.</td>
</tr>
<tr>
<td>• Lets the imaging center open document to edit slides.</td>
<td>• Files cannot be revised easily.</td>
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<tr>
<td></td>
<td>• Imaging centers that accept PostScript files can be hard to find.</td>
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<tr>
<td><strong>Genigraphics</strong></td>
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<td>• Good manual.</td>
<td>• Turns to print PostScript to disk.</td>
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Table 1: The type of software you use to create your slides, as well as your imaging center's facilities, will determine which output you should save your files in. Talk to the imaging center's personnel before deciding which format or printer driver to use.
Power Presentations

Which Presentation Program?

If you're thinking of creating a slide show on your Mac, you've probably already read reviews of the major presentation programs: CA-Cricket Presents, MORE, Persuasion (see "The Hidden Persuasion," also in this issue), PowerPoint, and StandOut. Although these packages have different strengths and weaknesses, all are capable of generating artwork for 35mm slides and they're all increasingly competitive in terms of raw features and ease of use (see the "Presentation Software" sidebar, below, for each of these package's main features).

Presentation programs vary considerably in their feel and working style. If you don't already own a presentation package, it makes good sense to choose an imaging service center first and ask the staff members which software they know best. It may turn out that you don't need a special program at all. If you make only a few slides occasionally and don't need the outlining, organizing, or fancy charting functions of a dedicated presentation program, you might be able to use something you already have, such as Claris' MacDraw II. Among its other virtues, MacDraw II generates good PICT files.

If your imaging center can take any PICT file, you can also create slides with programs such as Silicon Beach's SuperPaint or Deneba's UltraPaint or Canvas. And if your imaging center accepts print-to-disk PostScript files, you can create slides from page-layout programs such as PageMaker and QuarkXPress as well as Illustrator and FreeHand. In most applications, you can print a PostScript file to disk by holding down Command-F while clicking on the OK button in the Print dialog box.

There are other good reasons for choosing your software and your imaging center at the same time. For one, if you're creating files to be imaged by Autographix or Genigraphics centers, it's wise to use their proprietary printer drivers (Mac Chooser documents) when you create slides. These printer drivers are included in some presentation packages. PowerPoint includes a copy of the Genigraphics driver, for example, and Persuasion includes the Autographix driver, AGXit!. If your software doesn't include one of these drivers and you want to use an Autographix or Genigraphics center, you can probably get the correct driver from the imaging center for a fee that is usually deducted from the cost of your first slide order. These drivers work with all presentation programs, so you're not locked into using one of the name-brand services if it would be more convenient to use another. Also note that the driver you use has no effect on the quality of your slides.

Most presentation programs work with Autographix and Genigraphics drivers (regardless of whether the drivers are included with the presentation software), and all support exporting files as PICT, Scrapbook, or PostScript formats that can be imaged on film recorders. This doesn't mean you have complete freedom of choice, however. Your imaging center can probably accept only one or two formats (see Table 1 to check where each output format is accepted).

To use one of these drivers, put it into your System Folder, and — preferably before you begin to create your presentation — select it from the Chooser. The proportions of a slide are different from those of your screen or an overhead transparency, and the driver determines which proportions you can work in. Converting an overhead to a slide or vice versa is not handled very well by the software — you have to rearrange the elements on each slide — so it's important to work in slide format from the outset.

Presentation Software

If you're shopping for a presentation program, start by asking your imaging center which software works best with its system — it may turn out that you don't need a special program at all. Here, briefly, are the major packages' pros and cons. (For a more detailed look at these programs, see "The Presentation Pitch," December '89, page 244, and "The Art of Persuasion and MORE II," May '89, page 126.)

CA-Cricket Presents

Computer Associates' Cricket Presents doesn't have a built-in outliner, but it can automatically make slides from Acta outlines. It has strong charting and graphics tools.

MORE

This descendent of ThinkTank, marketed by Symantec, was originally billed as an "idea processor." MORE 3.0 emphasizes outlining — in fact, many people who use MORE as an outlining and organizing program hardly know about its presentation capabilities. MORE 3.0 includes the ability to produce charts, a much-needed feature absent from earlier versions.

Persuasion

One of the two most popular presentation packages (Microsoft's PowerPoint is the other), Aldus Persuasion is a graceful Swiss army knife of a program. Its many templates range from basic to wild and provide lots of inspiration for your own designs. It also provides an interactive outliner and competent drawing and charting tools. Many service-center operators are familiar with Persuasion and PowerPoint, which may make them better able to support these programs than others.

PowerPoint

Microsoft's PowerPoint doesn't have many bells and whistles — no built-in outliner, no flashy graphics. You can import graphics and outlines only from ThinkTank or the first version of MORE, neither of which is used much anymore. Despite these limitations, many service-center operators consider PowerPoint the most reliable and stable of all Mac presentation programs.

StandOut!

Letraset's StandOut focuses on layout, graphics, and typography. It has no outliner, nor can it import outlines from other sources; it does accept word-processing documents, however. StandOut provides great control over imported images and type (including a search-and-replace function that some layout programs could use).
Some imaging centers have more than one way of imaging slides from a Mac. A center affiliated with one of the traditional slide-imaging companies — Autographix, Dicom (formerly Crosfield Dicom), Genigraphics, or Management Graphics — cannot image files made with a competitor’s printer driver. They may, however, accept PICT or Scrapbook files, on the one hand, or PostScript on the other, as well as their own files. You have to ask.

Choosing a Slide-Imaging Center

No matter how effective your presentation software, you’re most likely to produce good slides if you have a strong working relationship with your imaging center. Before making your first slide, talk to — or better yet, visit — a few imaging places. A good slide house can contribute more to your success at slide making than any other decision you make. If you’re lucky, you’ll find one with an especially capable person (probably known as “the guru”) who understands Mac files, fonts, and film recorder technology. These gurus see thousands of slides and have a good idea of what works and what causes problems. Follow their advice.

It’s important to find an imaging center that processes the film and makes the slides. Don’t choose by price alone. In fact, a fair price — around $7 to $12 per slide — is one of the signs of a competent service bureau with operators who can take time to answer your questions and help you produce high-quality slides. If the prices are too low, they may be rushing jobs out the door or relying on older film recorders. If the prices are too high, the place may be badly managed or it may not be seriously in the imaging business. Most slide houses accept files on-disk or by modem, returning your slides by overnight express (for a premium) or by regular mail.

Most cities have several imaging centers or slide shops. You can find them listed in the telephone directory under headings such as Slides, Computer Graphics, or Audiovisual Production. A few are listed in the booklets that come with presentation-software packages, but these lists are often out of date and not always complete. Genigraphics has a nationwide toll-free number; it routes your files to the closest imaging center. (See the directory in this article for more information on how to find the right imaging center.)

Although there are unaffiliated shops, most imaging centers are either independent licensees of Autographix, Dicom, or Management Graphics, or they are branches of Genigraphics, which operates its own service centers. To confuse matters further, Autographix also operates its own imaging centers, which compete (at higher prices, generally) with its licensees.

**Autographix.** Autographix-based imaging centers are everywhere. Some are part of Autographix itself, and some are independent service centers. Of the latter, some are “authorized,” which means they’ve negotiated an exclusive right to advertise as Autographix imaging centers in a particular city or region. You often find the best prices at centers that aren’t authorized, because they don’t have to pay a fee to Autographix for every slide they image.

The Autographix printer driver works with all the major presentation programs, but as with the Genigraphics driver, some users find it trickier to use than systems that work with PICT or Scrapbook files. There are trade-offs either way — a system that can make a slide from a
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<table>
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<th>Monitor/Color Card</th>
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<tr>
<td>Complete 8-bit color system (14&quot; monitor with Color Board 20B)</td>
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<td>Seiko 14-inch color monitor</td>
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<td>RasterOps 8-bit color board</td>
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<td>RasterOps 24-bit color board</td>
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Printers

Laser Printer Value
Buy the TI microLaser — you'll save money and get a great printer in the bargain. This Macintosh-compatible PostScript printer is compact, user-friendly, upgradeable and affordable. Featuring a complete package of Adobe PostScript and HP LaserJet Series II emulations, the microLaser PS prints at 300x300 dpi and flaunts 11 PostScript font families with a total of 35 different fonts. And, at just over a foot square, the microLaser fits neatly on your desk.

<table>
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<td>with AppleTalk</td>
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<td>Envelope Feeder</td>
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<td>Second Paper Drawer</td>
<td>$329</td>
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<tr>
<td>TI microLaser RAM upgrade</td>
<td>$358</td>
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Drivers

Drives
Driving a great value
You need a drive you can count on, and the Protegè drive from MacAvenue is everything you'd expect from the best drive in the business. It's quiet, cool, quick, elegantly engineered, tough enough to travel and priced to move. Disk Management Software implements disk spanning, drive partitioning and password protection. And the Protegè is the only drive on the market bundled with On Location — the excellent new file-finding utility from Mitch Kapor — a $129.95 value. FREE!

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<td>155MB (Quantum)</td>
<td>$895</td>
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<tr>
<td>Protegè Carrying Case</td>
<td>$125</td>
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Take a Little Drive
Tired of constantly swapping disks to copy files or run applications? Give yourself a break and buy the Fujitsu 800KB floppy drive for your system. This disk drive is a reliable alternative to disk juggling.

<table>
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Boards

Capturing Color
The Aapps DigiVideo color card lets you capture color images from any video source through a window on your Mac screen. DigiVideo imports the video image in PICT II format and gives you the flexibility to change the screen size, enhance the picture resolution, and integrate HyperCard XCMDs.

<table>
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### Hardware

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<td>Memory</td>
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### Software

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<td>Utilities</td>
<td>2362 - System 6.0 for Mac</td>
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From Your Best Source for Macintosh Products

Memory
Memory Power
Take advantage of MacAvenue memory upgrades to upgrade your Mac Plus to 4MB of RAM or take your SE30 to 8 MB. MacAvenue offers only the best surface-mounted, 80-nanosecond memory products. To save the time and expense of installation, you'll get a step-by-step installation guide with a tool to "crack" the Mac Plus or SE. If you want to speed up printing of complicated graphics and heavily formatted reports, beef up your printer's RAM as well.

2 x 1MB SIMMs (80ns) 25480—$138
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Scanners
Color Scanner at a Gray-scale Price
The MicroTek 300Z Color Scanner is a full-featured color scanner — 16.8 million colors, 256 shades of gray, 24-bit color and 300 dpi resolution. You expect these features in a color scanner, but the MacAvenue bargain price will give you a double-take. This scanner is complete with Digital Darkroom image editing software.

300Z Color Scanner 22755—$2049

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Where in the USA is Carmen Sandiego 28676—$28

Born on the Fourth of July
If you leave your monitor on for too long, it will burn itself out. Install Pyro! and you can rest easy. If your screen is unattended for too long, this Control Panel Device kicks on automatically and prevents phosphor burnout in your monitor by replacing the screen image with random visual pyrotechnics.

Pyro! 30399—$21

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- Orders placed by 8:00pm, CST, weekdays for "in stock" items ship the same day (barring system failure and to shipper's "next day" zip codes) with a $2 overnight delivery charge.
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Network: 559-2049
If You Don't Want to Do It Yourself . . .

If you don't have the time, the resources, or the expertise to create your own slides, you can always have a slide show designed and produced by presentation specialists, such as graphic designers or the experts at your slide-imaging center. Here are some of the options:

**Graphic Designers**
There are firms that specialize in audiovisual, video, or multimedia productions, as well as general design studios. They may use traditional slide-creating techniques (using mechanicals imaged on precise, motor-driven staging cameras), computer graphics (using either high-end dedicated systems or small computers with off-the-shelf presentation software), photo and video equipment, or a combination of these techniques. You would probably use one of these firms when you needed to present stunning graphics or special effects, as their work is labor-intensive and usually very expensive.

**Imaging Centers**
Many imaging centers offer custom slide creation from your designs or theirs. Their dedicated computer-graphics systems offer more special effects than does the Mac with presentation software, and they run faster. It's one of the best approaches when you need slides in a hurry, and it's a good solution for the few tricky slides in a presentation you're producing yourself. Run out the simple slides from your software, and hand the more difficult ones to your imaging center's slide-production staff. They'll be able to match colors and type styles exactly, because they're outputting the rest of your job on the same equipment.

**Management Graphics' Quick Chart**
Even if you're on a budget, you can have slides — simple ones, at least — made without much effort. Management Graphics-based imaging centers may offer Quick Chart, a menu-driven slide-creation system. You use your Macintosh, a modem, and any telecommunications program to call in to the center. You then select the slide type (text, pie chart, and so on), enter text or values for charts, and let the remote system do the rest. The imaging center stores your basic format, including background and text colors; merges it with the data you transmit; and usually turns the slide around overnight.

**Autographix or Genigraphics**
Another of the old-time dedicated slide-making companies, Genigraphics has moved gracefully into desktop slide making. A Genigraphics printer driver comes bundled with PowerPoint, but for $45 (refundable with a slide order), you can buy a "generic" version that works with every Mac presentation package. This driver includes a useful preview utility called GeniPeek, which shows you the film-recorder version of your slide (not an approximation of it created by your presentation software). GeniPeek is not included with the PowerPoint package, but you can use it (and the generic driver) with PowerPoint as well as with other programs. All Genigraphics network imaging centers are served by a toll-free modem line ((800) 441-4364), which routes your files to Genigraphics' Memphis facility.

**Management Graphics**
Before the Mac had color, one of the few relatively easy ways to make 35mm slides was with Management Graphics' EasySlider, which lets users translate and add color to PICT files. Today's Management Graphics-based imaging centers (they're all independent) may offer EasySlider II or RIPit!, a custom version of Freedom of Press Professional. RIPit! allows a Solitaire film recorder to image print-to-disk PostScript files, including PostScript graphics and any Type I fonts.

**Visual Business Systems (VBS)**
This British vendor of PC-based slide-production workstations also sells its Output Manager Professional to imaging centers, which lets them image Mac PICT or Scrapbook files on Solitaire film recorders. VBS also markets Visual Business Systems No. 5, a Mac charting program designed for 35mm slides.

**PostScript Is Coming**
Users are clamoring for PostScript slide-imaging systems. It's not that PostScript slides are necessarily of much higher quality than others, but PostScript does have several advantages. First, it lets you make use of the precision and flexibility of sophisticated graphics programs such as PageMaker, FreeHand, QuarkXPress, Illustrator, and Photoshop. In addition, any PostScript fonts that work with LaserWriters, imagesetters, or other PostScript output devices can work with film recorders.

There are also disadvantages to PostScript slide making. A PostScript file of a slide may be larger than the same slide output as a PICT file, with little or no discernible quality advantage. With PostScript (as with PICT), each slide becomes a separate file, which makes your presentation hard to keep track of if it has more than a few slides. Using the Autographix or Genigraphics driver, or making a Scrapbook, makes it easier to control large slide shows. If you don't need special fonts or intricate drawings, PostScript may not be the right solution for your slide show.

Film recorders are not PostScript imaging devices any
more than Linotronic imagesetters are. Each type of output device has its own language and must have your PostScript document interpreted or translated — RIPed (raster-image processed) — before it can create a hard copy. There are several techniques for interpreting PostScript for film recorders. Adobe’s new Emerald RIP is one solution, although manufacturers will have to incorporate it into their film recorders. Most of the solutions are software — VBS’ Output Manager Professional, Custom Applications’ Freedom of Press for the PC, and Management Graphics’ RIPit! are available for imaging centers. Freedom of Press Professional for the Mac, which works with film recorders and other output devices, should be available this fall.

**Tricks of the Trade**

Once you have your presentation software and have chosen a slide-imaging service, there are still a few hurdles to cross before your completed slide show is in your hands. The following tips can help you sail through the process:

• **Use a color monitor.** If you have a color monitor and a monochrome monitor, boot your Mac with the color one.

• **Select the printer driver before creating slides.** If your software includes a special driver for writing slide files to disk, always go to the Chooser and select it before launching the program. Converting from another format is always more difficult than working in slide format from the outset.

• **Avoid side-to-side or diagonal blends.** Film recorders are raster devices, which write images in horizontal lines. Although your presentation software may make it easy for you to create ramps of graduated color that change in intensity from left to right or even diagonally, the film recorder can take a long time to image such a slide. A ramp that changes from top to bottom, on the other hand, can run efficiently. (This doesn’t mean you can’t have a diagonal blend if you need it, just that it carries a price — literally, if your service bureau charges extra for slides that take more than a minute or two to image.)

• **Control your fonts.** The only way you can use fonts other than the 11 that are resident in the LaserWriter Plus is to print PostScript to disk and have the files translated to film-recorder format by one of the PostScript interpreters (such as RIPit!, VBS Output Manager Professional, or Freedom of Press Professional). This means you cannot use the Adobe equivalents of the LaserWriter fonts (or any of the named styles) under most circumstances (see the “Using Fonts in Slides” sidebar).

• **Test your files before running an important job.** Create a small file containing the types of slides you normally use — word slides, pie charts, diagrams, and so on — and send them to any imaging center you’re thinking of using. This is also a good way to determine which format you prefer to work with.

• **Double-check every slide just before exporting your files.** More mysterious shifts in type and other elements seem to occur with presentations than with other types of files. Sometimes PICT files fly apart when you ungroup them in a presentation program — files from Canvas and DeltaGraph seem particularly prone to this. If you must rearrange the elements, reassemble and regroup them; check the slide before processing just to be safe.

**Future Perfect**

Only a few years ago, creating a slide show was a big (and very expensive) deal. We’ve come a long, long way. True, it can be confusing in the beginning, as you struggle to find an imaging center you can work with (possibly the most important decision in the entire process), learn new software, and solve all the little problems that inevitably accompany new undertakings. But after a couple of slide shows, you’ll wonder what all the fuss was about.

Kathleen Tinkel is a Connecticut-based graphic designer who writes frequently about computers and design. She is copublisher of MacPrePress, a weekly faxed newsletter.
RUNNING THE SHOW

With the right accessories, turning your Mac’s screen into the silver screen can be a breeze.

Figure 1: Using LCD projection panels is one of the most convenient and cost-effective methods for giving a presentation. These panels behave like electronic transparencies, letting you use an overhead projector to display your Mac screen. LCD panels were originally available only in monochrome, but some of today’s models can display many of the colors on your Mac screen.
You've put together a slick presentation and it looks great on your monitor, but now you have to find a way to show it to a wider audience. You could turn your images into slides or transparencies, but these have their own constraints — once you've prepared them, it takes time, money, and effort to make changes or corrections. The best solution would be simply to project your Mac screen on the wall so that you'd have all its interactivity at your disposal. Thanks to today's presentation peripherals, you can do just that, and they're turning the Mac into a killer presentation machine.

**Video Projection Systems**

One way of displaying your Mac screen to an audience is with a video projection system, which displays the Mac's video image on a screen or wall. The Project-A-Mac II color video projectors from PDS Video Technology are examples of such systems. Video projectors have the advantage of displaying a true video image, so you see the same color and motion on the screen that you see on the Mac.
your monitor. Unfortunately, these systems are big and expensive (the Project-A-Mac series costs from $14,400 to $22,400), making them impractical for all but the largest — and best-funded — businesses. A newer, cheaper, and more convenient technology is the LCD (liquid-crystal display) panel.

**LCD Panels**

LCD panels let you use an overhead projector to display what's on your Mac's screen. These panels are similar to the LCD displays installed on laptop computers such as the Macintosh Portable.

LCD panels are a little like electronic transparencies — if you hold one up, you can see through the glass. You plug the panel into a power source, connect it to your Mac, and place it on an overhead projector. Your Mac's screen image is then generated on the LCD panel. When the projector's overhead light passes through the panel, the image on the panel is projected on the wall. (For more about LCD panels, see “Color LCD Technology,” February '90, page 230.)

LCD technology is evolving rapidly, and several kinds of panels are now on the market, including panels that can display virtually every color on your screen. The first panels were monochrome, typically blue and white. (These panels are still available — for example, Computer Accessories' Proxima Data Display 342.) True black-and-white panels are also available, and these work well with the crisp black-and-white Mac screen. At a cost of about $1,500, monochrome panels are the least expensive LCD panels you can buy.

Gray-scale panels add another layer of sophistication to presentations by letting you make better use of your monitor's color or gray-scale capabilities. These panels assign each color in your presentation a shade of gray or a geometric monochrome pattern, such as cross-hatching or diagonal lines. The Apollo PC 9600, for example, assigns eight geometric patterns, similar to the black-and-white patterns in the MacPaint palette, to the colors on your screen. Other panels, such as the nView ViewFrame H+2, convert colors into eight or more shades of gray.

Gray-scale panels range in price from $1,500 to about $4,500, depending on the number of shades and other features available. They are a useful and effective means of displaying your presentation, but if you want to use color, clearly shades of gray won’t do. Fortunately, there's been an explosion of color in the LCD market, and you can now create slick color presentations — just what you need to show your company's transition from the red to the black.

There are two kinds of color LCD panels: simulated color and true color. Simulated-color panels, such as the Proxima Data Display MultiMode from Computer Accessories, convert the colors on your Mac screen to a range of yellows, oranges, browns, and purples. For between $2,000 and $3,000, you get colors that are differentiated from each other but that bear no (or little) relation to the actual colors on your Mac screen.

Simulated-color panels were the forerunners of true-color panels, which let you display the same colors as those that appear on-screen. True-color panels are the most expensive LCD panels you can buy — depending on the number of colors available, they cost between $5,000
and $6,500. At the low end of the price scale are products such as the 480C PC Viewer from In Focus Systems, which displays eight colors (red, blue, green, cyan, magenta, yellow, black, and white). At the high end you find another In Focus product, the recently announced 5000CX panel, which offers a palette of 4,913 colors (adequate for accurately displaying a color slide or photograph). Computer Accessories and nView also market true-color panels.

Color LCD is the wave of the future. We’ll soon be seeing this technology not only in niche products such as LCD projection panels but also in portable televisions and Mac monitors.

LCD panels do have one drawback: Unlike projection systems, they don’t have the same refresh rate as monitors do. A monitor updates the screen image 60 to 80 times a second, and although an LCD panel’s electronics have no trouble keeping up with this, the panel itself has a refresh rate of only four to five frames per second. As a result, the cursor isn’t always visible if you move it quickly across the screen, and it’s not practical to try to show presentations that include elaborate animated sequences — physically, the panel just can’t keep up.

