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When we introduced Microsoft® Word six years ago, we weren't planning on making history. We had just one goal, and a fairly simple one at that: to make a word processor that suited people's needs.

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First, there were some folks who didn't like tabbing much. Fair enough. For them, we developed Tables—an easier way to set up side-by-side paragraphs, columns of numbers, even forms. No tabs. No hassle.

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How else can we explain Word 4.0 being the most popular word processor in Mac history?

And those cards and letters are still coming. "Listen," someone'll say. "In case you guys are working on the next Word...."

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You don’t become the most popular word processor in Mac history by thinking big.
Three Cheers for Three New Macs
BY RIK MYSEWSKI, WITH EDITORS AND STAFF OF MACUSER AND ITS LABS
The new Apple lineup delivers more bang for the buck than everything from el cheapo IBM clones to high-end workstations. You can get a new Mac Classic with SE power at Plus prices. Better yet, how about a color LC, which delivers Mac II power at SE prices? Or a IIfx, with 68030-class performance for around $3,700? More good news: Apple has dropped the price of the IIfx by $1,000 or more. And it has sweetened the pot even further by introducing new sound capabilities, add-in cards, monitors, a keyboard, RAM-expansion kits, a System-software upgrade, and an Apple Ile-emulation card. Is it Christmas or what? ....................................................90

Moving Up to a Big, Fast Hard Drive
BY OWEN W. LINZMAYER AND THE MACUSER LABS STAFF
Interested in big external hard drives in the 300-megabyte range? Step right up, and see how 22 of these brawny boxes compare. The Labs evaluated such critical factors as service options, actual street prices, SCSI standards, read-ahead caches, zone-bit recording, short stroking, and bundled software. Also: disk mirroring and disk duplexing. ..............................................................114

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BY VICTORIA VON BIHL WITH HOWARD BORNSTEIN, BEN TEMPLIN, BRUCE MEWHINN EY, AND AILEEN ABERNATHY
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"Expect to see voice annotation as a common feature of such bread-and-butter applications as word processors and spreadsheet programs."

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When to buy

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About MacUser

Double Jeopardy!

Bob LeVitus is an ace when it comes to finding the answers. If you've read our monthly Help Folderful of questions and answers, you've seen him come up with answers on everything from QuickDraw to slow SCSI. And if you've read his best-selling book Dr. Macintosh or his new Stupid Mac Tricks, you know that — no matter how profound or how trivial the questions — he's the man with the answers.

But is he the man with the questions?

This question was put to the test last August, when Bob represented MacUser in the first BCS (Boston Computer Society) showdown of Macintosh journalists, industry insiders, and just plain folks in a game of Macintosh Jeopardy! — a takeoff on the ever-popular TV quiz show, in which the moderator provides the answers, the players provide the questions, and the sponsor provides a silver-plated bowlful of Twinkies and Coke Classic to the winner.

The questions tested the contestants' knowledge of Mac trivia, their speed with a buzzer, and their ability to bluff their way out of a paper bag. To nobody's surprise (not ours, at least), Bob won the trophy, and he also got something even better: a partner. Andy Ihnatko, one of BCS' noted Mac experts and a cocreator of the Macintosh Jeopardy! event, has now joined Bob in answering your questions every month in Help Folder.

Andy's the kind of guy who spends too much of his time memorizing Inside Macintosh — at least, he used to until he got fed up because it wasted so much space on pictures.

Andy doesn't, as he puts it, "have a big-time book contract or anything," but he does have an encyclopedic knowledge of the Mac. And he's got something even more valuable: an attitude. Actually, that should be Attitude, with a capital A, as in "rap is just opera with an Attitude." Check out this month's Help Folder if you want help in redefining Attitude.

Not content to be merely an answerman, Andy is also adept at eliciting questions. He's enjoyed some notoriety at BCS meetings by leaving an innocuous Star Wars Jedi lunch box, in which members can anonymously leave questions that they might be too embarrassed to ask aloud, by the door of the meeting room. Questions such as "OK, I know Apple says there are no user-serviceable parts inside the computer, but does it violate my warranty if I read Inside Macintosh?" Often enough, the answers aren't as trivial as the askers fear.

So don't be shy — send us your questions. We don't have a Jedi lunch box, but we do have the most expert duo since Masters and Johnson waiting to answer all your questions. (If you think you've already got all the answers — and questions — test your wits in the Macintosh Jeopardy! sampler sidebar, "More Than You Know?" in "Our Readers Write Back" in this issue.)
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.

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Portable Opinions

John Rizzo's article "Have Mac, Will Travel" (September '90, page 192) was well written, but the idea of purchasing a DOS laptop computer for use as a "data bucket" deserves the conspicuous-consumption-of-the-year award. Spending more than $1,000 for a computer is silly if you intend to "Fill 'em up, carry 'em home, and empty 'em into your Mac." If that's all you want, you'd be better served carrying a box of disks, or a portable hard-disk drive if you need the megabytes. If you purchase a DOS laptop, do it for the right reason: Use Microsoft Word, WordPerfect, Excel, or any of the other programs that run on both Macs and PCs, and get some productivity from your investment by working with the same programs on both computers and swapping formatted, compatible files as needed.

Geoff Hart
Sault Ste. Marie, Ontario Canada

I must take issue with your September '90 evaluation of portable Macs in the article "Have Mac, Will Travel" by John Rizzo. Although I agree generally with the trade-offs he mentions, it's my opinion that the best portable Macintosh is the Outbound Laptop System. The others are "luggables" at best and have severe deficiencies. The Dynamac SE/30 is ruled out completely because it is not a battery-driven machine.

Although the Macintosh Portable is a splendid machine, it has two significant drawbacks. The first is that it is indeed a luggable; after a few attempts to use it on flights and other modes of travel, I put it into a hard-shelled suitcase and shipped it with my other baggage. By contrast, the Outbound fits very nicely into my briefcase.

The second point is that the Macintosh Portable's screen is absolutely dismal unless you are working in a brightly lit office environment. This type of environment does not exist on the road. I am delighted with the Outbound screen, which I can use in a completely dark room.

To me there's no comparison. The Outbound is clearly superior to the Macintosh luggable and the Dynamac transportable.

Gerald W. Matthews
Orlando, FL

As I mentioned in the article, I too have used all four machines in airplanes, trains, cars, and buses. The Outbound Laptop System has too many shortcomings for the price. To reiterate, the Outbound's size is hard to use, the battery doesn't last on a coast-to-coast plane trip, and the screen-refresh rate is slow. In addition, our tests showed that the

Dear Mr. Sculley...

...When we asked for "insanely great" ideas that might keep Apple ahead of the pack, did we really expect our readers to perform the function of high-priced analyst types for free? Of course—we weren't disappointed either. Tom Capizzi, of Cincinnati, Ohio, thinks Apple should "steal a trick from IBM a few years back—sell a lot of machines below cost. The reason is obvious—everything else to run the system would have to be bought at regular markup!" Let's hope not—otherwise, next thing you know, Claris will be selling System 7.0.

"I'd like to see larger screens on all the Mac models," says Andrea Barol, of Philadelphia, Pennsylvania. "Computers priced at the SE level with large screens would be a terrific seller." Sounds like the thinking behind Apple's just-announced Macintosh LC. And speaking of new CPUs, Apple might consider Andrea's other suggestion: "A terrific incentive for consumers would be a buy-back program. More users would seriously consider upgrading to a faster, newer computer immediately, if they could trade in their older models."

We recognized another prescient voice in Robert Eikel, of La Jolla, California: "What an insanely great idea could keep Apple ahead of the pack? A simple one: voice recognition. I'm not talking about the difficult-to-develop fully voice-operated Mac system, just a microphone that replaces the keyboard. Something this simple could be brought to market very quickly." Robert's right about its being developed quickly—it's already here, or, here.

By now you've heard the news: Apple's bringing sound to the Mac in a big way. Annotation, voice mail, speech recognition, the works.

Speak Up: Sound on the Mac — is it a bang or a whimper?

Send your thoughts to Dear Mr. Sculley, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.
Outbound is slower than the Mac Portable and isn't completely compatible with all Mac software.

The real issue is cost. If you don't need fancy features such as a trackball, hard- and floppy-disk drives, and real SCSI and if weight is your main concern, I still recommend a DOS portable, which you can get for several thousand dollars less than an Outbound (not counting the Mac Plus or SE you have to disable). — JR

Singapore Sting
Guy Kawasaki is a pretty neat person. I read and enjoyed his book, and he did a swell demo on my user group when he was flogging 4th Dimension.

I realize he appreciates well-run organizations, but his praise of Singapore (“The Singapore Way,” October ’90, page 41) was a bit much. Singapore is governed by a fascist dictatorship. Its citizens barely have any freedom of speech as we know it or other little things such as due process or opposition political parties.

I'm glad Guy had a ball in Singapore. He'd probably have enjoyed Mussolini's Italy too. After all, didn't Mussolini make the trains run on time? Good pasta too.

I'm disappointed, Guy.
Richard Pachter
Boca Raton, FL

I wanted to be among the first to tell you how much I enjoyed Guy Kawasaki's tongue-in-cheek article “The Singapore Way.” As a Singaporean, I was tickled pink to read about his favourable impressions of Singapore and the Mac scene over there. It was refreshing to read something different, instead of the usual Singapore-bashing reviews that you often read in articles about the island and its political system.

In any case, Singapore is determined to be a major player in the global information-technology marketplace. Soon, not only will there be computers in offices, schools, and homes but they also may all be linked. Already all the schools are linked to the Ministry of Education. When all the computers in the island are linked, think of the incredible power that information sharing will bring. First Singapore, next the world!

John Heng
San Francisco, CA

Love Apple
Apple's behavior last year in temporarily raising prices cost the company a lot of goodwill. For the first time, Mac users realized that Apple might try to profit at their expense.

Now we have to make a decision. Are we going to... Hate the Company, but... Love the Machine,” as was jokingly suggested in October's "Dear Mr. Sculley" (Letters, page 14)? The rightful action is one that makes the community stronger, and in most cases, destroying members of the community makes it weaker. Hating Apple is self-destructive. Without Apple, there is no machine.

For Apple to succeed in a way that works for the community of Mac users is in all our interest. MacUser can be a leader by knowing how to ask the tough questions while still showing that it wants Apple to succeed. If Apple screws up, we need to tell it — not to destroy it but to stop it from screwing up.

Vik Rubinfeld
Manhattan Beach, CA

Love it or hate it, Apple must be listening to someone — check out "Three Cheers for Three New Macs" in this issue to read about the lowest-priced, most-bang-for-the-buck Macs ever — in addition to price cuts on the SE/30 and IIc. — JR

Ticked Off
In “EtherTalk-to-LocalTalk Routers” (Buyer's Guide, June ’90, page 42) you evaluated several AppleTalk-to-Ethernet gateways, including the Cayman GatorBox running GatorSystem version 1.4.1. The article recommended the GatorBox for NFS file sharing and other high-level gateway features but did not recommend it for straight LocalTalk-to-EtherTalk routing, owing to speed and consistency problems that were indicated by your test results.

At Cayman, we have run your tests and learned that, under certain conditions, the version of GatorSystem you tested indeed routes packets more slowly and less consistently than do other vendors' routers. However, our testing determined that the differences in speed and consistency are usually too small for users to perceive.

The results you presented contradict this because your tests contained a serious flaw: You used ticks instead of a reliable clock to measure elapsed time. Tick counters offer a convenient way of measuring elapsed time on a Mac, but they are not reliable enough for performance tests that exercise the Macintosh AppleTalk driver, because this driver
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interferes with the tick-counter mechanism. As a result, using ticks for running the comparison tests makes slightly faster routers look very fast and slightly slower routers look very slow. This method causes minor differences in relative performance to appear significant, when in fact users cannot tell the difference in actual use. We were glad to see that our data confirmed what our customers have been telling us. We look forward to your next lab on EtherTalk-to-LocalTalk routers. But please, MacUser, next time stay away from ticks!

Eric Janszen
Product Marketing Manager
Cayman Systems
Cambridge, MA

We apologize for the error in our test procedure and for any negative impression of the GatorBox that we may have created as a result. Who would've thought we'd be bitten by a tick? We appreciate the opportunity to improve our test suite. We have already begun work on a follow-up router lab report; we encourage readers to watch for it. —HB

Don't Do Windows

Over the past few months, I've been reading articles and editorials about Windows 3.0 and how poorly it compares with our Mac environment. Why? I think most of us already know what an exceptional platform the Mac is. If Windows 3.0 is neither a threat nor an Apple product, why am I wasting my time reading about it in your magazine?

Rich C. O'Brien
San Diego, CA

Sure, you know that Windows is not a threat. And we know that Windows is not a threat. But do all the people who sold their Apple stock after the Windows 3.0 announcement know? —JR

I read with interest your speed comparisons of Windows 3.0 and various Macintosh configurations ("Windows 3: The PC to Be Your Best?," September '90, page 222). In particular, you compared an 8-megahertz Mac SE with a 10-megahertz 80286-based machine and a 4-megabyte 16-megahertz Mac IICX with an 8-megabyte 25-megahertz 80386-based machine. Part of the reason the Mac may not have fared so well in the processor-intensive tests could be that, except for the Mac IICX, all the Mac configurations ran at a slower clock speed than did the PCs you were comparing them with. Furthermore, in the test comparing the IICX and PS/2 Model 80, the IBM machine was equipped with twice as much RAM as the Mac was. I would have considered this a fairer test if it had compared a Mac SE and an 8-megahertz 80286 machine (if you could find one). A more formidable challenger to the IBM PS/2 Model 80 would have been a Mac IIci. I wish you would consider redoing your IICX-versus-Model-80 benchmark—this time with an 8-megabyte IICX.

Sonny Shrivastava
Danville, CA

You're right: we did stack things against the Mac. Our intention was to compare machines in similar price ranges—not machines of similar power. Despite our approach, the Mac still proved to be the better performer overall. —JR

Yes, I Scan

Our thanks to Ron Hipschman and MacUser Labs for their informative review of hand-held scanners ("Hand-Held Scanners," September '90, page 167). We would like to clarify a couple of points. Here are LightningScan's correct specifications for three items in Table 6 (page 190):

- Scaling range: 25 to 100 percent.
- Resolution: True 400 dpi, not interpolated as stated.
- SCSI-box dimensions for LightningScan 400: 8.25 x 6.25 x 2.3 inches.

Our $189 upgrade mentioned on page 172 applies only to users of our original version of LightningScan—not to ThunderScan. However, ThunderScan users can contact Thunderware directly to obtain special pricing on the LightningScan 400.

Brian Smith
Thunderware
Orinda, CA

A Missing Dialog Box

When transferring the same file back and forth between two Macs, I have several times lost the latest edition of that file. I really do need a dialog box such as that in Figure 1. Will Apple create this

Figure 1

Are you sure you want to replace the file (filename) with an older version of the same file?

Yes
No
Think Fast. We've Got The Speed You Need.

Sure your Macintosh IICi is fast, that’s why you bought it. But it can be faster. A lot faster. After all, Apple built a special cache card slot into your machine so you could add on even more performance. Well here it is. Technology Works' Cache Card: it's just what Apple had in mind for your machine.

Make Fast Work of Power Hungry Applications With Our New 64K IICi Cache Card.

With our new 64K Cache Card, your Macintosh IICi will deliver its full high performance capability on big number crunching jobs like CAD, spreadsheets, and graphics. All it takes is our new Technology Works' Cache Card and a few minutes for installation. You'll be up to full speed in no time!

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Because you don’t have time to waste, we back our full product line with lightning fast delivery and support, an unconditional 30-day money-back guarantee, a lifetime warranty, and our 24-hour “Hot” replacement policy.

Quick Installation, Quick Service. Toll-Free Support.

Even the installation of our 64K Cache Card is fast. Complete instructions come with your new card when it arrives direct from our manufacturing facility. And if you have a problem, we’ll solve it right away. Just call us toll-free. Order a Technology Works' Cache Card today and give your Macintosh IICi the performance of a lifetime.
dialog box with System 7.0, or is there a utility that can do this for me?

Per G. Wylholt
Göteborg, Sweden

Sorry, we know of no such plans for System 7.0 nor of a utility that will do what you describe. We've got a name if a French-speaking hacker wants to write one, though: LaTest. — JB

**Powerful UltraPaint**

We at Deneba Software are pleased that you reviewed UltraPaint (September '90, page 69), but there were several inaccuracies that *MacUser* and its readers should be aware of.

Your reviewer noted a redraw problem that covered up the Layer Manager. This bug occurred in a beta version but was corrected in the shipping version. The cursor's behavior of changing colors is not a bug but rather a legitimate method of displaying the cursor (also used in Studio8 and PixelPaint) to maintain optimum visibility.

Your reviewer mentioned the blinking cursor as a product-specific flaw. This phenomenon is not unique to UltraPaint; it occurs under the same conditions in PixelPaint, Studio8, Digital Darkroom, ImageStudio, and SuperPaint.

Contrary to your reviewer's statements concerning complexity and clutter, we do not believe that users must sacrifice clarity to access all of UltraPaint's power. Total control can be obtained with only three windows open, and the tools are both fewer and more distinct than the reviewer states. (The free-form tool and pencil, for example, are not the same. The free-form tool creates Bezier curves and polygons; the pencil edits pixels.)

These inaccuracies, as well as others, have led us to conclude that your readers deserve a fairer and more accurate representation of UltraPaint.

Joaquin de Soto
Vice President
Deneba Software
Miami, FL

We regret giving the impression that many problems that appear in Mac paint programs are UltraPaint-specific problems. At the same time, we've glad to see that the legitimate bug mentioned in our review (the problem with copy and paste) has been corrected. Whether UltraPaint's interface is too cluttered is a largely subjective issue, but we're willing to reiterate our reviewer's opinion that the program provides "an easy-to-learn environment that packs much of the power of professional packages." — RI

**McGee Whiz**

Rebecca Parascandolo's description of our program McGee (September '90, page 115) is reasonably accurate, but it might have been more insightful had she engaged a preschool child for help with her review. McGee is targeted at preschoolers who are using a computer for the first time. Activity selection and overall size of the program (two disks) are limited to allow young children to run the program by themselves without extensive disk swapping or the frustration of clicking on dead screen areas.

Steve Vance
Lawrence Productions
Galesburg, MI

Rebecca Parascandolo did engage two preschool children (Bianca and Ivan Parascandolo) to help evaluate McGee. If you don't believe us, you'll find their respective pictures on page 53 of the July '90 issue and page 208 of the August '90 issue. — RI

**The Big Screen**

Your October '90 issue was exceptional, but why didn't you mention in "Power Presentations" (page 191) the option of Generation X's (no relation to Billy Idol, I think) new video card/box and a big-screen TV? A 25-inch television along with this new technology would run less than $1,000 — much more cost-effective than LCD projectors. Even with the 50- or 60-inch behemoths, the price is consistent with those of LCD projectors.

Plus you have the benefit of a working television for use with VCR presentations or just for showing football games at the office party. Such an expenditure would be easier to justify than the LCD technology, especially to old-school computerphobe bosses (who do, in fact, still exist).

Jim Downes
Huntington Beach, CA

**Go Fish**

I was a little disappointed with "33 Unsung Shareware Programs" (October '90, page 244). Games, INITs, and hacker supplies are nice, but I'm sure many Mac users would like to do more with their machines than watch fish swimming across the screen. We'd like to see what sort of educational shareware programs exist that we could use to build an actual...
At last, there's an inexpensive, high-quality fax for your Macintosh®. And it's from Dove Computer Corporation, a leader in Macintosh productivity enhancement products. DoveFax™ puts a full-featured fax in your Mac.

- It combines a 9600-baud fax modem and a 2400-baud data modem.

It's convenient.
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It's flexible.
- You can continue to work in your application while DoveFax works quietly in the background, sending and receiving fax documents.
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It's inexpensive to own and operate.
- Not only is DoveFax the value leader, but with its pre-scheduled transmission feature, you can send faxes during times when the phone rates are lower.

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library, such as a program about fish that would show how to identify certain types.
John Brosnan
Mankato, MN
It’s true that shareware authors gravitate more toward the practical and
the whimsical than the educational. But (speaking of gravitation), Gravitation Ltd.
by Jeff Rommeride surely fits your cri-
terion. If readers know of other outstanding educational shareware, let us know and we’ll spread the word.—JB

We Still Make House Calls.

"Virex saved our business. Our computers were severely infected,
but Virex repaired the damage." Scottsdale, PA

We update Virex quickly with the ability to both detect and repair files
infected by new Macintosh computer viruses. New versions are
available within days of new virus reports. Our update subscription
service delivers Virex updates to your door automatically. And our toll-
free Virex Help Hotline™ enables you to get help fast when you need
it. Yes, we still make house calls, because we know that’s important.
Call us for the name of the dealer nearest you or for information about site licensing.

Game Preserve
I read with interest John Dvorak’s column in the October ’90 issue. How-
ever, I must take exception to one comment. He wrote about Atari and its “just-
plain-mean suit against Nintendo.” If I remember correctly, Nintendo first sued
Atari, because Atari had found a software
way around the lockout chip in the
Nintendo system. This allowed Atari to
produce cartridges without buying
Nintendo’s chip. Atari countersued. From
Dvorak’s tone, it sounds as though he
thinks the chip is a good idea. I can
imagine his outrage if Apple computers
could accept only disks sold by Apple
and all the software companies had to buy
their disks from Apple. Although the chip
has reaped untold profits for Nintendo,
the prices for the cartridges are outrageous.
Aren’t Mac software and hardware ex-

The Self-

suppo rting Mac,” October ’90, page 263).
When I first received my Mac, I was
appalled at the number of manuals and
the amount of useful information that
came with it. I have
Ins ide Mac into
other books and am
still trying to figure
out what’s going on inside the box. Now,
I realize that I’m much more technically
inclined than average users, but I’m tired
of calling Apple, at my expense, and
having to say things such as, “OK, if
you don’t know it, tell me who does!”

Ed Fouse
Euclid, OH

What Goes On?
As a programmer for close to 20 years,
I totally agree with Thom Hogan’s com-
ments concerning diagnostics (“The Self-
Supporting Mac,” October ’90, page 263).
When I first received my Mac, I was
appalled at the number of manuals and
the amount of useful information that
came with it. I have Inside Macintosh and
other books and am still trying to figure
out what’s going on inside the box. Now,
I realize that I’m much more technically
inclined than average users, but I’m tired
calling Apple, at my expense, and
having to say things such as, “OK, if
you don’t know it, tell me who does!”

Ed Fouse
Euclid, OH

Letter Imperfect
I appreciated your in-depth Buyer’s
Guide to PostScript printers in the Octo-
ber ’90 issue (“The Letter-Perfect Post-
Script Printer,” Buyer’s Guide, page 5). Unfor-
nately, the usefulness of this
evaluation is marred by contradictory
product scoring presented in the article.
The caption that accompanies Figure 1
(“Jury Results,” page 16) points out that
the NEC Silentwriter2 290 “consistently
brought up the rear, with the worst image
quality,” while the chart places this printer
well ahead of most of the other printers in
the overall subjective rating of text and
graphics quality.
Additional, this chart shows the
LaserMAX 1000 Personal Typesetter as the clear overall winner in text quality. However, later, in the sidebar “All-in-One: The Desktop Publisher,” potential printer buyers who specialize in desktop publishing are warned that the “The LaserMAX 1000 had the best graphics performance, but this was offset by its poor text quality.” In fact, the quality of text was so poor that this enhanced-resolution printer actually “scored lower than some 300-dpi printers.” For many professional publishers, this concluding statement would immediately remove this otherwise excellent printer from their shopping lists.

Todd Cranstons-Cuebas
San Marino, CA

The caption for Figure 1 was in error. The NEC Silentwriter2 290 did not bring up the rear in image quality. It was the NEC Silentwriter LC 890XL that consistently had the worst-looking images.

As for the LaserMAX 1000, if you look on page 54 of the Buyer’s Guide, you’ll see a reprint of our jury page. You’ll notice that we used a serif Times and a sans serif Helvetica as text samples. We asked our jury to rate both of these samples. To make the chart readable, we combined the two jury results into a single bar result. If we had shown the ratings for each text sample, you would have seen that the LaserMAX scored worse than the LaserJet III for the Times sample. Our jurors gave the LaserMAX the highest rating on the Helvetica text, however. But we felt that for a printer with a claimed resolution of 1,000 x 1,000 dpi, such a low ranking on the more complex and demanding serif text was unacceptable. We felt that the Times test quality of the LaserMAX was indeed “poor” compared with that of the other high-resolution printers. — PY

6, No Trump

Borker’s Dozen (October ’90, page 48) failed to mention that Artworx’s Bridge 6.0 renegotes as well as deals the same card to two players. When I wrote to the company about the problems, it advised me to buy the upgrade (I had version 5.0). As version 6.0 still has the problems, I feel duped by the company and would not recommend buying anything from it.

David Lazar
Olympia, WA

When we contacted Artworx, the company said the bug that you described has been fixed in a subsequent run of version 6.0. You should return your disk in exchange for a free upgrade.— SB

DIY DPI

On page 58 of your October ’90 Buyer’s Guide (“Do-It-Yourself Printer Testing”), you present an interesting set of graphics for testing PostScript printers. Everything looks great with the exception of the scanned photograph. On page 54, you note that the photo was a
200-dpi scan. If the image was reproduced at the original size of the scan, the "blockiness" seen here should not have occurred.

Lawrence J. Grinnell
Palm Springs, FL

The image problem you caught was a mistake. We actually produced the scan of the binoculars from an 8-x-10-inch glossy at 100 dpi, reduced it by 50 percent to make a 200-dpi image, and saved it in TIFF. The image was then placed in a PageMaker 3.02 document. The problem developed when the PageMaker document went to our service bureau for output, where it was imaged at 2,540 dpi on a Linotronic L300. Unfortunately, through the wonders of linked documents, the scan imaged a 72-dpi PICT representation of the 200-dpi TIFF image that PageMaker shows on the screen. PageMaker lost the link information from the scan, and the results were not detected until too late. Rest assured, though, that when we juried the images from the PostScript printers, the 200-dpi scan always imaged correctly. — PF

Where's Bruce?

As we all know, many commercial programs are available for the Mac that cost too much, come with unintelligible documentation, and may or may not run at all on newer machines. But with Bruce Tomlin's wonderful shareware program SoundMaster, I have seen adults laugh when the Mac went "blaaah!" while ejecting a disk and children squeal with delight at the sound of the wicked witch cackling, "I'll get you my little pretty!" All this for $15.

I'd like to send Mr. Tomlin his shareware fee. I sent a postcard to the address that was listed in your magazine to be sure he was still there, but I have not received a reply. Please do everyone a service by locating and printing his current address.

Keith Johnson
Malmstrom AFB, MT

Mr. Tomlin's address hasn't changed; send $15 (not a postcard) to 15801 Chase Hill Blvd., #109, San Antonio, TX 78256. — MS

Clarifications

In the "The Right Tools for the Write Job" (September '90, page 241), the phone number for Screenplay Systems is incorrect. The correct number is (818) 843-6557. The price for Scripter 1.5 is $295, not $299.

The review of Accountant, Inc. Professional (August '90, page 75) listed the wrong price and address. Version 1.03 is available for $595 from Softsync/BLOC Publishing, 800 S.W. 37th Avenue, Suite 765, Coral Gables, FL 33134; (800) 933-2537.
In a world that changes economic systems overnight, can we really afford personal computer systems that take weeks to set up, months to learn, and years to deliver on their promises?
In the 1980s, American companies invested nearly $90 billion in PCs, yet office productivity has shown disappointing gains.

Not everybody was disappointed, however. According to a new independent study by Diagnostic Research, Inc., companies that invested in Macintosh® computers are enjoying dramatic results. Managers gave Macintosh productivity ratings that were 37% higher than for MS-DOS systems and 32% higher than for PCs running Windows. Which is like getting back 17 extra weeks a year.

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This one has everything that makes a Macintosh a Macintosh. Built-in networking. A SuperDrive® disk drive, which reads both Macintosh and MS-DOS files. And a $999 price that includes the built-in monitor, 1MB of RAM, keyboard, mouse, and system software. A 40MB hard disk is optional. Its processor is an 8 MHz 68000 chip. And it outperforms the popular Macintosh SE.

The Macintosh LC.

The new low-cost Macintosh LC introduces exquisite...
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The Macintosh LC expands by adding a card to its slot. A 40MB internal hard drive is standard. A built-in video chip runs an Apple monochrome or low-cost color monitor — without adding a video card. And the Macintosh LC, like the Mac™ IIsi, lets you record your voice and other sounds into the computer. Which will make voice-annotated software a standard Macintosh feature.

The Macintosh IIsi.

Running a 20 MHz 68030 microprocessor, the new Macintosh IIsi delivers serious number-crunching at the most attractive possible price.

Into its sleek package are compressed the powerful essentials of the Mac II line. Including an optional 32-bit NuBus™ slot for high-performance graphics and accelerator cards. Along with advanced networking systems like Ethernet and Token-Ring. Plus a 40 or 80MB hard drive. Built-in video chips drive four different Apple monitors.

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If you haven’t read our cover story on the three new Macintoshes yet, stop wasting your time here and turn to it immediately. You won’t be disappointed. (But please come back. Don’t worry, I’ll wait.)

(Uhm-hmm... the Mac LC... the IIsi... sound! pretty neat... Apple IIE emulation — about time... OK... you should... be done... just... about... now.)

Now that you’ve had a peek at three of the most long-awaited, most overanalyzed, and most innovative hardware releases of the year, your mind may be drifting to thoughts of software. What good’s a new CPU without something way cool to show it off with? System 7.0 — whose development has, at various times, been neck and neck with Windows 3.0, HyperCard 2.0, the new CPUs, and the unraveling of who killed Laura Palmer — has been beaten by all four (or at least three of them, depending on whom you believe) and now has a firm ETA of sometime in the first half of 1991 (read: next June 30).

So now that you’ve had a look at some of the hottest hardware of 1991, where can you go for a twin peek at 1991’s software hit parade?

Here’s a glimpse of the next big idea in software. And it definitely came from an unusual source. A microcassette tape arrived in the mail recently in an envelope with no return address. The name and address were smudged, and I don’t think it was intended for me. I played the tape, and this is what it said:

“Diane, this is Federal Agent Cooper. Now that the Palmer case is all wrapped up (in plastic! Just a little joke, Diane), I’ve headed down to Silicon Valley to search for the Most Wanted duo in this community — a real killer and a drop-dead radical. These two have paralyzed the hearts and minds of this sleepy little computer hardware and software haven.

“I’ve checked into the Sunnyvale Suites motel. Spectacular aerial views of Cupertino at the hotel’s OverByte cafe. No coffee, no pie, but they do serve up a damn fine glass of Jolt cola. The Twinkies in the minibar are a nice touch. I suspect I may have been a software developer in a former — or future — life.

“The local authorities have been less than cooperative and haven’t told me exactly who these two are that I’m looking for, but from reading the local computer magazines, I’ve formulated these profiles.

“First, everybody’s on the lookout for a gentleman who goes by the alias of Killer App. That’s ‘App’ as in application, Diane. They call him Killer because he’s the App that people would kill for; that people would contemplate switching platforms for; that people would actually consider shelling out bucks for, instead of just pirating software. He’s also called Killer because when he legitimizes a new platform, he threatens to kill off an existing one.

“His buddy goes by the handle of Drop-Dead Feature. This is one scary hombre, Diane. He’s the guy who makes happy end users abandon their application of choice for a newcomer. Computer companies in these parts live and die thanks to Killer App, and software companies live and die on the awesome power of Drop-Dead Feature.

“Last night I had a dream, Diane. I dreamt I was listening to radio station KMAC and that the DJ started off the set with The Silhouettes’ classic ‘Get a Job,’ which he played twice, and followed it with a cut from The Who’s Who’s Next and ended up with Duke Ellington’s ‘Lotus Blossom.’

“‘Job’ twice? Plural: Jobs. That’s Steve Jobs, Diane. Next? Lotus? The pieces all fit. The next killer app — full of drop-dead features — is on the NeXT machine, and the name of that app is —”

At that point, the cassette ran out of tape, so we may never know whether Federal Agent Cooper was on the right track, but I’ve got a few theories of my own.

Consider Agent Cooper’s radio-induced dream. Finding new and fresh software is a bit like finding new and fresh music on the radio. Among savvy DJs, looking to offer something besides the same old variations on a theme to Top 40, the buzzword these days is world music. From lambada to Ladysmith, from carioca to karaoke, from Bossa Nova to samba, world music is a chauvinistic shorthand for non-U.S. music — is where the action is today. And on computers, “world software” — that is, the non-Macintosh arenas is where some of the real challenges to Apple are coming from.

Killer apps are the Holy Grail of the computer community. Every other press release trumpets the arrival of a killer app, a piece of software so original that it defies categorization and will revolutionize not merely the computer industry but also the wave America does business.
Usually these overzealous announcements come from overzealous startup companies. The big guys know not to overdo the hype. They know that a true killer app comes along only once every two or three years. HyperCard was one. PageMaker was one. And Excel, offering relief from the character-based Lotus 1-2-3 world of spreadsheets, was another. And now, the newest killer app: It's called Improv, and it has not one but several drop-dead features. They are so radical that they're difficult to describe in print—although their operation is extremely clear and intuitive when you see Improv in action.

So what is Improv? It’s a spreadsheet program—sort of. Who’s it from? Would you believe... Lotus? What kind of hardware does it require? That’s the catch: It runs only on the NeXT—so far.

If you’re ready for the next generation of spreadsheet programs, it’s going to cost you—somewhere between 25 cents and $4,995—but more on pricing later. What are you going to get that will make it worth switching software—and maybe even worth switching computers?

Spreadsheet programs are simple and intuitive, as long as your work sheets stay manageable—say, 50 rows by 50 columns. Much beyond that—when you can no longer see your entire spreadsheet on a screen or two or when the underlying relationships among cells are buried deep in invisible formulas—the spreadsheet metaphor gets a bit strained. When you add new rows and columns, it’s all too easy to mess up a formula. You eventually take the plunge and learn to write macros to automate time-consuming chores such as rearranging your data. And because spreadsheet programs don’t have debuggers to verify that the logic of your data model stays intact, as your spreadsheet model grows, you’re left with nagging doubts about the validity of the numbers generated automatically by the spreadsheet program.

All this comes as a result of trying to force a spreadsheet program to do the work of a database program. The solutions are either to switch gears and shift to a relational-database program or to thoroughly document your spreadsheets and rigorously follow a planned and proper protocol for modifying them. But both alternatives are contrary to the main reason many of us embraced spreadsheet programs in the first place: the ability to quickly and easily organize information and try out a variety of what-if? scenarios with your data.

What Improv does is let you play what-if? games with the structure of your spreadsheets, not just the data. When you set up a work sheet, data is assigned to various categories. The meaning of the data and the relationships among categories are defined in a separate formula pane rather than hiding behind each cell. The benefit of this approach becomes clear when you want to, for example,
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Before you add anything to your Mac, add this to your library.

Improv brings two key aspects of database design into the realm of the spreadsheet. First, it brings the ability to automate this kind of reconfiguration and report generation. And it gets this ability because it also borrows the discipline that a database structure imposes on users.

You can’t simply blindly enter numbers and formulas (you know, the ones that make sense right now and that you promise yourself you’ll document before you forget what it all means but never get around to it, because, hey, if it works, it works, so why mess with it?).

So what’s it gonna cost to see for yourself and step into the future of spreadsheets? As I said, somewhere between 25 cents and just under five grand.

If you like the $4,995 option, get down to your local BusinessLand, ask for a demo of Lotus’ Improv for NeXT, and whip out your checkbook. The bad news is that the only machines that currently run Improv are the NeXT family of workstations; the good news is that (a) NeXT recently introduced a low-end $4,995 machine and (b) the software is being bundled free with NeXT machines until December 31, 1990.

If that’s too pricey, consider the 25-cent solution: Get out a piece of paper, and write the following words on it: “I’m a Mac user who’s ready — intellectually, emotionally, and fiscally — to decide whether Lotus will blossom in my future. Please port Improv to the Mac.” Mail that piece of paper (that’s the 25-cent part) to Donald Casey, VP, Spreadsheet Division, Lotus Development Corp., One Rogers Street, Cambridge, MA 02142.

Let the Lotus people hear from you — before they decide to port Improv to Windows instead. If you don’t need this kind of power or if you need something entirely different, let them know about that too.

Diane, I’ll muse about MUSE — another up-and-coming player in the not-necessarily-a-spreadsheet arena — on the next tape. And there’s another killer product you’ll need to know about. It’s called —
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DES K is a set of extraordinary desk accessories that integrate as well with your applications as they do with each other.

No more exiting PageMaker™ to edit graphics, or Excel™ to write a letter. Invoke one of these desk accessories to do the job instead. Use the other DAs to do what-if calculations, create pie or bar charts, communicate with remote computers, sort a database, or remind you about appointments.

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3. DeskCom: The communication program lets you send and receive files, even when using other applications (with or without MultiFinder). Supports XModem protocol and Hayes® and Apple® compatible modems.


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Requirements: Works on any Macintosh with a megabyte of memory and System 6.05 or better.

Available at better retailers and mail-order houses. Suggested retail price is $399. Call for special educational pricing.

MS. WORKS UPGRADE OFFER
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They laughed at brave little David when he set out to battle the big, bad, muscle-bound Goliath. How could he win? Modern day people think desk accessories are wimpy and applications are top. Boy do I have a surprise for them.

DESK is a set of business applications we crammed into seven bare-little desk accessories.

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Put DESK on your system today and watch it eat your inefficient memory-hogging applications!

Peter M. Gallop
Vice President
Zedcor, Inc.

P.S. Do you own Microsoft Works? For a limited time you can upgrade to DESK for only $99. See coupon for details.

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You’ve probably been reading and hearing about handwriting recognition, which is being called the next breakthrough in computer technology. There hasn’t been much concrete information about it, but hints about something amazing keep popping up.

Lots of dollars and big-name pioneers are showing up behind startup companies such as Slate and GO. These startups have been getting a lot of attention, even from the business press. There are still no real products, mind you, just the promise of another revolution to bring computing power to the rest of us. The concept has a lot of people pretty excited—even Apple is allegedly looking into it.

Stop and think about this for a minute. The hype is promoting the idea of a computer that reads your handwriting (or, more precisely, your printing, because cursive can be hard for people—much less computers—to read). Never mind that today’s computers have trouble reading typefaces, where every character is identical each time it appears. Even the best recognition hardware and software working at 300-dpi can’t achieve 100-percent accuracy. So, assuming that the startups do have some big breakthrough waiting in the wings, here’s the main question: Is printing on a touch-sensitive pad really going to be that much better than using a keyboard?

The first argument for the technology is that it will open up computers to non-typists. This may be so, but a person of average intelligence can become fairly proficient at hunt-and-peck typing, with some practice. Most people can type much, much faster than they can print (especially if they have to print carefully). So what about people, such as executives, who won’t type? Do you really believe that executives who feel that using a keyboard is beneath them will think that precise hand-printing is more their style? They’re more likely to put the handwriting computer on their secretary’s desk alongside the traditional one with the keyboard.

Some companies working with this technology have realized that keyboards are really the most appropriate data-entry mechanism for desktop computers. But what about portable computers? A handwriting-recognition slate could be much smaller than a standard keyboard. As keyboards shrink, typing speed decreases, which might make handwriting (even printing) faster after all. The dream is to create a fully functional computer about the size of a Sharp Wizard or Poqet PC but without the drawbacks of a tiny keyboard. Perhaps even Mac-like capabilities are possible with the use of a stylus to point and drag icons or select from menus. (Sony already markets such a device in Japan.)

There are some other scenarios for this technology. Electronic notepads that recognize handwriting could be useful for applications that don’t require much writing and also in environments that are rough on conventional keyboards.

There is one surefire application: Japanese and Chinese word processing. For the thousands of unique ideograms in the written form, handwriting recognition could be a revolutionary leap beyond today’s painfully clunky word-processing methods.

So does handwriting recognition have a future? Maybe, if the recognition rate can be close to 100 percent and if a way can be found to exploit the technology in new ways. In any event, keyboards aren’t going to disappear, and typing ability should remain a prerequisite for using computers.

Handwriting-recognition technology may turn out to be a big flop. On the other hand, if you’d come to me in 1980 and described a system with a mouse for pointing at little pictures on-screen, I’d probably have held out little hope for it either.

Outlining and More

While handwriting recognition inches toward fad status, I see far more potential for a faded fad: outlining. Last summer, Symantec released MORE 3.0, a major revision of a popular program. If you believed most of MORE 3.0’s press coverage, you might think all it could do was desktop presentations.

Admittedly, MORE does great presentations, and its new Chart Tutor feature makes creating presentations a snap even for first-time users. But it also has another life as an outliner and even possesses some word-processing capabilities. This descendant of ThinkTank, the original “idea processor” (read: outliner) for the Mac, is being compared only to Aldus Persuasion and Microsoft PowerPoint. Why is this? Is the Mac community so addicted to trendiness that only the latest product categories are worthy of consideration? Or is outlining just passé?

Maybe the Mac attracts visually oriented people who think text-based outlining is too structured. Or perhaps the multidimensionality
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Robert Wiggins

of products such as HyperCard makes two-dimensional outlines too mundane. Outlining isn't hot, or sexy, or new. In fact, you probably already have an outliner and may not even know it. Several word processors, such as Word, FullWrite, and MindWrite, include outlining facilities. Even one of MORE's competitors in the desktop-presentation field, Persuasion, has a rudimentary outliner. And Acta, the popular DA outliner, also has an application version (and even came bundled with MORE at one time). So if you want to try your hand at outlining, you may already have the necessary tool.

Outlining may bring back memories of high school and hard-to-remember numbering schemes or rules such as never having just one subordinate item. But the reason you had to learn outlining in the first place is that it really helps organize your thoughts. If you try it on the Mac with almost any of the available programs, you'll find that it's also an excellent way to reorganize your thoughts with a simple point, click, and drag. It's like having each outline item on an invisible movable file card. You don't even have to remember any complicated numbering schemes, as most programs handle the labeling (and relabeling when you move things), often with a choice of styles.

Once you've organized (and reorganized) your thoughts, almost any program that offers outlining can let you take it a step or two further. MORE can create tree or bullet charts from outlines. MORE even gives you some word-processing capabilities, at the memo or simple-report level, but Word and FullWrite let you hang an entire book on the skeleton of your outline. All three offer rules and styles for the various outline levels, so you can customize your output.

If you have never tried outlining to organize your thoughts, pick up one of these products and give it a try. You may be amazed at how far outlining has come since you were in high school. And if you've tried outlining on your Mac and hated it, perhaps it was because of the program. Some people hate the outliner in Word, and others love it. Almost everyone seems to like Acta and MORE, although some have strong feelings one way or the other. Try a different outliner, and see if it helps.

And someday, if technology advances, you may be able to enter your outlines in handwriting, going full circle from pencil and paper to stylus and slate.
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Stand by Your Man(agers)

Macintosh is successful now. Just about anywhere you go around the world, people either use a Mac or have heard about it. There are thousands of Mac user groups. Steve Jobs' prediction that Mac would become the "third standard in personal computers" has come true.

It's a stinking shame that at the brink of a grand-slam success, Apple seems capable of hitting only singles and doubles. Truly, Mac and the IBM PC/clones should reverse market shares if Apple did it right. Apple has dumped the come-to-Macintosh fervor and zeal of 1984-1985 and replaced it with the sugar-coated veneer of professional management.

This column is about how Apple can restore the old kind of evangelical fervor and zeal. If Apple can rekindle its flame, I can't guarantee better products, faster revisions, and inspired marketing, but these things would become more probable. And we would feel better, even if Apple failed from time to time.

The Way Things Were

Before continuing my sermon, let me state that in this case, hindsight is not only perfect but it's also rose-colored. As I recall, the mid-1980s were pretty miserable days for Apple. Macintosh wasn't selling well. There was very little software. Apple exorcised Steve Jobs and laid off several-hundred employees. Still, looking back, those were fun times.

Developers were creating Macintosh products, despite what their spreadsheets showed. People who bought Macs were laughed at or scorned — and loved it. We were sure that Macintosh was going to change the world. Our perspective was "Lead, follow, or get out of the way." The frightening thought of failing made it more exciting: Apple could die.

The Way Things Are

Today, in what should be the halcyon days of Macintosh, evangelism inside Apple is dead. Ironically, the very success that evangelism created, killed it. In 1984 we knew we had to use evangelism to survive. It was obvious that user groups, developers, and Mac fanatics were the means to success. Now that Apple is successful, it thinks it did it alone.

To some extent, deterioration of evangelism is inevitable as Apple grows larger and older and the slime of a new bureaucracy covers the flame of the original vision. But it is also only as inevitable as we let it be. If Apple were any other company, it would be OK to say, "It's bigger now. Things change. That's life," and let it go at that.

But Apple is not just another company. It's Apple, and as Apple, it represents dreams and ideals that should invent the future and forever change the rules of computing and business. That's why Apple has to be fixed.

Stabilize Top Management

Allow me, then, to propose a few ways to fix this situation and rekindle the flame of evangelism inside Apple.

The greatest deterrent to evangelism at Apple is the instability of its management. Apple's executives turn over more frequently than Sony Walkmans at 47th Street Photo. Each time a new executive comes in, he eighty-sixes the existing staff, brings in a new one, and becomes a golden boy for about six months until he gets wasted himself.

During this process, budgets are frozen, responsibilities are uncertain, and employees are demoralized. It's very hard to feel zealous when you don't know who your boss is and how long he or she will last.

It is not acceptable to hire people, see if they work out, and then fire them if they don't. The highest levels of Apple should stop getting away with the logic of "Don't blame us. It's the bozos we hired." If they hire bozos, they are bigger bozos. Building a stable management team is their responsibility. If they can't do it, they should go.

Promote from Within

There are two ways to fill the management positions at Apple. One is to hire experienced bozos who have supposedly done it before in the personal-computer industry, the broader computer industry, or some consumer-goods industry Apple admires — such as personal-hygienic products, for example. The other is to promote people from within. I favor the latter.

I base this preference on watching the constant flow of newly recruited saviors who go into and out of Apple like the tide, floating like Styrofoam cups on the surface of the water, waiting to choke some unsuspecting marine mammal. Instead, Apple should tap into its middle-management layer.

Although this would be a stretch for many current employees, these people offer several desirable qualities. They've seen it all: the decline of the Apple II, two failed "Test Drive a Macintosh" promotions, and controversial engineering projects such as fax modems.
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Leave the Engineers Alone
Apple’s top management needs to leave the engineers alone. I’ll let you in on a secret. At great engineering companies, management leaves the engineers alone. At good engineering companies, management interferes but engineers ignore them. At lousy engineering companies, management thinks it is the engineers.

Apple runs engineering on a last-in, first-out (LIFO) basis. This means that whatever management last read about in Popular Science, heard from an analyst, or saw in a competitor’s ad becomes the most important project. (LIFO is an accounting convention, not an engineering path.) At first engineers go crazy when this happens. Then they shut their brains. Then they leave. My recommendation is to leave the engineers alone and let them get back to creating great products.

Decentralize Decision Making
Not only is Apple’s Cupertino management unstable but it is also too powerful. Thus, we have the worst of both worlds: Management in Cupertino is incapable of making the right decisions, and the people in the field who are capable of making the decisions are not empowered to do so. (Rule of thumb: The farther an Apple employee works from Cupertino, the more effective he is. This is known as the Spindler Effect.)

My recommendation is to push much of the sales and marketing decision making out to the regional offices. Let the people who are closest to the customers make most of the decisions. Things won’t be as coordinated and they will waste some money, but it is being wasted anyway — on the $30 million Helocar campaign, for example; $30 million could buy a lot of seminars, loaner units, donated equipment to schools, and developer co-marketing projects, all spearheaded by Macintosh evangelists in the field.

Conclusion
The flame of evangelism may be flickering at Apple, but it’s not out. (I doubt that it could ever completely go out.) The bases are already loaded, and these are some ways to fan the flame so that Apple can hit one out of the park. It can be done. It must be done. You see, it’s Apple’s destiny.
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**HyperCard**

**HyperCard 2.0's much-delayed upgrade is worth the wait.**

The latest version of HyperCard comes in three forms: the minimal, bundled form that's included with all Macs; the upgrade, which includes the minimal version plus three manuals and dozens of sample stacks; and Claris' soon-to-be-released standalone package that includes everything in the upgrade and some extra goodies. This review is based on the upgrade.

The HyperCard timing was ironic: At just about the time NeXT was announcing its first color computer, Apple released version 2.0 of HyperCard, still in black-and-white. True, it's possible to display beautiful 32-bit color pictures with 2.0, but only in external windows. Graphics, in general, are not the strength of the 2.0 upgrade: HyperCard is still limited to bit maps, and you still can't directly associate a script with a graphic.

With those exceptions, most of the complaints about the old HyperCard have been addressed in the new version. Gone is the fixed-size HyperCard window; gone is the inability to have more than one stack open at a time. Text formatting and printing, two very weak points of HyperCard 1.x, are significantly improved, and hypertext linking from text fields is now adequately supported. There are three manuals now, including introductions to HyperCard and HyperTalk, and a general reference. Although there is no advanced scripting manual, there is good on-line support for learning HyperTalk. Overall performance is improved, and stacks can now run in the background under MultiFinder.

Stacks developed with HyperCard 2.0 look and act more like real applications, largely because more of the interface is now under the author's control. HyperCard now supports multiple, resizable windows. Cards can be larger than their windows, in which case they can be scrolled (all cards of a stack must be the same size, however). There are an icon editor and a tool for creating your own floating palette windows. There is also almost complete user control over the menus. You can create new menus and menu items, remove existing ones, change the fonts and styles of items, add check marks, and disable items.

**Hyping the Text.** Text handling has been improved on several levels. Now (at a small cost in performance) it's possible to have multiple fonts, sizes, and styles of text in one field. What's still missing is the ability to change alignment from line to line, and there is no full justification, only right, left, and center justification.

The lack of hypertext support in previous versions was the most amazing HyperCard shortcoming and the first that beginning HyperTalk scripts tried to fix. What was needed was the ability to designate a word or block of text in a field as "hot" and to associate some action with the act of clicking on that "hot" text. For performance and compatibility reasons, it was something that HyperTalk scripts couldn't do; it had to be built into the product. Version 2.0 implements this capability via several new HyperTalk functions, allowing words or lines or arbitrary groupings of text to be hot. It's possible to trigger off the location of the hot text, its content (the text itself), or even its font attributes (or a combination: italicized words might invoke links to their definitions, and boldfaced words might trigger links to related topics).

Printing was notoriously neglected in HyperCard and is still being treated as something of a stepchild. A full report-generation application has been squeezed into three dialog boxes. But it's a clever stepchild. Although using the report generator takes a little study, it is very powerful. (The manual only skims over the surface of report printing.)

One broadly useful new feature is the ability to "mark" cards according to various criteria. Both printing and searching can be limited to marked cards. Searching has been improved in other ways, including the ability to exclude specified fields, which speeds up the process. You can sort the cards of a stack or the parts of any container.

Although graphics didn't get as much attention as some other areas in the upgrade, there are some nice additions. Graphic images can now be freely rotated and distorted in several ways. You can import and export graphic images via a menu command. There are some new visual effects, and the effects now work properly when color is turned on. And there are new stacks of background art, art clips, and dynamic art effects.