Panel Pros and Cons

LCD panels do have several advantages as presentation platforms. Even their slow refresh rate has a benefit — you can use it to produce attractive fades between images. Several models give you the option of loading your presentation directly into the LCD panel, so you don’t even need a Mac for your presentation, just the LCD panel and an overhead projector. For example, In Focus Systems’ Liteshow II (which should be available in October) is a true-color LCD panel that lets you save your presentation on-disk so it can be loaded into the panel. You can reorganize the material without going back to your Mac and add special effects, such as wipes, dissolves, and fades. In Focus also has an optional storage module, called the Presentation Module, for its PC Viewer series that can store 50 or more gray-scale screens. The Apollo PC-9800 can store 50 or more gray-scale images on its built-in 2-inch floppy disk.

If you don’t like the hassle of hooking up your panel to an overhead projector, Dukane’s MagniView 800 VGA Multisync Data Projector combines an overhead projector with a simulated-color LCD panel. At a cost of $1,895, this is a reasonably priced product for streamlining your presentation.

A variation on the LCD panel is the Looking Glass Light Writer from Chisholm. The Looking Glass is an LCD panel that can display up to 30 simulated colors; the Light Writer is a graphics tablet. With this combination, you can project an image with the LCD panel and then annotate it by drawing on the graphics tablet. Your drawings are displayed on the panel over the screen image.

Before you spring for an LCD panel, there are a few things to consider. First, how will you connect it to your Mac? You may need to purchase a special adapter in order to use the panel with your Mac. These adapters can add up to $250 to a panel’s list price. Panels that work with the Mac II series plug into a video card; most come with a cable that lets you view the image on the monitor as well. The closed Mac systems — the Plus, the SE, and the
The presentation market has spawned some interesting innovations. Applied Resources recently introduced the Information Station, a floor-standing device that has a 24-x-34-inch vertical display area. This $15,000 unit operates a little like a paperless printer: Screen images from your computer are translated into monochrome TIFF files, which the Information Station "prints" by electrostatically applying magnetic toner to a white Mylar film loop. The image is printed on the loop as it scrolls up within the display area; it's erased when the loop scrolls behind the unit.

The Information Station's image size is 1,680 dots by 2,391 lines, with a resolution of more than 70 dpi. It can create a full screen, even with halftones, in about nine seconds.

Currently, only an interface for DDS machines exists. Applied Resources had not announced a Mac product at press time, but you'll probably see such a product in the near future.

For more information, contact Applied Resources, Inc., 220 Van Eyck, 7007 College Blvd., Overland Park, KS 66211; (800) 826-7963 or (913) 469-9191.

Remote Controls

Your presentation uses graphics, stereo sound, and some sexy animation. Great stuff, but don't forget this is your presentation. You, not your Excel chart, are the star of this show. The last thing you want is to be stuck behind your Mac feverishly punching in commands. What you need is a remote control, which lets you run the presentation and stay in the limelight.

You're in luck — there's a new crop of remote-control devices designed to let you perform basic keyboard and mouse functions while you walk around and away from the Mac. They use an infrared beam to send their signals, as a TV remote-control unit does, and they have a range of about 30 feet.

You can perform typical functions such as moving the cursor on-screen, clicking or double-clicking on mouse buttons, and selecting menu items. You can program some of these devices to perform a sequence of steps with one click, or they can work with existing macro programs such as QuicKeys or MacroMaker to perform several operations with a single click. Most presentations can run with only simple clicks or keystrokes, so remote-control devices let you get your presentation moving while leaving you free to make the most of your presentation.

The simplest type of remote control has a useful group of built-in keyboard and mouse functions. For example, Forté's Remote Keyboard comes with a good selection of general-purpose keyboard and mouse actions. Nine mouse keys let you move the mouse pointer horizontally, vertically, or diagonally as well as perform a mouse click. Ten keys are dedicated to common menu items — New,
Open, Close, Print, Quit, Undo, Cut, Copy, Paste, and Select All — and there are also keys for Return, Delete, Tab, and the space character. Through a Shift function, the device's entire keyboard is remapped to produce the alphabet and the ten digits. Finally, the keyboard has four cursor-control keys and six user-assignable function keys. These generate the codes used by FS through FIO on the remote. Let you reassign 28 keys to any keystroke or macro procedures. Most remote-control devices come with some kind of programmability: Some simply generate a character when you press a button; others perform entire macro sequences. Unfortunately, they're almost all awkward or difficult to program. Sayett's Smart Remote uses a complex system of LED lights to program the remote. SilentPartner and On-Command use Mac software to change their key assignments.

With a more complex remote-control device, you can redefine virtually every key on the remote keyboard to generate a mouse or keyboard action. Computer Support's On-Command and Sayett Technology's Smart Remote let you reassign 28 keys to any keystroke or mouse movement. With On-Command, once you have redefined a key set, you can save the set to a file.

SilentPartner from Presentation Electronics has expanded capabilities for redefining the remote keyboard. You can define three sets of key meanings and switch between them while running the presentation. These sets give you up to 60 active keys per presentation.

**Controlling Factors**

If you move the cursor with a remote control during your presentations, you'll notice that it has a different feel from a regular mouse or trackball. With a remote control, you move the cursor by holding down a button: When the button is down, the cursor moves; when you release the button, the cursor stops. It's pretty easy to miss or overshoot the target, because you don't directly control the movement as you do with a regular mouse. On-Command lets you configure the way the cursor keys move the cursor, making it by far the easiest and most accurate remote control to use.

Remote-control devices can be complex to operate, because they are designed to perform many functions with a limited number of keys. You must use special modes and shifted functions to perform all the operations, so they can be difficult and awkward for complicated procedures. The macro capabilities of these devices are relatively limited, so you're probably better off creating automated sequences with an application such as QucikKeys from CE Software or Hot Keys from K.I.S.S. (Keep It Simple Software). You can then use a simple remote-control device to implement these commands. This solution is simpler and more powerful than relying on the macro facilities of the more complex remote controls.

**Presentation Power**

Despite their limitations, LCD panels and remote controls give you the tools to express your own compositions with all the interactivity and power of your Mac. The LCD panel lets your computer strut its stuff, and the remote control lets you express yourself without being hunched behind the computer. Combine these peripherals with software such as HyperCard, SuperCard, and Macromind Director, and you can put together a presentation machine that will knock 'em out in any boardroom in America.

Howard Bornstein is a Mac journalist and the author of *Turn and Burn: The Authoritative Guide to Falcon*, published by COMPUTE! Books.
There are a lot of contenders—and pretenders—coming into the Macintosh market with so-called “full-featured” CAD programs. But there’s one program these imitators won’t compare to: MiniCad+. It set the standard for all Mac CAD programs when it was introduced in 1986, and continues to set the pace in Macintosh-aided design.

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A Digital Portrait Montage

Here's how to create a montage of scanned and modified photos with the embossed look of a relief.

Using childhood photographs, designer Jack Davis has created a series of self-portrait montages. Instead of turning to traditional photographic techniques, however, he produced the montages on a Mac II with image-editing programs such as Photoshop, PhotoMac, and Studio/8. For the embossed self-portrait shown in Figure 1, Davis used ImageStudio 1.5 and its new Effects modules. This project could be similarly executed in the programs mentioned above or in Digital Darkroom.

A photo of a running boy provided an overall background and frame. To give the figure a sense of movement, Davis silhouetted it in a second document and pasted it back into the original twice. The copies were resized, rotated, and rendered semitransparent. Two other figures were also silhouetted and pasted into place. Using ImageStudio's Relief effect, Davis transformed the finished montage into an image with the classical refinement of a carefully carved bas-relief on plaster or stone.

Verbum: The Journal of Personal Computer Aesthetics can be reached at Box 15439, San Diego, CA 92115; (619) 233-99n.

By the editors of Verbum magazine
3. Painting Out the Sky

A small square snapshot of a running boy provides the background. To add drama to the image, the sky is painted out. The unwanted pixels are eliminated using three tools: the lasso for large areas, the eraser for smaller chunks, and the paintbrush for fine details.

4. Silhouetting the Figure

To silhouette the running boy, the image is first resaved as a new document. Then the boy is carefully separated from the background, using the paintbrush. The tool’s default anti-aliasing mode provides a smooth transition of grey values along the figure’s edges. Once the boy has been extricated, the entire background is removed with the lasso and the eraser.

5. Adding a Transparent Copy

The silhouetted figure is copied to the Clipboard and then pasted into the background image. Design Effects is selected from the Effects menu and is used to rotate the pasted figure slightly, reduce it in size, and render it 50 percent opaque. The dialog box shows a preview of the existing image, along with the newly added figure. Position, angle, and size can be adjusted either by moving the selection box around the figure or by specifying numbers in the parameter fields.

6. Adding More Figures

Another transparent copy of the running boy is added to complete the effect of movement. Then a boy from another photograph is silhouetted, copied to the Clipboard, pasted into the background, and positioned. A shadow is created beneath the new figure by selecting the appropriate area with the lasso and decreasing the brightness.
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7. Joining the Figure and Background

The pasted figure has a "halo" of light tones left over from the silhouetting process. To meld the figure more seamlessly with the background, the halo is carefully eliminated by drawing along the light areas with a small brush loaded with a gray selected from the adjacent background. Selecting Only on Lighter Shades in the Paintbrush Shading Preferences dialog box ensures that only pixels lighter than the selected gray are changed.

8. Flipping a Figure

A third figure of a boy is silhouetted from its scanned image and pasted into the background. This figure is turned upside down using the Flip Vertical command, and its shadow is drawn by eye using the same technique as in Figure 6. The montage is now complete.

9. Creating a Relief

The entire image is selected and modified with ImageStudio's Relief effect. The Light Source Bearing and Light Source Elevation are set to 45 and 15 degrees, respectively, to simulate a light shining from the upper left and slightly above the image. The Height Scale Factor determines how deeply etched the relief will be.

Toolbox

Hardware: Mac II with 5 megabytes of RAM and 100-megabyte hard-disk drive, Microtek gray-scale scanner, LaserWriter II/NTX (for proofing).
Software: ImageStudio 1.5 with Effects modules. (The Effects modules are bundled with ImageStudio 1.5. For registered users of earlier versions, the modules are either free or $99, depending on when ImageStudio was purchased. Contact Letraset for details.)
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Prepress: The OPI Option

The Open Prepress Interface may help streamline the transmission of TIFF images from design to prepress.

When it comes to top-quality color publications, Mac-based publishing is not yet ready for prime time. The Mac can be an integral part of the publishing process, however, thanks to the recent introduction of links to high-end prepress systems such as those from Scitex, Crossfield, and Hel. These prepress links let you create a publication on the Mac and then transmit it to a prepress shop, where the publication is merged with high-quality scanned color photographs and color-separated to film.

Of course, the process isn’t really as simple as it sounds, and there are pitfalls such as the processing of color photographs. Designers can place, rotate, and crop low-resolution scanned images on the Mac, but the entire process must be duplicated on the prepress end, when console operators manipulate high-resolution versions of the photographs. This duplication of effort adds time and money to the production process.

Aldus, the creator of desktop publishing, hopes its Open Prepress Interface (OPI) will overcome this obstacle. Introduced in March 1989, OPI is actually nothing more than a standard method for describing the placement, scaling, cropping, and color of TIFF images. (TIFF, the standard file format for scanned images, is also an Aldus invention.) When a page layout is saved to disk, OPI comments are embedded in the PostScript code and passed along to the prepress system, which uses them to automate the process of replacing low-resolution scanned images with their high-resolution counterparts. This technique, often called electronic stripping, theoretically should save you costly console time at the prepress shop.

To show you how OPI fits into the design-to-prepress operation, here’s a short overview of the process. A prepress shop scans color photographs and creates two versions: low-resolution TIFF images for designers to use in laying out the pages, and high-resolution images that are stored in the prepress system for later use. Using a Mac, designers incorporate the low-resolution scans into the page layout, adjusting them to meet their needs. When the completed layout is saved to disk, OPI comments are generated automatically.

The file is then sent to a prepress shop, where a RIP (raster image processor) translates the PostScript file into the prepress system’s proprietary format. If OPI is not being used, prepress operators must manually insert the high-resolution color scans and duplicate the designers’ cropping, scaling, and positioning. With OPI in place, however, the prepress system can automatically perform all the image replacements and adjustments. The embedded OPI comments tell the prepress system which files to find, where to place them, how to crop and size the images — all the chores console operators would normally have to do. The entire page can then be color-separated and output to film.

In order for OPI to work, it has to be supported both by the page-layout software, which generates the code, and by the prepress system, which must be capable of interpreting the information. Aldus hopes that all software and prepress vendors will support OPI, making it the standard way to convey TIFF data. An OPI standard would have another major advantage: You would be free to use any combination of page-layout software and prepress service, rather than being tied to the exclusive relationships that currently exist between some prepress operations and Mac software developers.

Thus far, OPI has garnered support from several prepress vendors, including Hell, Crossfield, Diadem, Howtek, Kodak, Chelgraph, Screaming Color, and Networked Picture Systems. (At press time, Scitex was a major no-show in this group.)

On the Mac side of things, you have access to OPI if you use Aldus PageMaker 3.02 or 4.0 (naturally), QuarkXPress 2.12 or 3.0, Letraset’s DesignStudio 1.01 or ColorStudio, or Pre-Press Technologies’ SpectreSepts.

OPI sounds great in theory, but it too has drawbacks. For example, OPI works only with TIFF images that are cropped rectangularly. You’re out of luck if you want to frame your photograph in a circle, triangle, or polygon. And although OPI lets you rotate an image and its frame, you can’t rotate just the image within the frame. More importantly, logistical problems associated with the OPI work flow could increase your prepress bill. For example, before prepress operators can scan an image, they must know the final output size. This information is required for setting the proper pixel resolution for the scan. It’s a classic case of catch-22.

The designers don’t receive the placement images until the scans are done, and the prepress shop can’t perform the scans until the image sizes are set.

Why is it so important to know the image size at scan time? Because most prepress systems aren’t very good at resizing continuous-tone images. Image quality suffers, plus scaling and rotation (if required) take an enormous amount of processing time. It’s usually much simpler just to rescan the image. Thus, if designers resize or rotate images, they must pay for additional scanning time.

OPI is most practical in situations in which the final image sizes can be determined early in the process and the designers alter only placement and cropping. If you really need the freedom to play with images on-screen, however, try using a desktop color scanner to create your placement images. When you send the file to the prepress shop, include laser-printer output as a placement guide, along with the original transparencies for the high-resolution scans. 

By Keith Baumann and Aileen Abernathy
The NeXT Cube
Almost Gets a Mac
Floppy-Disk Drive

MacUser
NetWorkShop
looks at sharing
files between
the Mac and the
NeXT — using
floppy disks.

The NeXT computer has lots of impressive features, but its lack of a floppy-disk drive is not one of them. Typically, NeXT machines living in close proximity to each other will be networked together — Ethernet is built in — which makes NeXT-to-NeXT file sharing relatively easy. But what if you want to export a drawing done on the Mac, say in Illustrator, into a FrameMaker document on the NeXT? For Macs that aren’t on Ethernet, which is most of them, network transfer is out. You could try begging the NeXT optical read/write drive to read the data off your Mac floppy. But save your breath. Basically, you’ve got a problem.

Three third-party vendors — Dayna Communications, DIT (Digital Instrumentation Technology), and Pacific Micro — have solutions to this quandary. All three companies make floppy-disk drives for the NeXT that attach to its SCSI bus. All three drives read and write DOS- and UNIX-formatted floppies, and one of them reads Mac floppies as well.

1 Disk, 2 Disk,
Black Disk, Blue Disk

Before we launch into the details of the three products, however, we should bring up a rather significant (but perhaps not immediately obvious) point: We’re dealing with three operating systems and twice as many floppy-disk formats here. The Mac operating system supports two floppy formats: 800K (the most universal) and the newer 1.4-megabyte high-density drive (FDHD). (There’s also the old 400K format for the Mac, but that’s all but obsolete.) The UNIX operating system, which the NeXT employs, can also format high-density (1.4-megabyte) floppy drives, but of course, this format is inconsistent with the Mac’s 1.4-megabyte format. And then there’s DOS, which supports 720K and 1.4-megabyte formats on 3.5-inch floppy disks and a 1.2-megabyte format on 5.25-inch disks. (DOS also has an older 360K format.)

DOS? Why mention DOS in a story about Mac-to-NeXT file transfer? We wish the answer were, “Well, you might want to move files from a DOS machine to the NeXT too.” Unfortunately, the real answer is that as of press time, all three products relied heavily on DOS as an intermediate format for moving files from the Mac to the NeXT. With one exception, you have to save your Mac files in DOS format before you can make the transfer.

Does this mean you need to buy a DOS floppy-disk drive for your Mac too? No, AFE (Apple File Exchange), a utility that comes with the Mac’s System software,
lets you read, write, and format DOS floppies in the Mac’s internal disk drive. This procedure is cumbersome if you do it often, however. AFE is not integrated into the Finder, and it doesn’t mount DOS disks on the Mac’s desktop. A better solution is Dayna’s DOS Mounter INIT ($89.95), which correctly places DOS disks on the desktop. DOS Mounter blurs the distinction between Mac and DOS disks. You can then copy files back and forth between the Mac and DOS-formatted disks by dragging the file’s icons in the Finder. With DOS Mounter installed, you only need to use AFE to initialize DOS disks.

Another important point is that none of the NeXT floppy-disk drives reviewed here can read or write 800K Mac floppies. If you’re going to move files from the Mac to the NeXT — at least as of press time — you will need a Mac with an FDHD drive.

DaynaFile for NeXT

The DaynaFile for NeXT is a matte black box with an external power supply that houses one or two half-height drives. The DaynaFile is available in three configurations: a single 5.25-inch drive (for 1.2-megabyte disks) for $750, a single 3.5-inch drive (which supports both 720K and 1.4-megabyte disks) for $850, or both drives for $1,105. The 3.5-inch drive is the only one you really need in order to exchange files between a NeXT and a Mac, but if you also want to move files to the NeXT from DOS machines that have 5.25-inch drives, you’ll need a DaynaFile.

The DaynaFile for NeXT comes with two NeXT applications: DaynaDOS and DaynaUnix. To install these applications, you have to execute some UNIX shell commands to get the application files onto a local NeXT drive. (This text-based installation procedure is virtually identical for all three drives we reviewed.) Dayna’s manual does a particularly good
job of walking you through the process. The DaynaFile for NeXT can read and write only DOS floppies, and Dayna has no plan to overcome this limitation. Therefore, Mac files must be saved on a DOS-formatted disk before transfer to the NeXT. DaynaDOS is the application that accesses DOS disks. It opens a dialog box that looks a lot like the NeXT’s Browser, with two file lists displaying the local NeXT file directory and the other the files on the floppy disk (see Figure 1). DaynaDOS provides you with the option of performing rudimentary file translation for PC files, but you don’t really need to do this to transfer files between Macs and NeXT machines. In fact, translation corrupts binary file types such as those of Wingz and WriteNow.

DaynaUnix lets you initialize and mount UNIX-formatted floppy disks in the DaynaFile. To exchange floppies between two NeXT machines, each with a DaynaFile, you don’t have to use DOS floppies. When the DaynaUnix application is running, it makes UNIX-formatted floppies visible and accessible directly from the NeXT Directory Browser or any NeXT application, just as the DOS Mounter INIT does on the Mac.

Table 1: Supported Floppy-Disk Formats

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<th>Disk Format</th>
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<td>R, W</td>
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<tr>
<td>Mac 800K</td>
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<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Mac 1.4 MB (FDHD)</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
</tbody>
</table>

R = read  
W = write  
*Not supported from the graphical interface; must use the UNIX command line  
*Cannot read DaynaFile or CubeFloppy UNIX-formatted disks

Table 1: None of the three floppy-disk drives can read or write Mac 800K floppy disks, although the PM1.44 can read Mac FDHD disks. All three can read and write DOS-formatted 3.5-inch 720K and 1.4-megabyte disks and UNIX-formatted 1.4-megabyte disks. Only the DaynaFile can read and write DOS-formatted 5.25-inch 1.2-megabyte floppy disks.

DIT CubeFloppy 1.4

The DIT CubeFloppy 1.4 ($795) is a small black 3.5-inch drive with an external power supply. Its software currently reads and writes only 720K and 1.4-megabyte DOS disks, but read/write support for 1.4-megabyte Mac and UNIX FDHD disks should be available by the time you read this. As it is now, you can initialize, mount, and unmount UNIX floppies in the CubeFloppy via the NeXT’s Shell, a command-line interface, but you need some UNIX knowledge to do this. As with the DaynaFile, you need to use the NeXT’s Shell to install the CubeFloppy’s software onto a local NeXT optical or hard-disk drive. The CubeFloppy’s manual explains the steps clearly.

You connect the CubeFloppy with the supplied SCSI cable. But instead of providing an external terminator, DIT has put a small switch on the back of the drive to enable or disable the internal terminator.

The CubeFloppy’s software is similar to the DaynaFile’s (see Figure 2). It displays a window with two lists, one for local NeXT files and one for the files on the DOS floppy in the CubeFloppy drive. The CubeFloppy software can translate the files that are being transferred. The CubeFloppy program also enables you to format DOS disks, a feature the DaynaFile doesn’t offer.

Pacific Micro PM1.44

The Pacific Micro PM1.44 has the most appealing appearance of all three drives: It is matte black and one foot square, so it fits precisely on top of or
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underneath the NeXT cube. It contains a single 3.5-inch drive, has an internal power supply, and comes with the necessary SCSI cable. At $995, it's the most expensive of the three drives (except for the two-drive configuration of the DaynaFile).

The PM1.44 is the only drive of the three that, at press time, could read Mac-formatted disks directly. It only reads them, however — it can't write to them — and can handle only 1.4-megabyte Mac disks, not the 800K variety.

In addition, the PM1.44 can write as well as read DOS- and UNIX-formatted floppies. There are some limitations here, however. Although its documentation claims it can read and write 720K DOS disks, we consistently had problems when we attempted to do so. As far as UNIX is concerned, it can read only UNIX-formatted disks initialized by a PM1.44; it can't read UNIX floppies initialized by a DaynaFile or a CubeFloppy.

**Say What?!**

Moving files from one platform to another isn't the only challenge in sharing files between the Mac and the NeXT. Congenial file formats are an equally important part of the process. If applications can't understand your data, file transfer is pointless. Fortunately, Mac and NeXT have several file formats in common. Files from WordStar 2, one of the first applications available on both platforms, are completely interchangeable (even when they include charts and draw and text objects) between Mac and NeXT.

The graphics formats supported by the NeXT are TIFF (Tag Image File Format, for scanned images) and EPS (Encapsulated PostScript). Fortunately, most Mac graphics applications support one or both of these formats in addition to the Mac's native PICT format, which the NeXT cannot understand. We were able to move both TIFF and EPS files back and forth between systems successfully. (When saving an EPS file on the Mac for export to the NeXT, you don't need to save it with a PICT preview; the NeXT reads and displays the PostScript directly.)