**Programming Power.** HyperTalk scripts should breathe a sigh of relief over the new script editor. They should also appreciate the source-level debugger and the compiler that replaces the HyperTalk interpreter. Code is now compiled to RAM and discarded when you leave HyperCard; this speeds execution overall, although the first invocation of a handler is slower. The editor is nonmodal, lets you have several windows open at once, and allows you to control the font. The debugger, which
supports free-floating windows that track messages and values of variables, is integrated with the editor; both are implemented as XCMDs. Substituting a third-party editor and debugger is as easy as changing the value of a global variable—you must change both though, because they’re integrated. The HyperTalk language has been extended to support all the new features, and it’s now possible to add stacks to the message-passing hierarchy so that their scripts and resources will become available as shared code libraries.

Potentially the most important new development is the new XCMD interface, which should lead to more powerful XCMDs and XFCNs and hence to more powerful HyperCard stacks. XCMDs now work more effectively with the event loop. An XCMD can control one or more external windows, and HyperCard catches certain window events and passes them to the XCMD controlling the window. Properties of such external windows can be examined, and sometimes modified, from HyperCard. And XCMDs can run in the background.

The Bottom Line. With the exception of the lack of support for color and object graphics, HyperCard 2.0 is a huge improvement over earlier versions. One can only hope that Claris will address these deficiencies in the next release and that we won’t have to wait three and a half years for it.

— Michael Swanepoel
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Even in the latest versions, Plus 2.0's pluses and SuperCard 1.5's superiorities don't match HyperCard's.

**Plus and SuperCard**

The challenge faced by the developers of HyperCard enhancements on the Mac has always been to add features that HyperCard lacks, without degrading performance. Last time out, Plus and SuperCard got only the first half right. This time out, their challenge was to complete the task.

**Plus.** From the beginning, Plus was intended to be an extension of the HyperCard model. It opens HyperCard stacks, uses the HyperCard metaphor and terminology, and has the same look and feel as HyperCard. With minor exceptions, each Plus version has included all the features and behavior of the concurrent version of HyperCard. If anything, Plus 2.0 moves even closer; the manual even suggests setting aside Plus' Home stack and replacing it with your existing HyperCard Home stack.

Plus extends the HyperCard model in two ways: by adding features and by providing platform portability.

Many of the advanced features in earlier Plus versions have been matched by HyperCard 2.0: resizable cards, support for large screens, rich text (more than one text font, style, or size in a single field), and a modal script editor. Plus 2.0 is still ahead of HyperCard in object graphics and color — neither of which is supported in HyperCard's latest release — and there are no insignificant features. Object graphics let Plus users/developers create graphic objects, as with a drawing program, and associate behaviors with them via scripting. Plus also supports scriptable bit-mapped graphic objects. HyperCard supports only bit-mapped graphics on the card and does not support scripting of graphics.

Still, there's not a lot new in this first release of Plus under the Spinnaker label. It has a new manual by Dan Shafer and a new set of utility stacks. The on-line help is restricted to help with PPL, Plus' programming language. The stacks include utilities such as an address book; a limited clip-art collection; a to-do stack; and Power Tools, a library of scripts you can invoke directly from within other stacks.

Another feature Plus has long had is something developers call hypertext. Plus generates a special message when the user Option-clicks on any word. The word itself is passed with the message, and scripts can be written to take appropriate actions for any desired words. The capability is still there, but now every competing product has some sort of support for hypertext, and although it's hard to say which technique is best, Plus' approach has some serious limitations.

In addition to original HyperCard-style fields for text, Plus also provides the specialized field types DBField and WPField for database and word-processing applications, respectively. Although HyperCard finally supports rich text in fields, Plus' specialized fields are unique. Version 2.0 enhances WPFields to support full justification and triple-clicking to select an entire line. Plus' WPFields are the closest thing to full-featured word-processing support in this product category.

Plus, SuperCard, and HyperCard are all moving toward full user control over windows, menus, and the like, so their applications can look like any other Mac application. Plus supports adjustment of the size and type of windows but provides no way to reconfigure the menus.

The most distinctive aspect of Plus is that its stacks can run without modification on a Mac or on a PC under Windows or OS/2. There are some understandable limitations — for example, external commands don't translate directly. But by sticking to PPL, Plus developers should be able to write one version of their stacks for all three environments. Version 2.0 now extends support for WPFields to Windows and OS/2. Because Plus can convert from HyperCard's stack format to its own, it also provides an avenue for moving HyperCard stacks to PCs, with this caveat: So far, Plus can only version 1.x HyperCard stacks. No doubt support for HyperCard 2.0 is a top priority for the next release.

Unfortunately, Plus' performance hasn't improved significantly. Support for graphic objects and color has a performance cost, and Plus pays it. What users pay is a memory cost: Plus can boot up in 1 megabyte, but Spinnaker recommends that you have 2 megabytes to use it effectively.

**SuperCard.** Using SuperCard requires some rethinking on the part of experienced HyperCard users, particularly in SuperCard's development mode. It's really a different model for a different purpose. Like Plus, SuperCard's replication of the HyperCard environment is nearly intact, but it adds levels and

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**HYPERMEDIA**
views that occlude the resemblance.

SuperCard’s great strength has always been in the area of graphics. It has, for example, three specialized techniques for running animations, all of which have been upgraded in version 1.5. The move command lets you specify a set of points as a path for an object to follow, and the play PICS and play STEP commands play back files of animations stored in one of two formats. To allow you to create animations as well as play them, SuperCard lets you record sequences of cards to PICS or STEP files for subsequent playback. In version 1.5, the move command lets you move more than one object at a time, play STEP now supports different CLUTs (color lookup tables) for subtler color effects, and play PICS lets you specify a screen location for PICS animation.

SuperCard now supports two specialized field types called list fields and scrolling list fields. These fields, which have features such as scrolling by line rather than by pixel and permitting multiple discontinuous selections, are Silicon Beach’s response to one of the most common requests for hypertext features: the ability to select an item in a list and produce an action as a result. This ability is very useful, but as a nod to hypertext, it is not as friendly as Plus’ or HyperCard 2.0’s. SuperCard has several new and minor text features as well, including color text, which Plus has always had.

In earlier versions, SuperCard provided more control over user-interface elements, such as the appearance and number of windows and menus, than either HyperCard or Plus did, and it continues to do so. User-interface additions in version 1.5 include hierarchical items in menus, pop-ups menus at specified locations, and changing menu contents at run time.

The development environment has improved significantly in version 1.5. The interpreter runs faster; the SuperEdit editor has many enhancements for ease of use; the run-time editor has been revamped; and there’s a debugging aid called ScriptTracer, which lets you set breakpoints and trace messages and variables. It’s also possible to write your own error-handling routines, because SuperCard makes error messages available to the scripter. SuperCard supports the library idea through a SharedFile.

Silicon Beach avoids the run-time-licensing issue for most developers by letting SuperCard package its run-time elements into a SuperCard project (Silicon Beach’s terminology for what Apple calls a stack). This produces a large but self-sufficient stand-alone application. Version 1.5 lets stand-alones function as code libraries for other projects.

Silicon Beach has done several things to improve performance. SuperCard no longer stores all of its data as strings but uses a numeric format for numbers, improving performance in calculations. Moving from card to card is now faster too. As with Plus, SuperCard is able to run in 1 megabyte, but you need 2 megabytes to take advantage of all the product’s features.

The Bottom Line. Both products continue to offer capabilities that HyperCard lacks, although HyperCard retains a powerful price advantage — it’s free.

SuperCard is an excellent tool for developing animated presentations and other graphically rich applications, and its control over the interface and ability to produce stand-alone applications distinguish it from any dedicated animation or presentation product. The performance enhancements and new development tools in version 1.5 make SuperCard a significantly more pleasant development environment than it’s used with adequate horsepower and RAM.

Although Plus hasn’t improved radically in this version, it still provides a simple and familiar HyperCard environment and adds object graphics, specialized text fields, and color support. For anyone who is familiar with HyperCard, the learning curve for Plus is virtually flat. Its greatest advantage for developers is its support for multiple platforms.

— Michael Swaine

[At press time, Spinnaker had just announced the release of an unlimited, royalty-free run-time version of Plus. In fact, the publisher actually announced three run-time versions: one each for the Mac, Windows 3.0, and OS/2 Presentation Manager. The latter two, however, were not scheduled for release until after the full developer versions for those machines began shipping. The Plus Runtime Distribution Kits are priced according to how many of the three platforms (Mac, Windows 3.0, and OS/2 PM) a developer wants to support. One platform costs $495; two, $900; and three, $1,250. — Ed.]

Get Info

**Plus**

Published by: Spinnaker Software, One Kendall Square, Cambridge, MA 02139; (617) 494-1200.

Version: 2.0.

List Price: $495.

**SuperCard**

Published by: Silicon Beach, 9770 Carroll Center Road, Suite J, San Diego, CA 92126; (619) 695-6956.

Version: 1.5.

List Price: $299.
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DynaPerspective

DynaWare’s second release packs a lower price and plenty of pizzazz for 3-D architectural presentations.

DynaPerspective’s strength lies in its presentation capabilities. Its Rendered mode features transparent surfaces, easy color manipulation through the color controller (lower right), and quick animation creation through the simulation palette (lower left). Version 2.0 adds a more robust tool palette (left) and 16 layers. Clicking on one of the boxes in the layer palette (top) displays or hides items in that layer.

Several 3-D CAD programs can handle drafting, rendering, and presentations, but they usually specialize in only one aspect. Presentation was the forte of DynaPerspective 1.0 (July ’89, page 47), with its ability to create fly-through animations easily. Although its rendering was basic but fast, its drafting capabilities suffered. With version 2.01, DynaWare has added needed features to DynaPerspective’s drafting capabilities, tweaked its rendering, and made its animations faster and smaller. All this, and DynaWare has cut the price as well. DynaPerspective is still geared toward presentations, and version 2.01 makes it easier. There are a few interface annoyances and missing drafting features, but this upgrade takes several steps in the right direction.

Drafting Layers. The most important new feature is the addition of up to 16 layers, which you can display or turn off. This lets you, for example, put a basic floor plan in one layer, plumbing in another layer, and furniture in another or keep alternative designs for a single room. Layers are easily handled through the layer palette, and a Move/Copy to Layer command lets you move items between layers in one step.

The good drafting features of version 1.0 are enhanced in the new version. Four linked views representing floor plan, two elevations, and perspective can be displayed one at a time or simultaneously. A screen redraw stops when you click the mouse, so you don’t have to wait whenever you make a change or switch views. You can now also redraw a single window.

Moving the light source or the point of view is simple with the new set-light and set-eye tools, which let you draw the line of sight on-screen with the mouse. You can now also save as many as 20 views at different angles, distances, and zoom settings as recallable views, which become choices in the View menu.

The zoom tool has improved, now letting you specify the zoom factor to within .01 percent. The old wall- and shape-creating tools are joined by new manipulation tools, including extrude, scale, revolve, multcopy, and move (an alternative to clicking and dragging). These mostly work fine, although I found the revolve tool difficult to master.

The x,y,z position of the cursor is displayed at the bottom of the window in an area called the Parameter Bar. When you select a shape-drawing tool, such as the wall tool, this is where you enter such parameters as the thickness and height of the wall. Dimensions can be entered or displayed in English or metric units. You can even set DynaPerspective to let you enter dimensions in one unit and have it display them in the other.

DynaPerspective’s biggest void is a method for measuring relative distances. Right now, the Parameter Bar displays only the distance from the origin (point 0,0,0) and only when you create a new part. If you select an object and drag to modify the shape, no dimensions are displayed to tell you where you are. DynaWare is considering on-screen relative coordinates for a future version.

Another problem is that there really is no easy way to modify walls once you create them. It’s easier to delete them and re-create them.

Reality in Motion. Although rendering is not as fancy as in a program such as StrataVISION 3d, DynaPerspective is quite a bit faster and does include such niceties as movable light sources and transparent surfaces. Version 2.01 adds 24-bit color and anti-aliasing. If you need texture mapping, you can export your files in DXF format to StrataVISION. For ultrahigh-end rendering, you’ll have to wait until the beginning of 1991, when DynaWare plans to have the capability of exporting to Pixar’s Renderman.

Animations are easy to accomplish: You set viewing angles and distances in the perspective view and let the program interpolate frames between positions. Animations, also called films, can be recorded in two formats: DynaWare’s new high-speed format and PICS. Films in DynaPerspective 1.0 format can be converted to the new format, which shrinks them to about one-fourth their original size. Films created in PICS can be exported to MacroMind Director. PICS...
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files are about three times the size of high-speed-format films, however, and are limited to 16 megabytes. This is a severe restriction, as animations can easily exceed 100 megabytes. Anti-aliased 24-bit animations must be in PICS. Films can also be exported to video.

Animations can be played in three modes. If the film is small enough, you can load it into memory and play it from RAM at up to 60 frames per second. You can also set the film to load from the hard disk in chunks, which is a little slower. The slowest mode loads the film frame by frame from the hard disk. In this mode, I could play an 8-bit 100-megabyte film at 15 frames a second on a Ii, filling up a 21-inch screen. You can speed this up to 30 frames per second by creating the animation in a smaller window.

You also have a great deal of control over animations. You can speed up, slow down, stop, and reverse the film from the keyboard. The step-plate feature lets you jump between different viewpoints in the film. You can also set the animation to play continuously.

The manual has been greatly improved since version 1.0 and is well written and illustrated, with a lengthy tutorial. If this isn’t enough, the program comes with a 40-minute tutorial videotape. It’s probably a good idea to go through these aids before trying to tackle a major project.

The Bottom Line. For those of you with 2-megabyte Mac IIs, DynaPerspective 2.0 is a powerful, versatile tool for visualizing and presenting designs in architecture, interior design, and space planning. At its new price, DynaPerspective is a great value. Registered users of version 1.0 are well-advised to pay the $25 shipping fee to upgrade. And if you’ve always presented your designs with static drawings, think about using animation — DynaPerspective makes it a snap.

— John Rizzo

Get Info

DynaPerspective

$110
Published by: DynaWare USA, 950 Tower Lane, Suite 1150, Foster City, CA 94404; (800) 445-3982 or (415) 349-5700.

Version: 2.0.

List Price: $995.

MULTIMEDIA

MediaTracks

If you create Macintosh training programs or simple presentations, this is the ideal tool for you.

Farallon’s ScreenRecorder revolutionized training by making it easy to record on-screen work sessions — but something was missing. There was no way to edit a sequence, no way to add notations to a picture, no way to make a sequence interactive, and no way to turn a sequence into a double-clickable application. MediaTracks solves all these problems.

Making Tracks. The first task in creating a MediaTracks presentation is to record a screen sequence by activating the ScreenRecorder DA, which is included. A small control panel reminiscent of a VCR’s appears. Click on the Record button, and you’re prompted to name the tape. The panel shrinks to a small tape icon in the corner of the screen, and you can begin recording. Perform whatever action you want to record, and click on the tape icon to stop. When the control panel reappears, you can replay or rerecord your tape. If you have a large screen, you can shrink the recording area to a standard 9- or 13-inch size.

To edit a rough tape, launch the MediaTracks application and open the tape; you’re then presented with a window that looks like a window in SoundEdit, MacRecorder’s sound-editing software.

As you watch the tape, pressing a screen button (or m for mark on the keyboard) puts an edit point onto the tape, creating clips. Each clip can have its own name, sound, graphics, and actions. The clips can be rearranged, and each clip can also have an action attached to it.

To add a sound to a clip, just select the desired clip and click on the Record Sound button. You’re prompted to either record the sound with MacRecorder or to import a previously recorded sound. If the sound is longer than the clip, you can pause (at the beginning or the end of the clip) for the sound to finish before resuming playback or it can overlap the next clip.

The MediaTracks Record Sound dialog box tells you how long the recorded sound should be (depending on memory, sampling rate, and compression) and how long the selected clip is. (You can also select multiple clips.)

You can add simple color overlay graphics to a clip by double-clicking on a clip to bring up the drawing window. Here you can use typical MacDraw-like objects (text, lines, rectangles, rounded rectangles, and ovals) to annotate what’s happening in the clip.

Another tool in the drawing window is the button tool, the real key to MediaTracks’ power. You use it to define on-screen buttons, so you can have a clip pause and wait for a user action such as
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Up to Date

Changes New and Noted

After Dark, the first modular screen saver, has been upgraded to version 2.0 and now includes 30 modules, some of which have sound. Two new control modules extend version 2.0's capabilities by letting you run two modules simultaneously, either side by side or mixed together. You can also run several modules in a random sequence at user-defined intervals. System10 is a major addition that optimizes After Dark during background operations and improves memory management. Berkeley Systems, 1700 Shattuck Ave., Berkeley, CA 94709; (415) 540-5535. $39.95; upgrade, $14.85 or free with $5 shipping-and-handling charge if earlier version was purchased after June 1, 1990.

Metamorphosis 1.5, which we mentioned in a note appended to our September '90 review (page 80), is now available. Allsys' type-conversion utility can now generate Type 1 PostScript fonts in addition to Type 3 fonts. Version 1.5 can also generate font outlines and fonts without a PostScript printer, creating its files directly from disk. Allsys, 269 W. Renner Road, Richardson, TX 75080; (214) 880-2060. $149; upgrade, free to registered owners.

Grammatik Mac, the giant grammar-checker, has had its first Mac upgrade. Version 2.0's improvements include a more intuitive interface, a larger proofreading rule base, and a rule/help editor that lets users create their own custom writing rules and help. Reference Software, 330 Townsend Street, Suite 123, San Francisco, CA 94107; (600) 872-9833 or (415) 341-0222. $99; upgrade, free to registered owners.

Accutext, Xerox Imaging Systems' OCR package, has been bumped up to version 2.0. Some of the enhancements include improved performance, draft-quality dot-matrix recognition, halftone removal that automatically eliminates pictures from a document's scan prior to recognition, an improved preview function, a HyperCard output option, and better error recovery. The HyperCard connection, called AccuStack, provides an easy link between HyperCard and your scanner that simplifies the creation of HyperCard databases. Xerox Imaging Systems, 535 Oakmead Parkway, Sunnyvale, CA 94086; (408) 245-7900. $799; upgrade, $10 if version 1.1 was purchased after August 1, 1990, or $90 if version 1.1 was purchased prior to August 1, 1990.

In addition to audio, MediaTracks lets you add visual annotations, such as the titles and arrows shown here, to your clips; buttons can be linked to other clips or even other sequences.

the press of a button and then branch to another clip in the tape or even to a completely different tape.

Buttons can also play sounds and control tape playback (pause, stop, skip, and so on). Farallon includes an XCMD that lets you play MediaTracks tapes from HyperCard. To help mesh MediaTracks with HyperCard, MediaTracks sends HyperCard messages when MediaTracks buttons are pressed or when clips begin.

Unlike ScreenRecorder, which requires that all users have the application to play back tapes, MediaTracks gives you several options. The MT-Player program can be distributed without charge (noncommercially, or commercially with Farallon's permission) for opening, playing, and pausing tapes. You can also save tapes as stand-alone. Tapes saved in this way have MT-Player built in, so you end up with a double-clickable application.

Minor Faults. MediaTracks' few faults are minor. First and foremost, it doesn't record on-screen color (even though you can paste color goodies into its draw layer), so you'll want to change your screen to black-and-white while you're recording. Although the 246-page indexed manual is great, there are some inconsistencies in the tutorial section that can be confusing. The MediaTracks editor lacks a frame counter (actually a QuickDraw command counter), which would make it much easier to find a particular location on a tape or clip. (You can, however, single-step through a tape or clip.) Reusing sounds just duplicates the audio data, taking up extra disk space; pointers would've been much more efficient. Although the program works fine on normal Mac displays, it did have some problems with my RasterOps ColorBoard 108. Finally, if you have a large screen, you have to reboot to change the recording-screen size and reboot again to reclaim your expensive screen real estate.

MediaTracks is available in a software-only version ($295) for those who already have a MacRecorder; it is also available with a MacRecorder in the Multimedia Pack, which costs $495. If you already have ScreenRecorder, you can upgrade to MediaTracks for $50 (or $250 if you want a MacRecorder). By the time you read this, Farallon should also be delivering MediaTracks on a CD-ROM disc.

The Bottom Line. In MediaTracks, Farallon has created another great communications tool. It is a revolutionary program that is easy to learn, powerful, and versatile — everything we expect a Macintosh product to be.

— Ron Hipschman

[As we went to press, Farallon Computing began shipping the MediaTracks Multimedia Pack CD-ROM version for $495. The package includes a complete MacRecorder Sound System, including a MacRecorder with all its software (SoundEdit, HyperSound, and the HyperSound Toolkit). The CD-ROM also includes ScreenRecorder and the MediaTracks editor, as well as MediaTracks demos, tutorials, and sample tapes. — Ed.]

Get Info

MediaTracks

Published by: Farallon Computing, 2000 Powell Street, Suite 600, Emeryville, CA 94608; (415) 549-9000

Version: 1.0

List Price: Software only, $295; Multimedia Pack includes MacRecorder, $495.
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Utilities

Stufflt Deluxe

The file-compression standard just got better.

Stufflt has been the standard Mac file-compression-and-archiving utility for years, a rare accomplishment for a shareware program. Stufflt Deluxe is the first commercial version of Stufflt, and it's bigger and better.

Getting Stuff'd. The most bothersome things about the original Stufflt were that it opened only one archive at a time and that it was an application—you had to use MultiFinder to stuff files on the fly. Stuffing files with the original Stufflt required that you launch the application, create a new archive, name it, and then use another command to bring up a dialog box from which to select the files to include. The unstuffing process required the same number of steps.

AlthoughStufflt Deluxe still supports the old method, there are now two quick-and-easy ways to stuff files into a new archive. The QuickStuff command brings up a dialog box in which you can choose the file or folder you want to stuff. Stufflt Deluxe automatically creates an archive, stuffs your selection, and gives the archive the same name as your selection plus Stufflt's familiar standard .sit filename extension. QuickUnStuff works just as easily. You can even choose to check files for viruses as they are processed.

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The three status bars of StuffIt Deluxe's status window tell you the size of the current file and folder. The center bar grows with the completed percentage of the current file. The lower status bar appears only when you're processing a folder and tells you the completed percentage of the folder.

Panel file that places a menu called Magic in the Finder. Simply select the icons of the files you want stuffed or unstuffed in any Finder window, and click on the appropriate command in the menu. You never even open StuffIt Deluxe—because everything happens right on the desktop! Magic Menu can also automatically stuff and send files and E-mail without making you invoke your E-mail application; however, this feature works only with Microsoft Mail and QuickMail.

StuffIt Deluxe opens up to eight archives simultaneously. Moving files or folders among archives or copying them is the same as doing so on the desktop—just select and drag. For any open archive, you can stuff, unstuff, create a list of files to be stuffed in a single operation, delete, rename, copy, get info on or add comments to archived files, or create new folders.

The package includes special viewers (translation software) that can display text and PICT files on-screen and print them without your unstuffing them. Aladdin expects to release viewers for additional file types in the future. Files that can be viewed have a magnifying glass beside their name in the archive window. You can copy information displayed in the viewer window to paste elsewhere. In any text-viewer window, the Find command helps you locate specific text and you can define the text's font and size. StuffIt Deluxe can optionally display text files with Read Me in their names immediately after you open archives that contain them.

Multimenus. StuffIt Deluxe has both standard and expert menus. The standard

to your Macintosh.
menus are preferable for most users, because they work without unnecessary complexity. The expert menus enable better control of file compression and security and let you decompress files created by other utilities. StuffIt Deluxe unpacks PackIt (.pil) archives and both encodes and decodes BinHex files for transmission over networks that support only characters that can be typed on a keyboard. You can also DeArc and UnZip files created on IBM PCs and compatibles with those popular PC compression methods, but you’ll need translation software or a compatible Mac program to read them.

StuffIt Deluxe also offers archive encryption, which prevents unauthorized users from unstuffing archives. If you encrypt a file while using standard menus, StuffIt Deluxe automatically uses the NewDE encryption method, which Aladdin claims is faster and more secure than the National Bureau of Standards’ DES method. With expert menus, you can select NewDE, DES, or a custom encryption algorithm. The first time you open StuffIt Deluxe, you are prompted to sign your name, using a pencil tool similar to MacPaint’s. You can add that signature to any stuffed file as an additional security feature.

The more you compress a file, the longer it takes at either end of the process. With standard menus, StuffIt Deluxe automatically uses Fast compression, which is roughly equivalent to the compression of previous StuffIt versions. With expert menus, you can also select Faster, which applies less compression but really zips along, or Better, which sacrifices speed to achieve extra compression. You can also select No Compression or use custom third-party compression algorithms and compression optimizers to boost compression for specific types of files or for files from designated applications.

StuffIt Deluxe supports a scripting language to automate repetitive tasks, which you can do by using a recorder or by typing a script (or editing a previous script) in any text editor or word processor that saves text files.

The Bottom Line. StuffIt Deluxe is more flexible and capable than its predecessor with no increase in complexity. For me, the time the Magic Menu feature also has saved me has paid for the package. Although Aladdin intends to maintain the shareware version (to be called StuffIt Classic), you’ll really prefer StuffIt Deluxe for its convenience and versatility.

— Darryl Lewis

Get Info

StuffIt Deluxe

Published by: Aladdin Systems, Deer Park Center, Suite 23A-171, Aptos, CA 95003; (408) 685-9175.
Version: 1.0.1.
List Price: $99.95.

With the HP LaserJet III, you can

The Galaxy Playhouse presents Shakespeare’s

AS YOU LIKE IT
Removable media have two advantages over fixed-disk systems: infinite capacity — you just insert a new cartridge when one is full — and portability. SyQuest-based systems have dominated the market with their 44-megabyte cartridges, but now Microtech International has launched an effort to establish a second standard. Microtech is the first of several mass-storage vendors (GCC Technologies will follow shortly with a similar unit) to introduce a drive based on a new Ricoh mechanism that uses 50-megabyte cartridges.

Microtech is betting that customers will pay a premium for the Ricoh mechanism’s reliability, which they might— if only the Ricoh drive were faster and cheaper than its competition. It isn’t. And it isn’t compatible with SyQuest cartridges either.

The New Kid. According to SyQuest, drives that are based on its mechanisms currently own more than 70 percent of the removable-media market, making it the de facto standard. The fact that the Microtech R50 can neither read from nor write to the ubiquitous SyQuest cartridges makes it a poor choice if you intend to share data with other users or service bureaus. If you are more interested in using cartridges for your own use or for archival purposes, then this incompatibility shouldn’t concern you.

Standards do not necessarily indicate superior technology (witness the
In our test with SCSI Evaluator, Microtech's R50 was consistently slower than its competitors. In fact, of the three removable drives tested, it was the slowest, finishing at just over half the speed of a hard-disk drive. The DiskBasher! results were less conclusive. The results were normalized to a Quantum hard-disk drive, which was used purely for comparison.

continued success of IBM clones). And SyQuest cartridges are generally regarded as less than perfectly reliable, to put it gently. The problem with SyQuest cartridges — which are basically hard-disk platters encased in removable plastic shells — is that they are susceptible to contamination. Whenever you insert the cartridge into the drive, a shutter on the cartridge flips open, letting the drive's read/write heads enter. At this point, dust and other particles can enter the cartridge and cause a variety of ailments ranging from intermittent data losses to full-blown head crashes.

The Microtech R50 features several safeguards that improve reliability and reduce, but do not eliminate, the risks of contamination. The Ricoh drive has an airtight design with a built-in filter to prevent particle contamination. Both the drive and cartridge are shockproof, and the shutter on the cartridge cannot be opened unless the cartridge is inserted into the drive. Some chinks in the armor remain, however. The read/write heads are still exposed whenever a cartridge is inserted or removed. And the actual cartridges don't have protective plastic storage cases; they come in sleeves like those of videocassettes.

Although the Ricoh mechanism appears to have a number of features that should improve reliability, it is an

With the HP ScanJet Plus, you've

The HP ScanJet Plus scanner provides 8-bit photographic-quality scanning.

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 4-200%. 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.
unproven technology. I experienced no difficulties with my evaluation unit, but until the drive is in widespread use, its reliability can’t be confirmed. MacUser Labs plans to investigate the range of removable-media solutions in an upcoming report.

But we don’t have to wait to determine the performance of the Microtech R50. Using the shareware utility SCSI Evaluator, MacUser Labs acquired read and write throughput rates for Ricoh, SyQuest, and Bernoulli removable-media drives. As a reference, a fast, 19-millisecond Quantum ProDrive 40S 40-megabyte hard-disk drive was also tested. Our tests show that the 25-millisecond Ricoh drive is about 40 percent slower than the Quantum drive; of the three removablebs tested, it was the slowest. MacUser Labs’ DiskBasher! test results were less conclusive, with the Ricoh drive tying with the SyQuest unit, although both were slower than the Bernoulli drive.

The Good News. Microtech is obviously one manufacturer that values its customers and treats them well. The R50 package comes with everything you need to install and use the drive: a formatted cartridge, a 50-to-25-pin SCSI cable to connect the drive to the Mac, a 50-to-50-pin SCSI cable to daisy-chain additional devices, an external terminator block, Centa System’s Total Recall ($99) for backing up data, and Norton Utilities for the Macintosh ($129) for file recovery and disk optimization.

The 50-megabyte cartridge is covered for one year, and the drive itself is protected by a two-year warranty. Furthermore, Microtech maintains an electronic bulletin board and a toll-free technical-support hot line. When the evaluation drive wouldn’t mount, a courteous, knowledgeable staffer helped me diagnose the exact problem in less than five minutes (the SCSI-identification connector had come loose during shipping).

The Bottom Line. As an alternative to a SyQuest-based drive, the Microtech R50 can’t be recommended. According to Microtech, its R45 SyQuest drive has a field failure rate of less than 2 percent—a figure that has been confirmed by data from thousands of units over several years of use. The R50, on the other hand, will cost nearly twice as much as the cheapest SyQuest units, and all you have to go on is a claim of higher reliability. With such a small failure rate for the de facto standard, it’s hard to justify spending more money on a slower, incompatible R50, even if it does eventually prove to be more reliable.

—Owen W. Linzmayer

![Microtech R50](image)

**Get Info**

**Microtech R50**

**Manufactured by:** Microtech International, Inc., 158 Commerce St., East Haven, CT 06512; (800) 325-1895 or (203) 468-6223.

**List Price:** Drive, $1,299; extra cartridges, $129.
Sensible Grammar

No grammar checker is completely idiomproof, but Sensible Grammar comes close.

The early versions of Sensible Grammar were hardly worth a second look. That's certainly not the case with version 1.6.0. It's a serious contender in the recently reignited Mac-grammar-checker race (see the June '90, page 59, and August '90, page 59, issues for reviews of four other proofreading programs). Sensible Grammar works somewhat differently from the other programs, in that it relies on rules and phrase dictionaries, or lists, rather than on rules and word dictionaries. This approach is both a major strength and a weakness.

Idiom's Delight. When it comes to "correcting" informal language, too much can be as bad as too little, and no proofreading program is better than Sensible Grammar at catching and flagging idiomatic usage and not flagging contemporary usage. You can easily edit the phrase lists to reflect your personal style. The 20 lists contain more than 4,500 phrases, including clichés, confusing homophones, overly formal phrases, racial and sexist slurs, and legal phrases (the latter can be automatically removed). Because you can turn the phrase lists on and off, you can easily adjust the level of checking, depending on whether you're checking a formal report or an informal personal communication.

Sensible Grammar also has good punctuation-checking abilities, a category pretty much ignored by the competition. Another unique ability is the two-way conversion of abbreviations and contractions — that is, you can set Sensible Grammar to make your writing more formal by expanding all abbreviations and contractions. It can also make your work less formal by maximizing the use of contractions and abbreviations.

Its grammar-checking abilities are slightly above average. It can find most egregious errors. Although it has no built-in spelling checker, the program can catch homophones used incorrectly and double words. (However, you will probably want to edit the homophone list severely.)

The Proof Is in the Proofing. Operation is simple. Start by selecting either an entire saved document (file size is limited only by disk size) or a portion of a document (a very handy feature). Analysis immediately begins, and depending on which options you have selected, several windows open. Most are informational; all real work takes place in the Checking Document interactive...
window. This is a decent work area, showing the full sentence that contains each flagged item. Sensible Grammar would be better, however, if even more contextual material were shown. It also has too many marginally useful and cryptic icons. These icons let you access the phrase lists and rules that are currently in use. What looks like an on-line-help icon merely accesses the rules references; instead a small, very general Help file is available under the Apple menu.

The interactive window has buttons that let you try out suggested fixes and an editing area in which you can type in your rewrites and corrections. You can set the program to fix some classes of errors automatically. Flagged items can be ignored, logged to the various error logs, or marked for later consideration.

As you check, various indexes (readability index, word count, and so on) are updated to reflect results to that point in the document, which is remarkably useless, as all you’re typically interested in are the final numbers.

The main operational drawback is that you work on the original document. Because Sensible Grammar preserves your original file by adding the suffix .Old to the filename and gives the changed file the original name, it’s easy to get confused. Grammatik Mac uses the same, equally confusing, naming scheme. The program should give you an option to Save As rather than merely Save when a

have it all. (But keep it to yourself.)

The HP DeskWriter printer puts laser-quality printing right at your fingertips.

With a small size and a $995* price tag, the DeskWriter printer easily fits on your desk and in your budget. And its advanced 300 dpi inkjet technology lets you print sparkling text and detailed graphics.

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 1-800-752-0900, Ext. 1004 for your authorized HP dealer.

There is a better way.
check is complete. Speed is reasonable, and Sensible Grammar didn’t harm any of the test documents except for tables in Word 4.0, which lost some formatting.

Sensible Grammar runs on all Macs from the 512KE on up. It’s not copy-protected and works best from a hard disk. It works with MacWrite 4.5, 4.6, and 5.0; MacWrite II; all versions of Microsoft Word (not fast-saved documents) and Microsoft Works; Microsoft Write; WordPerfect 1; PageMaker (up to 1.2 only); all versions of WriteNow; and standard text files.

The Bottom Line. Sensible Grammar is a good if somewhat unusual proofreading program. It is based more on phrase lists than on word lists and rules. It does not spell-check per se, although it can catch some spelling errors. The necessary customization (required of all proofreading programs) is easy, and selection of options is clear. This is a very — well — sensible and useful program, although it’s not as powerful as Correct Grammar and the lack of a spelling checker is a major handicap.

— Steven Bobker

Sensible Grammar

Published by: Sensible Software, 335 E. Big Beaver, Suite 207, Troy, MI 48083; (313) 528-1950.
Version: 1.6.0.
List Price: $99.95.

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HP color printers let you draw splasry color from your Macintosh.

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There is a better way.

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Published by: Sensible Software, 335 E. Big Beaver, Suite 207, Troy, MI 48083; (313) 528-1950.
Version: 1.6.0.
List Price: $99.95.
Oasis is the first 32-bit painting program that truly mimics traditional media such as oil paint, watercolor, chalk, and pastel. The effects are created with its impressive selection of brushes, which can be adjusted for size, transparency, wetness, and dry-out rate. The brushes are also pressure-sensitive and are compatible with Wacom's pressure-sensitive stylus and digitizing tablets, which enables you to control line thickness and color density simply by varying how hard you press down when drawing on the tablet. A separate video module will offer features such as alpha-channel support, lockout of illegal colors, and video capture for RasterOps and Truevision video boards. For artists who have never been completely comfortable with standard mouse-driven graphics applications, Oasis may be just the ticket.

Time Arts, 1425 Corporate Center Parkway, Santa Rosa, CA 95407; (707) 576-7722. $795. ETA: November 1990.

Desktop Video Production takes SuperMac's proprietary compression technology into the video realm. Using a combination of a fast LaserFrame optical-disc drive (or large-capacity hard-disk drive), a NuBus card to handle the compression and decompression, and a multimedia video-display card, Desktop Video Production lets developers work with 24-bit full-motion digital video — directly from their drives — on the Mac. The product can digitize and compress video signals on the fly, making it possible for developers and video professionals to work with live video quickly and inexpensively. Design as a system for developers.

Desktop Video Production promises to reduce the cost of video postproduction by as much as 80 percent. Although it's currently only a developer's product, user systems and applications may appear as early as summer 1991. Multimedia developers and video professionals should be interested in this system, as working with digital video has been highly impractical due to the massive storage required for uncompressed full-motion video.

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6916 Dypnex 2.0—For Filofax, Day-Timer, or any personal organizer, manages & prints addresses. Labels & Rolodex cards tool includes free DA. 57.  
7992 DynoPage 1.0—Prints any Macintosh file to personal-organizer pages. Just insert and go! 57.

1.0-Prints any Macintosh file to personal-organizer pages. Just insert and go! 57.

2.0—For Filofax, Day-Timer, or any personal organizer, manages & prints addresses. Labels & Rolodex cards tool includes free DA. 57.
A phone call away

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<td>3449 SuperQil 2.01</td>
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<td>4644 Just Enough Pascal 1.0</td>
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**JAM Software** ... 30 day MBG

6089 Smart Alarms with Appointment Diary 3.0 - A Macintosh reminder and calendar system featuring: auto backup, variable snooze, multiple reminders, and weekly and monthly views and zoom. Multiple users available. **$63.**

5176 Symantec AntiVirus for Mac (SAM) . . . . . 67.
5241 Symantec Utilities for Mac (SUM II) . . . . . 99.
3421 THINK Pascal 3.0 . . . . . 165.
3420 THINK C 4.0 . . . . . 165.
6748 Norton Utilities for the Mac 1.0 . . . . 84.

**SyneX** ... 30 day MBG

7147 MacEnvelope 5.0 . . . . . 57.
6686 MacEnvelope Plus 2.0 . . . . . 159.

**Systems Compatibility** ... 30 day MBG

7872 Software Bridge 1.0 . . . . . 75.

**Teletypist** ... 30 day MBG

8058 TScript . . . . . 92.

**TGS Systems** ... 30 day MBG

6667 Prograph 2.0 Compiler Version . . . . 245.
3587 True BASIC, Inc. . . . . . 35.
3557 True BASIC 2.0 . . . . . 55.

**Wayzata Tech.** ... 60 day MBG

7679 Disc Tray Prog. Diagnostic (CD-ROM) . 75.
7965 Best of MacTutor (CD-ROM) . . . . 99.

**Williams & Macias** ... 30 day MBG

6926 myDiskLabeler III 3.0 . . . . . 42.
4976 StickyBusiness 1.3 . . . . . 51.
6927 StickyBusiness Plus 1.3 (bar codes) . . . . . 91.

**Zedcor** ... 60 day MBG

3985 ZBasic 5.0 . . . . . 99.

**LEARN & PLAY**

- **Activation**
  - Manhole . . . . . $28.
  - Manhole (CD-ROM) . . . . . 34.
- **Cosmic Osmo**
  - Mission Starlight or Sky Shadow . . . . . 32.
- **Apple**
  - Apple (CP) . . . . . 29.
- **Brogderbund Software**
  - The Playroom (CP) . . . . . 29.
  - Carmen Sandiego Series (CP) . . . . . 29.
  - SimCity 1.2 (CP) . . . . . 29.
  - SimCity Supreme 1.2C . . . . . 47.
  - Geometry 1.2 (CP), Physics 1.2 (CP), Calculus 1.2 (CP) . . . . . 58.
  - Whole Earth Catalog (CD-ROM) . . . . . 89.
- **Bull City** ... 30 day MBG
  - Moriarity Revenge (CP) . . . . . 32.
- **Bullseye**
  - Ferrari (CP) or P51 Mustang (CP) . . . . . 31.
- **Carina Software**
  - Voyager 1.2 . . . . . 88.
- **Casady & Greene** ... 60 day MBG
  - Crystal Quest 2.2X . . . . . 29.
  - Mission Starlight or Sky Shadow . . . . . 29.
- **Code Music Systems**
  - MusicPulse 1.01 . . . . . 186.
  - MusicPulse 2.0 . . . . . 549.
  - Davidson & Associates . . . . . 173.
  - Math Blaster 1.0 (CP) . . . . . 29.
  - Math Blaster Mystery (CP) . . . . . 29.
our very last flight.

Microcom ... 30 day MBG
8027 Max/Motion V3.3—Featuring 9600 Baud MNP Class 9, 38,400 BPS, error free transmission, auto-dial/redial/answer. Includes CarbonCopy Twin Pack, QuickLink II and Wake-Up Cable. $689.

MicroSpeed ... 30 day MBG
6620 MacTRAC. 65.
6621 MacTRAC ADB. 75.

Mouse Systems ... 30 day MBG
7550 Trackball ADB. 69.
7520 Little Mouse. 75.
8001 Little Mouse Plus. 75.

Nutmeg Systems ... 30 day MBG
6240 SE/30 Monochrome Video Interface. 499.
15" Monitor for SE, SE/30 or II. ea. 599.
19" Monitor for SE, SE/30 or II. ea. 995.

Orange Micro ... 30 day MBG
3036 Grappler (9 pin). 87.
6229 Grappler LX. 128.

Pacific Data Products
7411 Pacific MacPage. 425.
7412 Pacific MacPage PE. 459.

ColorBoard 208. 379.
ColorBoard 264 for Mac II. 579.
ColorBoard 264 for SE/30. 689.

Video ColorBoard 364. 1495.

Abston ... 30 day MBG
7432 Scan 3000GS—Flatbed scanner capable of 256 shades of true gray-scale. Mac, IBM, and NeXT compatible with optional interface kits. Compatible with most OCR packages. $999.

4561 250 Watt. 199.
3809 Power/Key. 65.
8008 Power/Key Wake Up Cable. 32.

Thunderware
3648 ThunderScan Plus ThunderWorks. 199.
4894 LightningScan 400. 385.

SAFE Power Systems
4565 Address Labels 3. 13.
4566 Address Labels 3. 22.
4567 Address Labels 4" x 11" (Qty. 50). 22.

SuperMac Tech. ... 30 day MBG
5449 Datatframe XP 100 Hard Drive. 1049.
5451 Datatframe XP 200 Hard Drive. 1399.
5454 Datatframe XP 300 Hard Drive. 2369.

Toshiba
6749 XM 3201 CD-ROM Drive. 899.

ACCESSORIES

Apple Computer
6717 MIDI Interface. 84.
7748 Personal LaserWriter Toner Cart. 89.
1114 LaserWriter Plus Toner Cartridge. 99.
1115 LaserWriter II Toner Cartridge. 105.

Avery ... 60 day MBG
4812 Laser Labels 4½" x 1½" (Qty. 2500). 7.
4808 Laser Labels 4½" x 1½" (Qty. 1400). 24.
4807 Laser Labels 1½" x 2½" (Qty. 3000). 24.
4864 Disk Labels 3½" (Qty. 250). 13.
5392 Disk Labels 3½" x 1½" (Qty. 3750). 15.
5403 Address Labels 1½" x 4" (Qty. 1000). 9.
4865 Address Labels 3½" x 1½" (Qty. 3750). 15.
4811 Transparencies 8½" x 11" (Qty. 50). 22.
Carina
5726 Voyager 1.2--A full-featured Planetarium on your Mac! View the sky from anywhere on Earth, past, present or future. Features include planet tracking, user defined orbits, extensive printing capabilities, and more... $88.

Earthquest
8050 Earthquest--A new highly acclaimed program that takes users on a journey of discovery through timeless material about the Earth, its people and the environment... $48.

**HyperGlot...** 30 day MBG
Word Torture - Beginner to Advanced (Span., Fren., Germ., Ital. & Rus.) ea. $29.
Pronunciation Tutor - Beginner (Span., Fren.) ea. $35. (Germ.) $42.
Verb Tutor - Intermediate (Spanish, French, German) ea. $42.

**Earthquest...** 30 day MBG
8050 Earthquest--A new highly acclaimed program that takes users on a journey of discovery through timeless material about the Earth, its people and the environment... $48.

**Okinawa Tech...** 60 day MBG
6389 The World Factbook'89 (CD-ROM) $69.
7678 USA Factbook (CD-ROM) $75.
7374 Sport News Baseball Stats (CD-ROM) $139.

**XOR...** 30 day MBG
6040 MacGolf Classic (CP) $52.
8061 MacSki $40.

**Earthquest...** 30 day MBG
8050 Earthquest--A new highly acclaimed program that takes users on a journey of discovery through timeless material about the Earth, its people and the environment... $48.

**HyperGlot...** 30 day MBG
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**Note:** Prices are subject to change without notice.
Dear MacConnection,

I'm so pleased with your efforts to protect the planet from yourself. But one of my favorite things about MacConnection has come to an end. Goodbye, foam peanuts. I re-used them to lighten the soil in my basement nursery. I also have two wonderful eighteen-foot-high river birch trees growing on top of a pile of your foam peanuts. I even have a lovely cultivar of black bamboo flourishing in a similar arrangement. MacConnection has certainly helped me realize the potential of my Macintosh. Moreover, your foam garbage inspired me to explore innovations in ways neither of us expected. But I certainly applaud your recycling efforts.

Paul Vendrick
St. Louis, MO
### Now 3:15 AM!

**Dove Computer ... 60 day MBG**

Marathon 030 w/Virtual 2.0, SUM II, SAM 2.0... Turn a Plus, SE or II into a powerful workstation. Create 16 MB of app memory with the Dove 030 upgrade w/Virtual, without adding RAM. Mac II version doubles CPU speed $529.

**Fine Points ... 60 day MBG**

8046 MVP Mouse ... 89.
8045 MVP Foot Switch ... 19.
6129 Ultimate SE/Ext. Carrying Case ... 79.
6091 The Organizer ... 199.
2381 Macluggage Macinware SE ... 75.
7453 The Organizer Jr. ... 69.
7413 Mac SE/ci Monitor Stand ... 40.
6682 Hard Top ImageWriter II ... 16.
1725 Mac SE Ext. Keyboard Cover set ... 10.
1723 ImageWriter II Cover ... 8.
6680 Dust Covers ... call.
1229 Mac Plus/SSE Carry Case ... 32.
4015 Mac SE & Ext. Kybd. Carry Case ... 69.
4014 High Trek Mac Plus Carry Case ... 59.
4013 High Trek Mac SE & Ext. Kybd. Case ... 69.
4862 SE Protection Pak (ext. keyboard) ... 75.
4012 High Trek ImageWriter Carry Case ... 49.
4011 LaserWriter II Series Cover (navy) ... 17.
4010 Mac SE & Ext. Kybd. Case ... 69.
4623 Solid Oak Disk Case ... 32.
4019 Mac SE & Ext. Keyboard Cover (navy) ... 15.
4623 Solid Oak Disk Case ... 32.
4018 LaserWriter II Carry Case ... 8.
4623 Solid Oak Disk Case ... 32.
4017 ImageWriter II Cover (navy) ... 11.
4863 SE Protection Pak (ext. keyboard) ... 75.
4016 Mac Plus/SSE Carry Case ... 55.
4015 Mac SE & Ext. Kybd. Carry Case ... 69.
6116 Mac Icx Carry Case ... 75.
6198 Isobar 4 (surge suppressor, 6 outlets) ... 49.
6200 Isobar 6 (surge suppressor, 6 outlets) ... 59.

### Storage Media

**STORAGE MEDIA**

2559 Apple Security Kit ... $33.
2566 System Saver Mac (platinum) ... 63.
2567 System Saver Mac (bagset) ... 63.
2546 A-B Box (DIN-8) ... 63.
4643 Mac II Stand and Cable Kit ... 64.
6763 SE Radiation/Anti-Glare Filter ... 52.
5064 Apple Color Monitor Polarizing Filter ... 63.

**MacConnection ... 60 day MBG**

4623 Solid Oak Disk Case (holds 90 disks) ... 32.

**MicroSpeed ... 30 day MBG**

*Maxell*—The most ergonomically trackball available. Replace your mouse & work faster & easier in 1/3 the desk space. Dragging is a breeze with the built-in drag lock button.

### New Shipping

Continental US: Barring events beyond our control, all credit card orders placed in weekdays by 3:15 AM EST will ship Airborne Express for delivery the next business day. Which means same day delivery for orders placed between midnight and 3:15 AM EST. Some orders may ship by UPS Ground for next day delivery. Saturday delivery available to many areas upon request. Some areas require an additional day delivery. The total freight charge on any order placed with MacConnection is only $3.

Hawaii, Alaska, Canada, Puerto Rico and U.S. Virgin Islands: Call 800/G34-4444 for information on shipping and charges.

All other areas: Call 603/446-7711 or FAX 603/446-7791 for information.

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**New Our Policy**

- We accept VISA and MASTERCARD.
- No surcharge added for credit card orders.
- Your card is not charged until we ship.
- If we must ship a partial order, we never charge freight on the shipment(s) that complete the order (in the U.S.).
- No sales tax, except Ohio residents (please add applicable tax).
- All U.S. shipments insured; no additional charge.
- APO/FPO orders shipped First Class Mail.
- International orders U.S. $250 minimum.
- Upon receipt and approval, personal and company checks clear the same day for immediate shipment of your order.
- Corporate P.O.s accepted subject to credit approval.
- COD max. $1000 Cash or certified check.
- 120 day limited warranty on all products. Defective software replaced immediately. Defective hardware repaired or replaced at our discretion. All items subject to availability. Prices and promotions subject to change without notice.
- Our order lines are now open 24 hours a day Monday through Friday, and Saturday 9:00 AM to 5:30 PM EST. You can call our business offices at 603/446-7711 Monday through Friday 9:00 AM to 5:30 PM EST.

---

**Basic Needs ... 60 day MBG**

- Dust Covers ... call.
- Hard Top Keyboards ... ea. 15.
- 6682 Hard Top ImageWriter II ... 16.
- 7413 Mac Icx/ci Monitor Stand ... 40.
- 7417 Cordsless Mouse ... 89.

**Computer Coverup ... 60 day MBG**

- ImageWriter II Cover ... 8.
- CoStar ... 30 day MBG ... 69.
- The Organizer Jr. ... 69.
- The Organizer ... 199.

**Curiosity Manufacturing**

- GFS-3 (Glass Filter Plus-Mac Plus, SE) ... 65.
- 8045 MVP Foot Switch ... 19.
- 8046 MVP Mouse ... 89.

**ID/Design ... 30 day MBG**

- 2379 MacLuggage ImageWare II ... 49.
- 2381 MacLuggage Macinware SE ... 75.
- 6129 Ultimate SE/Ext. Carrying Case ... 79.
- 6129 Ultimate SE/Ext. Neon Case (available in green, pink or yellow) ... ea. 89.

**Kensington ... 30 day MBG**

- Toshiba/Swivel (platinum) ... 22.
- 4973 Power Tree 20 ... 27.

**Sophisticated Circuits ... 30 day MBG**

- 8009 Powerkey—Turns your Mac & peripherals on from the keyboard & off with "Shut Down!") Includes software for scheduling on/off & macro events for unattended operation. Four filtered outlets provide surge & overload protection $65.

- 2573 Tilt/Swivel (platinum) ... 22.
- 4973 Power Tree 20 ... 27.

**Microspeed ... 30 day MBG**

- 2792 3½" DS/DD Disks (10) ... 14.
- 2793 3½" HD Disks 1.44 Meg (10) ... 27.
- 3M ... 60 day MBG ... 3943 DC2000 40 MB Data Cartridge ... 20.
THREE CHEERS
FOR THREE
NEW MACS

Sound! Video! Color! Speed! Apple-Ile-in-a-Mac!
Prices that challenge low-cost PC clones!
These three new Macs herald a bold new chapter
in the Macintosh story.