Two options exist for formatted text documents. WriteNow's file format and RTF (Rich Text Format). The WriteNow word-processing application comes bundled with the NeXT. Most word processors on the Mac can save as and open RTF. WriteNow, or both. MacWrite II has a specific WriteNow application for the NeXT translator that handles the differences in the NeXT and Mac character sets. WriteNow itself only handles the differences in files that are going from Mac to NeXT, not from NeXT to Mac.

But there can be problems. WriteNow uses font numbers to identify fonts, and the same font can have a different ID number on a Mac than it does on a NeXT (such numbering inconsistencies can also occur between Macs). When font numbers don't match up, text displays in the wrong typeface. RTF has the benefit of identifying fonts by name rather than by number, making it more likely to retain font information correctly.

**The Bottom Line**

Of the three drives, we liked the CubeFloppy ($795) the best. It is the least-expensive 3.5-inch solution and has easy-to-use software. At press time, the CubeFloppy could read, write, and format DOS disks only. By the time you read this, however, it should be able to mount UNIX floppies and read and write Mac FDHD disks as well. The addition of these features will make the CubeFloppy the clear winner.

The DaynaFile for NeXT (3.5-inch drive only, $850; 3.5-inch and 5.25-inch drives, $1,105) was our second pick, even though it doesn't read or write Mac disks (and Dayna has no plans to change this). The DaynaFile for NeXT is an evolution of the DaynaFile for Mac — it's a mature product. For those who want to move files between DOS machines with 5.25-inch floppy-disk drives and the NeXT, as well as between the Mac and the NeXT, DaynaFile provides the only available solution.

The PM1.44 ($995) is more expensive than the other units. It is able to read Mac 1.4-megabyte disks, but this feature may not be worth the extra cost. Its UNIX format isn't compatible with that of the other two drives.

Regardless of which drive you choose, we recommend that you install Dayna's DOS Mounter INIT ($89.95) on your Mac, since it provides tremendous functionality for a small price. With DOS Mounter and any of the three drives for the NeXT, you can read from and write to the same floppy from three different platforms.

**Capsule Reviews**

**CubeFloppy 1.4**

The CubeFloppy 1.4 is a 3.5-inch floppy drive that reads DOS 720K and 1.4-megabyte disks. By print time, it should be able to read 1.4-megabyte Mac and UNIX FDHD disks too.

**Pros**: Very compact unit. Least expensive of the three.

**Cons**: External power supply. Doesn't read or write Mac-formatted disks.

**Manufactured by**: Digital Instrumentation Technology, Inc., 901 18th St. #11000, Los Alamos, NM 87544; (505) 662-1482.

**List Price**: $795.

**DaynaFile for NeXT**

The DaynaFile for NeXT can contain up to two floppy-disk drives; it allows file transfer between DOS disks and the NeXT, as well as creation of NeXT UNIX disks.

**Pros**: Supports 5.25-inch floppy disks. Comes with coupon for free copy of DOS Mounter.

**Cons**: External power supply. Doesn't support Mac disks.

**Manufactured by**: Dayna Communications, 50 S. Main, 5th Floor, Salt Lake City, UT 84144; (801) 531-0600.

**List Price**: 5.25-inch drive, $750; 3.5-inch drive, $850; both, $1,105.

**PM1.44 Floppy Drive**

The PM1.44 reads and writes DOS-formatted 720K and 1.4-megabyte disks and UNIX 1.4-megabyte disks, and reads Mac 1.4-megabyte (FDHD) disks.

**Pros**: The only drive that at press time could read Mac disks directly. Fits under or on top of NeXT CPU cube. Integrated power supply.

**Cons**: Most expensive drive. Didn't work well with 720K DOS disks.

**Manufactured by**: Pacific Micro, 201 San Antonio Circle, C250, Mountain View, CA 94040; (415) 948-6200.

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Coming Soon to a Mac Near You: ISDN

Everyone’s talking about the advantages of ISDN. A few people are doing something about it — and Apple is among them.

By Stephan Somogyi

If you want to talk to someone over the phone and have your Macs communicate via modem, you need two phone lines. Not only that, but the highest data rate you can get out of your modem is 19.2 kbps (kilobits per second) — and you have to pay a premium to get that. Wouldn’t it be nice if both you and your Mac could communicate over the same phone line or if you could transfer data to a friend across the country at 64 kbps?

ISDN (Integrated Services Digital Network) will make your dreams come true. Eventually. Already widespread in Europe, ISDN is available in the U.S. only on an experimental (read: expensive) basis. And since no one else has it, even after you paid for it, there wouldn’t be anyone else to communicate with.

Although most telephone switches communicate with each other over digital communications lines, most telephone customers connect to their local telephone switches over analog lines (see Figure 1). If you want to send digital data over phone lines, you must first convert it into an analog signal, which is what a modem does. When your Mac is communicating with another Mac via modem, the information you send is converted four times: digital to analog in your modem; analog to digital at your local telephone switch; digital back to analog at the remote telephone switch; and finally, analog-to-digital again in the modem at the other end.

What’s worse, analog phone lines are designed with relatively low bandwidth (4 kilohertz), because that’s all that’s needed to provide their main function — transmitting human voices. When you try to send computer data over these lines, you run into the 19.2-kbps limit. Most people communicate at much lower rates, typically 2,400 bps. And you can’t use the same line for voice and data. You either need to alternate or to install two lines, one for each purpose.

2B+D or not 2B+D?

ISDN provides users with a single high-bandwidth digital connection to a local telephone switch. The typical ISDN service provides two B-channels, each with a capacity of 64 kbps, and a single D-channel with 16 kbps bandwidth. This 2B+D service is called the Basic Rate Interface, or BRI. The B- and D-channels are not physical channels; they are...
Figure 2: Apple's ISDN NuBus card can be used as ISDN TE (terminal equipment) — you can plug a standard analog phone into it. The NuBus card converts the analog voice signal from the phone into a digital signal, combining it with the digital data from the computer into a single digital bit stream that it sends to the digital switch. The NT1 provides power and the proper interface to the digital switch. At press time, this card was available only to developers.

Figure 3: This setup is similar to the one in Figure 2. Here, however, the ISDN phone is the TE. The Mac is connected to it over a standard serial line via the modem port. The phone converts speech directly into a digital signal, which it combines with the signal from the Mac into a single digital bit stream. The NT1 provides power to the ISDN phone.

Logical "portions" of the total bandwidth. The B-channels are the primary data carriers. When you place an ISDN call, either voice or data, you're using a B-channel to send and receive. One B-channel is typically used for voice (64 kbps of digital information is approximately the same as 4 kilohertz of analog data); the other is typically used for transmitting computer data. If you've ever waited to complete a long file transfer over a 1,200- or 2,400-bps modem, you'll appreciate what 64 kbps will do for you. The 16-kbps D-channel is used for call setup and disconnection and for other signaling information. This way, the phone company doesn't have to open a full-bandwidth (64 kbps) connection until the receiving party accepts the call.

Call setup uses only a fraction of the D-channel's bandwidth. The D-channel is
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packet-based—that is, any information traveling on it is compartmentalized into small data packets that contain addressing and packet-sequencing information. This makes the D-channel a good conduit for sending X.25 packets. X.25 is an international standard for transmitting data packets over wide-area networks.

When your local ISDN switch receives an X.25 packet on the D-channel, it knows how to route the packet to the appropriate destination. The B-channels, on the other hand, are open channels from you to the recipient. ISDN doesn’t specify a data-packet protocol for them. However, if you have an application, say a communications package, running on computers at each end of an ISDN connection, they can format the data in any protocol, such as Xmodem, that both can understand.

The Hardware

ISDN runs over the same single twisted-pair wire that’s currently used for analog lines. The hardware changes needed to support ISDN are twofold: The phone company needs to have ISDN-capable switches, and you need the requisite hardware on your premises.

Figure 2 shows a typical setup. The single twisted pair that comes out of the wall socket goes to an ISDN network terminator (NT1); this is called the U interface. The NT1 requires external power, because with ISDN, the lines from the phone company don’t supply power to your local phone equipment. Three wire pairs come from the NT1: one pair each for sending and receiving signals and the third pair for power. The send/receive pairs are called the T interface. The T interface goes from the NT1 to the TE (terminal equipment).

This terminology reflects ISDN’s approach to the hardware connecting to the network: Either a computer or an ISDN phone can be a TE. It doesn’t really matter—both put out a digital signal. In fact, in an ISDN setup, nearly everything is digital. If you use an ISDN phone as your TE (as in Figure 3), it converts your voice into a digital signal. If you use an ISDN add-on card in your Mac as the TE (as in Figure 2), you plug a standard analog phone into the card, and it does the analog-to-digital conversion. Digital data coming from the computer (one B-channel) is combined with digitally encoded voice data (the second B-channel) and whatever data is being sent over the D-channel into a single digital signal. This is then transmitted to the local telephone switch.

The Software

ISDN’s software component is mainly the data that goes over the D-channel: call-setup and call-status information. Unfortunately, though, there isn’t a universally accepted standard yet. CCITT, the international committee that sets communications standards for telephony, has produced a detailed specification, but each of the ISDN switches available today implements only a different subset of the total potential feature set. Because of this disparity, ISDN terminal equipment needs to know which type of switch it’s communicating with. At press time, Apple’s ISDN card could communicate only with AT&T and Northern Telecom ISDN switches, the most common switch types in the United States. Apple’s card cannot communicate with a Siemens switch or with NEC or Hitachi switches.

The TE sends information containing the caller ID of both the calling and the receiving parties and the billing-number ID to the switch it’s connected to when it sets up a call. The caller ID feature of ISDN sends your phone number along with every call made. If the receiving TE is a telephone, it will display the number; if the receiving TE is a computer, it will look up the number in a database and immediately associate the number with a name. The recipient can then choose whether or not to answer the call. There has been a lot of controversy over the caller ID, and many people oppose ISDN because it provides this feature. But caller ID is only one of ISDN’s many features; it is not a fundamental part of the whole concept. In fact, part of the ISDN software specification defines a “privacy bit,” which blocks the receiving party from seeing the caller ID.

Another ISDN software feature is user-to-user information. Each time a call is set up, the calling party has the option of sending up to 131 bytes of user-defined information along with the standard calling information. If one Mac is calling another, the user-to-user information can contain such things as the name of the application that the receiving Mac needs to run to communicate with the calling Mac, or an instruction to turn on a Mac that is turned off (remember, the ISDN card is powered by the NT1). If, for example, you’ve set up your home TE to...
2B+D: This description refers to the ISDN BRI (Basic Rate Interface), which consists of two 64-kbps (kilobit per second) data channels (B-channels) and a single 16-kbps signaling channel (D-channel). These channels are logical; data from all three channels is combined into a single digital data stream before being sent to a telephone switch.

Basic Rate Interface (BRI): The Basic Rate Interface is the smallest unit of ISDN service a telephone company provides. The BRI provides two B-channels and a single D-channel.

B-channel: A B-channel is a 64-kbps ISDN communications channel. Once an ISDN connection has been established between two users, all data is exchanged via B-channels.

billing ID: The billing ID is used by the telephone company to bill a user for an ISDN call. The difference between a billing ID and a caller ID is that companies with PBXs use a single billing ID but require multiple caller IDs for their PBX-connected users.

caller ID: The caller ID is the phone-number equivalent for ISDN. When setting up an ISDN connection, you provide the caller ID of the party you wish to connect to. More than one caller ID can have the same billing ID.

Primary Rate Interface (PRI): The Primary Rate Interface consists of 23 (U.S. and Japan) or 30 (Europe) B-channels and one D-channel. PRI is used by businesses. Access to the B-channels is parceled out to various users; the single D-channel provides call setup and disconnection for all users.

privacy bit: The privacy bit causes the receiving switch in an ISDN call to hide the caller ID from the receiving party.

switch: A switch, owned by the phone company, establishes connections between callers and the people or computers they are calling. Switches are connected via high-capacity lines, almost all digital, to other switches. Each ISDN connection goes from a user to a local switch. If users call someone who is connected to a different switch, their local switch establishes a connection with the destination switch, sometimes through one or more intermediate switches. The destination switch then makes the final connection to the called party’s line.

terminal equipment (TE): ISDN terminal equipment can be an ISDN phone, a computer with an ISDN interface, or any other device that can communicate via ISDN.

U interface: The U interface is the connection between an NTI and TE. It consists of two sets of twisted-pair wiring: one for sending, the other for receiving.

truk: A trunk is a large-capacity line, usually digital, that transmits data at hundreds of thousands of calls between two switches.

U interface: The U interface is the connection between an ISDN switch and an NTI. It consists of a single set of twisted-pair wiring.

This glossary is dedicated, with thanks, to Ernestine Tomlin.

Refuse calls from unknown caller IDs, and you’re away on business and calling from a hotel or pay phone, you can include a “Pick up the phone, it’s me” message.

Applications

Ultimately, ISDN will come into its own as applications that take full advantage of it become available. The most obvious use is phone management. If your ISDN line goes straight into your Mac, you just plug in a handset and speak and listen, you end up with an extremely intelligent telephone-management system. A simple application might be a dialer/answerer with a database that dials numbers based on name or that accepts calls only from certain caller IDs.
Another application is one using a simultaneous voice and data connection. Farallon Computing has a development version of its Timbuktu/Remote screen-sharing software that runs over ISDN. With it, you can control another user's Mac via one B-channel and talk via the other — with a single phone connection. With a setup like this, imagine how much easier tech support could become once ISDN is widespread.

The additional bandwidth that ISDN provides is ideal for use with multimedia applications. Sound and video are expensive to transmit by conventional electronic means, because they are so data-intensive. Combining data-compression technology and ISDN's bandwidth will make long-distance desktop video feasible. In fact, any type of data that until now was too great in volume to send over analog lines, even with the high-speed modems available today, will become easily transportable.

Writing applications on the Mac that communicate via ISDN is going to be relatively easy, because Apple is providing Communications Toolbox tools for use with ISDN. The Toolbox provides prepackaged code for making various kinds of telecommunication connections, allowing developers to concentrate on what users do with an application after they get connected (see "Communications Toolbox," September '90, page 295).

At this year’s Worldwide Developer’s Conference, Apple showed a dialer application that had been created in SuperCard and that used XCMDs to make and receive calls via the Apple ISDN card. The XCMDs in this particular demo were specific to Apple’s card and won’t be made available to the public, but Apple will provide a HyperCard toolkit for the Communications Toolbox.

Users will also appreciate the simplicity that ISDN provides. The typical hassle of talking to modems with AT commands will end with ISDN. And it’s going to take much less time to set up and complete an ISDN connection than it takes to set up a connection with modems. Such short connect times mean that you can query a remote database via a quick ISDN call without perceiving any lag. The connection duration can also be kept at a minimum when two computers are talking to each other directly without human interaction. This will also be the case with faxing via ISDN. Currently, Group 3 fax is sent at 9,600 bps; imagine what a
digital 64 kbps connection will do for fax transmission speeds.

Cost, Availability, and Reality

ISDN is not easily accessible here in the U.S. and won’t be for some time to come. Optimistic estimates are that by 1993, major metropolitan areas and their surroundings will have access to ISDN. Compared with Europe and Japan, the U.S. is lagging behind. Most of Europe will have ISDN within a few years.

ISDN also isn’t going to be cheap. Users will have to buy their own NT1 and TE (ISDN phone or ISDN card for the Mac). Since this is a new technology, the price will initially be high. ISDN lines will cost an estimated one-and-a-half times as much as today’s analog lines. If you’re using a single line, alternating its use between voice and data, this will mean a price increase. But if you’re using two lines — one for voice, one for your modem — ISDN will save you money.

There are other problems with ISDN. Because the phone company won’t provide power for ISDN equipment, the NT1 and the TE will need to be powered locally. In the event of a power outage, an ISDN phone system will go dead unless it has a noninterruptible power supply. Maintenance is another problem. Because customers will own the NT1, telephone technicians will need to come into users’ homes to troubleshoot line problems — they won’t be able to do it by climbing up a pole any more.

As it did with cellular telephones, the business market will have to popularize ISDN, which offers lots of benefits to this market. ISDN can usually replace expensive leased lines. Wide-area networking is another obvious application area, and ISDN’s high-speed-fax capability is attractive. The bottom line is that ISDN’s ability to send large amounts of information for a relatively low price will ultimately assure ISDN’s success. Home users will follow business when equipment prices drop and ISDN-based services (banking, on-line services, and so on) become available.

Widespread ISDN is going to happen. Sooner or later. Definitely sooner outside the U.S. and probably later within it unless all the players agree to support ISDN here the way it’s supported internationally. Either way, ISDN is going to fundamentally change the way we telecommunicate. For the better.
Work Groups or Work Teams?

Networks are usually organized by departmental work group, but sometimes this arrangement can slow things down.

An AppleTalk internet is a collection of interconnected work-group networks that are usually joined together by a backbone network. Typically, the work-group networks are LocalTalk. Although LocalTalk is sometimes used for the backbone as well, the higher-speed Ethernet is often used too. Thousands of AppleTalk internets around the country are organized according to work groups because this design follows our assumptions about the nature of business communications.

We tend to think of people as working in departments, all performing similar functions — such as a group of designers working on a car’s fuel system or a group of salespeople. So when we design AppleTalk internets, we tend to use departmental boundaries to define work-group network boundaries.

Three assumptions guide this design strategy. First, we assume that people have the greatest need to share information with, and therefore communicate most frequently with, others in their department. Second, we assume that since users in the same department usually sit together, they will share the same printers, because people tend to use the printer that involves the shortest walk. Third, we assume that department size corresponds to the acceptable maximum (20 to 25 people) LocalTalk work-group size.
With the Proxima Data Display VersaColor, Mrs. Fields opens a window on the cookie world.

"With the introduction of the new Proxima® Data Display® VersaColor, Mrs. Fields® managers can now project our Retail Operations Intelligence (ROI®) data on any wall, anytime. Like an oversized full-color monitor, it lets us review the continuous data stream coming into HQ from our 650-plus cookie and bakery shops internationally," says Randy Fields, CEO of Mrs. Fields Cookies.

"And we get this real-time window on our world without having to squeeze our management group around a desktop monitor. We can roll up our sleeves for intensive work sessions - for reviewing sales data, for exploring 'what-if' financial scenarios, even for training sessions," says Fields.

"VersaColor's 512 high-resolution colors let our managers quickly grasp the key visuals of any screen. Which not only makes for more efficient in-house meetings, but adds impact to ROI sales presentations. Best of all, VersaColor is easy to use. We just plug the flat panel into a desktop computer, set it on an overhead projector, and project exactly what's on the screen. In dramatic color. For great impact and retention."

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Figure 2: A centralized-server approach to E-mail. Three LocalTalk work groups share a mail server connected to the Ethernet backbone network.

(see "The Limits of LocalTalk," September '90, page 299).

Are these assumptions valid? Not always. Let's consider a department of product managers, who generally deal with people from several departments. In guiding a product from conception to market, product managers deal with engineers, designers, drafters, and marketing, sales, finance, and production people. This example demonstrates how grouping people into LocalTalk work groups along departmental lines may not always be the best choice, because people in a work team may not work in the same department. In the earlier example of the fuel-system designers, the work group — people performing similar functions — is the same as the work team — people working together on the same project. In the example of the product managers, the work team is different from the work group.

Understanding how work teams are formed requires an understanding of users, which isn't necessary in understanding how departments are formed. All you need is an organizational chart to understand departments. To understand work teams, you must interview the users and discover their communications needs.

What does this have to do with network design? Everything. You want to make the shape of your internet follow the shape of your business communications. On any but the simplest of internets, most messages do not travel directly from their source to their destination — they make many stops along the way. To design an efficient and effective network, you must minimize the number of these intermediate stops. Efficiency is an important factor in an electronic-mail system.

With efficiency in mind, let's look at three different designs for a three-department E-mail system. Each department is connected in a LocalTalk work-group network, and each of the three networks is connected to an Ethernet backbone via a LocalTalk-to-EtherTalk router. By counting the number of times that a message is re-sent as it moves through the internet, we can develop a "score" for each alternative.

For the first design, we operate under the assumption that work teams are organized by department; therefore, we put a mail server into each of the three work groups (see Figure 1). This is called a distributed-mail-server approach. If Sales user 1 (S1) wants to send a message to Sales user 2 (S2), the mail message will be sent twice (blue arrows) — once from S1 to the Sales server and then again from the server to S2. But if S1 wants to send a message to Production user 1 (P1), the message must be sent five times (red arrows) — S1 to the Sales server; the Sales server to the Sales router; the Sales router to the Production router; the
Production router to the Production server, and finally, the Production server to P1.

If we interviewed the users in the three departments and found that most messages did not stay in the department (unfortunately, no AppleTalk software tool currently available measures this), we might start to question whether our distributed approach to mail servers was the best one to take. Let’s use the same analysis method to compare the distributed approach with a second design, a centralized-mail-server approach, in which all three LocalTalk work groups use a single mail server attached directly.
to the backbone Ethernet network (see Figure 2). In this configuration, any message from any user to any other user would be generated four times — sender to router, router to server, server to router, router to recipient — regardless of whether the source and destination were in the same LocalTalk network or not.

Many companies have decided that software routers make more sense for their internets than hardware routers. One of the advantages of software routers (for example, Liaison, recently acquired by Farallon, or Apple’s AppleTalk Internet Router) is that you can run other services in the Mac that is also performing the router service. Let’s perform the analysis one more time for the third design, a distributed approach using mail servers running concurrently in the same machine as a software router (see Figure 3). In this configuration, a message that stays within a single LocalTalk work-group network gets sent twice, and one that goes from one work group to another gets sent only three times. This makes the distributed-router/server approach the most efficient of the three designs.

Figure 4 shows the total number of transmissions that must be sent on the internet to deliver 100 mail messages from their sources to their destinations. A distributed-server approach requires four transmissions per message, regardless of whether messages remain within a single LocalTalk work group or travel between work groups. Both the distributed-server and distributed-router/server approaches require more transmissions per message for cross-network messages than for intranetwork messages, so as the percentage of cross-network messages grows, the total number of transmissions grows as well. Still, the distributed-router/server approach is the most efficient of the three approaches in all cases, and I therefore recommend it for E-mail.

This counting method of analysis helps make more-efficient networks, and it is an approach to designing networks that works well for E-mail. However, if we want to perform this analysis for file transfers, speed might be a higher priority than message-resending efficiency. For file transfers, we might try to minimize the number of routers that a message has to pass through, rather than trying to minimize the number of times a message is sent, because each router introduces a significant delay in end-to-end transmission time.