No more excuses. The final barrier to owning a
Mac—cost—has been lifted. On October 15,
Apple introduced three new low-cost Macs:
the Macintosh Classic, the Macintosh LC, and
the Macintosh IIxi. At the same time, it retired
three of the best-selling Macs ever—the Plus,
the SE, and the Ilcx—and demoted the IIx to
special-order status. The hallmarks of the revised Mac lineup
are power and affordability. The bottom line: Macs can
compete across the full desktop spectrum—against low-cost
IBM PC clones and powerful workstations—and they can
compete in terms of both performance and price.
Three New Macs

Seven Macintosh computers remain, one for every need and budget (see Table 1). You can pick up a Classic for less than $1,000 dollars, or you can spend ten times as much for a top-of-the-line IIfx. The color LC gives you the power of a Mac II for the price of an SE, and for $599, you can plug in a new 12-inch color monitor. The Ilsi provides 68030-class performance for around $3,700, and the IIci has dropped in price by about $1,500. The remaining family members, the Mac Portable and the SE/30, are unchanged in both features and price — for now (see the “On the Horizon” sidebar).

The three new Macs are only part of the story: Apple also announced new add-in cards, new monitors, a new keyboard, new RAM-expansion kits, and new System software. Apple invited a team of MacUser editors and Labs staff to investigate this outpouring of new technology at its secret new-product stronghold. There we tested, disassembled, and inspected each new machine and accessory and then grilled their creators about hidden strengths and weaknesses. (Our analysis of the new products is based on evaluations of preproduction units; details that were still unresolved at press time are noted.)

Our testing sought not only technical details but also answers to some larger questions. What about the challenge of Microsoft Windows 3.0? Can low-cost Macs beat back the advancing horde of cheap DOS clones? And will Apple maintain its deserved reputation as the leader in innovative, truly personal computing? Although the final results are elusive, we did identify the beneficiaries of Apple’s latest offerings. It’s you.

More Than Just Inexpensive

The Classic, LC, and Ilsi are not just new Macs at attractive prices. The LC and Ilsi, for example, are pioneers in a new era in personal computing that features the integration of the human voice. Both include built-in digital-recording capability and an attractive omnidirectional microphone (see Figure 1). Third-party developers are rushing to provide messaging, file-annotation, and voice-recognition applications to bring sound to every Mac user’s desktop and network (see the “Bandwagon” sidebar).

All three new Macs include built-in video circuitry. The Classic — the successor to the Plus and the SE — continues the compact-Mac tradition with its built-in 9-inch monochrome monitor. The LC and Ilsi follow the lead of the IIci and include on-board video circuitry to drive a variety of popular Mac monitors. In the new Mac family, only the flagship IIfx still requires an additional video card before a monitor can be hooked up. (The Mac Portable requires a third-party adapter to drive an external video display.)

It’s a good thing that video cards aren’t required for these new machines, because each follows Apple’s original Mac philosophy of providing few or no expansion options (see Figure 2). The Classic, for example, has no expansion slot — although its unusual RAM configuration should allow enterprising developers to develop interfaces for large-screen monitors. The LC and Ilsi each include a PDS (processor direct slot), waiting for third-party cards. Only the Ilsi offers a NuBus slot — and only as an extra-cost option. That’s the bad news.

The good news is that the LC’s PDS accepts a new card that will warm the heart of educators and Apple II enthusiasts: the Macintosh LC Apple Ile Option Card (see Figure 3). This eight-chip beauty turns the LC into a fully functional Apple IIe, complete with connections for a 5.25-inch disk drive and joystick (see the “Apple-IIe-in-a-Mac” sidebar). But more on slots and cards in a moment. First, let’s meet each new Mac.

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On the Horizon

Any thoughtful, fact-filled analysis of Apple’s activities is not complete without a good dose of unsubstantiated speculation. Here’s what they’re talking about on the street — be it Wall Street or the boulevards of Silicon Valley — when talk turns to evidence for the former comes in part from Apple’s acquisition of technology from Outbound Systems. Although there was nothing in that purchase that Apple couldn’t have done alone, why build when you can buy? The “Portable Jr.” will probably weigh about 40 percent less than the current anchor-in-a-briefcase, and it won’t be equipped with a fancy screen — a common backlit LCD like those used in DOS data buckets will be the order of the day. And for those still financially stable enough, the familiar Mac Portable will remain just as heavy and expensive but it will have a backlit screen.

For IIcx owners left out in the cold when the IIci became the standard-bearer in the modular line, a reasonably priced IIci-upgrade kit may become available. Some time in the summer, the first 68040 machines should make their appearance, but an upgrade kit for 68030 owners is unlikely.

Look for Ethernet to appear on the motherboard of machines from the low to the high end (the only exception being the Classic). Also, the new Mac LC appears to be an ideal candidate to become Apple’s first diskless workstation. AppleMail, a system architecture for store-and-forward messaging (text, graphics, video, sound), will appear, most likely with a simple voice- and text-messaging application built on top of it.

On the software side, Claris should begin shipping its first products for Microsoft’s Windows 3.0 operating system by early 1992 (a Win3 version of FileMaker Pro is the most likely candidate). And while we’re on the subject of foreign markets, don’t be surprised if Apple revives its interest in stylus-driven computers in an effort to bolster its business in Asia.

— Russ Ito
Low Cost, High Value

The Macintosh Classic is the perfect machine for users who don’t require lots of muscle. If your work consists of processing words, telecommunicating, or using a simple spreadsheet program — and you’re willing to trade performance for savings — you don’t need a Mac more powerful than the confidently named Classic (see the “$1,000,000 Name” sidebar). If you use a IICi or IIX at work and you want to tweak that sales-report spreadsheet at home, this may be the Mac for you — no more staying late at the office because you can’t afford a Mac for home. Although the Classic doesn’t give you the microphone and sound-recording capability of the LC and IIsi, third-party vendors such as Farallon and Articulate Systems can provide you with the low-cost hardware and software you’ll need to take advantage of the coming age of sound input.

For some time, careful shoppers have been able to pick up a Mac Plus for less than $1,000. With the introduction of the Classic, the three-digit Mac is now official. With 1 megabyte of RAM and a 1.4-megabyte floppy-disk drive, the Classic sells for one dollar less than a thousand — and street prices should be substantially less than those of even the best Plus bargains.

But don’t think of the $999 Classic simply as a lower-priced Plus. When equipped with 1 megabyte of RAM and an FDHD 1.4-megabyte floppy-disk drive — now officially named the SuperDrive — it’s actually a repackaged SE with 95 percent of the SE’s performance (see Figure 4) at 39 percent of its price. Or you can load up your Classic with 2 megabytes of RAM and a 40-megabyte internal hard-disk drive for $1,499 — that’s more than $1,800 less than an equivalently equipped SE!

Like the SE, the Classic includes an ADB port to which you can connect a mouse, the newly redesigned Macintosh keyboard, and other input devices (see Figure 5). Unlike the SE (and all the other members of the Mac family except the Portable), the Classic — along with the LC and IIsi — has only one ADB port, so you must attach your mouse to your keyboard. Our editors and technicians were divided about the new keyboard — its soft touch was judged ideal by some and mushy by others. Also unlike the SE, the Classic has no PDS or on-board SIMM slots for RAM expansion. Any expansion cards — RAM or others — must use the Classic’s unique (and, at press time, unnamed) system-memory slot. We know of at least two developers — Computer Care and Lapis (see the “Bandwagon” sidebar) — that have teamed up to supply a full-page display/video-RAM card for this slot. Computer Care is also developing two RAM cards: one incorporating a RAM disk along with system memory and the other supplying only additional system memory.

With the 2-megabyte Classic configuration, Apple provides a small card that can occupy the as-yet-unnamed system-memory slot. This card contains an additional 1 megabyte of RAM and two standard SIMM slots. Slip two 1-megabyte 150-nanosecond SIMMs (the same speed as the SIMMs used in the Plus and SE) into these SIMM slots, and you reach the Classic’s limit of 4 megabytes of RAM. If you get a 1-megabyte Classic, you’ll probably want to buy the optional memory card, because a 1-megabyte Classic doesn’t have enough RAM to run Apple’s upcoming System 7.0. A 1-megabyte RAM ceiling also makes it essentially impossible to do any useful work when you’re running MultiFinder.

The Classic’s power supply has been redesigned for more reliability than that in the SE or Plus. The redesign has introduced one minor deficiency, however: The new power supply can’t handle a big power surge just as the machine is starting up. As a result, internal hard-disk drives are forced to wait about a second before they turn on. This delay will be imperceptible to users, but third-party internal drives for the Classic will be in limited supply until hard-drive vendors have redesigned their drives to include a delay circuit.

Also missing is a hard-drive-indicator light on the Classic’s front panel, although some hard-disk utilities (Norton Utilities for the Macintosh and Silverlining, among
### Three New Macs

Others) supply on-screen indicators — which you can turn off if you find them distracting. And while we’re talking picky details, the Classic’s 9-inch monochrome display has no external brightness knob, as did the displays of the SE and Plus, which it replaces. Display brightness is controlled by a cdev — a “feature” not seen since the venerable Lisa.

### Low-Cost Color

The next new Apple offering we consider here, the Macintosh LC, is the ideal mass-market office machine — and its Apple Ile Option Card makes it no slouch in the K–12 (kindergarten through high school) market either. If you need color on your desktop and don’t require the power of a high-end Ilsi, Iici, or IIfx, the LC is the machine for you. And if you’re a corporate volume buyer looking for a way to forever liberate your office staff from IBM Selectrics while giving them the power to — dare we say it — be their best, buy ‘em each an LC, and you’ll be an instant hero.

The LC is the real showstopper of the new CPUs — a very versatile machine (see Figure 6). With a 16-megahertz 68020 microprocessor and on-board video, it performs most day-to-day jobs as well as its 68020 ancestor, the Mac II, did — even though the LC doesn’t include the Mac II’s number-crunching FPU (floating-point unit) math coprocessor. The LC’s motherboard is extremely compact and reliable, because of its low chip count and the addition of four new custom chips that do the work of a whole handful of older chips. The LC — without keyboard or monitor — weighs just over 8.5 pounds, half the weight of the Mac Portable. With the addition of an LCD display (rumored to be under development by a third-party vendor), the LC could become a very “transportable” alternative to the SE/30 and Mac Portable — and unlike with the Portable, you can hook the LC up to a color monitor when you get to your destination.

Although it was announced along with the Classic and the Ilsi, the LC will miss the Christmas shopping season — it won’t be on your dealer’s shelves until January 1991 (the other two machines are available immediately). When it appears, the LC will be available in only one configuration: with 2 megabytes of RAM and a low-profile 40-megabyte hard-disk drive ($2,499). The RAM is soldered onto the LC’s motherboard, along with two SIMM sockets ready to accept either 1- or 4-megabyte 100-nanosecond SIMMs (256K SIMMs are not supported on the LC). A pair

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**Figure 2: The Mac Family History**

![Figure 2: The Mac family started small — low price, small footprint, not much RAM or disk capacity. This time line shows how quickly the family grew — and how prices grew as well. The three new Macs (lower far right) represent a reversal of Apple’s steady march toward more powerful, more expensive machines. The overall trend is clear: Performance is increasing exponentially, and prices are finally beginning to drop significantly. For this time line, we chose each configuration (RAM and hard-disk capacity) for its popularity and availability through the life of the Mac. Although the Mac IIfx is shown as a current member of the family, it’s being supplied only through government and corporate contracts. Prices shown are Apple’s suggested retail at the introduction and cancellation of each model.

* The Mac SE and Mac II were later upgraded to a 1.4-MB SuperDrive.
Figure 3: Optional add-in cards give the new Macs added power. Back row, left to right: A memory card for the Classic includes two SIMM slots with 1 megabyte of RAM. The Macintosh LC Apple Ile Option Card allows the LC to emulate an Apple Ile, and the Macintosh LC 512K VRAM SIMM (front) boosts the LC's color-video capability. The Macintosh IIsi 630 Direct Slot Adapter (center, vertical) and NuBus Adapter Cards allow third-party expansion cards to be used in the IIsi; both include an FPU math coprocessor. In the foreground is the Macintosh IIsi/IIf 2 MB Memory Expansion Kit of four 512K SIMMs (an 8-megabyte kit of four 1-megabyte SIMMs will also be available soon).
Three New Macs

Figure 4: Mac-Family Performance

Overall Speed

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Speed in Disk-Intensive Tasks

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Figure 4: The new Macs — the Classic, the LC, and the IIsi — not only meet the need for low-cost power but they also fill the gaps in the Mac family’s performance curve. MacUser Labs tested each Mac from the Plus to the IIcx with four real-world applications, with disk-intensive tasks, and with two common benchmarks that determine the CPU’s raw speed. Overall speed is a combination of real-world and disk-intensive tests; every model’s overall ranking is maintained throughout the charts as an aid to comparison. Each chart shows the computer’s performance factor — how many times faster each Mac performed when compared with a Plus.

Every Mac runs into the SCSI bottleneck each time it accesses its hard disk. MacUser Labs’ DiskBasher! test of hard-disk throughput showed the level of SCSI-port evolution to be the determining factor in disk-intensive performance. We also copied a large file, using the Finder’s Duplicate command. Surprisingly, the new IIsi beat out even the powerful IIcx — if only by a hair.

Although the IIcx includes sophisticated SCSI DMA (direct-memory access) hardware, the current Mac operating system doesn’t take advantage of it. Don’t look to System 7.0 to help either — the IIsi should remain the disk-intensive-application champ.
We sorted a large 4th Dimension database and found that CPU speed has little effect on this common database procedure. A faster hard-disk drive would be a better investment than a more powerful Mac. We then previewed a large and complex Adobe Illustrator document, recalculated a mortgage in Microsoft Excel, and performed a global search-and-replace in Microsoft Word. The speed of the llsi in the Excel and Illustrator tests was limited by its lack of an FPU math coprocessor — we recommend that you add this optional chip for best performance.

Raw-speed tests show how fast a Mac can perform pure computational tasks that aren't dependent on applications or disk speed. We used Dhrystones2 (the latest version of the tried-and-true benchmark) to test integer and string operations that mimic real-world computation. The Classic and the SE put in nearly identical performances, because of their nearly identical electronics. The 20-megahertz 68030 microprocessor in the llsi shot it ahead of the 16-megahertz SE/30 but not ahead of the 25-megahertz llic and the 40-megahertz llix.

We found a tremendous increase in the raw speed of number crunching as we climbed the evolutionary ladder — especially with the addition of an FPU. We used the familiar Whetstone test to perform floating-point calculations beyond the basic math of simple spreadsheet setups. The Plus, Classic, SE, and Portable — all 68000-based machines — performed dismally, with the llsi without an FPU and the LC only marginally better. When an FPU is added to the llsi, it again joins the big leagues. The Mac llix remains the undisputed champ: more than 200 times faster than the lowly Plus.
Three New Macs

of either-size SIMMs will bump you up to 4 megabytes or 10 megabytes, respectively.

The LC supports the new 64-dpi 12" RGB Display, the newly revitalized 76-dpi 12" Monochrome Display (see the "New Low-Cost Monitors" sidebar), and the familiar 69-dpi 13" AppleColor High-Resolution RGB Display. On the latter two monitors, 640 x 480 pixels are displayed at up to 16 grays or colors, respectively — a 4-bit pixel depth. The new, optional Macintosh LC 512K VRAM (video RAM) SIMM (around $200) will raise the ante to 8 bits (256 grays or colors) on either the 12-inch monochrome or 13-inch color display. Apple's new Macintosh 12" RGB Display beams 512 x 384 pixels in 8-bit color onto a crisply focused screen without the optional VRAM SIMM. With the VRAM SIMM, the LC can display 16-bit color, providing subtle enough shading for all but the most demanding photo-retouching applications. The first 15 bits of 16-bit color provide 32,768 colors; the 16th bit is reserved for the alpha channel, which is used by software developers.

We were disappointed to discover that the LC includes neither an FPU nor an MMU (memory-management unit). The lack of an FPU makes numbers crunch more slowly, and without an MMU, the LC can't take advantage of System 7.0's virtual-memory feature: the ability to use hard-disk space as temporary RAM. Neither can the LC run A/UX — maybe not a great limitation today but sure to become more important as Apple's UNIX operating system becomes more popular. Not only are these important and powerful chips lacking but the motherboard doesn't even offer empty sockets to enable you to add them later.

It's possible that enterprising third-party vendors will offer add-in cards that include an FPU or MMU for the LC's 96-pin PDS. This slot is a whole new 68020-based PDS that — as do all PDSs — gives you access to all the necessary microprocessor pins. The PDS also has some special wiring, such as a sound line that lets an internal modem send sounds to the LC's built-in speaker. Any add-in card, however, is limited to about 3 x 5 inches and can't draw more than 4 watts of power — you won't see any power-hungry 24-bit-video cards for the LC. However, you will definitely see network cards (Apple is working on an inexpensive Ethernet card — look for it in the spring of '91) and possibly 68030- or 68040-based accelerators.

The Bandwagon

If you're excited about the three new low-cost Macs, imagine how ecstatic developers are. If Apple's expectations of high-volume sales are sound, there will be a lot of money to be made by supplying new software, peripherals, and add-in cards for the new Macs. Third-party developers are releasing a variety of products that either take advantage of new capabilities such as sound or target special needs such as networking, memory expansion, or RAM caching.

For the Classic, Computer Care and Lapis will be jointly marketing a card that includes RAM and an interface for a large-screen monochrome monitor. You will be able to use both the Classic display and that of the add-on monitor simultaneously, and the board will supply an extra megabyte of memory with SIMM sockets for 2 megabytes more — just as Apple's board does. Computer Care will also be offering two additional memory boards. The first (about $150) is a third-party version of the optional Apple memory-expansion board. The second (about $199) is a board that will have additional SIMM sockets for adding a RAM disk.

For the Ilsi, PSI Integration is offering a low-cost, flexible alternative to Apple's Macintosh Ilsi 030/30 Direct Slot Adapter Card. Its SE/30 Bus Adaptor card includes a 68030 PDS, a socket for an optional FPU, and a third socket for PSI's $399 Cache-It! — a 64K RAM-cache card. PSI has announced that the Bus Adaptor will list for $99, but the company is thinking of lowering the price to $69.

Many of the new products for the LC and Ilsi are based on the new sound capabilities of those machines, but if you want to start digitizing sounds and taking advantage of the new wave of sound software and you aren't planning to buy an LC or a Ilsi, you'll need a third-party digitizer. Farallon's versatile MacRecorder, which comes bundled with SoundEdit software, is still a good value at $249. If you only want to even the score with LC and Ilsi owners, you can opt for Farallon's less expensive Voice Digitizer ($149), which has no audio-input jack or built-in level control.

Farallon no longer has the digitizer market to itself. Articulate Systems, the maker of Voice Navigator, recently introduced VoiceLink ($260), a voice digitizer with built-in compression and an...
In addition, Apple has announced that third parties are working on token-ring and IBM 3270 mainframe terminal-emulation cards for the LC’s PDS. Clearly, manufacturers believe that the LC will become a corporate network workhorse.

Little Big Man

At first glance, the Macintosh Ilsi is the hardest new Mac to get excited about — unless you like saving money. The Ilsi is ideal for corporate buyers who want to equip their staff with high-powered, expandable color Macs but who can’t convince their finance departments to spring for IIci’s all around. Although the 20-megahertz Ilsi lagged noticeably behind the 25-megahertz IIci in most of our testing, its overall speed was greater than that of the popular 16-megahertz Ilcx that it’s replacing. Also, it was surprisingly fast in disk-intensive tasks — faster even than a $10,000 Ilfx. (The Ilfx’s much-hyped SCSI DMA feature, designed to speed up disk-intensive tasks, is not yet supported by System software — and don’t expect System 7.0 to help.)

The Ilsi is essentially a repackaged SE/30 with a 20-megahertz 68030 instead of the 16-megahertz chip, minus the monitor and FPU (although an FPU is optional, unlike with the LC) and including a video port ready to accept a color monitor (see Figure 7). Two configurations are available: 2 megabytes of RAM and a 40-megabyte hard drive ($3,769) or 5 megabytes of RAM and an 80-megabyte hard drive ($4,569). One megabyte of RAM is soldered onto the motherboard, and either four 256K or four 1-megabyte SIMMs are

accompanying DA that allows direct-to-disk recording (something SoundEdit doesn’t do yet).

If you’re handy with a soldering iron, you can download plans from Mac for do-it-yourself sound-input device that costs about $20 in parts (it’s called SIO), and you’ll also find some simple software for recording and very basic voice recognition.

Because Apple has remained from trying to provide much in the way of user software tools for audio, anybody interested in exploring the full capabilities of a digitized Mac sound will have to buy an editing application, such as Paroll’s SoundEdit or Articulate Systems’ Voice Link software.

SoundEdit, which until now has shipped only with MacRecorder hardware, will soon be available separately. The stand-alone software, price was underestimated at press time. The price of Voice Link software without the digitizing hardware was also underestimated, but it will be less than $100. For those who are looking for more power, Passport’s Sound Apprentice ($295) is a full-featured MIDI-capable editing environment that also supports input from music synthesizers.

Although powerful sound-editing software such as SoundEdit and Sound Apprentice is fun (we haven’t yet seen the Voice Link software), these applications probably do more than most business users will need.

A new software package from Paroll with broader application is DiskPaper, which lets you print pages from any application to disk for distribution to other users. These users can then view or print the image without needing the original application. If you’ve got a sound-capable Mac — that is, an LC or Ilsi or any Mac equipped with Paroll’s MacRecorder or Articulate Systems’ Voice Link — DiskPaper also lets you add voice annotation to the document. Any Mac user can play back the annotation.

Both CE Software and Microsoft have already added annotation capability to their E-mail programs. Adding sound to E-mail messages greatly increases their file size; so adding three-minute symphonic overtures to memos should not be encouraged. QuickMail is more problematic than Microsoft Mail in this respect, because it sends a separate copy of your message to every single address on your network — a good way to bring your server to a standstill if each of those messages occupies several hundred kilobytes. CE Software says it’s studying this problem. In addition, WordPerfect is planning to include voice-annotation capability in the E-mail module of its WordPerfect Office collection of utilities.

Several major software developers have already started taking steps to add voice annotation to new versions of popular business applications. Ashton-Tate has announced that voice annotation will be included with upcoming versions of its FullWrite word processor and Full Impact spreadsheet program. Claris is showing a prototype for a similar feature in MacWrite II. Others are sure to follow.

Voice recognition, which until now was an exotic technology for most Mac users, will be available to any LC or Ilsi owner who gets Voice Navigator/SW — a new, software-only version of Articulate Systems’ Voice Navigator II system. Voice Navigator won the MacUser 1989 Eddy award for Most Significant Hardware Product. With this new version, the hardware becomes transparent, although you might want to invest in an Articulate Systems’ unidirectional Desktop Mike (95), which not only looks smarter than Apple’s omnidirectional microphone but is also better suited to voice-recognition applications, especially in noisy offices.

Once you’ve seen how long it takes to move big sound files around on your network, you’ll be interested to hear that Asanta has redesigned its SE/30 Ethernet card so it will fit vertically in the box. Buying the new card will save you the $100 that you would otherwise spend for an adapter card, although you’ll have to live without an FPU math coprocessor.

— Jim Bradbury

The $1,000,000 Name

While becoming a $5-billion corporation, Apple earned the right to pat itself on the back. No matter the cost. The new econo-Mac is a case in point — Apple bought the name Classic from Florida-based Modular Computer Systems for a cool million dollars.

The name Classic is also associated with Coca-Cola — the irony being that John Sculley, Apple’s president, is the former president of Pepsi-Cola, Coke’s archrival in the cola wars. We can only assume that Sculley hopes his new Mac Classic will become the choice of a new generation.

Pop culture aside, the term classic has for years been used to describe the Mac Plus and the earlier, 128K, 512K ("Fat Mac"), and 512Kc. A real fanatic, however, considers only the original beige Mac 128K to be the true classic.

— Bruce Newkirk
Three New Macs

by the Mac's current operating system. System 7.0 and A/UX, however, can address up to 4 gigabytes (billions of bytes). While you wait for System 7.0, you can use the leftover megabyte as a RAM disk.

Apple has also announced 512K and 2-megabyte SIMMs that it will sell in kits of four SIMMs each. These kits will upgrade the II to 3 megabytes or 9 megabytes, respectively (the II can also use these new SIMMs). You can use any of your old SIMMs in the II as long as they are rated at 100 nanoseconds or faster.

The II's motherboard is extremely compact, because of a low chip count and the addition of a few new custom chips. A 20-megahertz 68882 FPU is available on either of two optional adapter cards — one that adds an SE/30-style PDS and one that adds a standard NuBus slot. We expect the PDS card to cost about $100 and the NuBus version about $200. The slot on the II's motherboard matches the SE/30 PDS pin for pin and has a generous 15-watt power allocation — more than enough to power the greatest 24-bit-video card. Without the adapter card, however, add-on cards must be very small in order to fit vertically in the chassis. Asante, one of many developers that were expected to announce products on October 15, has redesigned its Ethernet card to fit vertically in this slot. This $495 card will give you Ethernet and save you the cost of the adapter card — but you'll have to live without an FPU. When either the PDS or the NuBus adapter card is used, add-in cards are held above and parallel to the motherboard, with cable access through a punch-out port at the rear of the II.

The II supports the same three Apple monitors the LC does, plus the crystal-clear 15" Macintosh Portrait Display. All three Apple 12-inch monitors and the 13-inch monitor can display up to 256 colors or gray levels (an 8-bit pixel depth). The II can drive the Apple Portrait Display.

### Apple-IIe-in-a-Mac

With the October product announcements, Apple is ready to add two more operating systems to the Mac's repertoire. With various software or hardware add-ons, the Mac can run IBM's PC-DOS, the UNIX and X Window systems found on workstations, and even Microsoft Windows 3.0 for PCs. A new emulation board to be released by Apple in March will allow a Mac to run DOS 3.3 and ProDOS 8, respectively the earlier and current Apple II operating systems. This is especially important for the school market (kindergarten through 12th grade), where Macs have been too expensive until now and where a large investment has already been made in Apple II software.

There's only one catch: The board works only in the Mac LC, not in the low-end Classic.

The entire emulation board contains only eight integrated-circuit chips, including the 6502 CPU, the same processor that powers the Apple IIe. The board can run at two clock speeds (1 megahertz or 2 megahertz), which are switchable in software.

The card has one input with a Y connector that allows the simultaneous hookup of a joystick and a 5.25-inch floppy-disk drive. Accompanying software will allow an Apple II disk to mount on the Mac desktop, so you won't need Apple File Exchange to copy Apple II files to your hard disk. Other software will let you create a ProDOS partition on your Mac hard disk that will mount as a separate volume.

To launch ProDOS, you double-click on an application icon on your Mac desktop. The IIe board takes over your entire screen rather than running in a separate window as do other foreign operating systems. This approach is intentional, so as not to confuse school children with issues of multiple operating systems and interfaces. A click lets you move between the Mac and Apple II environments, and you can quit to the Finder from an Apple II application.

This emulation board will not doubt be compared to IBM's Apple II emulator board, which runs in the IBM PS/2 line of PCs. Not surprisingly, users should find Apple's board easier to use. In order to run Apple II files with IBM's board, users must first launch a utility that converts ProDOS files to PC-DOS files that look like ProDOS to the board. Apple's IIe board for the Mac can run real ProDOS files.

Although we haven't tested the new board, we did watch it run the old Apple II game Raster Blaster — a good sign, because games are tough tests of compatibility.

A future release of Apple's board will also handle existing AppleTalk networks with AppleShare file serving, which is used in many schools. Pricing was not available at press time, but Apple indicated that the IIe-emulation board's retail cost would be in line with the LC's low price tag.

— John Rizzo
Although the Mac Classic is positioned as the replacement for both the Mac Plus and the SE, its sole direct ancestor is the SE. The inside of the Classic is not radically different from that of the SE, except that the Classic has no PDS and no RAM SIMM slots on its logic board. Instead, RAM upgrades involve adding a RAM-upgrade card that contains 1 megabyte of RAM and two SIMM slots. The Classic's logic board is half the size of the SE's — even though they both contain essentially the same parts — because the Classic's parts are smaller and are mounted on both sides of the logic board. The smaller board allows for a bottom-mounted fan, a screen, and an air scoop.
Three New Macs

at up to 16 levels of gray (4 bits). Unlike the LC, the Illsi has no optional VRAM SIMM that allows it to display 32,768 colors (16 bits) on the new 12" RGB Display — you'll have to use the PDS or NuBus option with a third-party video card to step up to 16- or 24-bit color. Because Apple provides only one slot for expansion, you're stuck with Apple displays if you want to add a nonvideo expansion card for Ethernet, SCSI acceleration, or other uses.

Cheap Chips

It's not just marketing savvy that makes Apple offer these three new machines at such reasonable prices. There's a lot of cost-cutting engineering know-how inside their sleek cases. In addition to the reduction in the number of expansion slots, less apparent changes have dramatically reduced production costs. For example, because no screws are used, the Mac LC and Illsi can be assembled from their snap-in subcomponents in less than 90 seconds. But the biggest part of the economy story is in the logic boards and the chips that they contain.

The Classic has no new chips (read our lips). Every part on the SE logic board is on the Classic board. The big difference is that parts on the SE board are traditional, through-hole parts — the little "feet" on each chip, called leads, must be inserted through holes drilled into each board. The new machines take a giant step beyond this slow, expensive process by using SMD (surface-mounted device) technology.

SMD parts (also used on the Illcx, Illci, and Illfx) don't have leads but are soldered onto the board's surface. Because you don't have to drill holes in the boards, SMD boards are cheaper to build. The absence of leads lets SMD chips (and other electronic parts) be very small, down to a tenth of an inch in size, and they can be used on both sides of a circuit board. All this results in smaller circuit boards. And smaller circuit boards mean cheaper circuit boards. SMD parts are also cheaper to put onto a board. You need people to insert the leads of a through-hole part into the little holes on the board, but SMD parts can be attached to a board by industrial robots.

Also, the LC and Illsi have fewer chips than do previous Macs. Apple achieved this by combining older custom chips into single new chips. For example, the LC and the Illsi have a new chip that combines the SCSI controller and the serial-port controller, which were previously on separate chips. There is also a chip that Apple refers to as the Egret, which combines the parameter RAM, the ADB circuitry, and the real-time clock, among other things. This combining of chips not only saves Apple money but also provides peace of mind for Mac users, because more integration — fewer chips — generally means better reliability.

The LC's logic board uses just 27 chips (not including resistors and capacitors). Compare this silicon frugality with IBM's use of almost 100 chips on its PS/2 55sx — and Big Blue's machine doesn't contain onboard video, networking, sound, or a SCSI interface! If you're still not impressed, remember: The Mac LC is $1,500 cheaper than the 55sx. Cuter too.

Systemic Changes

Hidden in all the excitement about new hardware is Apple's release of new System software, version 6.0.6. All System-software revisions since 6.0.2 have been billed as simple support releases for new Macs. System 6.0.6's purpose isn't all that different, but the number of changes required to support the three new Macs is extensive.

Minor changes in 6.0.6 include a revision of Font/DA Mover, version 3.9, which claims to fix several previously undiscovered bugs as well as incompatibilities with MultiFinder. The upgraded LaserWriter driver, 6.0.2, now accommodates printing envelopes on the Apple Personal LaserWriter (you feed them in on the left edge rather than in the center of the paper tray, as required by printers in the LaserWriter II series), and the old LaserWriter SC driver has been replaced by a new driver for the Personal LaserWriter SC.

The most significant change is the inclusion of a substantially upgraded version of the Sound Input Manager, which was redesigned for System 7.0. It is included in 6.0.6 to support the sound capabilities of the Macintosh LC and Illsi. The most obvious change for users is that the Sound

Apple Versus Apple

Why hasn't Apple provided CD-quality sound-recording capability in its new Macs? The NeXT machine supports full 16-bit, 44-kilohertz sound — high-quality audio matched by your CD player. Apple, however, limits its LC and Illsi to 8-bit sound and provides a cdeq that samples at a paltry 22 kilohertz. Why is the conservative approach? The answer might be found in the courtroom, not in the developer's lab.

Way back in 1981, up-and-coming Apple Computer signed an agreement with the famous Apple Corps, the Beatles' record company, promising not to market products "for the recording or reproduction of sound or video or a component part of such a system." Last year, after being tipped off by former Beatle George Harrison, Apple corps initiated legal action, charging that Apple Computer had violated this agreement when it introduced the Apple MIDI interface and other audio technologies.

Believing that the best defense is a good offense, Apple Computer sued to have Apple Corps' trademark revoked in West Germany, Japan, Sweden, and a few other countries. A British court ruled that Apple Corp was protected from such actions.

At press time, the dispute between the two Apples is still unsettled, with the trial scheduled to begin in late 1990. Regardless of how the lawsuit turns out, onlookers say that it has cast a pall over music and sound development at Apple — and may have kept CD-quality sound out of the new CPUs.

— Jim Bradbury
The color-capable Mac LC is the most innovative of the three new Macs. It uses only three new multifunction chips — the V8, Egret, and DFAC — to perform the functions of many older, less versatile chips. Like its distant cousin, the discontinued Mac II, the LC is powered by a 16-megahertz 68020 microprocessor. Unlike the Mac II, the LC includes neither an FPU math coprocessor nor a socket for the PMMU necessary for A/UX and the virtual-memory feature of System 7.0. The LC includes a new 68020 PDS that is not compatible with similar slots in other Macs (Apple and third-party vendors have already announced compatible add-in cards, though). An optional VRAM increases the number of colors the LC can display. A special education-market configuration of the LC will be available that replaces the hard-disk drive with a second floppy drive.
Three New Macs

cdev now lets them select a sound-input device (usually the LC’s or the IIsi’s microphone) as well as set any of the device’s options. Once you’ve selected an input device, clicking on the Add button lets you record a sound directly to disk, using familiar tape-recorder-style controls (see Figure 8). You can then name the sound and use it—as a system beep, for example.

The updated Sound Input Manager offers a broad range of new features, the most revolutionary being MACE: Macintosh Audio Compression and Expansion. MACE can compress sound data by a ratio of 3:1 (300K of sound data compresses into 100K) without loss of fidelity, or by a ratio of 6:1 by cutting the sampling frequency in half (more on this later). Compressed sound can be played back in real time on any Mac from the Plus to the IIfx — as long as the playback Mac is running System 6.0.6 or its System has been upgraded to include MACE.

Introducing Sound

The new sound-recording and sound-playback abilities of the LC and IIsi represent only one small step for technical innovation — but one giant leap for Mackind. Although the core technology has been available to Mac users since Farallon’s MacRecorder shipped in 1988, Apple’s inclusion of 8-bit sound-digitizing hardware and software with these two new Macs is potentially the most significant interface development since the introduction of the graphical interface on the original 128K Mac in January 1984.

If you’re familiar with Farallon’s MacRecorder or Articulate Systems’ Voice Link, then you already understand much of what Apple has done. An A/D (analog-to-digital) chip on the motherboard of the LC and IIsi digitizes sounds in available RAM and lets you store the sounds to disk for subsequent playback and modification (for a more detailed discussion, see “Sound Advice,” May ’90, page 284).

How does a sound get converted from an analog wave into a digital sequence of numbers? The LC or IIsi samples the wave — instantaneously records it — at regular intervals and then creates a digital map of the wave’s shape (see the “How Sound Works” sidebar). This map — which carries information that describes the sound that produced it — can later be used to reconstruct the original sound.

New Low-Cost Monitors

October 15 was not only a great day for CPUs — it also saw the introduction of a new color monitor and the revitalization of an old monochrome one. First, the Macintosh LC, Apple’s lowest-cost color unit, needed a companion low-cost color display. Although the LC supports the AppleColor High-Resolution Monitor, few of us on a tight budget want to pay $399 for Apple’s finest. The new $299 12” Macintosh RGB Display is a solid product that can outperform many similarly priced monitors. Most higher-end users will still opt for the AppleColor, with its cavalierlike price, but the rest of us no longer have to settle for cheap, low-performance third-party options.

Here are the facts: The 12” Macintosh RGB Display is not a Trinitron. It is, however, a monitor with a fine-pitch, .28mm shadow-mask tube that looks better than any other shadow-mask low-price monitors we’ve seen. And it lists for $400 less than the AppleColor does. As for screen resolution, it’s a 64-dpi display that shows 512 x 384 pixels; that’s 12 percent more than the Classic screen but 36 percent less than the AppleColor has. The display has a 60-hertz refresh rate, which may cause eyestrain for those who are sensitive to screen flicker.

The basic LC and the IIsi support this display at 8 bits (256 colors). When it contains the optional Macintosh LC 512K VRAM SIMM, the LC can show 16-bit true color (32,768 colors), with the 16th bit reserved.

Apple’s new Macintosh 12” Monochrome Display does not have an etched screen as did the Macintosh High-Resolution Monochrome Monitor it replaces, so it’s much sharper and has higher contrast. The previous model’s etched screen drastically impaired contrast and sharpness, although its antiglare properties were superior (see “A Study in Black and White,” April ’90, page 162, for a full discussion of monitor matters). The new display is priced the same at $399 and still shows 640 x 480 resolution with a flicker-free screen-refresh rate of 67 hertz. The pixel density has been upped to 76 dpi from 74 dpi, so things display a bit smaller than they did on the earlier unit. On the Macintosh IIsi and IICl, the display shows 8 bits (256 grays); on the LC, it shows 4 bits (16 grays), or 8 bits (256 grays) with the optional VRAM SIMM.

— Jeff Pittelkau

Despite their equal screen sizes, the new 64-dpi Macintosh 12” RGB Display (left) displays significantly less information than does the new 76-dpi Macintosh 12” Monochrome Display (right).
The Mac IIIi is a low-cost replacement for the just-discontinued IICx. Its electronics are similar to those of the SE/30 but cost significantly less. Like the LC, the IIIi can be disassembled and reassembled in minutes: No screws are used to hold together the major components, which all snap into place. Into the expansion slot, you can place one of two optional adapter cards, one with a NuBus slot or one with an SE/30 PDS — both cards include a 68882 FPU math coprocessor. One megabyte of RAM is soldered onto the motherboard, and four RAM SIMM slots permit expansion to 17 megabytes of RAM. A ROM-expansion slot is included for future ROM upgrades.
The more frequently you sample the wave, the more accurate that reconstruction will be — but the larger your sound file will be.

RAM-based recording limits the length of recordings to a few minutes, even if you have lots of RAM and record at low-quality settings. Hard-disk recording, which is not yet supported by software from Apple or Farallon, lets you record for longer and at higher resolutions. The best-known example of hard-disk recording is Digidesign’s Audiomedia board (see review, October '90, page 55), which lets you record CD-quality audio at a cost of 10 megabytes per minute. Articulate Systems’ Voice Link, a voice digitizer with built-in compression, includes a DA that also allows recording direct to disk.

In the audiophile world, the sampling rates that Apple offers in the new Sound eDev are far from the “CD quality” standard of 16 bits of information sampled at 44 kilohertz (44,000 times per second) (see the “Apple Versus Apple” sidebar). High-quality Macintosh audio options such as the Audiomedia board are significant for specific users, much as 16-million-color capabilities are significant for specific users. These high-end options aren’t really necessary for the applications, such as voice messaging and file annotation, that Apple is hoping to see take hold in the general Mac-using public. For example, even though the telephone is a low-quality sound device, you can still recognize voices and understand what they’re saying and how they feel about saying it. You don’t need to have the clarity of the latest Pavarotti CD to convey a message with a voice-mail system. Apple hasn’t shut the door on Pavarotti, though — it has provided System-level software tools that can record at a full 44 kilohertz (although only at 8-bit resolution). The new Sound Input Manager’s capabilities will give developers plenty of ways to exploit the new world of sound.

**Sound Software**

When the original Sound Input Manager debuted with the Mac II, the practical result for most people was the ability to change their beep sound to Monkey, Boing, or Clink-Klank. The new, improved Sound Input Manager bears about as much resemblance to that rudimentary beginning as a IIfx does to the original 128K Mac. With appropriate software, users can now record and play multichannel sampled sounds from memory or from disk — you can finally expect to hear some stereo output from Macs with stereo-output jacks (the IIsi, SE/30, IIfc, and IIfx).

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**How Sound Works**

1. When you speak into the microphone, your voice is transmitted through the air as a wave.

2. The microphone converts the sound wave into an analog audio signal.

3. The digital sound-recording hardware in the LC and IIsi converts the analog signal into a digital “picture” of the waveform — an audio version of the connect the dots.

4. The digital representation can be edited before it is stored or transferred to other users over a network. Editing may include a variety of sound-processing techniques, including cutting and pasting segments and adding reverberation effects. Files can be compressed before storage to reduce their size.

5. The sound file can be sent to one or many users on a network.
Although Apple includes sophisticated sound hardware with the new LC and llsi, the only user software it provides is the familiar Sound cdev — a System feature since the Mac II’s debut. The only difference is that you can now add your own beep sounds.

The closest that Apple comes to providing a real user sound tool is the Audio Palette, which comes with HyperCard 2.0. It lets you sample and edit sounds at different frequencies. You can also compress sound files when you’re saving them to disk.

The sound-reproduction hardware in all Macs converts the digital signal back into an analog signal, amplifies it, and plays it back through the Mac’s built-in speaker.

The higher the resolution, or quality, of the digitization, the more accurate is the representation of the original sound wave. The resolution of the sound is defined as a grid in which the vertical measurement is the bit depth of the sample and the horizontal measurement is its frequency. The LC and llsi can record at a depth of 8 bits (256 levels) and at a frequency as high as 44 kilohertz (44,000 times per second). However, software provided by Apple is limited to a frequency of 22 kilohertz; CD-quality audio is 16 bits deep at a frequency of 44 kilohertz.

Apple’s new MACE (Macintosh Audio Compression and Expansion) protocol lets developers build sound compression into their applications. MACE can save both disk space and network transmission time by compressing large sound files.
provided developers write the necessary applications.

While you wait for this new software to appear, check out HyperCard 2.0’s Audio Palette (see Figure 8). This free tool lets you digitize, play back, and do simple editing of sounds from within HyperCard. HyperCard users who remember the hassle of converting to and from HyperCard’s native sound format needn’t worry. All Mac sounds from now on will comply with AIFF (Audio Interchange File Format). Old HyperCard sounds can still play, but new sounds must be recorded in AIFF. If the Audio Palette doesn’t meet your needs and you can’t wait for the next generation of sound software, check out Farallon’s SoundEdit.

Whether users will attach more than novelty value to sound input is uncertain. Software publishers, on the other hand, have already shown interest in exploiting the new technology. After all, now that Microsoft Windows claims to have brought a true graphical user interface to the IBM PC, sound could become a key distinguishing feature of the Mac. Here are some of the initial uses you can expect to see for digitized sound on the Mac:

**Electronic mail.** Both CE Software and Microsoft have licensed technology from Farallon that adds a voice option to their mail packages. Recording your mail messages is faster than typing — especially if you don’t touch-type. A less obvious advantage is the emotional shading that speaking a message provides — for most people it’s far easier to sound sarcastic, wry, or humorous than it is to write it. Think how many ways you can say “Way to go” and how many more words would be required to make the same statement unambiguous in writing.

Sending and storing messages as voice mail is less efficient, however. Sound files get big in a hurry, and the better the sound quality or the longer the message, the faster they grow and the slower your mail system will run. Still, it would be a mistake to underestimate the appeal of voice mail.

**Annotation.** Expect to see voice annotation as a common feature of such bread-and-butter applications as word processors and spreadsheet programs (it’s already a standard feature of NeXT software). In the meantime, products such as Farallon’s forthcoming DiskPaper will make it possible for people to annotate documents from applications that don’t have a built-in provision for sound annotations.

**Voice recognition.** Apple isn’t introducing voice recognition just yet, but it’s a logical next step. It’s already happening with third-party products such as Articulate Systems’ Voice Navigator and MacSema’s new Voice Express. Once you’ve added software that can interpret digitized sounds — especially the human voice — the Mac interface gains an entirely new dimension. Speaking commands is more natural, more intuitive, and faster than typing or clicking with a mouse.

**A New World You Can Afford**

For years users have been begging Apple to release a low-priced Mac. Now there are three — and they’ve been worth waiting for. All three Macs are great values and should strike fear into the hearts of the IBM PC-clone makers whose only selling point is price. No longer can a corporation justify saddling its staff with antiquated DOS machines — Windows 3.0 notwithstanding — when a few dollars more can provide color, sound, SCSI, plug-and-play simplicity, crisp displays, cross-application interface consistency, and the interapplication-communication promise of the upcoming System 7.0. And no longer will home-computer users be forced to cross the Big Blue line, when a Mac Classic is available at street prices well under $1,000. Small — as in price — is indeed beautiful.

Rik Myslewski, senior editor who couldn’t have written this report without Tony Bojorgo, Henry Bortman, Jim Bradbury, Andrew Eisner, Paul A. Freedman, Russ Ito, Steve Lipson, Bruce Newlinney, Jeff Pittelko, John Rizza, Stephen Somogyi, a Mac Portable, and his father-in-law’s boat.

For years we hoped for a low-cost Mac, and now Apple delivers three. Not only that, but it throws in a whole new technology — built-in digital sound recording — two new monitors, and a cluster of new add-in option cards. In our opinion, the wait was worth it — each new Mac is a great value.

The **Macintosh Classic** ($999 with 1 megabyte of RAM and a 1.4-megabyte SuperDrive, $1,499 with 2 megabytes of RAM and a 40-megabyte hard-disk drive) is a repackaged SE at a significant savings. In fact, you could buy two Mac Classics, each with 2 megabytes of RAM and a 40-megabyte hard drive, for the price of one similarly configured SE. That is, if Apple would sell you an SE — it, along with the venerable Plus and popular IIE, has been retired. The Classic is perfect for first-time buyers or anyone who has a Mac at the office and hates to stay late to finish that never-ending report. IBM PC-clone makers should start looking for another line of work.

The **Macintosh LC** ($2,499) is the most interesting of the new Macs. In its low-profile case are 2 megabytes of RAM, a 68020 microprocessor (as in the Mac II), and a 1-inch-high 40-megabyte hard disk drive. Apple offers a new 12-inch 64-dpi color monitor for the LC, along with an add-in card that emulates the Apple IIE (complete with joystick and 5.25-inch floppy-disk drive ports) and a soon-to-be-released Ethernet card. Put it all together, and you get a fully equipped color Mac in the low $3,000 range. Both business and education users will love this one.

The final new kid on the block is the **Macintosh IIfx** ($3,769 with 2 megabytes of RAM and a 40-megabyte hard-disk drive, $4,569 for 5 megabytes of RAM and an 80-megabyte hard-disk drive). This successor to the IIE outperforms its ancestor and costs $1,000 less. Considering that the IIE was the most popular Mac model, corporate buyers will be lining up to buy IIfx’s by the boatload.

**The Bottom Line**

For years we hoped for a low-cost Mac, and now Apple delivers three. Not only that, but it throws in a whole new technology — built-in digital sound recording — two new monitors, and a cluster of new add-in option cards. In our opinion, the wait was worth it — each new Mac is a great value.

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## Table 1: The New Mac Family

<table>
<thead>
<tr>
<th>Classic</th>
<th>Pros</th>
<th>Cons</th>
<th>Ideal Users</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Least expensive.</td>
<td>• No FPU or memory-management chip.</td>
<td>• This new no-frills Mac is perfect for first-time buyers or home-computer users who don't need color or speedy performance.</td>
</tr>
<tr>
<td></td>
<td>• Built-in monitor.</td>
<td>• Small monochrome display.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Compact package.</td>
<td>• No built-in sound input.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• New power supply.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portable</td>
<td>• Long battery life.</td>
<td>• Expensive.</td>
<td>• Consultants or business travelers will appreciate the battery operation and full Mac functionality of this surprisingly speedy machine.</td>
</tr>
<tr>
<td></td>
<td>• Good display contrast.</td>
<td>• Screen is not backlit.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sturdy carrying case.</td>
<td>• Heavy.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Fast 68000 microprocessor.</td>
<td>• No FPU or memory-management chip.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• No built-in sound input.</td>
<td></td>
</tr>
<tr>
<td>LC</td>
<td>• Low-cost color.</td>
<td>• No 24-bit color.</td>
<td>• This versatile low-cost color Mac should be on the desk of every office worker, student, or educator who doesn't require top-speed performance.</td>
</tr>
<tr>
<td></td>
<td>• Lightweight and compact.</td>
<td>• Limited expansion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• IEEE-emulation-card option.</td>
<td>• No FPU or memory-management chip.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sound Input.</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• On-board video.</td>
<td></td>
<td></td>
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<tr>
<td>Llsi</td>
<td>• Good price/performance ratio.</td>
<td>• FPU is an option.</td>
<td>• The LlSI should take the corporate world by storm — it's the ideal multipurpose business Mac.</td>
</tr>
<tr>
<td></td>
<td>• SE/30 or NuBus expansion.</td>
<td>• Limited expansion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On-board video.</td>
<td>• No separate video RAM.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Sound Input.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SE/30</td>
<td>• Built-in monitor.</td>
<td>• Small monochrome display.</td>
<td>• This powerful compact Mac is ideal for number-crunching accountants or others who need power but not color. It's also the perfect network server.</td>
</tr>
<tr>
<td></td>
<td>• Color ROMs.</td>
<td>• Limited expansion.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Compact and transportable.</td>
<td>• No built-in sound input.</td>
<td></td>
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<tr>
<td></td>
<td>• Includes FPU.</td>
<td></td>
<td></td>
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<tr>
<td>Llci</td>
<td>• Three NuBus slots.</td>
<td>• Expensive.</td>
<td>• For corporate power users, database developers, or the average DTP shop, the Llci is all the Mac they'll ever need.</td>
</tr>
<tr>
<td></td>
<td>• On-board video.</td>
<td>• No built-in sound input.</td>
<td></td>
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<tr>
<td></td>
<td>• Cache-card slot.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• Includes FPU.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Llfx</td>
<td>• Fastest Mac.</td>
<td>• Very expensive.</td>
<td>• The blazing performance of the Llfx is best appreciated by graphic artists, high-end DTP shops, and engineers.</td>
</tr>
<tr>
<td></td>
<td>• Six NuBus slots.</td>
<td>• Large footprint.</td>
<td></td>
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<tr>
<td></td>
<td>• SCSI DMA capability.</td>
<td>• SCSI DMA not supported by System software.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Built-in cache.</td>
<td>• No built-in sound input.</td>
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<tr>
<td></td>
<td>• Includes FPU.</td>
<td>• No on-board video.</td>
<td></td>
</tr>
</tbody>
</table>
## Three New Macs

### Table 2: Features of the New Mac Family

<table>
<thead>
<tr>
<th>Feature</th>
<th>Mac Classic</th>
<th>Mac Portable</th>
<th>Mac LC</th>
</tr>
</thead>
<tbody>
<tr>
<td>List price: RAM, disk drive (megabytes)</td>
<td>$999: 1 MB, SuperDrive</td>
<td>$4,799: 1 MB, SuperDrive</td>
<td>$2,499: 2 MB, 40 MB</td>
</tr>
<tr>
<td>RAM on motherboard (megabytes)</td>
<td>1 MB, SuperDrive</td>
<td>1 MB, 40 MB</td>
<td></td>
</tr>
<tr>
<td>Maximum RAM with 256K SIMMs</td>
<td>2.5 MB</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Maximum RAM with 512K SIMMs</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Maximum RAM with 1-megabyte SIMMs</td>
<td>4 MB</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Maximum RAM with 2-megabyte SIMMs</td>
<td>NA</td>
<td>NA</td>
<td>10 MB</td>
</tr>
<tr>
<td>Maximum RAM with 4-megabyte SIMMs</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Memory-management unit (MMU)</td>
<td>soldered</td>
<td>soldered</td>
<td>socketed</td>
</tr>
<tr>
<td>Internal video support (bits per pixel)</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>9-inch internal CRT (512 x 342 pixels)</td>
<td>1</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>9.8-inch internal flat-panel (640 x 480 pixels)</td>
<td>NA</td>
<td>1</td>
<td>NA</td>
</tr>
<tr>
<td>12-inch monochrome (640 x 480 pixels)</td>
<td>NA</td>
<td>NA</td>
<td>1,2,4,8 FF</td>
</tr>
<tr>
<td>12-inch RGB (512 x 384 pixels)</td>
<td>NA</td>
<td>NA</td>
<td>1,2,4,8,16 FF</td>
</tr>
<tr>
<td>13-inch RGB (640 x 480 pixels)</td>
<td>NA</td>
<td>NA</td>
<td>1,2,4,8 FF</td>
</tr>
<tr>
<td>15-inch portrait (640 x 870 pixels)</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Audio out</td>
<td>mono</td>
<td>mono</td>
<td>mono</td>
</tr>
<tr>
<td>Audio in (mono)§§</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Modem</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Video</td>
<td>○</td>
<td>00</td>
<td>●</td>
</tr>
<tr>
<td>SCSI</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Printer</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>External floppy drive</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Slots</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Cable card</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>NuBus</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Other</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Processor included</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>A/DX-capable</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Supports virtual memory</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Size (H x W x D, in.)</td>
<td>13.2 x 9.7 x 11.2</td>
<td>2 to 4 x 15.2 x 13.8</td>
<td>3 x 12.2 x15</td>
</tr>
<tr>
<td>Weight</td>
<td>16 to 17.1 lb</td>
<td>14 to 17 lb</td>
<td>8.8 lb</td>
</tr>
</tbody>
</table>

*The optional 16-bit NuBus and O30 Adapter Cards include an MC68882 floating-point unit.