In a complete network-design analysis, the chances are high that you would be looking for a solution that worked for both E-mail and file transfers, so you would need to consider both efficiency and speed as design values. You might also be using the network for print spooling, modem sharing, or other functions. The key to designing better networks is understanding your needs, defining what “better” means, and developing a counting method to test alternatives.
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But you can choose how to manage it.

FileMaker® Pro software includes sophisticated drawing tools so you can create layouts in any form you choose. Pop-up menus, radio buttons and checkboxes make entering data fast and accurate. And a full palette of colors helps people vividly see your thoughts.

FileMaker Pro lets you automate repetitive tasks with "buttons." It's easy. Simply select any object or graphic on the screen and a "button" is born. Buttons can invoke commands, trigger scripts, and switch layouts—all without plodding through a programming language.

Multiple-file lookups let you relate data. For example, when you want your monthly invoices to each show customer address, FileMaker Pro looks at the customer name, searches the customer address file and fills in each address for you—all automatically.

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Unfortunately, the world demands you actually do something with your data. And then present it in a compelling and useful way.

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There's powerful scripting with user-definable buttons for automating tasks. Multiple-file lookups for relating data. Network access with field-by-field security for workgroups. And flexible report generation, including color and database publishing tools.

Yet, FileMaker Pro does all this without making you learn a complex programming language.

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You'll find a few surprises, however. All of them pleasant.

As you use FileMaker Pro you will find more and more things to do with it. This “revealed power” is what makes FileMaker users FileMaker fanatics.

What's more, you will experience the seamless way that FileMaker Pro fits with other Claris® software. The graphic and text tools work the same as they do in our other products — so you spend more time on business and less time remembering commands. There's also XTND, a Claris invention that lets you easily exchange text and graphics with other software and computers without loss of formatting. All this raises Macintosh productivity to a new level.

But why not see for yourself? Simply stop by an authorized Claris dealer and ask to see FileMaker Pro. It's the start of a better way to manage the data you have to manage.

FileMaker Pro. The #1 database manager for the Macintosh.

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Here are 33 great little programs that you've probably never heard of. Some of them boost productivity, and some are just for fun, but all of them can be tried for free.

By Roger Gilbert

Out of the hundreds of shareware programs posted on bulletin boards, distributed at user-group meetings, or brokered through commercial shareware resellers, a few break out from the pack and become top-ten hits.

In fact, MacUser published a list of the top 50 last December ("The 200 Best Macintosh Products," page 171). This month, instead of covering well-known hits such as StuffIt and Boomerang, we decided to seek out newer, "unsung" shareware that most people haven't heard about yet.

I've divided these programs into three categories. The "Serious Contenders" section lists sophisticated programs that could easily be marketed through conventional channels. I've subjected them to MacUser's usual review criteria and assigned them mouse ratings.

"One-Trick Ponies" contains invaluable little programs that do only one job but do it well. If one of them sounds like it does something you've been wishing for, it's well worth your while to try it out.

Finally, some of the more whimsical items are collected in "The Lighter Side." This stuff probably won't make you more productive, but Mac users have always placed a premium on their computers' being productive and fun.

### Serious Contenders

1. ASCII Chart DA 3.2
   If you've ever spent more than a minute searching for a character in the Key Caps DA, here's relief. ASCII Chart DA will appeal to people who use a variety of fonts and want to find hidden characters or keystrokes quickly and also to programmers hunting for hex equivalents.
   The DA shows all 256 characters for a font in a chart. You can easily change fonts by using the Font menu. Clicking on a character shows what keystroke or keystroke combination accesses it, and you can display a character at 72 points for close examination. This tool's only drawback is that it doesn't print. Author: Jon Wind. Free.

2. BaseToBase DA 1.0
   One of the simplest and finest DA calculators for converting numbers easily from decimal to hexadecimal, octal, or binary, this little utility also sports logical operations and other functions (see Figure 1). Author: Remy Malan. Free.

3. Blesser 1.1
   If you need to switch between various System Folder configurations on your hard disk, Blesser is the ticket. This small freeware application lets you "bless" one System on the SCSI chain to make it the active System. Use it to conveniently store alternative Systems such as small System Folders for games or foreign-
Startup defaults for MultiFinder when messages over an AppleTalk network to one entity can respond without accessing the Chooser and selecting Broadcast and the afford an expensive E-mail system, one or more users.

4. Broadcast 1.2

If you have a small network and can’t afford an expensive E-mail system, one way to keep in touch on-line is to use Broadcast. It lets you send short messages over an AppleTalk network to one or more users.

To send a message, you open the Chooser and select Broadcast and the name of another user. You must keep messages short, but you get the unusual option of choosing from a selection of icons to accompany the message. Recipients can respond without accessing the Chooser. Unfortunately, all chatting must be done in real time; you can’t leave a message in someone’s mailbox. Author: Joachim Lindenberg. Shareware fee, $25 per AppleTalk zone.

5. Clipboard Magician

If you’ve come up empty while making data transfers on the Clipboard, you may need a trick or two from the Clipboard Magician. This DA accesses the Clipboard in a Scrapbook-like window and lets you manipulate the data. It comes with a “magic wand” that helps you coax data through seemingly impossible hoops. These techniques take practice, but Clipboard Magician is a powerful tool if you can work through the learning curve. Author: Ed Lai. Free.

6. Color Bits 1.0

Compared with previous generations of icon managers and icon-drawing utilities, Color Bits is a dream come true. It’s still not the ultimate icon-manufacturing machine, but it lets you quickly draw a new icon or add color or revisions to an existing one (see Figure 2). And it doesn’t require ResEdit. It’s compatible with Icon Colorizer and SunDesk. Author: Ben Haller. Shareware fee, $10.

7. Dir-Acta-Ry

Using folders is a great way to keep things tidy on your desktop, but they can get in the way when you’re trying to get an overview of what the whole directory contains.

The Dir-Acta-Ry application takes a picture of the files and folders on the main disk and stores it in outline form. You can read the file with any of the Acta (shareware or commercial) DAs/applications or with other outlining programs.

For a free program, Dir-Acta-Ry features an impressive array of display and directory view options. You can even select whether you want to include invisible (hidden) files in the directory list. Author: David Dunham. Free.

8. Gravitation Ltd. 4.0

Want to play with the solar system? How about making your own and watching your planets coexist or collide? That’s the object of Gravitation Ltd., an educational application that’s reminiscent of the far more expensive commercial program Interactive Physics.

Gravitation Ltd. comes with 21 prefabricated solar systems, but you can easily start from scratch and design your own system. Enter the weight values and velocities for planetary objects, and watch the animation play.

The graphics representing the planets are crude, and this version is limited to black-and-white. But this is an educational tool that’s fun to use, even without polished color graphics. Author: Jeff Rommereide. Shareware fee left to user’s discretion.

9. MIDI Companion 1.0

If you’re into MIDI — the universal connectivity language of music hardware and software — and you use a Mac, you’ll want to look at MIDI Companion. This MIDI tool allows you to patch MIDI signals, sounds, and channels through the DA and separate sounds for single-channel playback.

MIDI Companion comes with extensive docs, but you still need to know something about using the Mac with MIDI. Author: Robert Patterson. Shareware fee, $15.

10. Speedometer 2.0

Tired of guessing what a particular INIT or set of startup documents is doing to your Mac’s performance? Try Speedometer. It’s easy to use and fairly comprehensive. The documentation tells you what to watch for to clock your Mac through a wide range of tests. You get charted results, so you can compare your system’s performance with that of another machine (see Figure 3). Author: Scott Berfield. Shareware, $25.

Figure 2: Color Bits lets you quickly draw a new icon or add color or revisions to an existing one — without resorting to ResEdit.

Figure 3: Anyone can benchmark a Mac with Speedometer and then graph the results to compare them with those for other system configurations.

11. Alias 1.01

Here’s a chance to preview one of the techniques Apple’s System 7 will offer. Alias is an application that lets you create a duplicate icon of an application and place it anywhere in the folder hierarchy. Although the created document occupies only about 2K, it can launch the application it mimics, which can be buried folders away.

Alias works with MultiFinder too. Alias is expected to be used by Apple in the forthcoming System as a technique to let users install applications
How Does Our High Density Drive Stack Up Against Apple’s?

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**800K MSRP**  $429  $289

**SuperDrive MSRP**  $629  $339

**Everyone wants** a second SuperDrive, but not everyone wants to pay the hefty price. Now there’s an alternative. Applied Engineering’s new 3.5" high density drive looks, feels, runs, reads, writes just like Apple’s. It even smells like Apple’s. But it costs a lot less. And with our exclusive 2-color read/write indicator you can actually tell what your drive is doing at any given moment. We even make a Mac II external drive adapter ($19), so you can add a second high density drive to your Mac II, IIfx or IIfx. So how’s our drive stack up against theirs? That’s the bottom line.

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POWER TOOLS

What Is Shareware?

If you decide to use a particular shareware program on a regular basis, you should rightly pay the author a fee. If the software's free, the author says so; otherwise, pay any requested fee!

Paying fees is not only the honest thing to do but it also benefits you as a user. Unless an author has an incentive to keep up interest in a program, you may never see updates. Receiving enhanced feature sets and maintaining compatibility with current systems are key reasons to help support and promote your favorite shareware utilities.

All credible sources of shareware provide the complete files for each program. This means you'll usually get a Read Me file or some other documentation along with the program itself. Documentation is important, because it usually provides instructions as well as information about payment.

easily onto the Apple menu. Author: Richard Harvey. Free.

12. AltCDEF 1.1.2

Overexercising your mouse on the scroll bars can be annoying. AltCDEF comes to the rescue by putting bidirectional arrows at each end of them. Compared with other renditions of scroll-bar enhancers, AltCDEF has the cleanest and most unobtrusive interface, and it comes with special Shift and Option commands for added scrolling benefits. Author: Alexander Colwell. Free.

13. BundAid 1.1

If you've lost a document's icon or double-clicking on the document doesn't bring up its application, it's time to try BundAid. This application goes beyond rebuilding the desktop — it gets to the root of the problem by resetting improperly set bundle bits, which tell whether a file has an icon associated with it. It all sounds technical, but the program is easy to use. You scan a disk or partition with BundAid, and it takes care of all the bundle bits for you. Author: Jim Hamilton. Free.

14. ColorDesk

Are you envious of a colorful background picture on someone else's desktop? Start using ColorDesk, an advanced version of the INITs that allow illustrations to replace the background patterns. ColorDesk is a cdev that allows a color PICT image to serve as a background scene and lets users change the image at any time with a new picture located in any folder on a hard disk. Author: Paul Mercer. Free.

15. MountEm 1.5

MountEm is an Fkey that can help you mount unmounted disks along the SCSI chain. It was initially designed for use with SyQuest drives to eliminate the need to have the SCSI port polled. With MountEm you can mount or unmount obstinate hard-disk drives or other devices that won't seem to mount any other way. Author: Bill Steinberg. Free.

16. Mouse2 v. 1.4a

Perk up your mouse with Mouse2, an INIT that automatically doubles the mouse's tracking speed. If you're not using AltCDEF yet, try using your refreshed mouse to practice running back and forth between the scroll-bar arrows. Author: Ryooji Watanabe. Shareware fee, $5.

17. Screener 2.0

Are you a Mac II owner who wants to run a favorite pre-Mac II program? The Screener cdev helps put some of these programs back to work by redefining the screen so it acts like a smaller monitor. This technique doesn't always work, but it's worth a try for any program you'd like to see up and running again. Author: Frank Price. Shareware fee, $5.

18. The Fondler 2.0

One more tool to add to the font fray is the Fondler. This Font/DA Mover alternative is designed for moving families of harmonized LaserWriter screen fonts from one set to another. It checks for font conflicts too. Author: Jim Lewis. Shareware fee, $10.

19. UnScrolly

UnScrolly cuts the time you need to get things done in the Control Panel. It strips out the Control Panel icons so you can view all cdevs by name. The UnScrolly cdev is a must for Macintosh users who make frequent trips to the Control Panel. Author: Frederic Misrey. Free.

20. WindowShade 1.1

WindowShade is a utility for people who use MultiFinder and get buried under

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The database that helps Federal Express deliver buildings overnight.

Ric Honey, a project manager of new construction for Federal Express, knows a little about deadlines.

"People say to me, 'We need this building next month.' I say, 'But that's a 1-year project.' They say, 'OK, 3 months.'

"Managing 4 or 5 projects like that can mean a paper trail of over 600 forms at a time. All with pen and paper. I knew I had to do something."

So Ric looked into a database program for his Macintosh. "I chose Double Helix because I didn't want to learn a programming language.

"I had a spreadsheet, and I knew it could do 'macros.' But I couldn't. If I could tell it in English what I wanted, fine. But I'm an awful typist. One finger. Try doing macros with that!"

"When they told me about Double Helix, I said, 'You mean I don't have to read anything? All I do is drag around icons, pictures? This is great!'"

Now Ric and his team run the Double Helix multi-user application he created. He reports it's already cut 25% off his paperwork time.

"I just tell Double Helix what I want. And I get it.

"I wish my whole life was like that!"

For a Double Helix brochure or test flight kit, call Odesta now at 1-800-323-5423. (In IL, 312-498-5615.) Current users, ask about our special upgrade offer.

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piles of windows. This shareware cdev does exactly what its name suggests. When you double-click on any window’s title bar, the window disappears as if it’s been rolled up into the title bar. When you click on the title bar again, the window reappears, without forcing you to close data files that you might want to keep open. This is extremely useful for information transfer among multiple documents and windows or for Finder actions such as duplicating documents or visiting the Trash while several files remain open. Author: Robert Johnston. Free.

21. Scroll Limit

It’s hard to believe, but scrolling on some Macs is actually getting too fast—especially in those small dialog windows. That’s where Scroll Limit comes in. It’s a configurable cdev that lets you change the scrolling speed for just a single case or for a general default setting. Author: Ken McLeod. Free.

22. ProVue RAM Check 2.0

Have you recently handed over a few hundred bucks for RAM to some guy on a street corner (or some other place you didn’t know too much about)? RAM Check should calm your nerves. It checks your RAM for any problems.

At startup, all Macs go through a self-check routine. But if you’re having suspicious problems with your memory, use this application to make hundreds of passes through it to see if any glitches show up. Authors: Tim Capps and Mike Friese. Free.

23. Icon Colorizer 1.5

Icon Colorizer is a cdev that makes maximum use of available color icons. Like Color Finder and SunDesk, this cdev can open a file loaded with color icons, much as Suitcase II can open a DA of Font. Icon Colorizer works with all cien (original color icon resource) or icon8 (new icon resource) files and is compatible with the Mac IIC.

Unlike its close competitor SuitDesk, Icon Colorizer doesn’t support color cursors. It also doesn’t work on third-party color monitors that don’t use Color QuickDraw. And you’ll notice a definite slowdown at startup. But despite all of that, it’s worth it to watch your desktop bloom with colorized icons. Full documentation is included. Author: Robert Munafo. Free.

24. MacNinja

There may be better things to do and better games to play than MacNinja, but its simple portrayal of a karate match will quickly hook those who enter into the match. The moves are fast and may keep you laughing much longer than you intended. Author: Ron Minor. Shareware fee, $10.

25. Big Cheese

If you begin playing MacNinja at work, it might be a good time for you to try out the cdev Big Cheese as well. This “panic key” gets its name from fooling your boss — the big cheese — into thinking you’re doing what you’re supposed to be doing. You start by taking a screen picture of what you should be working on (screen capture is a built-in function of the cdev) and then assign the picture to a user-definable hot key. If the boss walks by your cube, just press the hot key to look sharp. Author: Andrew Welch. Shareware fee, $5.

26. Ripper Fkey 0.3

When writers started working with computers, they lost the satisfaction of balling up their false starts and throwing them across the room into the garbage. Now with the Ripper Fkey, animated ripping action, complete with horrific sound, will tear across your active window (see Figure 4). Author: Steve Blackstock. Free.

Figure 4: The Ripper Fkey lets users harmlessly indulge their destructive streaks, complete with sound effects.

27. TappyType 1.21

If you want your typing to sound just as noisy as Hemingway’s and Fitzgerald’s, TappyType is a cdev that adds keystroke sounds, space-bar sounds, and even a carriage-return bell when you press the Return key. The sounds can be

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POWER TOOLS

turned on and off with a keystroke.

TappyType's Achilles' heel is that for some reason it won't work with Suitcase II installed. Author: Colin Klipsch. Free.

28. MacKeyboard

If you can’t get enough keyboard action, MacKeyboard may be just the thing. It's a simple sound application that installs piano or other digitized sounds into your keyboard. Good for after hours when your fingers just want to keep going. Author: Terry Bertram. Shareware fee, $15.

29. Fish! 2.0

Put Fish! into your System Folder, and you’ll have fish and divers swimming across the desktop. They won’t interfere with your work, but you will notice a fish occasionally nabbing a small one or a diver come swimming by with a harpoon. Fish! works fine in black-and-white, but the color show is much more lifelike. It requires generous memory. Author: Bogus Software. Shareware fee, $20.

30. Globe

Strictly a conversation piece. Put this colorful spinning globe anywhere on your desktop (see Figure 5). Try resting the spinning earth on top of a window and going to lunch. It's easy to get running and comes with configurable rotating speeds. Author: Paul Mercer. Free.

31. Solarian II 1.02

For an excessive dose of audiovisual stimulation, check out Solarian II. This high-quality color arcade game is set in outer space, where you’re attacked by a menagerie of interesting characters. The game’s humorous sounds and extremely professional graphics and presentation set this one apart as one of the best and most ridiculous shareware games out there. Author: Ben Haller. Shareware fee, $25.

32. SpiNit INIT

Most people will want to use this INIT for about two minutes, and then they won’t be able to take it any more. But you can be sure they’ll show it to someone else. When you open a window, it’s like watching special effects from Hitchcock’s Vertigo. Author: Jonathan Gary. Free.

Free Markets

BBS Services

Local BBSs (bulletin-board services) or national services such as CompuServe’s MAUG forum, America On-Line, and MacUser’s own Zmac user service all have the latest offerings. (If you’d like to find all the files in one place, visit the Zmac Download Forum.) If you’re a member of CompuServe, just type GO ZMAC or GO MACUSER at any % prompt. Then choose the Download Library from the main menu. If you’re not a CompuServe user, look elsewhere in this issue for sign-up instructions.

User Groups

You can easily get almost any shareware offering through user groups — especially national user groups such as the Boston Computer Society (48 Grove St., Somerville, MA 02144; [617] 876-4835) and the Berkeley Macintosh User Group (1442A Walnut St., #62, Berkeley, CA 94709; [415] 849-9114). The major user groups are now producing CD-ROM discs loaded with shareware. If you have time, stop by your local user group and see what’s available.

Disk Services

And there are also mail-order disk-library companies such as EduCorp (531 Stevens Ave., Solana Beach, CA 92075; [800] 849-9487 or [619] 259-0255), and Software Excitement (P.O. Box 3097, Central Point, OR 97502; [800] 444-5457). You can purchase software collections on-disk from the catalogs of these services’ libraries. It’s important to realize, though, that when you buy from a disk service, you’re paying for its collection efforts, not for the shareware itself. You’re still obligated to pay the full fees for shareware you use regularly.

33. Melt DA

Invoking this "screen saver?" triggers a slow oozing animation of your current desktop melting — windows, menus, and all. This can put you in a contemplative mood. The melting action is compatible with the Mac IIC, but it runs extra fast on that computer. Author: Gordon Acocella. Free.

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MacUser October 1990 251
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But there's more you can do. (The feature is called XTND.) You can import graphics, not only from Macs, but many computers, guaranteed. And you can scale and crop them, one and all, in your MacWrite II document. In short, MacWrite II with XTND is a powerful word processor that lets you freely exchange text and graphics. You'll find also that your MacWrite II lets you change fonts, styles, sizes and colors, as well as text with its find/change feature. And you can create custom styles and save them as stationery — with all formats preset. You'll share your reports and letters quickly.

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The Slow Switch and the Dog-Faced Clock

The name of this magazine is MacUser, not MacFixer. This is as it should be, because most of us are more interested in using our Macs than in fixing them. When we do encounter something that requires fixing, we resent it. As likely as not, it’s an INIT problem, and do we ever resent those.

“Do something about INITs, quickly!” — J. Vallot, Pontoise, France, advising John Sculley in MacUser, August ’90, page 12.

INITs are the Startup documents, such as Apple’s MacroMaker and ICOM Simulations’ On Cue, that are loaded into memory on startup, if they have been placed in the System Folder. INITs in the System Folder act as though they are part of the System file itself, a bit of magic supported by an INIT known as INIT 31 in the System file. Because INITs are loaded automatically, a buggy INIT can crash the system before you can disable it by removing it from the System Folder — locking up the machine in a nasty situation that could be called catch-31. Even when they do load successfully, INITs may conflict with one another.

Various INIT managers — Aask, INIT-Picker, Inix, INIT Manager, INIT cdev, and TattleTale — have been developed to deal with such problems. These managers are all INITs too, and they tend to conflict with each other. The only sure method of resolving an INIT problem is to keep removing suspect INITs from the System Folder and rebooting until the problem goes away. To deal with the INITs that lock up the machine, you need to follow Bob LeVitus’ advice of keeping a disaster disk on hand to boot from.

INIT management today is mostly disaster cleanup. What the INIT managers do, generally, is allow you to turn off or alter the loading order of INITs. What they don’t do, generally, is tell you what the problem is. If you knew that, you might be able to fix it.

Apple will do something about INIT problems shortly. With version 7 of the System software, we will find, no doubt, new versions of all our favorite INIT problems, which will demonstrate new ways not to work and which will make all our version 6 INIT-handling tricks obsolete. Sufficient unto the day is the System-software version thereof, so until System 7 makes all our lives more interesting, what can we do about debugging version 6 INIT problems?

Maybe what we need is a Slow switch.

The Slow Switch

“Five new front panel switch positions have been added to the ALTAIR 8800b computer to expand the front panel capability [including a SLOW position] that permits execution of a program at a rate of approximately 2 machine cycles per second or slower. The normal machine speed is approximately 500,000 machine cycles per second.” — alair 8800-b Technical Information Package, MITS, 1976.

Most Mac users would not applaud a decision by Apple to put a Slow switch on the front of the Mac. It was a good feature on the alair, though. In 1976 there were no Mac users, or personal-computer users of any stripe really. What there were were electronics hobbyists, gadget freaks, programmers, entrepreneurs, and brave-and-bloodied pioneers. All of them were necessarily fixers rather than users, because the first personal computers didn’t work. The Slow switch was a useful tool for them, and a kind of Slow switch could be useful now.

By Michael Swaine
The only table built around the Macintosh.

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Powers Tools

for any Mac user forced to act as a Mac fixer.

The Slow switch on the altair was a program-debugging tool, and slowing down the programs was, paradoxically, a good way to speed up the debugging process. It allowed programmers to step through the execution of a program, one machine instruction at a time, looking for any funny stuff. The results of each instruction could be displayed in binary in the rows of lights on the machine’s faceplate, or front panel.

If you were a machine-language programmer and if the Mac had a front panel, you could use a Slow switch to step through the INIT-loading process, reading off the results on the front panel and looking for any funny stuff. It doesn’t, you’re probably not, and it wouldn’t work anyway, because the Mac is more complicated than the altair. But there is a tool that does the same job and that is usable by nonprogrammers. (There is also, no foolin’, a software Slow switch called Sludge, just for Mac programmers. We won’t talk about that here, because the name of this magazine isn’t Mac-Programmer.)

The Dog-Faced Clock

Enter INIThound, the Slow switch and front panel for debugging Mac INIT conflicts. The Slow switch has become a dog-faced clock, and the front panel is now a cdev and a collection of printed reports. Nothing stays simple.

I first encountered INIThound over dinner. I was sitting with a dozen or so Mac software developers; conversation led in predictable directions, and I left the dinner with a pocketful of disks from developers eager to have their work mentioned in MacUser. One of the disks contained INIThound, and I found it surprisingly useful.

With INIThound, you can monitor the INITs in your system, see what they are doing, turn them on or off, delay between INITs, and print out core dumps — er, excuse me, reports on INIT activity. You control INIT loading directly, as INIThound displays a clock that looks like a bloodhound before each INIT loads. While the clock is visible, you can disable the INIT or begin tracking its activity.

INIThound was written by Steven J. Tubbs and is available from his company, Cambridge Information Ware, P.O. Box 1296, Cambridge, MA 02238-1296. It runs on any Mac with more than 128K.
Who Was That MITS Man?

In an age and an industry that often undervalue history, this month's puule may seem a little banal, but knowing the past can at least give you an ironic perspective on progress. Mac INITs are something like DOS TSRs, and the INIT problems we see today are a lot like the TSR conflicts of a few years back. Then, as now, the simplest solution was not to use the things. Then, as now, that solution had the advantage of putting pressure on the vendors — and today through the vendors onto Apple — to come up with standards or safeguards that prevent the conflicts. If then, as now, the outcome was a new operating system with new problems, well, that's progress.

The MITS Altair, by some accounts the first personal computer, didn't have INITs or TSRs, but it had enough problems to foreshadow every glitch, bug, crash, and bomb we've seen since, and not just because the kid who wrote the Altair's programming language is today the chief executive officer of Microsoft. "Every good idea was half-executed at MITS," this programmer once told me, with an ambiguity that has served him well in dealing with IBM, and indeed the first personal-computer company half-launched a lot of good ideas and meteoric careers.

Knowing something about MITS could win you a T-shirt. I'll send an "I Beat the System" T-shirt to the person who sends the best answer to the following question before the arbitrary cut-off date: Who is the MITS documentation writer who also started the first computer trade show, and what is his connection with the Macintosh? (He is not the aforementioned programmer.)

Looking for Funny Stuff

Here are some specific INIT problems and INIThound solutions or debugging approaches:

Problem. Since you installed a new INIT in the System Folder, that INIT or another one doesn't work or the system crashes or won't boot.

Solution. Find the culprit. INIThound gives you a chance to disable any INIT during the startup process, just as it's about to load. If there's a conflict between two INITs, this won't necessarily tell you which is the villain but it will tell you not to use them together. You can also more or less permanently disable any INIT without removing it from the System Folder. Any INIT manager will do some variation of this.

Problem. You've identified compatible and incompatible INITs, and you use different sets of INITs depending on what you're doing. This approach demands that you remember what INITs can work together and that you reboot after moving the appropriate set into the System Folder.

Solution. INIThound, like some other INIT managers, can manage sets of compatible INITs. INIThound lets you leave all your INITs in your System Folder; sort them into sets of mutually compatible INITs; and assign a label to each set, such as Jackie's_INITs or Do_not_use_with_AppleShare or MacUser_Editorial. Other INIT utilities do something similar.

Problem. You really need to know what's going on. A friend with apparently the same system setup as yours has no trouble with an INIT that gives you headaches. Or your system administrator refuses to let you use an INIT that you believe will not cause any problems. Or you have symptoms so intermittent that you can't pin down a culprit. Or you really need to use two apparently conflicting INITs together and are willing to pay someone to fix the one causing your problems — if only you knew which one was the guilty party and exactly what the problem was.

Solution. INIThound, alone among INIT utilities, tracks the activity of INITs as they load and produces a report of files changed, volumes mounted or unmounted, and memory locations modified, among other things.

Much of this information is largely incomprehensible to mere mortals, but some things are readily apparent. For example, in the low-memory report in Example 1, we see that both Pyro! and Suitcase II changed the same low-memory value. In
POWER TOOLS

Example 1

- Begin low memory chain report
  Memory AppZone, at 0x2AA,
  was originally 0x2304C, is now 0x266A0
  It was changed to 0x233D4 by 'Pyro'TM
  And then changed to 0x266A0 by 'Suitcase™ II'
  Memory MMExist-ODExists, at 0x6F2,
  was originally 0xF000040, is now 0x40
  It was changed to 0xFF000040 by 'Suitcase™ II'
- End low memory chain report

this case it's benign, but when this doublechanging shows up in one of INIThound's reports called the Trap Patch Chain report, it may be signaling the most common source of INIT incompatibility. And even if you can't make any sense of the report, you probably know someone who can.

Of course, avoiding problems is also a way of dealing with them, and one common technique for avoiding INIT conflicts in an office setting is for the system administrator to prohibit the use of any INITs that are not known (by the system administrator) to be trouble-free.

This policy saves (the system administrator) a lot of trouble, and it's an excellent solution until it gets in the way of your using your Macintosh. That's the point at which you might decide to demonstrate the reporting capabilities of INIThound and challenge your system administrator to defend the policy in question. Sorry, system administrators; I don't want to make any trouble for you, but the name of this magazine is MacUser, not MacSystemAdministrator.

Users as Programmers and Users as Programs

The name of this magazine is MacUser, but what's a user? System 7 is going to blur the definition of the term.

One of the most profound effects of System 7 will be the greater power it will afford Mac users to configure and develop applications. AppleEvents will lay the groundwork, and Apple's user scripting language, AppleScript, which will come later, will put into users' hands the power to tie applications together, creating new custom entities to handle specific problems. The version of HyperCard that ships with System 7 may be the first tool that gives a taste of this power, by allowing users to program the Finder.

What could "program the Finder" mean? Right now the shortest path to user programming is HyperCard. HyperCard is a model of the kind of user programming I mean: a mixture of activities that would not in the past have been called programming (copying and pasting buttons and other active objects, typing a command into a window, copying snippets of code) along with activities that users didn't engage in before (writing scripts, manipulating resources, redesigning menus).

But the HyperCard version that ships with the first release of System 7 will support AppleEvents. AppleEvents are a standard set of events and messages for standard Mac functions. FinderEvents are a subset of AppleEvents and represent the unbundling of the functionality of the Finder so that an application can use any part of it. Using HyperCard, via AppleEvents, you should be able to write a simple program of fewer than ten lines that performs a complex, repetitive task, not in the world of spreadsheet cells or database fields but in the world of the Mac desktop. In just the way that other applications let you manipulate data, HyperCard 2.1 will let you manipulate the objects of the Mac environment.

You Will Be a Programmer

This ability to program the Finder is only part of the user power to which System 7 will open the door. User programming is a handy umbrella term for the capability, but it's misleading. User programming will not require users to turn into people like the programmers of today. Users can continue to be primarily users, and not professional programmers. But it will be programming.

Programming is changing, though. The reason for the user/programmer distinction and the distinction itself are getting fuzzy. Programming is getting both harder and easier, creating different classes of programmers. And programming will be the main way to get work done under System 7 when it matures. This will not be the programming that application developers do or even what HyperCard-stack developers do. But it will be programming.

Programming is simply controlling the computer efficiently. The essence of the machine is that it can do repetitive tasks. Identifying and delegating to the box the repetitive parts of your work is something that only you know how to do, and therefore, ultimately, you have to have control of that process if you want to use the machine effectively. You have to become a programmer. The definition of programming I'm using here is not one that present-day programmers would endorse. That's all right, though; the term is not theirs to define, and no tight definition is appropriate, because programming is evolving. I choose to take as a defining characteristic of programming the automation of repetitive tasks, because it's a characteristic with survival value.

Yes, you will become a programmer, even if you always said it would never happen. You won't change, though; programming will.

Programming Literacy

At the risk of sounding like the typical high-tech drumbeater, I'd like to encourage anyone interested in getting the most out of next year's Mac to look to their programming literacy. What is usually called computer literacy is not enough; computer literacy is the stuff of matchbook-cover schools. What the power Mac users of today need for tomorrow is programming literacy.

The Virtual User

Besides, Apple has succeeded in replacing the ordinary sort of user with a piece of software, so we'd better all learn how to be extraordinary users.

The piece of software is called Virtual User, and Apple demonstrated it at the Apple Worldwide Developer's Conference in May. Virtual User is really a collection of tools for software testing. It allows developers to write scripts that try out options in the programs they're writing.

Virtual User is not a user tool, but it points in the same direction as AppleEvents — that is, toward the day when the Mac's System software is "self-aware" and can understand references to the elements that comprise it. No, not real self-awareness, but anthropomorphisms are hard to avoid. That pseudo-self-awareness is the objective of a future System-software release, beyond System 7.
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We can give you lots of good reasons to purchase your Macintosh, peripherals and software from CDA. But we feel the personal service and attention you receive is the best reason of all. At CDA your satisfaction is the bottom line. From our knowledgeable sales staff and customer service representatives, to our technical support team and warehouse crew, every order receives personal care, from start to finish.

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<tr>
<td>ImageWriter II Sheet Feeder</td>
<td>$189</td>
</tr>
</tbody>
</table>

**Scanners**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microtek MSF 300GS w/built-in SCSI</td>
<td>$1899</td>
</tr>
<tr>
<td>Microtek MS II w/scsi</td>
<td>$1099</td>
</tr>
<tr>
<td>Microtek MS 300GS w/SCSI</td>
<td>$1559</td>
</tr>
<tr>
<td>Abaton Star 300/6 GS</td>
<td>$1479</td>
</tr>
<tr>
<td>Logitech ScanMan 32 Now w/Gray Scale</td>
<td>$579</td>
</tr>
<tr>
<td>Complete Page Scanner w/Onni Page</td>
<td>$749</td>
</tr>
<tr>
<td>Thunderword ThunderScan</td>
<td>$169</td>
</tr>
<tr>
<td>Digital Vision Computer/Eyes Color</td>
<td>$349</td>
</tr>
</tbody>
</table>

**Video Adapters by Generation X**

These new video adapters allow you to output directly to a television and-or a video card for color display and video recording.

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>TV Board</td>
<td>$379</td>
</tr>
<tr>
<td>TV Box</td>
<td>$379</td>
</tr>
</tbody>
</table>

**Monitors & Video Cards**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Magnavox Mac Color 14&quot;</td>
<td>$459</td>
</tr>
<tr>
<td>Apple High Resolution RGB</td>
<td>$799</td>
</tr>
<tr>
<td>Micron 8-bit Video Card (Mac II/SE/90)</td>
<td>$499</td>
</tr>
<tr>
<td>Apple Display Card 8.24</td>
<td>$719</td>
</tr>
<tr>
<td>Apple Display Card 8.24GC</td>
<td>$1619</td>
</tr>
<tr>
<td>E-Machines Color/17-16 w/video card</td>
<td>$2149</td>
</tr>
<tr>
<td>NEC MacSync 14&quot; Color</td>
<td>$499</td>
</tr>
<tr>
<td>Radius Two Page Display</td>
<td>$1099</td>
</tr>
<tr>
<td>Two Page Interface Card</td>
<td>$485</td>
</tr>
<tr>
<td>Radius Pivit Display</td>
<td>$839</td>
</tr>
<tr>
<td>Pivit Interface Card</td>
<td>$596</td>
</tr>
<tr>
<td>Elegamite C120 20&quot; Trinitron w/8 bit card</td>
<td>$519</td>
</tr>
<tr>
<td>SuperMac Trinitron 19&quot;</td>
<td>$3250</td>
</tr>
<tr>
<td>Spectrum 8 Series III</td>
<td>$1139</td>
</tr>
<tr>
<td>RasterOps ColorBoard 264i (Mac II)</td>
<td>$589</td>
</tr>
<tr>
<td>Generation X Publisher SE Video Card</td>
<td>$369</td>
</tr>
<tr>
<td>Video Memory—Upgrade your 4-bit Apple Video Card to 8-bits and display 256 colors simultaneously</td>
<td>$89</td>
</tr>
</tbody>
</table>

**UpgradenYour Mac Now Only**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Mb Upgrade</td>
<td>$150</td>
</tr>
<tr>
<td>4 Mb Upgrade</td>
<td>$300</td>
</tr>
</tbody>
</table>

**Printed Circuit Board Prices**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ID8 Wip 20 Mb External</td>
<td>$369</td>
</tr>
<tr>
<td>ID8 Wip 40 Mb External</td>
<td>$479</td>
</tr>
<tr>
<td>ID8 30 Mb Prologue Zero FootPrint</td>
<td>$479</td>
</tr>
<tr>
<td>ID8 30 Mb Prologue Zero FootPrint</td>
<td>$359</td>
</tr>
<tr>
<td>Quantum Internal w/software &amp; bracket</td>
<td>$359</td>
</tr>
<tr>
<td>400 Mb Internal 19ms</td>
<td>$399</td>
</tr>
<tr>
<td>800 Mb Internal 19ms</td>
<td>$629</td>
</tr>
<tr>
<td>1.85 Mb Internal 19ms</td>
<td>$629</td>
</tr>
<tr>
<td>170 Mb Internal 19ms</td>
<td>$899</td>
</tr>
<tr>
<td>DaynaFile Single 360K Drive</td>
<td>$499</td>
</tr>
<tr>
<td>DaynaFile Dual 560/1.2Mb Drive</td>
<td>$719</td>
</tr>
<tr>
<td>CD Technologies CD-ROM Drive</td>
<td>$1099</td>
</tr>
<tr>
<td>CD-ROM w/Microsoft Office Bundle</td>
<td>$1099</td>
</tr>
</tbody>
</table>

**Modems**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abaton Interfax 24/96</td>
<td>$509</td>
</tr>
<tr>
<td>AE DataLink Express 4000 External</td>
<td>$189</td>
</tr>
<tr>
<td>AE DataLink Express w/MNP-3 External</td>
<td>$219</td>
</tr>
<tr>
<td>AE DataLink Mac Internal (Mac II)</td>
<td>$169</td>
</tr>
<tr>
<td>AE DataLink Mac Portable w/Serial Fax</td>
<td>$189</td>
</tr>
<tr>
<td>DoveFax Desktop</td>
<td>$279</td>
</tr>
<tr>
<td>Supra 2400 Baud w/cable &amp; software</td>
<td>$159</td>
</tr>
<tr>
<td>Prometheus 2400 Baud Internal w/MacKnowledge software (Mac II)</td>
<td>$199</td>
</tr>
<tr>
<td>Prometheus ProModem 2400 External w/MacKnowledge software</td>
<td>$189</td>
</tr>
</tbody>
</table>

**Speed up Your Mac!**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DayStar 68030 PowerCards</td>
<td>Call for Pricing</td>
</tr>
<tr>
<td>Dove System 7.0 Upgrade</td>
<td>$459</td>
</tr>
<tr>
<td>Radius Accelerator 16 (SE/Plus)</td>
<td>$639</td>
</tr>
<tr>
<td>Radius Accelerator 25 (SE)</td>
<td>$1099</td>
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**Printers**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>ImageWriter II w/cable</td>
<td>$459</td>
</tr>
<tr>
<td>Olympia NP-30 w/cable</td>
<td>$289</td>
</tr>
<tr>
<td>LaserWriter INT w/cable</td>
<td>$599</td>
</tr>
<tr>
<td>LaserWriter INT w/cable</td>
<td>$449</td>
</tr>
<tr>
<td>Personal LaserWriter INT w/cable</td>
<td>$2475</td>
</tr>
<tr>
<td>Personal LaserWriter ISC w/cable</td>
<td>$1569</td>
</tr>
<tr>
<td>HP DeskWriter w/cable</td>
<td>$869</td>
</tr>
<tr>
<td>Kodak Dij侬or 300/6 GS</td>
<td>$1479</td>
</tr>
<tr>
<td>New! QMS PS-410 w/cable &amp; toner</td>
<td>$2579</td>
</tr>
<tr>
<td>QMS PS-810 w/cable &amp; toner</td>
<td>$2995</td>
</tr>
<tr>
<td>QMS PS-820 Turbo w/cable &amp; toner</td>
<td>$1695</td>
</tr>
<tr>
<td>QMS Color 100 Model 10</td>
<td>$769</td>
</tr>
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</table>

**Printer Accessories**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organizer Cart by CoStar</td>
<td>$189</td>
</tr>
<tr>
<td>LabelWriter by CoStar</td>
<td>$125</td>
</tr>
<tr>
<td>Apple LaserWriter II Toner</td>
<td>$1000</td>
</tr>
<tr>
<td>ImageWriter II Sheet Feeder</td>
<td>$189</td>
</tr>
</tbody>
</table>

**Scanners**

<table>
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<td>$169</td>
</tr>
<tr>
<td>Digital Vision Computer/Eyes Color</td>
<td>$349</td>
</tr>
</tbody>
</table>

**StarController EN Series 500**

StarController EN Series 500 enables Mac users to get the speed and throughput of Ethernet over ordinary twisted-pair phone wiring. Features include: automatically shutting off unused ports to prevent disruptive signal errors; diagnostic LEDs to indicate power, ROM, RAM, and packet transmission to each port. Comes complete with StarCommand management software. $1599

**Networking**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farallon PhoneNET StarController 300</td>
<td>$825</td>
</tr>
<tr>
<td>Farallon PhoneNET Connector (DIN-9)</td>
<td>$51</td>
</tr>
<tr>
<td>Farallon PhoneNET Connector 10-Port</td>
<td>$198</td>
</tr>
<tr>
<td>Farallon PhoneNET Repeater</td>
<td>$315</td>
</tr>
<tr>
<td>Farallon Remote/WakeUp Cable</td>
<td>$55</td>
</tr>
<tr>
<td>Farallon Telbus 3.1</td>
<td>$395</td>
</tr>
<tr>
<td>Farallon Telbus/Remote 1.01</td>
<td>$123</td>
</tr>
<tr>
<td>Farallon Telbus/Remote Access Pack</td>
<td>$849</td>
</tr>
<tr>
<td>Dayna Communications DaynaTalk PC</td>
<td>$209</td>
</tr>
<tr>
<td>Dayna Communications EtherPrint</td>
<td>$349</td>
</tr>
<tr>
<td>Nuvotech Nuvolink II</td>
<td>$279</td>
</tr>
<tr>
<td>Nuvotech Nuvolink 5C</td>
<td>$319</td>
</tr>
</tbody>
</table>

**Little Mouse by Mouse Systems**

Increase productivity with the smallest, lightest, and most accurate mouse available. If you're in the business of graphic arts, CAD, design, or any field where accuracy and precision are required, you'll want Mouse Systems Little Mouse. $75

**Input Devices**

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DataDesk Mac 101 Plus</td>
<td>$35</td>
</tr>
<tr>
<td>DataDesk Foreign Language Keyboard</td>
<td>$159</td>
</tr>
<tr>
<td>DataDesk Trackball Option</td>
<td>$159</td>
</tr>
<tr>
<td>DataDesk 15 Function Key Option</td>
<td>$159</td>
</tr>
<tr>
<td>Kensington Turbo Mouse ADB</td>
<td>$109</td>
</tr>
<tr>
<td>Altra Felix</td>
<td>$119</td>
</tr>
<tr>
<td>Kurta Tablet 12 x 12 ADB</td>
<td>$419</td>
</tr>
<tr>
<td>Microsoft WristMac (Executive Model)</td>
<td>$189</td>
</tr>
</tbody>
</table>

**Switchboard by Datadesc**

The Switchboard's unique modular design allows you to arrange the keyboard layout into the position which is most comfortable for you. A trackball module & function key module can also be added. Designed for both right and left handed users. Compatible with both IBM and Mac. $175
Software Available

Software

**Accounting**
- Quicken V1.5 by Intuit ........................................ $262
- Classic Accounting by Absolute Solutions .................. $89
- Simply Accounting V1.1 by Bedford ........................ $222
- TimeSips III V1.1 by Norhedge .............................. $169

**CAD**
- DesignCad 2D/3D by ASBC ....................................... $369
- MiniCad V2.0 by Graphsoft ..................................... $569
- Vellum V1.0 by Ashlar .......................................... $699

**Communications**
- Liaison V2.06 by Infosphere .................................. $169
- Microphone V3.0 by Software Ventures $215
- WhiteKnight V1.02 by Freesoft ................................. $65

**Connectivity**
- Dos Mounter by Dayna Communications .................... $55
- LapLink Mac III by Traveling Software ...................... $125
- MacLink Plus/PC V4.5 by Dataviz ............................ $120
- Soft PC V3.1 by Insignia ....................................... $259

**Desktop Publishing**
- 4th Dimension V2.01 by Acius ................................. $469
- Double Helix III by Odesta ...................................... $389
- Filemaker II V1.1 by Claris ..................................... $229

**Desktop Publishing**
- Image Studio V1.5 by Letterset ............................... $275
- PageMaker V4.0 by Aldus ......................................... $499
- PhotoShop by Adobe .............................................. $529
- Publish it V2.0 by Timeworks .................................. $225
- Streamline V1.0 by Adobe ...................................... $229
- TypeAlign by Adobe .............................................. $65
- Type Manager V1.2 by Aldus ........................ .......... $56
- Type Set 1 by Aldo ................................ ................. $59
- Type Set 2 by Aldo ................................ ................. $59

**Graphics/Design/Painting**
- Canvas V2.0 by BenBene .......................................... $179
- Freehand V2.02 by Aldus ........................................ $329
- Illustrator 88 V2.4 by Adobe .................................. $529
- PixelPaint Professional V1.0 by Supermac .................. $389
- SuperPaint V2.0 by Silicon Beach .............................. $129
- Swivel 3D V1.1 by Paracom ...................................... $419