Two SIMM sockets and an additional 1 megabyte of RAM are included in the 2-megabyte Mac Classic configuration.

The Portable uses static-RAM cards instead of SIMMs.
<table>
<thead>
<tr>
<th>Model</th>
<th>RAM Options</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac SE/30</td>
<td>1 MB, SuperDrive</td>
<td>$3,669</td>
</tr>
<tr>
<td></td>
<td>4 MB, 80 MB</td>
<td>$5,569</td>
</tr>
<tr>
<td></td>
<td>16 MB</td>
<td>$7,369</td>
</tr>
<tr>
<td></td>
<td>32 MB**</td>
<td>$9,369</td>
</tr>
<tr>
<td></td>
<td>SIMM in MC68030</td>
<td>$10,569</td>
</tr>
</tbody>
</table>

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</tr>
<tr>
<td></td>
<td>32 MB**</td>
<td>$9,369</td>
</tr>
<tr>
<td></td>
<td>SIMM in MC68030</td>
<td>$10,569</td>
</tr>
</tbody>
</table>

** More than 16 megabytes of RAM can be accessed only by A/UX and System 7.0.
†† The optional LC 512K VRAM SIMM (video RAM) is needed.

§§ Third-party products are available for audio input through any Mac's serial or SCSI port.
©© A third-party adapter is required to drive a video display.
ROSES ARE X=0.7344, Y=0.2656;
VIOLETS ARE X=0.1566, Y=0.0177.

Owing to variations in human perception, color, like beauty, is very much in the eye of the beholder. This being true, if we want to communicate accurately about color, we need to convert the language of art into something considerably more objective and exact: the language of science.

Some time ago, an international scientific team developed a mathematically reliable color system, known as CIE. This model is the basis for the new RasterOps® True Color Calibrator Display System™.

Due to temperature, humidity, and as yet-imperfect CRT technology, even the best and brightest display colors...
can drift and fade over time. To compensate, the True Color Calibrator display has a built-in microprocessor which monitors performance on a continual basis and corrects instabilities with its own internal calibration routines.

This self-calibration is performed automatically, 75 times a second—well before the sharpest eyes would detect any variation in color. The net result is that roses and violets on a True Color Calibrator display will always remain true to their mathematically-defined color values. Whether three minutes, three days, or three months from now. And the system has a communication port which can send these scientifically precise formulas to other monitors and printers.

Unlike other optical sensors, RasterOps’ Optisense is thermally stabilized to insure consistently accurate measurements.

The makers of other calibration systems may make a big to-do about the optical sensor they provide. This is understandable, since that’s all they provide. With no microprocessor in their display, they cannot offer automatic, continual calibration. The moment you remove the sensor, colors begin to drift and fade all over again. Which means their system is only as accurate as the number of times per day you stop and use the sensor. What’s more, they recommend that calibration be performed only while in the more limited 8-bit mode.

In deciding which calibration solution is in fact the most effective, it might be helpful to know that the world’s most sophisticated electronic pre-press systems use the same microprocessor-controlled calibration we do. And further, that MacUser has hailed the RasterOps True Color Calibrator as “the most sophisticated monitor ever built”.

If your application calls for a truly stable and precise color environment, your best call would be to a RasterOps dealer. Or you can phone 800.468.7600 to find out more about the True Color Calibrator from RasterOps. The people who’ve got the art of color down to a science.

The True Color Calibrator is based upon the CIE model which mathematically defines all available natural colors.

The True Color Calibrator is an electronic microprocessor which continually recalibrates the display—75 times per second.

The True Color Calibrator has a built-in microprocessor which continually recalibrates the display—75 times per second.

Only the True Color Calibrator has a built-in microprocessor which continually recalibrates the display—75 times per second.

Now you can upgrade anytime. Or extend your warranty with RasterCare™.

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You can never be too rich or too thin, but can you have a hard-disk drive that’s too big or too fast?

By Owen W. Linzmayer and the MacUser Labs Staff

What do big, fast hard-disk drives and good Thai food have in common? A little taste of either, and you’re hooked forever — although an appetite for megabytes is harder to satisfy. Just install a network server for file sharing or a large multiuser database — or store dozens of 24-bit graphics, audio, and animation files on your stand-alone Mac — and you’ll soon hunger for a bigger, faster hard-disk drive.

But there are special factors to consider when you buy a drive ten times the size of anything you’ve bought before. And with so many drives to choose from, deciding what to purchase can be a bit intimidating. Is it wiser to get just the storage space you need or to overbuy so you’ll have room in the future? What’s most important: price, performance, or reliability? And should you trust the tweaks that some manufacturers have made to their big-drive mechanisms to increase speed in high-use settings (see the
**How It Works Faster** sidebar

MacUser Labs gathered 22 external hard-disk drives in the 300-megabyte range and subjected them to performance tests for speed and data throughput. We also surveyed dealers across the country to compile a unique street-price index to help strengthen your bargaining position. In addition, we investigated the service options offered by each vendor Finally, we added it all up to pinpoint the best deals.

### Learning the Mechanics

Although we found 22 vendors that offer drives in the 300-megabyte range, all their drive mechanisms come from only seven OEMs. The high-capacity-drive market is dominated by Seagate Technology, whose various mechanisms are used in 13 of the drives we reviewed. The next-most-ubiquitous OEM is Micropolis, which makes the mechanism used in 4 drives. Five other manufacturers were represented, each with a single entrant. Be aware that some vendors vary the OEM mechanisms based on customer request, market price, or availability. If you’re interested in a drive because it contains a particular mechanism, be sure to specify the one you want. If a vendor isn’t willing to commit to providing it, look elsewhere.

Although this report focuses on drives of about 300 megabytes, the actual capacities of the 22 drives range from 291 to 420 megabytes. (To see how this year’s crop of drives compares to the past, see “Big Hard Disks,” June ’88, page 122.) As always, whenever you shop for drives, compare formatted capacities only. For the most part, advertised drive capacities closely approximate formatted capacities. Some of the drive names can be misleading, however — for example, the MacProducts Magic 380 actually yields only 325 megabytes when formatted.

Conventional wisdom holds that you can never have too much disk storage capacity, but you may regret buying too much too soon. The hard-drive market is extremely competitive, and storage technology continues to advance at a dizzying rate. As a result, each year sees the introduction of higher-capacity disk drives at greatly reduced prices (see Figure 1). So when you buy a large drive, estimate how much storage capacity you are likely to need in the next year or two and try to pick a drive that fills only these short-range needs. By the time you outgrow this purchase, hard-drive prices will most likely have dropped because of advances in technology and the increasing number of large drives available. You can then expect to buy much more for less.

### Cost Consciousness

Just because big hard drives have become more affordable doesn’t mean that you can afford to take this...
Disk-duplexing systems use an extra SCSI controller card to write data to two hard-disk drives at the same time.

Disk-mirroring is a software approach that first writes data to one hard-disk drive and then to another—taking twice the time of a duplexing system.

Example, bundles a very versatile software package with several Seagate-based drives in the 300-megabyte range. You can get a 330-megabyte Wren Runner mechanism (more prosaically known as the Seagate ST4385NM) with backup, encryption, disk-mirroring software, and software that supports A/UX and ProDOS, all for $1,999. But remember: Mail-order houses usually can’t give you the same level of after-sale service that a dealer can.

To see which drives provide the most bytes for the buck, divide formatted capacity by street price (see Figure 2). High-capacity hard drives tend to be more cost-effective than smaller models, with the best bargains (the MacProducts Magic 380, HDI POWERDrive 320, and La Cie ZFP 400) at slightly more than $4 per megabyte. In contrast, premium-priced drives (the PLI PL 320F Turbo, Procom MD 320, and Optima MiniPak 310) cost more than $10 per megabyte.

SCSI Standards

All the external hard-disk drives reviewed this month are SCSI devices that attach to the DB-25 connector on the back of all Macs since the Plus. The SCSI standard lets you connect up to seven devices—hard drives, scanners, printers—in a daisy chain, with each device plugged into the back of the next. Theoretically, all you need to do is make sure that you assign each device a unique SCSI ID number and that the devices on both ends of the chain are terminated. It sounds easy, but it’s not (see “A Beginner’s Guide to Daisy Chains,” August ’90, page 243).

Drives usually arrive on your desk with a SCSI ID number already assigned, but sometimes that number is already taken by some other SCSI device attached to your Mac. Don’t worry. Resolving SCSI ID conflicts is simple—usually. Vendors provide several ways to set SCSI ID numbers. The choices include mechanical settings such as DIP or rotary switches, push buttons, and thumb wheels or special software “switches” that alter nonvolatile memory in the drive’s controlling electronics.

DIP switches (used only on the Mirror MP290 among the drives we tested) are a nuisance, because you must interpret their binary settings; the manufacturer usually provides a DIP-switch map, though. The software-based solutions offered by Crane!, MacProducts, and SuperMac are a little better, but be careful not to lose the utility disk. In general, external ID switches—push buttons, thumb wheels, and rotary switches—are best, because you can see the current ID setting at a glance.

More problematic and potentially more damaging to your data is the part of the SCSI standard that requires that devices at either end of the daisy chain be terminated. This requirement ensures that all signal voltages fall reliably within the right range and prevents signal reflections from appearing on the SCSI lines. It

purchasing decision lightly. The list prices of these drives run from a low of $1,395 for the 325-megabyte MacProducts Magic 380 to $4,395 for the 306-megabyte Optima MiniPak 310 and the 320-megabyte PLI PL 320F Turbo.

Because list prices don’t tell the whole story (drives sold through dealers are often discounted far below their suggested retail price), MacUser contacted a representative sampling of dealers throughout the United States to determine the average—not necessarily the lowest—street prices of the drives we reviewed. We found that manufacturers that sell directly to customers usually have the best prices, but even street prices for drives sold through dealers average 25 percent below the manufacturer’s suggested retail price.

Additionally, mail-order houses often offer bundling schemes that can save you money on the drive as well as on the software that comes with it. Mac-Tel in Austin, Texas, for example, bundles a very versatile software package with several Seagate-based drives in the 300-megabyte range. You can get a 330-megabyte Wren Runner mechanism (more prosaically known as the Seagate ST4385NM) with backup, encryption, disk-mirroring software, and software that supports A/UX and ProDOS, all for $1,999. But remember: Mail-order houses usually can’t give you the same level of after-sale service that a dealer can.

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Hard Drives

How It Works Faster

The prices of hard-disk drives are constantly declining while their capacity and speed continue to increase. Here are some of the ingenious tricks OEMs are using to eke greater performance out of their drives.

**Read-Ahead Caches**

Instead of reading a single sector at a time (as requested by the computer), drives with read-ahead caches—most OEMs are using these now—read an entire track or more and store the data in RAM on the drive's SCSI controller card. When data that resides in the cache is needed, it can be accessed much more quickly than from the hard drive, because the delay inherent in reading from a rotating drive (rotational latency) is eliminated and the transfer rate from cache RAM is faster than from disk.

**Zone-Bit Recording**

ZBR (zone-bit recording) drives squeeze more data sectors onto a disk's outer tracks than onto inner tracks. (Standard drives have equal numbers of sectors on inner and outer tracks—much like spokes in a wheel). By dividing the drive into inner-track and outer-track partitions and by writing equal-length segments as you move toward the outer edge of the drive, you can achieve the speed advantages of short stroking on the outside partition without sacrificing precious storage space. Not only does ZBR allow for higher capacities but the throughput rate also increases as the read/write heads access the denser outer tracks. ZBR is exclusive to Seagate Technology—one reason for the company's dominance in the high-performance market.
Higher Rotational Speeds
Even when the read/write head finds the correct track, it must wait for the desired sector to arrive. Because hard-disk drives typically rotate at 3,600 rpm, the average rotational latency (waiting time) is 8.33 milliseconds. Some OEMs, however, increase the rotational speeds of their drives to speeds in excess of 4,000 rpm. The faster the rotational speed, the shorter the latency and the greater the throughput.

Short Stroking
Because the circumference of a disk is greater than that of the hub and their angular velocity is the same, the outer edge of a disk covers more distance than does the inner edge in the same amount of time. Some OEMs exploit this physical fact by short stroking — restricting a drive's read/write heads to the outer tracks, which can hold more sectors, thus increasing throughput. And because the heads are closer to any particular track, seek time is reduced.
Hard Drives

Figure 1: Declining Cost per Megabyte

Figure 2: Cost per Megabyte

Figure 1: In five years, 5.25-inch hard-disk drives have drastically dropped in price. One megabyte now costs just one-fifth of its 1985 price. This trend toward cheaper drives will continue, with 5.25-inch drives gradually being replaced by smaller, faster, and less expensive 3.5-inch drives. Projected prices for 1994 are less than $4 per megabyte for 3.5- and 5.25-inch disk drives—some drives, such as the MacProducts Magic 380, approach $4 per megabyte now. (Data and estimates courtesy of Dataquest, a computer-industry research group.)

Figure 2: When you buy a hard-disk drive, you’re paying for storage space—the more megabytes per dollar, the more cost-effective your purchase. We divided the August 1990 street price by the formatted capacity of each drive to come up with these figures. Because street prices fluctuate, the quote you get from your dealer may not match ours.

sounds very precise, but in practice SCSI termination is often a black art about which even the experts strongly disagree on the best approach. Apple itself doesn’t terminate its computers (as called for in the SCSI specifications), and the Mac IIx differs from previous Macs in that it requires so-called black terminators with built-in filter capacitors that “absorb” short pulses that the SCSI controller chip might otherwise interpret as control signals.

Most drive mechanisms come from the OEM with removable terminating resistors already installed in the drive. In 12 of the drives we evaluated, these internal terminators were left in place, forcing you to open the case to get at them (if required by your hardware configuration).

A better approach is for the vendor to remove the drive’s resistors and provide an external terminator plug instead. If you need termination, you slide the supplied plug into the last connection in the SCSI chain. Even
Figure 3: We used the popular utility SCSI Evaluator to determine how quickly each drive could find data — its seek time. SCSI Evaluator sends a series of seek commands as fast as the drive and the Mac can handle them and reports an average of the seek times. Although most drives are optimized for repeated last seeks, the drives — speed up throughput for reads and writes of the variable-sized files simulated by SCSI Evaluator.

<table>
<thead>
<tr>
<th>Better</th>
<th>Worse</th>
</tr>
</thead>
<tbody>
<tr>
<td>RACET SA350</td>
<td>PLI PL 320F Turbo</td>
</tr>
<tr>
<td>Deltaic Server 300Q</td>
<td>Storage Dimensions 325-S1</td>
</tr>
<tr>
<td>Procom MD 320</td>
<td>FWB Hammer 300</td>
</tr>
<tr>
<td>MicroNet MS-404</td>
<td>La Cie ZFP 400</td>
</tr>
<tr>
<td>GCC UltraDrive 430S</td>
<td>Microtech N320</td>
</tr>
<tr>
<td>MicroEnhancements</td>
<td>IDS VPS340</td>
</tr>
<tr>
<td>HDI POWERDrive 320</td>
<td>Data Enhancements</td>
</tr>
<tr>
<td>Cranel 330MB</td>
<td>ProSystem PS 1350</td>
</tr>
<tr>
<td>Optima MiniPak 310</td>
<td>Relax Hard 300 Plus</td>
</tr>
<tr>
<td>MacProducts Magic 380</td>
<td>SuperMac DataFrame XP330</td>
</tr>
<tr>
<td>SuperMac DataFrame XP330</td>
<td>Redtime Systems Cobra 330e</td>
</tr>
<tr>
<td>Mirror MP290</td>
<td>Mirror MP290</td>
</tr>
<tr>
<td>CMS Platinum Series PC 300</td>
<td>CMS Platinum Series PC 300</td>
</tr>
<tr>
<td>Bay 300</td>
<td>Optima MiniPak 310</td>
</tr>
</tbody>
</table>

Time in milliseconds

Figure 4: Again using SCSI Evaluator, we tested how much data each drive could read or write per second — its throughput. Read-ahead caches — such as those in the Seagate mechanisms of the Storage Dimensions, MicroNet, FWB, La Cie, and GCC drives — speed up throughput for reads and writes of the variable-sized files simulated by SCSI Evaluator.

<table>
<thead>
<tr>
<th>Slower</th>
<th>Faster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Dimensions 325-S1</td>
<td>MicroNet MS-404</td>
</tr>
<tr>
<td>FWB Hammer 300</td>
<td>La Cie ZFP 400</td>
</tr>
<tr>
<td>GCC UltraDrive 430S</td>
<td>Procom MD 320</td>
</tr>
<tr>
<td>RACET SA350</td>
<td>Optima MiniPak 310</td>
</tr>
<tr>
<td>Deltaic Server 300Q</td>
<td>Redtime Systems Cobra 330e</td>
</tr>
<tr>
<td>PlI PL 320F Turbo</td>
<td>Cranel 330MB</td>
</tr>
<tr>
<td>HDI POWERDrive 320</td>
<td>IDS VPS340</td>
</tr>
<tr>
<td>SuperMac DataFrame XP330</td>
<td>MicroEnhancements</td>
</tr>
<tr>
<td>Mirror MP290</td>
<td>Data Enhancements</td>
</tr>
<tr>
<td>CMS Platinum Series PC 300</td>
<td>ProSystem PS 1350</td>
</tr>
<tr>
<td>Bay 300</td>
<td>Mirror MP290</td>
</tr>
<tr>
<td>Optima MiniPak 310</td>
<td>CMS Platinum Series PC 300</td>
</tr>
</tbody>
</table>

Kilobits per second

though it's one more thing to lose or have fall off, the termination plug is simple and effective, and you can easily tell whether it's installed or not. Deltaic, FWB, GCC, Optima, RACET, Relax, and Storage Dimensions have chosen this external-termination scheme for their drives. iDS Systems, PLI, and Procom take an even better approach by providing externally switchable built-in SCSI termination that can be turned on or off.

**Software Setup**

Most hard drives come preformatted by the vendor, ready to use. The way the disk has been formatted, however, may not be best for the kind of Mac you have. If, for example, you use an accelerator, you'd do best to choose a higher-performance format, so you may need to reformat the drive. The vendor should provide you with utilities to do this.

Some formatting software can detect the type of Mac you're using and...
Hard Drives

On the Horizon

New drives are appearing all the time, even as we go to press. Micropolis is now marketing its 330-megabyte Micropolis 1980 directly (it's already the OEM for several vendors) for $1,995. And the Metro 335, a new drive from EMAC for $2,499, should be out by the time you read this. The EMAC drive uses a Motor mechanism, has a two-year warranty, and comes bundled with Norton Utilities.

Improvements in hard-disk-drive technology also show no signs of slowing down. Just around the corner, you're going to see high-capacity drives that are smaller, cheaper, and faster. Expect to see more 3.5-inch drives costing less than $4 per megabyte and data-transfer rates pushing 5 megabytes per second.

Faster rotational speeds will help new drives increase both seek times and throughput rates. Today, most drives spin at 3,600 rpm. Drives of tomorrow will spin at speeds pushing 5,400 rpm, so data will reach a head much faster after a seek and will stream through the head at a higher rate. Hewlett-Packard has announced a 4,000-rpm drive, and Micropolis will soon introduce a 5,400-rpm drive.

Seagate Technology has announced two new 3.5-inch, 4,400-rpm hard drives — the 426-megabyte ST1480NM and the 331-megabyte ST1400NM. According to Seagate, these SCSI units will offer throughput as fast as 5 megabytes per second and a 14-millisecond seek time. Expect to see high-speed, high-capacity 3.5-inch drives from Quantum as well. The new ProDrive 425 and ProDrive 330 boast an access time of 14 milliseconds and have a throughput of 5 megabytes per second, according to Quantum.

Faster SCSI implementations will also help get data into the Mac faster. When you buy a top-of-the-line MicroNet drive, you can now couple it with the company's automatically format the drive for use with that Mac. Others give you this option manually. In either case, choosing an alternative format geared to the Mac you have can sometimes affect the drive's performance profoundly. To understand why this is so, you need to know what it means to format a drive, install its driver, and change its interleave (see also "The File System," October '90, page 279).

Drives come from the factory with concentric circles, or tracks, and a way for locating any particular track (a servo strategy) already established. During a low-level format of a drive, its tracks are divided into segments, or sectors, and bad areas or sectors are locked out. The drive is then initialized; that is, a partition map of the drive is laid down (you can have two or more partitions), a driver is installed, and the drive is then ready to receive data. When data is subsequently written to the drive, it's written sector by sector by the same head that will read it later. When data is requested from the Mac, the drive sends it back one sector at a time, waiting for the go-ahead from the Mac (through the SCSI interface) before sending the next sector.

It's here that questions of efficiency arise. If the requested data is in contiguous sectors and the SCSI interface gives the go-ahead quickly enough, the drive will be able to efficiently transfer all the necessary data in one pass of the track. If, however, the SCSI interface is too slow for the drive — as might be the case with a Mac Plus or SE — the drive will be able to transfer only one sector of data per rotation of the disk and will have to wait at least another full rotation before the next proper sector of data is correctly positioned under the read/write head. Each mechanical rotation requires about 1/60 second — a lifetime in computer terms.

To avoid this time-wasting spinning, hard-disk vendors use a formatting trick called sector interleave. Instead of logically consecutive sectors being placed one after another on the hard disk's magnetic platter during formatting, they're laid out in an alternating pattern, occupying every second or third sector. While the drive waits for the Mac to catch up, only the intervening sectors (rather than the whole track) spin past it reads again. As a general rule, the best interleave for most disks on an unaccelerated Mac Plus is 3:1, meaning that three sectors must spin by for each sector that is read. With a Mac SE, the best interleave is 2:1, and Macs in the II line perform best with a 1:1 ratio.

Of all the drives we tested, only those from CREAL, Deltaic, RACET, and SuperMac do not have formatters to let you set the interleave. Keep in mind, however, that many third-party hard-disk software utilities — such as La Cie's Silverlining, On Track's Disk Manager Mac, and DJK Development's SC5 Commander — let users select the interleave. Their drivers may increase performance over those bundled with your drive, if they're compatible with the drive (most are).

The Faster, the Better

Volume aside, for most buyers, speed is the most important drive attribute. Although drivers account for some speed differences between drives, it is the mechanism that determines a drive's overall performance.

If you plan to use a big hard drive as a server, you need one that can quickly move its read/write heads from track to track. That's what happens when multiple users request data that resides in different places on the drive's platters. In that case, you should concentrate on finding a drive with a low seek time (usually represented in milliseconds) — the average time it takes the read/write heads to move across one third of the platter. Unfortunately, not everyone agrees on how to measure this, so vendors may claim different seek times for the same drive mechanism. What's more, once the data has been found, a drive's throughput — the
amount of data it can deliver to your Mac in a given amount of time — is more crucial than its seek time.

To obtain a consistent measure of seek time, we used the shareware utility SCSI Evaluator, available from most on-line services (including Zmac) and user-group program libraries. Our benchmark platform consisted of a 4-megabyte Mac IIci running System 6.0.5. Each hard drive was formatted at a 1:1 interleave — the appropriate interleave for the Mac II family — using each vendor’s own formatting software.

The Deltaic Server 300Q, PLI PL320F Turbo, and RACET SA350 tied for first place, with average seek times of 12 milliseconds (see Figure 3). Near the other end of the scale were several drives with 19-millisecond seek times. The Optima MiniPak 310 came in last at 25 milliseconds (the OEM rates it at 12.5 milliseconds), because of a special wait state that protects against testing programs such as SCSI Evaluator that do multiple seeks! [Optima representatives explain that, for reasons of reliability, they purposely pause their drive between the multiple seeks requested by SCSI Evaluator. Optima claims — and rightly — that seek-seek-seek sequences don’t occur in the real world: Usually, heads seek a track and then read or write before another seek is requested. — Ed.]