**Multimedia**
- Director V2.0 by Macromind .................................... $445
- MediaTracks V1.0 by Farallon ................................. $189
- SuperCard by Silicon Beach ...................................... $189

**Music/MIDI**
- MasterTracks Pro 4 by Passport .............................. $209
- MasterTracks V3.02 by Passport ............................... $209
- MIDI Transport by Passport ...................................... $279
- Trax by Passport .................................................. $59
- Final V6 by Adobe ................................................ $59
- Mark of the Unicorn Performer V3.4 ......................... $365
- Mark of the Unicorn MIDI Time Piece ....................... $365
- Vision V1.1 by Opcode ........................................... $539
- Studio III by Opcode ............................................. $279
- EZ-View by Opcode ................................................ $90
- Pro Plus MIDI Interface by Opcode ......................... $59

**Networking**
- QuickMail V2.2 by CE Software (5 User) .................... $219
- Traffic Watch by Farallon ....................................... $125

**Personal Finance**
- Dollars & Sense V4.1 by Monogram ......................... $85
- Managing Your Money V3.0 by Meca ......................... $124
- QuickCheck V1.5 by Innotax .................................... $59

**Programming**
- Planners and Organizers
  - Fast Track Schedule V1.5 by AEC ............................ $139
  - For the Record V2.0 by Nolo Press ......................... $32
  - Hyperworks Organizer by Timeworks ....................... $62
  - Resume Kit by Spinnaker Software ......................... $58
  - WillMaker V4.0 by Nolo Press ............................... $35

**Presentation/Outliners**
- More V3.0 by Symantec ......................................... $249
- Persuasion V2.0 by Aldus ....................................... $529
- Powerpoint V2.01 by Microsoft ............................... $239

**Security**
- A.M.E. by Casady & Greene ..................................... $165
- SafeV2.0 by Symantec ........................................... $167
- Vax V2.0 by Microcom/HIC ...................................... $52

**Spreadsheets**
- Excel V2.2 by Microsoft .......................................... $245
- Wingo V1.1 by Informix .......................................... $245

**Utilities**
- After Dark V1.01 by Berkley Systems ....................... $25
- Can Opener V1.1b by Abbott Systems ....................... $65
- Capture V3.0 by Mainstay ....................................... $43
- Complete Undelete V1.0 by 1st Aid ......................... $38
- Freedom of Press V2.1 by Custom App ....................... $229
- Gopher by Macsoft ................................................. $45
- Inside Information by Microlitics ......................... $69
- MacPrint V1.2 by Insight Development ...................... $65
- Norton Utilities V1.0 by Peter Norton ....................... $84
- On Location V1.0 by On Technology .......................... $75
- Pyro V4.0 by Fifth Generation ................................ $25
- Quick Keys V1.2 by CE Software .............................. $68
- Retrospect V1.1 by Datari ....................................... $139
- Silverlining V5.22 by LaCe ...................................... $75
- Suitcase V1.26 by Fish Generation .......................... $48
- SuperLaserSpool V2.02 by SuperMac ....................... $87
- SuperSpool V5.0 by SuperMac ................................ $58

**Word Processing**
- Big Thesaurus by Denex ......................................... $59
- Mac Pro V3.21 by Lexpertise ................................. $105
- Microsoft Word V4.0 by Microsoft ......................... $245
- Office CD-ROM by Microsoft .................................. $45
- Spelling Coach V1.0 by Denex ................................. $125
- Write Now V2.2 by TMaker .................................... $311
- WordPerfect V2.0 by WordPerfect ......................... $279
- WordFinder V2.0 by Microlitics .............................. $54
- OmniPage V2.2 by Camer ....................................... $549
- Scan Reader by CTAs ............................................. $339

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New! Neon Ultimate SE Carry Case

These sturdy, Dupont Cordura nylon cases by I/O Designs have internal, padded compartments for your Mac, keyboard, mouse, hard disk and cables. Also feature two additional outside pockets. Available in black with fluorescent pink, green or yellow accents. Now with free matching disk wallet ........................................ $79

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Add Freedom of Press to
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and get true PostScript
images at a fraction of
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ready printer.

Freedom of Press allows you to print
PostScript language text and graphic
files on many non-PostScript
printers. .........................$259

Save $10 when you purchase
Freedom of Press along with the HP
DeskWriter Package .............$249

CDA offers Macintosh systems that come complete with everything you need to get up and running quickly. If you would like to custom design a system to meet your specific needs, please call one of our sales consultants at 800-526-5313 for assistance.

Mac II fx System

- Macintosh Il fx CPU
- Quantum 170 Mb Int. HD
- 1.44 Mb FDHD Drive
- 4 Megabytes of RAM
- DataDesk Switchboard
- Magnavox 14" Color RGB Monitor w/Video Card
- HyperCard & MultiFinder
- Virex Software
- 10-3.5" Diskettes
- Disk Storage Box
- Mac IIfx Dust Cover
- Mouse Pad
- 6 Outlet Surge Protector Package #9052V

CDA Price $8,699
Only $204 per mo.*

Mac IIci System

- Macintosh IIci CPU
- Quantum 105 Mb Int. HD
- 1.44 Mb FDHD Drive
- 4 Megabytes of RAM
- Magnavox 14" Color RGB Monitor
- DataDesk Switchboard
- HyperCard & MultiFinder
- Virex Software
- 10-3.5" Diskettes
- Disk Storage Box
- Mac IIci Dust Cover
- Mouse Pad
- 6 Outlet Surge Protector Package #9088V

CDA Price $5,995
Only $154 per mo.*

Mac SE 30/40 System

- Macintosh SE/30 CPU
- DataDesk 101 Keyboard
- Apple 40Mb Hard Drive
- 1.44 Mb FDHD Drive
- 2 Megabytes of RAM
- HyperCard & MultiFinder
- Virex Software
- 10-3.5" Diskettes
- Disk Storage Box
- Mac SE/30 Dust Cover
- Mouse Pad
- 6 Outlet Surge Protector Package #9011V

CDA Price $3,499
Only $83 per mo.*

Printer Packages

HP DeskWriter

Printer Package

- HP DeskWriter Printer
- 6 ft. Printer Cable
- Printer Dust Cover
- Package of Paper (500)

CDA Price $899
Package #9077

Personal LaserWriter

IINT Printer Package

- Personal LaserWriter IINT
- 6 ft. Printer Cable
- Printer Dust Cover
- Package of Paper (500)

CDA Price $2,495
Package #9078

Please circle 113 on reader service card.

Micron "Xceed" Cache Card

Improve the performance of your Mac IIci by as much as 40%. The Xceed Cache Card allows you to eliminate the 68030 wait states by using 128K of direct mapped static RAM. Easily plugs into the Ilci cache connector & comes complete with cache control software. 5 Yr. Warranty ..$585

Freedom of Press

by Custom Applications

Add Freedom of Press to
your HP DeskWriter
and get true PostScript
images at a fraction of
the cost of a PostScript-
ready printer.

Freedom of Press allows you to print
PostScript language text and graphic
files on many non-PostScript
printers. .........................$259

Save $10 when you purchase
Freedom of Press along with the HP
DeskWriter Package .............$249

All prices subject to change. Apple is a registered trademark of Apple Computer Inc. CDA is not an authorized Apple dealer. Product names are registered trademarks of their respective companies.
Apple is famous for the quality of its customer support — lousy. If you’d prefer another kind, here are some answers and options.

In some ways, I pity Apple. As the company’s introduced more and higher-end machines, things have gotten considerably more complex, support-wise. One reason Apple has no real customer-support group may be that there’s too much to support. If ignored long enough, most users bumble their way to a solution, learn to live with the problem, or give up on using Macs.

Well, I hate to see people giving up on Macs, and I certainly don’t advocate learning to live with a problem. Therefore, I’ve compiled a brief set of answers to questions users keep asking me. Curiously, Apple has already answered most of these questions in one forum or another (usually within the developer community or via AppleLink postings to dealers). It’s only you, the users, who don’t seem to get the answers.

How can I get rid of the single-pixel line in the lower portion of my AppleColor monitor? You can’t. All Sony monitors have a thin black wire that runs horizontally across the tube about a quarter of the way up from the bottom. This wire is part of the system that holds the color monitor together. It’s only the Mac’s black-on-white windows that make it visible — ironically, on PCs, which have inferior displays, you usually can’t see the line.

What’s this about the Mac IIci’s needing different memory? Is my dealer trying to pull a fast one? The IIci, unlike any other Mac model to date, needs what is called “fast page” RAM chips. Fortunately, virtually every 1-megabyte chip currently being made (and mounted on a 1-megabyte SIMM) can run in fast-page mode. Unfortunately, no 256K RAM chips can. Thus, to add a 256K SIMM set to a

By Thom Hogan
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POWER TOOLS
Iici, you have to make sure that the SIMMs are made up of 1-megabyte chips. Frankly, with memory prices the way they are, I recommend that you forget 256K SIMMs if you have a lici — go right to 1-megabyte SIMMs (make certain they're 80 nanoseconds or faster, however).

Ever since I added an extension cable to my keyboard and mouse, I've been having problems. Apple says you can't have more than 5 meters (about 15 feet) of total cable connected to the ADB connectors.

HDSetup doesn't seem to work with my drive. Why? Apple has made it so that HDSetup recognizes only Apple-supplied drives. If you bought your drive from another vendor, the vendor is responsible for supplying any utilities you need to maintain your drive.

How can I determine the order in which MultiFinder opens applications on startup? Assuming you want program 1, program 2, and program 3 opened in that order when MultiFinder starts up, start program 3, program 2, and program 1 in that order, and then use the Set Startup command in MultiFinder to open applications and DAs. If you're a ResEdit buff, you can snop the fndr resource in the Finder Startup file, which contains the applications to be launched, in order.

What do I need to have in my System Folder to make the machine start? Good question. The answer depends on the machine and the System version you're using. When in doubt, always return to the original System folder from Apple and perform a new installation on a disk, just to be sure.

OK, the answer to your next question is this: You can get a set of System disks from your Apple dealer (by having the dealer copy the disks from the CD-ROM disk — Apple provides for such things — the dealer is allowed to charge you for the service — or by buying an "official" shrink-wrapped version). Alternatively, most user groups and on-line services keep a copy of the current System files around, although downloading all the files involved usually isn't very cost-effective.

Apple says I can read IBM PC disks with my Mac, but all I ever get is the "Disk not initialized" message. First, for your Mac to read an IBM PC disk, you must have a model with a SuperDrive (1.44 megabytes). This includes
all current models (except the Plus) but not older SEs or Mac IIs. Second, you must use Apple File Exchange (to read the disk - see the instructions that came with your Macintosh) or purchase a third-party program such as Dayna's DOS Mounter. Finally, be aware that neither of these alternatives lets you run DOS programs — they only provide access to the files on the disk.

You can make sense of some DOS files if you have a Mac program that can translate the data into something your programs can handle (I suggest DataViz's excellent MacLinkPlus Translators) or a program that understands DOS file formats (some Claris and Microsoft programs understand some IBM file formats, for example). To actually run DOS software on your Mac, you need a DOS coprocessor board or Insignia Solutions' SoftPC software.

**What's the best way to back up a hard disk?**

Trick question, this. The best way to back up a hard disk is to make sure that you've got it organized well in the first place. Here's what I do:

1. Format my new hard disk.
2. Put a System on it and add any INITs, cdexes, font files, and so on that go in the System Folder.
3. Create a folder for applications and then add my applications to that folder (in appropriate subfolders, of course).
4. Back up the hard disk so far and label it Boot/Aps.
5. Create a folder for data and create appropriate subfolders.

From then on, all I have to back up on my disk is the data folder. With the Bernoulli Box II I use (I highly recommend it, by the way), I can usually do a Finder copy of the data folder onto Bernoulli cartridges.

Even if you're still stuck in the floppy-backup group, arranging your hard disk correctly and doing incremental backups of only the data folder keeps the floppy pile to a minimum. Meanwhile, a side benefit of this arrangement is that the most frequently used files get put at the head of the hard disk, where they tend to load a little faster, whereas the most changeable files go at the end of the disk, where there is the most room for adding to them. This approach keeps file fragmentation to a minimum.

**How do I park my hard disk?**

I recommend parallel parking. First practice with cones on a deserted street for several weeks before taking the drive out to the

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city for a real parking session. Seriously, virtually all hard drives now being made park themselves. Whether the auto-parking mechanism entails withdrawing the heads on power-down or having the heads land on an unused portion of the disk platter is unimportant.

What are the best and most useful cdevs and INITs available? First, a warning: Here at Macreations, we’ve traced through the operations of dozens of INITs and cdevs and have been a little frightened by what we’ve seen. A majority of them had potential memory-management or other conflicts that could cause crashes or idiosyncratic behavior when used in conjunction with other programs and utilities. Our experience is not unique — other developers I’ve talked to also have expressed serious reservations about the robustness of many of these small, clever programs.

So Tom’s first rule of INITs is use as few as you can. Add them one at a time to make sure there’s no conflict before committing to their use. Avoid useless duplication (I talked recently to one fellow who had ScrollInit, Boomerang, and Shortcut all loading into his System, despite the fact that these three INITs overlap in what they do — Boomerang was all he really needed).

Beware of memory hogs (for instance, ATM and SuperLaserSpool together, when set up to optimize printing speed, can easily chew through 2 megabytes of memory in no time).

Even Apple has gotten into the act of warning about overuse of little System add-ons. Apple cautions that System 7 will change the relationship between the System and accessories, that many of System 7’s features will directly replace some of the things you’re using now, and that System-heap memory (where the System and most INITs and cdevs reside) is valuable territory that shouldn’t be fought over or wasted.

OK, with those caveats aside, here’s what I use and why:

**Boomerang.** Gives standard file dialog boxes the intelligence and shortcuts that Apple should have provided. Especially useful with large-capacity hard disks that have lots of files and folders.

**ATM.** See my July column for details.

**Suitcase II or Master Juggler.** Again, see my July column. Choose whichever one suits your style of work best, and use it to organize your fonts and DAs. Either can help keep the size of your System file

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to a minimum at all times, which optimizes the amount of memory available for applications and data. And don’t automatically have them load all fonts and DAs all the time, as that defeats the purpose. I have one font suitcase containing laser-printer fonts, another with fonts for my newsletter, another with decorative fonts I use infrequently, and so on. I try to keep open only those suitcases that contain things I’m currently using.

**SAM or Virex.** Viruses have twice tried to take over my hard disk. Both times SAM has stopped them. Ever had to rebuild a 210-megabyte hard disk? Don’t learn the hard way.

**Pyro! or AfterDark.** If you leave your machine on for long periods and use it only intermittently (I leave mine on when I go out to lunch, for example), get a screen saver and use it. The biggest problem with the Mac is that the menu bar at the top of the display is almost always there, and even though monitors have gotten better, there is still some potential for a constant image to be etched permanently into the display (called burn-in), especially on monochrome monitors.

**SuperClock.** I like knowing what time it is (so that I know how late I really am), and SuperClock is always there at the right side of my menu bar. Not a necessity, but nice.

**On Cue.** Even though On Cue gets senile once in a while, forcing me to rebuild the application launch list, it makes it very convenient to start up applications and data files I use frequently (and that might be buried in folders within folders). Think of it as a menu.

**INITPicker.** Even if you have only a few basic INITs, such as the ones I’ve just mentioned, someday you’ll need to disable or reorder some of them. INITPicker does just that, with a straightforwardness that’s refreshing to find in Mac software.

Of course, these are just my opinions. I’m sure I’m going to get piles of indignant letters from marketing managers, users, lobbyists, and who-knows-who else telling me I left out their favorite indispensable utility.

**Why does the Apple logo flash in the upper left corner of the menu bar?** It’s funny how soon we forget. I too have pondered this problem at length, only to remember that that’s what happens when the Alarm Clock (DA) goes off. Now wait a minute, I didn’t set the alarm clock! True, but some program probably managed to wander off in memory and stamp on the PRAM (parameter RAM).

**I’m taking my Macintosh overseas. How do I power it?** It depends on what equipment you have. Most recent Apple-labeled products are self-configuring within the voltage and frequency ranges of most countries’ power output (50 – 60Hz, 100 – 240 volts). Products that are self-configuring include the Mac SE, SE/30, II, IIx, Iie, Ile, IIX, and Portable; RGB and HiRes Mono monitors; the LaserWriter II; and HD20, 40, and 80 drives. (Some range restrictions apply to certain models, notably the older IIs, so check your manual to be sure.) For these products, your biggest problem is finding the right cables and adapters. For other Apple products, notably the Plus...
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and older Macs, you must use a step-down isolator transformer (Apple recommends one that handles 500 watts).

**Why does my Mac keep crashing?**

This is, of course, the number 1 question experts get asked. The simple answer is that someone, somewhere, is doing something wrong. To determine the answer, look at the "Crash Course" sidebar.

When my system has been stable (no new software added or changed) for any length of time, crashes become so infrequent as to be almost unnoticeable. If that's not your case, something's wrong and you need to find it and fix it.

Obviously, there are many, many more questions that could be answered. Computer users shouldn't hesitate to ask questions on Zmac. The rest of you? Well, try your local user group or dealer, or look for computer consultants in the phone book. I'm not betting that Apple will figure out how to provide direct customer support in the near future, so you'd better find an alternative source.

In the remaining space here, I'd like to address some gripes to the muckamucks at Apple:

**Telephone-support lines.** Apple needs to respond directly to customers—all customers, not just Fortune 500 accounts. Assuming that we actually get to talk to a reasonably intelligent (trained) human during the entire time we're on-line, most of us probably wouldn't even mind paying a small fee (the 900-number idea, for example). It's not that we're averse to paying for support; it's that we've seen nothing to date that indicates you can even begin to answer our questions, so what would we be paying for?

**Support-oriented publication.** No, starting an Apple user publication would not compete with MacUser. At least, not if you start the publication we need: one that talks about Apple-labeled products with an emphasis on update information, compatibility information, problem solving, interaction effects, long-term-use issues, and the like. If you need a model, check out Lotus or Aldus magazine. The point is to avoid spending any time trying to sell us anything (We've already bought, remember? We might buy more if we like what we've got.) and concentrate on providing useful information.

**Diagnostics.** I can't begin to count the number of times I—or another Mac user I know—have tried to pin down a crash or other problem and would have liked to be able to isolate whether it was a hardware or software problem.

I've seen the diagnostics you provide dealers, and they're pretty good. Why don't you sell them to users? Are you afraid they'll begin tinkering with hardware? If so, why does this frighten you? When their soldering guns destroy the motherboard, that's just another motherboard you'll be able to sell. Do you think, perhaps, that your users are too dumb to use the diagnostics?

Sorry, but I've run into more than a handful of dealer "repairmen" who couldn't even read the messages on the screen—intelligent users aren't going to be able to ignore little things such as a picture of a motherboard with a big X
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through it. Moreover, I’ve heard too many horror stories of people taking a Mac into a dealer and the dealer ended up selling them a new motherboard and an AppleCare package when the real problem turned out to be the wrong System software or a bad cable. By keeping the diagnostics in dealers’ back rooms, you encourage this kind of thievery.

Ombudsman. I know the ombudsman idea has been floating around Apple for some time and that you supposedly have such a beast ensconced somewhere in one of your 419 buildings. It’s pretty obvious, however, that you don’t want anyone to find this person, department, or whatever. If you did, we would all see the number to call (or the mail stop to write to) in big red letters in the very front of every Apple product’s manual (as in, “If your dealer cannot satisfactorily resolve any problems you may have with your Apple-labeled equipment, please call . . .”).

Action, not PR. I’m tired of hearing about System 7 (you’ve been telling me about it for almost a year now). Meanwhile, I hear hardly a thing about the differences between System 6.0.1, 6.0.2, 6.0.3, 6.0.4, and 6.0.5. And don’t try to tell me that the new releases were mainly for new machines. Sure they were, but what about those 100-plus bugs you fixed along the way? Don’t you think some of us might have run into them? I’m also pretty nauseated to hear your top officers consistently tell audiences everywhere that “Apple is going to be a world-class provider of customer support.” Frankly, your actions to date show that you don’t have the foggiest notion of what support is really about.

Once in a while you do something that rewards the faithful — the pricing of the II-to-II fx upgrade, for instance — but most of the time, you ignore our needs. For six years now, you’ve had at least one registration card from me for a Mac product. In that time, you’ve sent me exactly one mailing: a two-page letter that described one upgrade choice, promoted five new products you wanted me to buy, and attempted — unsuccessfully — to help me make sense of what operating-system version I should be using.

Finally, when you’ve been faced with a problem you needed to fix (the original Mac power supply/video board, the original Image Writer II, the Quantum drives, and so on), you seem to go out of your way to keep your repair and replacement policies a secret from users (and from dealers who don’t read every line of every missive you send them). Fortunately, a few alert publications and bulletin boards keep you honest and disseminate the information, but you’ve had very little to do with that.

Action, folks, we demand action! (If you readers agree, write to me in care of MacUser, and I’ll see that your letters are forwarded to the appropriate lethargic Apple employee.)

Thom Hogan is taking a sabbatical from things that others might call work (this column excepted). He can be reached on CompuServe at account 72511,140.

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<table>
<thead>
<tr>
<th>Capacity</th>
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<th>Quantum</th>
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The File System

Computers need data, and data comes in files. This month — in preparation for our next project — we examine how the Mac’s file system works.

**Figure 1: Inside a Hard Disk**

The disk spins on a spindle. Magnetic media cover both plates of a platter. The read/write heads ride on an arm that seeks from track to track.

Have you ever seen a generic document icon on your desktop and wondered how it got there and what’s inside? Chances are that it belongs to an application you no longer use and have discarded.

Browser, a utility that we’ll be developing here, can open any file that has a data fork and display its contents in a document window. This month, we’re going to lay the groundwork for Browser by examining the Macintosh file system and discussing some basic File Manager concepts.

The File System

Let’s begin our examination of the file system from the ground up, at the hardware level. The physical file system is based on a collection of disks and their contents. Disks can be fixed (a Winchester hard disk, for example) or removable (a 3.5-inch floppy disk). In strict hardware-hacker terminology, the disk contains the recording medium, the drive spins the disk and reads and writes the data, and the controller tells the drive how to read and write.

At the bottom of it all is the recording medium, which is a coating of electromagnetically sensitive material. This medium resides...
on platters, each of which has two sides, called cylinders. Formatting a disk divides the cylinders into tracks, which run in concentric rings around the surface of the cylinder, and sectors, which are formed from the intersection of pie-slice divisions of the disk’s surface and the track boundaries. A sector usually contains 512 bytes of data and a track generally has 16 or 17 sectors, but the number of tracks on a cylinder varies from disk to disk. Figures 1 and 2 illustrate the physical organization of disk real estate.

The hardware controller manages the cylinders, tracks, and sectors. A disk-driver program, which is part of the system software, mediates the interaction between hardware and software. To the disk driver, drives are known as volumes.

**Disk Formatting**

Formatting of a disk occurs in two stages. First, a low-level format lays down the tracks and sectors. The second stage lays down the file-system information—the disk driver creates a volume record on the disk that describes its size, a directory that holds references to files, and a list of free blocks.

A block is a logical sector. Whereas a physical sector contains 512 bytes of data, a block may contain 512, 1,024, 1,536, or another multiple of the physical sector size. A block is the smallest unit of data available on the drive—even if you are requesting only one byte of the file, the driver will always read an entire block into RAM. Blocks are sequential—they run from 0 to n and cover the entire hard disk.

This layered approach to hardware and software insulates application programmers from the details at the hardware and driver level. Blocks are of great interest to system programmers who write device drivers. We will leave them to the initiated, however, as we're more interested in the next level of file-system organization.

The Macintosh file system and the File Manager routines create files and folders from blocks. The Finder, the user interface to the Mac operating system, uses the File Manager routines to simulate the desktop metaphor. So, for example, when you drag a file from a hard-disk folder onto a 3.5-inch disk’s icon, the Finder is calling File Manager routines that in turn call the disk driver to read a list of blocks on the source disk. At the same time, the disk driver is allocating blocks on the...
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disk for the destination file. The whirl of
the disk drive and the movement of the
read/write-arm stepper motors are acous-
tic evidence that all is working on the
physical level.

Files
We use files every day. Each of the
icons on your desktop represents a col-
lection of data known as a file. Mac files
have two parts — the data fork and the
resource fork — but you may find it
easier to think of these forks as two files
in one. The resource fork is a collection
of resources that are accessed through Re-
source Manager routines. The data fork,
which is application-specific, is used to
hold application data.

As a programmer, you should think of
a file as an ordered list of bytes. Each file
has a beginning and an end and therefore
a size, in bytes. Each byte in a file is
addressable as an offset from the first
byte of the file. In Mac documentation,
this offset is called the file’s mark. If the
mark is at offset 0, a read gets you the first
byte in the file. When the mark is at the
last byte in the file — the end of file (eof)
— a write appends the characters to the
file. The last byte in a file is the character
before the eof. Figure 3 illustrates this
concept of a file as a stream.

The blocks of a file are of a fixed size,
and depending on the file’s size, there
might be extra, unused bytes after the eof.
For example, if a block is 512 bytes and
a file contains 3,900 bytes of data, 4,096
bytes will be allocated to the file (eight
blocks) and so the extra bytes will remain
unused. You may have noticed that the
Get Info dialog box reports the size of a
file as something like “3,900 bytes used,
4K on disk.” To reconcile this difference,
Inside Macintosh refers to the logical eof,
which in our case is 3,900, and the physi-
ical eof, which is the size in bytes occu-
pied by the blocks allocated to the file, or
4,096 in our example. Figure 4 illustrates
logical and physical eofs. The logical eof
is of greater interest for appending data
to a file, so when we refer to the eof, we’ll be
talking about the logical eof.

File Signatures
The Resource Manager maintains data
about the file type and creator for each
file the Finder uses. This information
binds an icon to a file. The file-type value
identifies the kind of data the file con-
tains, and for Mac applications, it is always
APPL. Browser is interested in files of
Table 1: Common Macintosh File Signatures

<table>
<thead>
<tr>
<th>Application</th>
<th>File creator</th>
<th>File type</th>
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<td>System</td>
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<td>ALD3</td>
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</tr>
<tr>
<td>Tycho Table Maker</td>
<td>Tyco</td>
<td>APPL</td>
</tr>
</tbody>
</table>

*Version 3.0 and later

Figure 5: A Hierarchical File System

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Example 1: PBHGetFinfo Documentation

OSErr PBHGetFinfo (HParamBlkPtr paramBlock, Boolean async);

Parameter Block

--- 12 ioCompletion pointer
-- 16 ioResult word
-- 18 ioNamePtr pointer
--- 22 ioRefNum word
-- 24 ioRefNum word
-- 28 ioDirIndex word
-- 30 ioFlAttr byte
-- 32 ioFlFndrInfo 16 bytes
-- 38 ioDirID long word
-- 52 ioFlStBlk word
-- 54 ioFlTxtLen long word
-- 58 ioFlPyLen long word
-- 62 ioFlExtBlk word
-- 64 ioFlTxtLen long word
-- 68 ioFlPyLen long word
-- 72 ioFlExtDat long word
-- 76 ioFlExtDat long word

Example 2: GetFinfo Declaration

OSErr GetFinfo (Str255 filename, int volRefNum, Finfo fndrinfo);

typedef struct Finfo

OSType fdType,
fdCreator;
int fdFlags;
Point fdLocation;

Note that a normal string, declared with double quotes, is written as "KWGM" and translates into the 5-byte hexadecimal sequence 0x4B, 0x57, 0x47, 0x4D, and 0x00.

Table 1 lists some examples of standard file types and signatures.

Volumes

The file system considers each drive in the system to be a volume. The volume information resides on block 2 of the disk, and again, the information it contains is primarily the domain of System programmers. Application programmers are interested in volumes for one reason only: to locate files. Volumes are used as part of the access path to a file. In fact, a volume ID and filename are all that's needed to open a file.

Directories

Directories and subdirectories are the internal structures that refer to groupings of files represented by folders on your desktop. Old-timers whose experience extends back to the 1985 Mac 128K and 512K models remember when only one level of directory was allowed—the so-called flat-file system. Folders within folders were supported with the advent of the 128K ROMs of the Mac Plus, creating the UNIX-like hierarchical file system of today's Mac software.

This radical change in the file system's structure caused a rewrite of the File Manager documentation. As a result, the File Manager documentation in Inside Macintosh, Volume II, is obsolete, having been superseded by the information in Volume IV.
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The file system is hierarchical. At the top is the root directory, which is itself a volume. This is an important concept: in a hierarchical file system, directories are logical volumes. Each directory or folder is considered a volume, so File Manager routines that accept a volume ID as an argument can find a file in the hierarchical system.

The hierarchical system of the Macintosh also supports the concept of a "working directory," which is the folder you currently are working in, and provides an alternative method for accessing files in a folder. This working directory is set to the current folder whenever a program is launched from the Finder and, because of the relationship between volumes and directories, the current directory is changed with calls that set the current volume.

The File Manager

The File Manager, which is responsible for this file and folder hocus-pocus, is probably the most powerful of all the collections in the Toolbox. But this power comes at a high cost. The File Manager documentation is voluminous, confusing, and contradictory — there are four ways to specify a file, three variants of the standard I/O parameter block, two levels of using the File Manager, and more information than one person would want to know about any file system. Although navigating through the file system may be a breeze, working your way through the documentation is an ordeal. Let's start at the bottom of this mess.

As a novice, your worst choice is the low-level interface to the File Manager. The low-level routines have the prefix PB, as in PBRead, PBWrite, and PBGetEOF, to distinguish them from the high-level ones. The PB reminds you that you're using a variant of the Device Manager parameter block to pass data into and out of these routines.

To add to the confusion, when the change was made in 1986 to support the new file system, each primary routine was doubled with a hierarchical routine. So, we have a PBOpen and a PBHOpen, and we have a PBGetInfo as well as a PBHGetInfo.

Why is this the worst choice? The entire interface is based on the concept of a variant-record parameter block. The fields of the parameter block change, depending on what kind of File Manager procedure is being called, and the input requirements are different for each call. The entire scheme is something out of the old Motorola 6800 Exorcizer days.

The parameter block contains everything you want to know about a volume, file, or access path, depending on the variant. Each PB routine has its own set of input and output parameters, so you...
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POWER TOOLS

can’t work with these routines without a copy of Inside Macintosh open on the desk next to you. Even then, you’re in deep muck.

Example 1 is an excerpt from the documentation for the call PBHGetFileInfo, which returns information about a file in the hierarchical file system and provides enough information to give you a feel for this low-level documentation.

Problem 1: Note the arrows. The ones that point right (→→) specify inputs to the routine. The ones pointing left (<--) specify outputs. The ones pointing both ways (<-->) specify data that passes into and out of the routine — whatever that means.

As a novice, your worst choice is the low-level interface to the File Manager.

Problem 2: Which variant of the parameter block do you use? Notice the F1 in the name of the fields ioF1Attrib, ioF1CrDat, and so on. This F1 and the fact that you’re getting file information is the tip-off that you use the fileParam variant. There are two other variants to use — ioParam, which accesses open files, and volParam, which returns volume information.

Problem 3: Look at the numbers column — 12, 16, 18, . . . . These numbers are offsets of the field from the beginning of the record, which should tip you off — these calls are for assembly-language programmers, and if you’re going to do your work down here, you’d better know what you’re doing.

The routine in Example 1 returns a hodgepodge of data about a file. First, it returns open-file and directory numbers. Second, in the ioF1FndrInfo field, it returns data about the file’s Info structure, or Finder information. Third, it returns the file’s data- and resource-fork sizes and logical and physical end-of-file marks. Fourth, it returns the file’s creation and modification times.

Our problem with this low-level File Manager interface is that it’s really a Device Manager interface, and as proponents of layered design, we believe that applications should not be mucking around with devices.

Fortunately, there is an alternative: the high-level interface to the File Manager. For most applications, its routines are sufficient, and they’re easier to use. The high-level routines are the ones that don’t begin with PB. Some of them begin with the prefix FS, as in FSDopen, FSRead, and FSWrite; others, such as Create, GetEOF, and SetVol, are named in accordance with their action.

The high-level interface provides 80 percent of the functionality of the low-level interface, and the procedures that go with them are easier to understand. They’re more modular too — there are usually two or three high-level calls that can get you the same data as the parameter-block call. For example, GetFileInfo, which returns the Finder-information data in the Info data structure and is shown in Example 2, returns the same data that is contained in the ioF1FndrInfo field of ioParamBlk. The frustrating fact is that if you want other information, such as the file size, you need to call the low-level function.

There is a third, THINK C alternative to the low-level interface. The full ANSI C stdio library is supported by the compiler. This library has more functionality than the high-level routines and is handy if you want your I/O modules to maintain compatibility with non-Mac systems. These routines are based around the standard file streams. THINK C provides the same interface as you would find in a UNIX or DOS environment, along with sources. If you’re familiar with these routines, studying their sources is a great way to learn the low-level File Manager interface. In fact, if it weren’t our charter to teach the Mac way of doing things in this column, we’d recommend that you, as new programmers, use this library for your file I/O.

File-System Etiquette

The file system has lots of flexibility. The number of files or folders it contains is limited only by the size of the disk, and files may share common names if they are in different folders. You can copy files, move them from one folder to another, or delete them.

To keep things straight, the File Manager maintains a complex, cross-referenced set of data structures on-disk and in memory. Any access to a file must initially be set up by the File Manager, so that all the structures that relate to the file are available.

MacUser October 1990 291
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Tip of the Month

QuarkXPress

QuarkXPress, like most other word-processing and page-layout programs, doesn't let you mix two style sheets in the same paragraph. But let's say you have a catalog whose layout needs to look like that in Figure 1. In this case, you might set up a format for the hanging indent in New Century Schoolbook and then painstakingly select and change the part numbers to Helvetica Bold.

A quicker way is to set up a style sheet for the hanging indent and a separate style sheet for the part number. Then instead of running the part number and the description together, as they will eventually appear, insert some unique combination of paragraph returns and other characters if necessary between the part number and the description so you can search for and replace it later.

Select the entire text, and format it as a description (with hanging indents) by using your first style sheet. Now click on each of the part numbers and — with the function-key equivalents that QuarkXPress lets you assign to style sheets — format all the part numbers with their own style sheet.

You then have a document that looks like Figure 1b. (I've used two carriage returns as my separator, knowing that nowhere else in my document do I ever use two carriage returns together. You can use any combination, as long as it's unique and includes at least one carriage return.)

Now use QuarkXPress' Edit Find/Change menu option to replace your separator (in this case, two carriage returns) with spaces or whatever else you want to have between the part number and the description.

When you've finished, you'll see that the description and the part numbers each have their own style, just as in Figure 1a. QuarkXPress, unlike PageMaker and Word, doesn't store styles in the paragraph marker, so when you cut the paragraph marker between dissimilar styles, QuarkXPress simply juxtaposes the styles rather than replacing one with the other.

Because all formatting options in the style sheet remain with the text itself, you can have different fonts, styles, formats, and numbering. You name it, and QuarkXPress will preserve them.

Greg Raven
Los Angeles, CA

DesignStudio

In DesignStudio you can tighten all the boldface type in a document simultaneously or make virtually any kind of adjustment to any kind of type style by using style sheets in conjunction with the program's search-and-replace function.

For example, here's how to tighten all the boldface type in a document:

1. Create a style sheet with tracking and other attributes set to whatever you want.

2. Call up the Replace dialog box, and click on Use Format in the Find section. You then get another dialog box that lets you set boldface.

3. In the Replace section, click on Stylesheet and scroll to the style sheet you've just created.

4. Click on Document in the Limit Search To box, and then click on Start Search. All the boldface type in the document instantly tightens to the degree that you've specified. And if you want to further adjust the boldface, simply make the change in the style sheet.

Jon Marken
Hampden-Sydney, VA

Adobe Illustrator 88

When using Adobe Illustrator 88, you can easily become frustrated at having to cycle repeatedly through layers of graphics objects to get to an object at the back of an illustration. This is especially true when you use the masking feature. You can avoid this frustration by creating identifiers, or "handles," for the objects in your multilayered illustration.

Start by creating a short, straight line with the pen tool. Set its fill and stroke to None on the Style menu, and group it. This is one of your handles. Make several copies, and set

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them aside. As your work progresses, group the object(s) in a layer and move one of the handles you’ve created toward the perimeter of the illustration. Group the handle to the object. Now, no matter where the object occurs in the layering of the illustration, you can select it quickly and easily. If you move an object away from the illustration, using its handle, in order to make adjustments to any of its attributes (size, shape, fill, or stroke), you can return it to its position in the illustration, after regrouping, without losing its layered position.

For further clarity, you may wish to describe the attributes of an object in a layer, especially if objects in different layers are identical. When you create your first handle, create some dummy text and place it underneath the handle. Do not group the text to the handle at this point, but remember to set the fill and stroke of both handle and text to None. Select the handle and text, and make copies. When you’re prepared to group a handle to an object, move a text/handle combination toward the illustration and change the dummy text to a description of the object. Then group the text to the handle and the handle to the object (see Figure 2).

These descriptive handles come in handy when you’re trying to keep track of objects, especially when you need to make adjustments to a complex illustration you created weeks or months ago.

Jeff Negran
New Brunswick, NJ

StuffIt

Simply pressing Command-. (period — the usual method in most instances) doesn’t stop the stuffing/unstuffing operation in StuffIt 1.5.1. Instead, you need to hold down Command-. continuously until the operation has stopped.

Paul P. Villasenor
Newark, DE

PageMaker

In a recent Tip Sheet (June ’90, page 293), Bob Jones, of Salt Lake City, Utah, stated that he couldn’t use his numeric keypad to enter numbers in PageMaker 3.0.2. I have been able to use the numeric keypad by making sure the Caps Lock key is down.

Diane Greenwood
Omaha, NE

Finder

With the Finder 5.0 and 6.0.x, there’s a quick and easy method for adding prefixes or suffixes to a filename without carefully placing the insertion point. Select the file/folder you want to modify by clicking on it once. Press the left arrow key, and when the blinking insertion point precedes the filename, type your prefix. Press the right arrow key to deposit the blinking insertion point at the end of the filename, and then type in your suffix.

If you press the arrow keys and no insertion point is deposited, the file is locked. If that’s the case, make sure the file is selected and choose Get Info from the File menu (or press Command-I), click on the Locked check box, and close the Get Info window. The tip will now work.

Barry J. Silver
Bethlehem, PA

HyperCard

Here’s a simple way to simulate a toggle switch in HyperTalk (actually the basic idea can be implemented in any programming language). Each time the program executes the following line, it toggles the variable Switch between 0 and 1. If the value of Switch is 0 (off), it will change to 1 (on) and vice versa.

In HyperTalk the line looks like this:

```
Put (-1* Switch) +1 into Switch
```

Alexei Kosut
El Granada, CA

Here’s a tip for printing screened areas in Microsoft Word with a LaserWriter HSC or other non-PostScript printer for use as table headers, highlighted table rows, and so on.

Use Word’s Insert Table command to set up the text or table in which you wish the shaded area to appear. Once you have the text formatted as you desire, add a column at the left of the existing table. If this column has any borders, remove them (see Figure 3a). Use the ruler to determine the approximate width of the screen area you want (you can figure out the row height with the Cells command).

Use SuperPaint (shipped with Microsoft Word) to create a box of the size and screen density you desire. Then choose one of the 36 predefined gray-scale patterns included with SuperPaint (see Figure 3b). Paste the box into the appropriate cell in the column at the left of your table, and set the left margin of the screen paragraph to correspond with the desired screen position. Make sure the right margin of the paragraph is far enough to the right that the entire screen box fits within...
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Create a box with the desired pattern or gray fill in SuperPaint. You can then copy this graphic and paste it into the appropriate cell in the extra column of the document and manipulate the cell's margins so that it overprints the rest of the row.

Add space under the paragraph when you print, the text appears on top of the screen. When you use Print Preview, you will see the screen over the effect in Page View, but achieve the desired effect. You won't be able to see placement or size slightly to the right of the table row. You may need to adjust the screen space of the table row, which will expand the vertical margin over the screen. You may need to adjust the screen space of the table row, which will expand the vertical margin over the screen.

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And unlike other programs, Speed Disk won't lose your data even if your Mac loses power.

What a find.
Of course, you don't have to lose your data to want to get at it as quickly as possible.

That's something you want to do every day, every time you open a file.

So you'll be interested to know that Fast Find locates and opens files so quickly, you may never use the Mac's standard Find File accessory again.

If all of this looks too good to be true, see your favorite software dealer for a demonstration.

If you haven't got a favorite software dealer, call us right away at 1-800-343-4714 Ext 703F.

We'll send you more information.

*Total times to recover refomed 40MB Quantum internal hard drive on a Macintosh IIx with respective volume information files installed.
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Help Folder

Answers to Readers’ Questions

Is your Mac sick? Need a diagnosis? Leave it to the doctor — Bob LeVitus. He’s the author of Dr. Macintosh: Tips, Techniques and Advice on Mastering the Macintosh and the former editor-in-chief of Macazine. Now he’s also the guy who answers your questions in this space every month.

Small Goof Department

In the July ’90 issue (page 237), my column stated, “Dealers will charge you $120 for the deluxe [System software] upgrade — which includes manuals ….” That was a mistake. Somehow, between the time the column left my Mac and the time it was typeset, a gremlin inflated the price. The suggested retail price of a complete System software upgrade from a dealer is, and always has been, $49. Sorry for any confusion.

PostScript Files from the Sun

Q. Here’s a question about printing PostScript files — not EPS, but PostScript text files — that have been transferred from another type of computer (specifically, a Sun computer running Frame).

Although Word can do the job, you must convert the text file to Word format, select all the text, style it as PostScript, and set the margins to zero.

There’s a program that is distributed with Adobe fonts called Downloader, but it doesn’t work with Apple’s Print Monitor. Illustrator and (I believe) FreeHand require an EPS-format file or at least a text file with certain header information in the PostScript file.

Do you know of any other software that I can use for downloading PostScript text file or PostScript font and also lets you create “sets” of files.

Ilcx Compatibility Woes

Q. I recently moved up from a Mac Plus to an Ilcx.

I transferred all my files and applications from an external hard-disk drive to the Ilcx’s 40-megabyte internal drive, but I’m having some problems with older applications. They either bomb or don’t run properly.

Example 1: MacGolf 2.0 boots, but the golfer is ten feet in the air and his image is deformed.

Example 2: MacDraft has developed the habit of quitting while it’s in use, giving the “Error Code ID = 33” message.

My Ilcx had System 6.0.5 installed. Thinking the System version might be the problem, I went back to System 6.0.3, which had worked fine on the Plus. That didn’t help.

One other question: Is there a way to make various applications use the full screen on the Ilcx monitor? Most applications default to the Plus/SE small-screen format.

A. Yes, there’s an application called Widgets and a DA called LaserStatus. Widgets is a little program that lets you download any PostScript text file or PostScript font and also lets you create “sets” of files.

Ilcx Compatibility Woes

Figure 1: Some programs let you expand their windows, if you hold down the Option key and then click and drag the size box.

By Bob LeVitus
POWER TOOLS

fonts, or a combination of the two for batch downloading. LaserStatus can download PostScript text files or PostScript fonts as well as sets created with Widgets. Although neither Widgets nor LaserStatus works in the background (takes advantage of Apple’s Print Monitor), they’re the fastest, most convenient solutions I know. Both are included in MockPackage Plus Utilities from CE Software (1854 Fuller Road, Box 65589, West Des Moines, IA 50264; [515] 224-1995).

MockPackage Plus Utilities is chock-full of other goodies such as MockChart, a chart-plotting DA; MockWrite, a text-editing DA; MockPrint, a fast-printing DA; MockTerminal, a telecommunications DA; Ask, an INIT manager; FolderShare, to change privilege default settings on an AppleShare volume; Control-1, which lets you specify which cdev is active when you open the Control Panel DA; and EZ-Menu, which lets your mouse pull down menus without your having to click when you move the cursor into the menu bar.

At a suggested retail price of $49.95, MockPackage Plus Utilities is a great value, even if you don’t think you need all its contents. You’ll probably find most of them indispensable, however.

By the way, I mentioned Widgets and LaserStatus in July ’90 (page 255) and said they were also included with CE Software’s DiskTop (my favorite Finder-replacement DA). This is no longer true: They’re now available only in MockPackage Plus Utilities.

What’s a Developer?
Q. I’m a programmer and have always wondered what, exactly, a developer is.
A. Developers are programmers who have been “certified” by Apple. They used to be called Certified Apple Developers but are now called Apple Partners.

To become an Apple Partner, you must complete an application, submit a business plan or sample product literature, and pay a $600 annual fee. If you’re approved, you get software updates, sample code, technical publications, access to AppleLink (Apple’s electronic communications and information system), as well as many other goodies.

For more information on this, contact Apple Developer Programs at Apple Computer, Inc., Attn: Developer Programs, 20523 Mariani Ave., M/S 73-2C, Cupertino, CA 95014; [408] 974-4897.

Duplicate SuperLaserSpools
Q. Sandy and I have a laser printer connected to our Macs, and we both have SuperLaserSpool installed. Here’s the problem: Sandy sends a Print command first, prints, and takes “priority” over the printer. When I issue a Print command, I get this message: “There is a duplicate copy of SuperLaserSpool already installed: Please see your network administrator.” Conversely, if I print first, Sandy gets the duplicate-copy message on her Mac.

We examined our disks
for a duplicate copy of SuperLaserPool but found none. We are very tidy and are careful not to put duplicate items (especially Systems) on our disks. After hours of fiddling, we gave up.

We need SuperLaserPool. Help!

Jeri Elliott
Jubail, Saudi Arabia

A. The problem is that SuperLaserPool uses a form of copy protection known as "network serialization." Your copy of SuperLaserPool is licensed for a single user and has a unique serial number. When someone else on the network tries to use a copy with the same serial number, you get the message you describe. It appears that you and Sandy are using the same copy of SuperLaserPool — and

No DAs under MultiFinder

Q. I own an SE/30 with an ImageWriter II and an HP DeskWriter printer. Recently I added 4 megabytes of RAM to take advantage of MultiFinder. Now I don’t have access to the Chooser or any of my other DAs under MultiFinder. I have to re-start under the Finder so I can switch printers. This is very annoying — closing all the applications, re-starting under Finder, printing, re-starting under MultiFinder, and opening the applications again. Is there any software that lets you access your DAs under MultiFinder?

Paul Farabaugh
Pittsburgh, PA

A. It sounds to me as if the problem is a missing piece of System software called DA Handler, and the good news is that it’s free — it came with your Mac. DA Handler is what gives MultiFinder the capacity for DAs. You should be able to find it on one of your System Tools disks (see Figure 2). Just copy it into the System Folder on your startup disk, re-start under MultiFinder, and voilà — DAs.

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that's a definite no-no.
The solution is simple — just buy another copy of SuperLaserSpool.

**Upgrading FileMaker Plus, II, or 4**

Q. I purchased FileMaker Plus in April 1987. I've been very satisfied with it and would like to incorporate an updated version. Can you tell me if the rights to the software were acquired by a firm other than Nashoba Systems and/or if the software is now sold under a different name? If it's the latter case, is there any way to acquire an update without buying a new program?

Andrew Mercer
Stafford, England

A. Yes, yes, and yes. The software was acquired by Claris a few years ago, there have been several new versions since then, and you can acquire the latest and greatest upgrade for less than the price of a brand-new copy.

The newest version is called FileMaker Pro and includes more than 100 new features. Overall performance has been improved by more than 30 percent, and it now includes customizable grid lines, auto-alignment, and scripts that can automate any of the program's commands or series of commands. In addition, workgroup-administration features have been improved, and FileMaker can now share its spelling checker and dictionaries with other Claris applications such as MacWrite II and MacDraw II.

The suggested retail price of FileMaker Pro is $299 — the same as that of previous versions. The cost of upgrading for registered owners of FileMaker Plus is $119; for owners of FileMaker II or FileMaker 4, it's $99.

Contact Claris Corp., 5201 Patrick Henry Drive, Santa Clara, CA 95052-8168; (800) 544-8554 (domestic upgrades) or (408) 727-8227 (international upgrades).

**Custom Key Caps**

Q. I've made many additions to the fonts in my System file and regularly use the Key Caps DA. When I choose Key Caps from the Apple menu, it defaults to the Chicago font, which I never use. Can this default font be changed?

F. Robert Schmidt
District Heights, MD

A. It's easy — and Apple even provides the tool you need. MacroMaker, with the latest versions of the System software. Install MacroMaker, and use it to create a macro that opens the Key Caps DA, pulls down the Key Caps menu (the one that should have been called the Font menu!), and selects Geneva.

If you use one of the more powerful macro generators — Tempo II; AutoMac; or my personal favorite, QuickKeys — you can use it instead of MacroMaker to generate this macro sequence.

For another free solution to your problem, see Jon Wind's ASCII Chart DA, described in "33 Unsung Shareware Programs" in this issue. With this DA, you can see all 256 characters at once, and you can pick the default font for display. It's available from MacUser's ZipMac service.

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**Tactic Software**

- **Art 1st Edition** - $48
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- **Artfonts 1** - $48
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- **Artworx** - $44
- **Clip Art** - $48
- **Clipart Plus 2** - $48
- **TimeWorks** - Published by Easy Software - $110

**Williams & Macias**

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  - 102 Alien Cassette (Laserware) - $15
  - 104 VHS Video Cassette - $12
  - 216 (Imageviewer) - $15
  - 278 (Imageviewr) - $18
  - Mydisklabeler (Imageviewer) - $48
  - Mydisklabeler (Laserwriter) - $33
  - Printer Business Plus 1 & 2 - $149

**Zedcor Inc**

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  - Digital Color Video - $665
  - Micro再见 - $254

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  - Interface 248 Modem - $415
  - Quickstep Page Printer - $398

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*PRINTERS*

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<tr>
<td>QMS PS 820 Turbo</td>
<td>$4695</td>
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CDC IMPRIMIS WREN

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20mb  $259
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Sharp JX-100 $719
Sharp JX-450 $5165
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DISK TOP 50
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DISKTOP LOCK 75

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"I would like to... thank Laser's Edge for the manufacture of ULTRA Black... At 54% of the cost of a new cartridge, ULTRA Black is the best thing that happened to our computer art department since the Apple."
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—Datek Imaging Supplies Monthly

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Please circle 195 on reader service card.
1. Please indicate which of the following computers you currently use in your company or organization:

   a) IBM PC
   b) Mac SE
   c) Mac II
   d) Other

2. For how many micro computers do you buy products?

   a) 1-4
   b) 5-49
   c) 50+

3. Your primary job function is:

   a) Administrative/General Management
   b) MIS/Communications Systems/Programming
   c) Engineering/R&D
   d) Financial/Accounting
   e) Marketing/Sales
   f) Computer Dealer/VAR

4. For which of the following products are you interested in selecting brands/models to be bought by your company or organization?

   a) Accounting
   b) Spreadsheet
   c) Financial Planners
   d) Project Managers
   e) Word Processors
   f) Database Managers
   g) Public Address Equipment
   h) Graphics
   i) CAD/CAM
   j) Communications

5. Are you involved in the purchasing of microcomputer equipment at your company?

   a) Yes
   b) No

6. If so, what function do you serve in the purchasing process?

   a) Evaluations/Specification
   b) Recommendation
   c) Buyer/Purchaser

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4. Please send me a one-year subscription to MacUser for $19.97. Offer valid in U.S. only.

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<td>SmartArt II, III, IV or V</td>
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<td>Super 3D v2.0</td>
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<td>Super Paint v2.0</td>
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<td>Atilsy Corporation Art Importer v2.0</td>
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<td>Metamorphosis</td>
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<td>Astral Development Corp. Picture Publisher v2.0</td>
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<td>Bright Star Technologies Hyper Animator</td>
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<td>Broderbund Print Shop</td>
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<td>TypeStyle</td>
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<td>MacDraw II</td>
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<td>MacPaint II</td>
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<td>SmartForm Designer</td>
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<td>Computer Associates Cricket Stylist</td>
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### All Packing Materials 100% Safe For The Environment

#### Electronic Arts
- Studio II: $96
- Studio III: $130

#### Generic Generic CAD
- Graphisoft Blueprint: $219
- CAI+ : $519
- I.S.I. Precision: $155

#### Innovative Data Design
- Draw2D v2.0: $193
- Kaerston Software Top Down v2.0: $199
- LetterSet Color Studio: $179
- LetraSet: $159
- MathSoft MathCAD: $305

#### MGI
- Eye Opener Springer II, III or IV: $95
- PageMaker-Business Vol. I: $95
- USA Series I, II or III: $95
- Micro Frontier Enhance: $235
- Micro Spot MacIntechnics: $195
- MacPlot Pen Plotter Professional: $295
- MacPlot Pen Plotter Standard: $135

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- MacArt EPS or PICT: $69
- MacArt Paint: $39
- Gitterer VisualPaint: $175
- Paracamp Model Shop: $364
- Swivel 30 v1.1: $265
- Strata Stratavision 3D: $375

#### Strategic Mapping
- MapMover Atlas: $289
- StudioTec Colorset: $228
- SuperMap Software
  - Pixel Plot Professional: $388
  - Pixel Plot v2.0: $225

#### Zenstar
- DeskPaint & Desktop Draw v3.0: $115
- DeskWorks: $225

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### HYPERMEDIA & LANGUAGES

<table>
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<th>Alladin Systems Programmers Assistant</th>
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**INPUT/OUTPUT**

#### Apple Computer
- LaserWriter II NT: $3600
- LaserWriter II SC: $2266
- Plus: $69
- Printer Monitor Adapter: $489
- Printer Monitor: $488

#### Applied Engineering
- 3" external floppy drive: SPECIAL 208
- Cambridge MailBox 160K: $785
- CMS Enhancements
  - MacStack 44MB Removable: $839
  - MacStack SD200: $459

#### REQUIREMENTS

- MacStack SD30U: $459
- Complete PC: $289
- Complete Half Page Scanner: $295
- Data Desk International
  - Hyper Painter: $32
  - Mac 1012 and/or Non-Abb Keyboard: $129
  - Switchball for SwitchBoard: $119
  - SwitchBoard: $175
  - Vertical Function Keys for SwitchBoard: $39

#### Dayna Communications, Inc.
- DaynaFile DFO100 Single: $499
- DaynaFile DFO102 Dual: $685

#### DigitalVision
- Computer Aide: Mac: $194
- Computer Aide-Mac II (color): $338
- Eastman Kodak Kodak Diconix M150 Plus Printer: $469

#### Fifth Generation
- FastFile Tape Drive: $1035
- GDT Softworks
  - JetLink Express: $109
  - Print Link Collection: $74

#### Hewlett Packard
- HP 3012 Digital ATM: $659
- LaserJet III: $1785
- LaserJet IIIF: $1115

#### Kensington Technology
- Drive 2 1/2 with Fastback II: $329
- Rapport: $155

#### Keytronic
- Mac Pro Keyboard w/Tempo II: $119
- Keala Technologies
  - MacStack SD103 (250MB): $259
  - Karta 12" x 12" IS/ADT Tablet: $359
  - Korda 3 Switch Pen: $75
  - Cordless 4-Button Cursor: $75

#### Megavox
- SD7000 Color Monitor 14": $529
- Mass Micro Systems
  - Data Cartridge (44MB): $105
  - Datapack II: $1439

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<table>
<thead>
<tr>
<th>Product</th>
<th>Suggested Retail</th>
<th>Programs Plus Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCSI Interface/Port</td>
<td>$109</td>
<td>$109</td>
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<td>Micron Technology, Inc</td>
<td>Xceed Ici-128 Cache Card</td>
<td>$579</td>
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<td>Samsung 80ns 1 meg SIMMS</td>
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<td>$79</td>
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**MODEMS**

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<tr>
<th>Company</th>
<th>Model</th>
<th>Programs Plus Price</th>
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<td>Abaton</td>
<td>InterFax 12/48</td>
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<td>InterFax 24/96</td>
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<td>Anchor Automation</td>
<td>Mac 2400E5 w/MNP</td>
<td>$230</td>
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<td>Mac 96 E4 External</td>
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<td>Mac Send Fax</td>
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<td>DataLink Express</td>
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<td>DataLink Express Send Fax Option</td>
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<td>DataLink Mac II</td>
<td>$279</td>
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<td>DataLink Mac Portable</td>
<td>$259</td>
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<td>Doce Desktop Fax</td>
<td>Desktop Fax (Networkable)</td>
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<td>Nubus Fax-Mac II</td>
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<td>Nubus Fax-Mac II (Networkable)</td>
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<tr>
<td>Fresco</td>
<td>White Knight v11.04</td>
<td>$85</td>
</tr>
</tbody>
</table>

**WIN AN APPLE LASERWRITER II SC!**

Everytime you order from Programs Plus, you’re automatically entered into a fantastic drawing for Apple LaserWriter II SC laser printer. Full-page 300 dpi. High resolution graphics and near typeset quality text. 4 fonts. A $2800 retail value!

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**MEMORY EXPANSION**

<table>
<thead>
<tr>
<th>Company</th>
<th>Model</th>
<th>Programs Plus Price</th>
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<tbody>
<tr>
<td>Applied Engineering</td>
<td>Additional 1 meg SIMM Modules</td>
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<td>MacRAM Portable 2 meg</td>
<td>$899</td>
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<td></td>
<td>MacRAM Portable 1 meg</td>
<td>$499</td>
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<td>MacRAM Portable 8 meg</td>
<td>$1699</td>
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<td></td>
<td>MacRAM Portable 1 meg</td>
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<td>Dover Computer Corporation</td>
<td>MacSnap PowerBus</td>
<td>$239</td>
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<td>MacSnap 5/4B</td>
<td>$479</td>
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<td></td>
<td>MacSnap ToolKit</td>
<td>$15</td>
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<tr>
<td></td>
<td>Marathon O30 Upgrade (Mac+ SE, Mac II)</td>
<td>$449</td>
</tr>
</tbody>
</table>

**TONER CARTRIDGE**

**Zik Pit by Dart Products** has everything you need. Toner cartridge recharge takes only 10 minutes. No mess, and no tech skill needed. Won’t damage cartridge or printer—money back guaranteed! Toner quality exceeds OEM density tests by 12% for blacker blacks. For all Series I and II Laserwriters, EP, EP+, CS, SX.

<table>
<thead>
<tr>
<th>Product</th>
<th>Programs Plus Price</th>
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<tbody>
<tr>
<td>Toner Zip Kit</td>
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<td>Programs Plus Price</td>
<td>$29</td>
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</table>

**America On-Line • Genie • Compuserve • GOPP**

- Micron Technology, Inc.
  - Xceed SE/30 1024 X 780 Video Card: $559
  - Xceed SE/30 1024 X 780 Video Card: $329
- Orange Micro Grappler 9 Pin: $78
- Grappler LX: $128
- Peripheral Land
  - Infinity Turbo 40MB: $999
  - Turbo 40MB Card: $199
  - Turbo Floppy 1.44: $30
- Radius Color Display (with card): $349
- Pivot Display (without card): $608
- Rodine Systems 30 Plus: $415
  - Cobra 10GE: $899
  - Cobra 21GE: $1535
  - Cobra 45E: $679
  - Cobra 70E: $879
  - Selksys SP1000 (Printer): $229
- ThunderWare
  - LightningScan 400: $385
  - ThunderScan Plus w/ ThunderWorks: $189

**Hayes Microcomputing**

- Smartcom II v3.1: $34
- Smartmodem 2400DM: $423
- V2400 Baud Modem: $459
- V2400 External w/ Software: $489
- V9600 Baud Modem: $759

**Suggested Retail**

- America On-Line • Genie • Compuserve • GOPP
- Micron Technology, Inc.
  - Xceed Ici-128 Cache Card: $579
- Samsung 80ns 1 meg SIMMS: $79
- Micron Technology, Inc.
  - Xceed Ici-128 Cache Card: $579
- Samsung 80ns 1 meg SIMMS: $79

**ضحألًلاًدًلًذًلًذ°
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MediaTraks Multimedia Pack $319

MacMind MacMind Director v.2.0 $439

NETWORKING

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DataViz MacLink Plus Translator v.4.5 $199

Daffron PhoneNET Connector $31

PhoneNET Connector (10 Pack) $198

PhoneNET Managers Pack $59

PhoneNET Star Connector $17

PhoneNET Star Connector (10 Pack) $198

PhoneNET Star Controller $819

TrafficWatch or Timbuktu Remote $123

Insigo SoftPC v.1.3 $245

Microcom Software

Carbon Copy SPECIAL $119

Carbon Copy Twin Pack $168

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NovoLink SC $319

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<tr>
<th>Annual Premium</th>
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</thead>
<tbody>
<tr>
<td>up to $2,000</td>
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<tr>
<td>$2,001-$5,000</td>
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<tr>
<td>$5,001-$8,000</td>
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<tr>
<td>$8,001-$11,000</td>
</tr>
<tr>
<td>$11,001-$14,000</td>
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### Quantum 12ms Access

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Internal</th>
<th>External</th>
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<tr>
<td>40 mb</td>
<td>$339</td>
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<td>80</td>
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<td>170 mb</td>
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<td>$949</td>
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### Syquest

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<tr>
<th></th>
<th>45 meg Removable</th>
<th>Dual 45 meg Removable</th>
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</thead>
<tbody>
<tr>
<td>Syquest</td>
<td>$649</td>
<td>$1245</td>
</tr>
</tbody>
</table>

- All include one cartridge
- $76 per cartridge for additional cartridges

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- $599

### Teac 155mb Tape With Retrospect!

- $649

### WangDAT

- $2395

- All include one cassette

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<table>
<thead>
<tr>
<th>Height</th>
<th>Capacity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Half</td>
<td>173</td>
<td>1159</td>
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<tr>
<td></td>
<td>300</td>
<td>2095</td>
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<td></td>
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<td>Runner</td>
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<td></td>
<td>600</td>
<td>1999</td>
</tr>
<tr>
<td></td>
<td>630</td>
<td>2595</td>
</tr>
<tr>
<td>1 Gig</td>
<td>3999</td>
<td>4295</td>
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### Dual Drive Combo's

<table>
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<tr>
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<td>600 mb/WangDAT</td>
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<tr>
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<td>600/Teac 155</td>
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<td>600/Syquest</td>
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<tr>
<td></td>
<td>300/Syquest</td>
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<td></td>
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<td>2599</td>
</tr>
<tr>
<td></td>
<td>330/SyQuest</td>
<td>2599</td>
</tr>
</tbody>
</table>

### Maxtor 200mb

- $999

### Maxtor 200mb

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**MacUser Marketplace**

is a special economical section for product and service listings.
The world has gone insane: Lotus Development Corp. has won a lawsuit over Paperback Software and its Lotus 1-2-3 clone, VP-Planner. Poor Adam Osborne, who started Paperback, never could turn the corner with this product, and he moved to Oregon to live the life of a country gentleman. Now Lotus is all prepared to sue Borland over a broader interpretation of spreadsheet cloning involving Borland's Quattro. It seems to me that Dan Bricklin and Bob Frankston — the founders of Personal Software, the company that brought out VisiCalc, the first spreadsheet program — should in turn have some sort of case against Lotus. But they were wisely bought out. Until recently, Frankston worked for Lotus.

This all means that Apple can go ahead with its look-and-feel suit against the Microsoft Windows product, and presumably with a suit against the X-Windows and Motif interface, and perhaps even a suit against the NeXT machine. Of course, it helps that Xerox's suit against Apple (based on the claim that Apple stole its interface from the Xerox Star in the first place) failed. Whew!

Apple does pretty well by these suits. It has put a few small-time Apple II clones out of business and has threatened anyone who's even thought too loudly about cloning the Mac. Poor Akkord in Taiwan was nearly going broke trying to clone a Mac, when Apple attacked it with a suit. Kick 'em while they're down. What fun.

Of course, nobody ever talks about the suit Paul Heckel brought against Apple over the HyperCard interface. Heckel designed a product called Zoomracks some time before HyperCard was even a dream, and the HyperCard concept was similar enough to his to warrant a suit, which, as far as anyone knows, Heckel won in a secret settlement. Apple finally loses, kind of. Actually, because of some weird joint-technology exchange thrown in as part of the settlement, Apple can sue anyone who clones HyperCard.

Meanwhile, some stockholders of the Beatles' Apple record company are suing Apple over its name, because the Apple Macintosh makes music and thus could conceivably confuse the competition for public attention. Oh brother. I'm sure we're all confused here...

Let's not forget that lawyer in New York at Refac International who buys old, useless patents and then revivifies them so that he can sue one company or other over infringement. Heck of an idea.

This all pales when we look at the possible ramifications of the war between Motorola and Hitachi, however. Motorola thought Hitachi was stealing a few of its concepts and decided to sue. Hitachi, in turn, took a good look at the 68030 chip; saw some of its patented technology; and got a court order to stop Motorola from making the chip. Motorola pulled out some big guns and was allowed to continue making the chip. Boy, Apple would be in a heap of trouble if Motorola suddenly could not deliver any more 68030 processor chips. I suspect Apple would then sue Motorola for fraud and breach of contract. Motorola would then sue Hitachi for ruining its business and, perhaps, restraint of trade. Wow, the lawyers can clean up with these possibilities.

The chip makers also love suits, and they've gone wild. AMD (Advanced Micro Devices) has been sued by Intel over its introduction of a clone of the 80287 processor used in IBM AT-class machines. As if anyone cared. Chips and Technology sued Elite Microelectronics in fear that the ex-C&T employees at Elite would steal its ideas. What ideas?

Let's not forget Atari and its just-plain-mean suit against Nintendo because Nintendo has managed to lock out anyone trying to access its system without buying chips from Nintendo. I can imagine the directors of Atari also saying, "Darn. I wish we'd thought of that trick!"

Folks, this is going to get worse and worse. The most terrible aspects of all this began in the late 1970s, when the technophobes in Congress formed the Congress' Commission on New Technological Uses of Copyrighted Works (CONTU), which studied the software-protection issues then appearing. In 1980, Congress passed an amendment to the copyright law that said that computer programs were protected by copyright. How bold.

But neither a report issued by the CONTU nor the 1980 amendments discussed whether it would infringe a copyright to copy an interface to make compatible software. Reverse engineering, disassembly, and other aspects of cloning weren't even thought of by CONTU's staff analysts. And if they had been thought of, nobody would know what it all meant. So the courts are going to make these decisions. If you think Congress is made up of pathetic technophobes, wait until these old judges start to look at these issues.

One more part of the picture. America is like a big business. The guy at the top influences everyone below. President Bush was showcasing his office on a recent TV newscast and bragging about his typewriter, admitting he didn't know anything about computers or word processors or anything like that. Kind of proud of it. Here we are, a nation relying on the technological revolution to get us out of the next few centuries alive and the president can't understand how to work the simplest dinky computer. My God!

So the circle is complete. The judicial system has gone berserk in attempting to deal with high-technology patent and copyright issues. The legislators in Congress are making dopy laws that they don't understand. Who knows what they may dream up next? And, finally, the executive branch of government is being led by someone who thinks a typewriter is high-tech. The circle is complete. We're in the middle — surrounded. Surrounded by idiots. I think I'm going to cry.

By JOHN C. Dvorak

372 October 1990 MacUser
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