If you’re using a stand-alone Mac and working with large files — 24-bit graphics, animation sequences, source code, or audio samples — then you should search for a drive with a high throughput rate. A drive’s throughput rate — typically expressed as kilobits or megabytes per second — represents how much data it can deliver in one second. To measure throughput, we instructed SCSI Evaluator to write random blocks of data to the drives (see Figure 4) and measured the results.

As a class, drives containing Seagate ST2502NM and ST2383NM mechanisms proved fastest, with throughput rates of around 15,000 kilobits per second. Speed variations among like mechanisms can be attributed to manufacturing deviations and differences in driver software. The fastest drives are sold by FWB, GCC, La Cie, MicroNet, Procom, and Storage Dimensions. The slowest drive by far, the MacProducts Magic 380, managed a lowly 8,132 kilobits per second with its MiniScribe mechanism.

Finally, to test real-world speed, we used DiskBasher!, a test utility developed by MacUser Labs. DiskBasher! simulates typical drive performance by reading and writing actual “files,” with all the overhead involved. The DiskBasher! results (lower times indicate faster drives) have a high correlation with the SCSI Evaluator results and are included in Table 2.

At Your Service

In one respect, hard drives are like politicians and S&Ls: The bigger they are, the harder they fall. Because you stand to lose so much valuable data if you experience a problem with a high-capacity hard drive, reliability is an extremely important issue. Unlike speed, which we can accurately measure with a suite of benchmarks, there’s no way MacUser Labs can empirically test the long-term reliability of drives. With MTBF (mean time between failures) ratings in excess of 100,000 hours, we could wait for more than 11 years before a drive took a dive. So we did the next-best thing: We investigated the service offered by each of the 22 vendors (see Table 1).

The warranty periods offered run from the common one year to the truly generous five years (Cranel and Microtech). Some vendors offer optional extended warranties for an average cost of several hundred dollars per year. The bargain in this category is Deltaic’s five years of additional coverage for only $100. Given the hourly rates charged by service technicians and the high price of replacement parts, extended-warranty plans often pay for themselves the first time you send a drive in for repair. One-third of the vendors offer 30-day money-back guarantees, so if you are unhappy with their products for any reason, you can return them for a full refund.

If something goes wrong with your drive, it’s comforting to know that help is just a phone call away. Although all the vendors we surveyed operate technical-support hot lines, only seven provide toll-free support. If the problem requires you to return the drive for service, consider where you must send it and how long it will take before you get it back. If you buy a drive mail-order, you usually have to return the drive directly to the vendor, which adds shipping delays to the time required to fix the drive.

One of the benefits of buying retail is that you can usually return the drive to the dealer for repair. Keep in mind, however, that most dealers lack adequate facilities and simply ship the drive back to the manufacturer. And some make no promises whatsoever about turnaround time, although most vendors attempt to get your drive back to you within two to three working days of receipt. Optima, RACET, and Rodime guarantee 24-hour turnaround times, at the opposite end of the spectrum is Cranel’s 30-day turnaround time, which is pretty lax.
Table 1: Service and Support

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Standard warranty</th>
<th>Extended warranty</th>
<th>Money-back guarantee</th>
<th>Toll-free support</th>
<th>Service center</th>
<th>Guaranteed turnaround</th>
<th>Data recovery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bay Microsystems</td>
<td>1 year</td>
<td>none</td>
<td>none</td>
<td>direct</td>
<td>dealer</td>
<td>30 days</td>
<td>none</td>
</tr>
<tr>
<td>CMS Enhancements</td>
<td>1 year</td>
<td>none</td>
<td>none</td>
<td>direct</td>
<td>dealer</td>
<td>30 days</td>
<td>none</td>
</tr>
<tr>
<td>Cranel</td>
<td>5 years</td>
<td>none</td>
<td>none</td>
<td>dealer</td>
<td>dealer</td>
<td>30 days</td>
<td>none</td>
</tr>
<tr>
<td>Data Enhancements</td>
<td>1 year</td>
<td>none</td>
<td>none</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>Deltalic Systems</td>
<td>1 year</td>
<td>$100/5 years</td>
<td>30 days</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>FWB</td>
<td>1 year</td>
<td>$288/year</td>
<td>none</td>
<td>dealer</td>
<td>dealer</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>GCC Technologies</td>
<td>2 years</td>
<td>30 days</td>
<td>none</td>
<td>direct</td>
<td>dealer or direct</td>
<td>72 hours</td>
<td>none</td>
</tr>
<tr>
<td>HDI</td>
<td>1 year</td>
<td>none</td>
<td>30 days</td>
<td>direct</td>
<td>dealer</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>iIDS Systems</td>
<td>2 years</td>
<td>none</td>
<td>none</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>72 hours</td>
<td>none</td>
</tr>
<tr>
<td>La Cie</td>
<td>2 years</td>
<td>none</td>
<td>none</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>30 days</td>
<td>none</td>
</tr>
<tr>
<td>MacProducts USA</td>
<td>1 year</td>
<td>none</td>
<td>30 days</td>
<td>dealer</td>
<td>dealer</td>
<td>24 hours</td>
<td>none</td>
</tr>
<tr>
<td>MicroNet Technology</td>
<td>1 year</td>
<td>$195/year</td>
<td>none</td>
<td>direct</td>
<td>dealer</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>Microtech Interna</td>
<td>5 years</td>
<td>none</td>
<td>none</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>Mirror Technologies</td>
<td>1 year</td>
<td>$177/year</td>
<td>30 days</td>
<td>direct</td>
<td>dealer</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>Optima Technology</td>
<td>1 year</td>
<td>$690/2 years</td>
<td>none</td>
<td>dealer</td>
<td>dealer</td>
<td>24 hours</td>
<td>none</td>
</tr>
<tr>
<td>PLI</td>
<td>1 year</td>
<td>$440/year</td>
<td>30 days</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>Pracom Technology</td>
<td>1 year</td>
<td>none</td>
<td>none</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>RACET computers</td>
<td>3 years</td>
<td>none</td>
<td>none</td>
<td>dealer</td>
<td>dealer</td>
<td>24 hours</td>
<td>none</td>
</tr>
<tr>
<td>Relax Technology</td>
<td>1 year</td>
<td>none</td>
<td>30 days</td>
<td>direct</td>
<td>dealer</td>
<td>48 hours</td>
<td>none</td>
</tr>
<tr>
<td>Rodime Systems</td>
<td>2 years</td>
<td>none</td>
<td>none</td>
<td>dealer</td>
<td>dealer</td>
<td>24 hours</td>
<td>none</td>
</tr>
<tr>
<td>Storage Dimensions</td>
<td>2 years</td>
<td>none</td>
<td>none</td>
<td>dealer</td>
<td>dealer</td>
<td>24 hours</td>
<td>none</td>
</tr>
<tr>
<td>SuperMac Technology</td>
<td>1 year</td>
<td>none</td>
<td>none</td>
<td>dealer or direct</td>
<td>dealer or direct</td>
<td>72 hours</td>
<td>none</td>
</tr>
</tbody>
</table>

Table 1: Don’t judge postsale service and support just by the length of the warranty or warranty extension. Also take into account money-back guarantees, phone support, the location of the repair service, guaranteed turnaround times for repairs, and the availability of data-recovery services. Having access to a variety of support services is one of the advantages of buying through a dealer as opposed to buying mail-order, even though a mail-order house may give you a fantastic deal.

Perhaps the most important service consideration is whether the vendor will attempt to recover your data or will simply swap out faulty mechanisms. Although nobody can guarantee 100-percent success at recovering data from a damaged disk, many common problems can be resolved easily with the help of a good utility program such as Symantec’s SUM II or Norton Utilities for the Macintosh. Vendors that offer data-recovery services (and more than half of them do) often do so only at the customer’s request and expense. Depending on your data’s value, you must determine when data recovery becomes a cost-prohibitive option. The best preventive measure is to back up, back up, and then back up again. To help simplify this tedious chore, investigate some of the new mirroring and duplexing techniques that automatically copy your data to another drive (see the “Double-Duty Disks” sidebar).

Software Bundles

In an effort to differentiate their offerings from competitors’, many vendors sweeten their deals with free software. Bundled software runs the gamut from scads of shareware freebies thrown in seemingly for sheer volume to well-chosen commercial applications that normally retail for hundreds of dollars. GCC, iIDS, La Cie, Microtech, Optima, Rodime Systems, Storage Dimensions, and SuperMac.

More-discriminating buyers may be interested in specific commercial programs such as DiskFit, Fastback II, MacTools Deluxe, Norton Utilities, Silverlining, SUM II, or SuperSpool, to name a few. These packages, in various combinations, are available from CMS, GCC, La Cie, Microtech, Optima, Rodime Systems, Storage Dimensions, and SuperMac.

Table 2 includes a checklist of the types of software bundled with each hard drive. Some of the more useful utilities handle Interleave, partition-
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CURTIS
30 Fitzgerald Drive, Jaffrey, NH 03452
ing, password protection, data encryption, disk optimization, backup, file recovery, mirroring, and spooling.

Partitioning software can divide a large physical drive into several smaller logical drives that each appear on the desktop individually. Some vendors allow you to set up A/UX and ProDOS (the Apple II operating system) partitions on their drives so that you can share the drive with UNIX and Apple II users.

Password protection prevents others from accessing your drive without your knowledge. Data encryption scrambles the contents of files but does not prevent you from performing regular file maintenance.

Disk optimizers improve performance by reorganizing drive contents into contiguous blocks so that the read/write heads needn’t roam the disk looking for bits and pieces of files. Backup software, such as DiskFit, FastBack II, and Total Recall, copies files from the hard drive to another medium for safekeeping. File-recovery utilities, such as Norton Utilities and SUM II, can rescue deleted or damaged files. Finally, print spoolers, such as QuickSpool II and SuperLaserSpool, take care of printing in the background.

The Hard Part

New drives are appearing all the time, and attentive buyers will want to keep their eyes peeled for the latest advances in technology (see the “On the Horizon” sidebar). Even with the current list of 22 hard drives we tested, making the right selection is difficult. You must balance your needs against your means, make trade-offs between value and speed, and consider a host of intangibles such as the vendor’s reputation, construction quality, and aesthetics. Although there’s no “best” drive for every application, check out the “Bottom Line” sidebar for our recommendations. And remember, other storage choices are available—for example, if you need enormous storage capacity that’s removable and transportable, look at “Maximum Movable Megabytes: Erasable Optical Drives” in last month’s issue.

San Francisco author Owen W. Linnmayer could probably fill two 300-megabyte hard drives with all the articles he’s written in his ten-year career.
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Vol. V, No. II

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DPI

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Immediate Delivery! FAX 408-945-8148
## Table 2: Features of Big, Fast Hard-Disk Drives

<table>
<thead>
<tr>
<th></th>
<th>Bay 300</th>
<th>CMS Platinum Series PD 300</th>
<th>Cralen 330MB</th>
<th>Data Enhancements ProSystem PS1350</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price (list/street)</strong></td>
<td>$1,650/$1,650</td>
<td>$3,299/$2,000</td>
<td>$2,350/$2,350</td>
<td>$3,199/$2,200</td>
</tr>
<tr>
<td><strong>Capacity (advertised/actual)</strong></td>
<td>300/291 MB</td>
<td>300/291 MB</td>
<td>330/321 MB</td>
<td>330/330 MB</td>
</tr>
<tr>
<td><strong>Seek time (advertised/actual)</strong></td>
<td>16.5/19 ms</td>
<td>19/19 ms</td>
<td>16/16 ms</td>
<td>14/16 ms</td>
</tr>
<tr>
<td><strong>Disk/Cache results (seconds)</strong></td>
<td>21.4 sec</td>
<td>21.3 sec</td>
<td>18.0 sec</td>
<td>22.7 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>OEM mechanism</td>
<td>Seagate ST4350NM</td>
<td>Seagate ST4350NM</td>
<td>HP 97544SU</td>
</tr>
<tr>
<td></td>
<td>Platters (number and size)</td>
<td>five 5.25-in.</td>
<td>five 5.25-in.</td>
<td>eight 5.25-in.</td>
</tr>
<tr>
<td></td>
<td>SCSI ID selector</td>
<td>push button</td>
<td>software</td>
<td>thumb wheel</td>
</tr>
<tr>
<td></td>
<td>Termination</td>
<td>internal</td>
<td>internal</td>
<td>internal</td>
</tr>
<tr>
<td></td>
<td>Cables (length, type)</td>
<td>1.5 feet, 50/25-pin</td>
<td>6 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
</tr>
<tr>
<td></td>
<td>Software Bundled</td>
<td>proprietary</td>
<td>proprietary, SUM II</td>
<td>UniMac StorWare</td>
</tr>
<tr>
<td></td>
<td>User-selectable interleave</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Partitioning</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Password protection</td>
<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td></td>
<td>Data encryption</td>
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<td>0</td>
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</tr>
<tr>
<td></td>
<td>Disk optimizer</td>
<td>0</td>
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<tr>
<td></td>
<td>Backup</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>File recovery</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Print spooler</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td>Fan</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td></td>
<td>Indicator lights</td>
<td>access, power</td>
<td>access</td>
<td>access, power</td>
</tr>
<tr>
<td></td>
<td>Size (L x W x H, in.)</td>
<td>10 x 9.75 x 4.25\textsuperscript{1}</td>
<td>11.25 x 10 x 4.5\textsuperscript{1}</td>
<td>13 x 9.25 x 5.75</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>12 lb</td>
<td>15.5 lb</td>
<td>18 lb</td>
</tr>
<tr>
<td></td>
<td>Construction</td>
<td>plastic</td>
<td>metal</td>
<td>metal</td>
</tr>
<tr>
<td></td>
<td>Fuse</td>
<td>external</td>
<td>internal</td>
<td>external</td>
</tr>
<tr>
<td></td>
<td>Support</td>
<td>Bay Microsystems 210 Columbus Ave. Suite 108 San Francisco, CA 94133 (415) 563-8392</td>
<td>CMS Enhancements, Inc. 1372 Valencia Ave. Tustin, CA 92680 (714) 259-9555</td>
<td>Cranel, Inc. 510 F. Wilson Bridge Rd. Worthington, OH 43085 (614) 433-0045</td>
</tr>
</tbody>
</table>

\textsuperscript{1}Zero footprint on one-piece Mac

*Supports AUX partitioning
Since it was introduced, our ULTRA 96 has become the fastest-selling Hayes modem ever.

Not only because the move to high-speed modems is in full swing, but because no other 9600 can deliver the features, performance, and networking capabilities of the fully loaded ULTRA 96.

ULTRA 96 provides up to 4-to-1 data compression, so it can save you money by letting you run computer equipment at its maximum speed.

In fact, you'll save so much on long-distance charges, your ULTRA 96 will pay for itself in just a few months.

It's available bundled with HayesConnect™ network server software, so any user on an AppleTalk™ network has access to ULTRA™ performance.

Of course, ULTRA 96 also works on dial lines, leased lines, and satellite links, and it's ideal for AppleTalk bridges. It even automatically negotiates the best connection with other modems. Hayes or otherwise.

Plus, it uses the world standards for error-control and data compression, V.42 and V.42bis, and it can downshift to MNP® levels 2 through 5.

What's more, ULTRA 96 is compatible with the most popular high-speed modem on the market. The Hayes V-series® Smartmodem 9600™

And with its low sticker price, you'll also find it compatible with your budget.

For more information about ULTRA 96, call 1-800-635-1225.

We think you'll find it to be the ultimate communications machine.

Hayes® Our technology has the computer world talking. More than ever.

Please circle 417 on reader service card.

At 38,400 bps, and the way it runs on the network, no other modem can keep up with it.
# Table 2: Features of Big, Fast Hard-Disk Drives, continued

<table>
<thead>
<tr>
<th><strong>Hard Drives</strong></th>
<th><strong>Deltaic Server 3000</strong></th>
<th><strong>FWB Hammer 300</strong></th>
<th><strong>GCC UltraDrive 430S</strong></th>
<th><strong>HDI POWERDrive 320</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comments</strong></td>
<td>Fastest seek times.</td>
<td>Fast seek times.</td>
<td>Average seek times.</td>
<td>Inexpensive. Average seek times and throughput.</td>
</tr>
<tr>
<td><strong>Price (list/street)</strong></td>
<td>$2,299/$2,299</td>
<td>$3,495/$2,403</td>
<td>$2,699/$2,499</td>
<td>$1,499/$1,499</td>
</tr>
<tr>
<td><strong>Capacity (advertised/actual)</strong></td>
<td>320/326 MB</td>
<td>300/323 MB</td>
<td>430/428 MB</td>
<td>320/330 MB</td>
</tr>
<tr>
<td><strong>Seek time (advertised/actual)</strong></td>
<td>10.7/12 ms</td>
<td>13/13 ms</td>
<td>16/16 ms</td>
<td>16/16 ms</td>
</tr>
<tr>
<td><strong>DiskBasher! results (seconds)</strong></td>
<td>17.3 sec</td>
<td>14.4 sec</td>
<td>14.9 sec</td>
<td>20.0 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>Seagate ST4385NM</td>
<td>Seagate ST2383NM</td>
<td>Seagate ST2502NM</td>
<td>Micropolis 1664-07</td>
</tr>
<tr>
<td><strong>OEM mechanism</strong></td>
<td>eight 5.25-in. push button</td>
<td>four 5.25-in. push button</td>
<td>four 5.25-in. push button</td>
<td>push button, software</td>
</tr>
<tr>
<td><strong>Platters (number and size)</strong></td>
<td>1.5 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
</tr>
<tr>
<td><strong>SCSI</strong></td>
<td>push button</td>
<td>push button</td>
<td>push button</td>
<td>push button</td>
</tr>
<tr>
<td><strong>Termination</strong></td>
<td>external</td>
<td>external</td>
<td>external</td>
<td>internal</td>
</tr>
<tr>
<td><strong>Cable (length, type)</strong></td>
<td>proprietary</td>
<td>proprietary</td>
<td>proprietary, QuickEnvelope, QuickSpool II, SUM II, 3.5 MB public-domain</td>
<td>Disk Manager Mac</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>proprietary</td>
<td>proprietary</td>
<td>proprietary</td>
<td>proprietary</td>
</tr>
<tr>
<td><strong>User-selectable interleave</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Partitioning</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Password protection</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Data encryption</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Disk optimizer</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Backup</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>File recovery</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Print spooler</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td>9.75 x 9.75 x 4.5 in.</td>
<td>9.75 x 9.75 x 2.25 in.</td>
<td>11 x 9.5 x 3 in.</td>
<td>9.75 x 9.75 x 2.5 in.</td>
</tr>
<tr>
<td><strong>Fan</strong></td>
<td>access, power</td>
<td>access, power</td>
<td>access, power</td>
<td>power</td>
</tr>
<tr>
<td><strong>Size (L x W x H, in.)</strong></td>
<td>12 lb</td>
<td>8 lb</td>
<td>9 lb</td>
<td>7 lb</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>19 x 9.75 x 2.25 in.</td>
<td>12 lb</td>
<td>9 lb</td>
<td>7 lb</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>metal</td>
<td>metal</td>
<td>plastic</td>
<td>metal</td>
</tr>
<tr>
<td><strong>Fuse</strong></td>
<td>external</td>
<td>external</td>
<td>internal</td>
<td>internal</td>
</tr>
<tr>
<td><strong>Supports A/UX partitioning.</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

*Zero footprint on one-piece Mac.
Finally there is NuPORT. A NuBus, SCSI-2, synchronous, DMA, host adapter, that is fully compatible with the Macintosh II family.

Each NuPORT host adapter adds a brand new SCSI port that is three times as fast as the native SCSI port. To ensure performance, MicroNet sells matched hard disk drives capable of synchronous transfers from 2.1 to 3.7 MBytes per second. Their capacities range from 300 to 2,000 MBytes with average access time as fast as 5.4 ms.

Matched NuPORT hard disk drive systems are excellent for all disk intensive applications. They are especially suited for sound, graphics, multi-media, publishing, pre-press, CAD/CAM, and EtherTalk file servers.

For more information and the location of an Authorized MicroNet Reseller in your area, call our sales department at 1-714-837-6033.

**COMPARISON OF SIMILAR PRODUCTS**

<table>
<thead>
<tr>
<th>NuPORT</th>
<th>PowerCard</th>
<th>ProntoCard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to Duplicate 200 MBytes</td>
<td>3:39</td>
<td>9:30</td>
</tr>
<tr>
<td>Time to Load a 30 MB Color File</td>
<td>0:11</td>
<td>0:33</td>
</tr>
<tr>
<td>Suggested Retail Price</td>
<td>*$600</td>
<td>$1295</td>
</tr>
<tr>
<td>True NuBus Bootable Device</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Disables Built-in SCSI Port</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Multiple Macintosh Support</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Supports SCSI-2 and 16 Bit SCSI</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Synchronous Data Transfers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Supports Transfers to 4.4 MBytes/s</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Includes Hard Disk Utility Software</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>On-Board DMA Support</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Shipped With a Matched Hard Disk</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>System 7.0 Compatible</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>A/UX 2.0 Hard Disk Partitioning</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Supports Spliced/Overlapped Seeks</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Supports Synchronized Spindles</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

*Additional cost when added with specific MicroNet hard disk subsystems.

**NuPORT is Sold Only With Matched Hard Disk Drives.**

Quality is Not Expensive, It's Priceless.

MicroNet Technology, Inc.

20 MASON • IRVINE, CALIFORNIA • TEL: (714) 837-6033 • FAX: (714) 837-1164

AppleLink: 01656 • Compuserve: 76004,1611

Please circle 137 on reader service card.
## Table 2: Features of Big, Fast Hard-Disk Drives, continued

<table>
<thead>
<tr>
<th>Comments</th>
<th>Price (list/street)</th>
<th>Capacity (advertised/actual)</th>
<th>Seek time (advertised/actual)</th>
<th>DiskBasher! results (seconds)</th>
<th>Technology</th>
<th>Software</th>
<th>Case</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDS VPS340</td>
<td>$2,995/$2,295</td>
<td>341/330 MB</td>
<td>14/16 ms</td>
<td>20.5 sec</td>
<td>Micropolis 1684-07</td>
<td>proprietary, 10 MB public-domain</td>
<td>plastic</td>
</tr>
<tr>
<td>La Cie ZFP 400</td>
<td>$1,999/$1,999</td>
<td>400/423 MB</td>
<td>15/15 ms</td>
<td>14.5 sec</td>
<td>Seagate ST2502NM</td>
<td>Silverlining, Norton Utilities, 5 MB public-domain</td>
<td>metal</td>
</tr>
<tr>
<td>MacProducts Magic 380</td>
<td>$1,395/$1,395</td>
<td>325/355 MB</td>
<td>18/18 ms</td>
<td>24.5 sec</td>
<td>MiniScribe M93805</td>
<td>proprietary, Disk Manager Mac, 10 MB public-domain</td>
<td>plastic</td>
</tr>
<tr>
<td>MicroNet MS-404</td>
<td>$3,795/$2,950</td>
<td>423/423 MB</td>
<td>15/15 ms</td>
<td>14.6 sec</td>
<td>Seagate ST2502NM</td>
<td>proprietary, 10 MB public-domain</td>
<td>metal</td>
</tr>
</tbody>
</table>

- **•** = yes
- **O** = no

- Average seek times and throughput. Small case.
- Inexpensive. Average seek times. High throughput. Good software and support.
- Average seek times. High throughput. Extremely well built.

### Technology

- **OEM mechanism**
  - IDS VPS340: Micropolis 1684-07
  - La Cie ZFP 400: Seagate ST2502NM
  - MacProducts Magic 380: MiniScribe M93805
  - MicroNet MS-404: Seagate ST2502NM

- **Platters (number and size)**
  - IDS VPS340: four 5.25-in.
  - La Cie ZFP 400: four 5.25-in.
  - MacProducts Magic 380: eight 5.25-in.
  - MicroNet MS-404: four 5.25-in.

- **SCSI**
  - **ID selector**
    - IDS VPS340: push button
    - La Cie ZFP 400: push button
    - MacProducts Magic 380: software
    - MicroNet MS-404: push button
  - **Termination**
    - IDS VPS340: externally switchable
    - La Cie ZFP 400: internal
    - MacProducts Magic 380: internal
    - MicroNet MS-404: internal
  - **Cable (length, type)**
    - IDS VPS340: 2 feet, 50/25-pin
    - La Cie ZFP 400: 2 feet, 50/25-pin
    - MacProducts Magic 380: 6 feet, 25/25-pin
    - MicroNet MS-404: 3 feet, 50/25-pin

### Software

- **Bundled**
  - IDS VPS340: proprietary
  - La Cie ZFP 400: Silverlining, Norton Utilities
  - MacProducts Magic 380: proprietary
  - MicroNet MS-404: proprietary

- **User-selectable interleave**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **Partitioning**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **Password protection**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **Data encryption**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **Disk optimizer**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **Backup**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **File recovery**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **Print spooler**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

### Case

- **Fan**
  - IDS VPS340: •
  - La Cie ZFP 400: •
  - MacProducts Magic 380: •
  - MicroNet MS-404: •

- **Indicator lights**
  - IDS VPS340: access, power
  - La Cie ZFP 400: access, power
  - MacProducts Magic 380: access, power
  - MicroNet MS-404: access, power

- **Size (L x W x H, in.)**
  - IDS VPS340: 9.75 x 9.75 x 2
  - La Cie ZFP 400: 10 x 9.75 x 2.5
  - MacProducts Magic 380: 11 x 10.25 x 3.5
  - MicroNet MS-404: 10.5 x 10 x 3

- **Weight**
  - IDS VPS340: 6.25 lb
  - La Cie ZFP 400: 8 lb
  - MacProducts Magic 380: 12 lb
  - MicroNet MS-404: 9.5 lb

- **Construction**
  - IDS VPS340: plastic
  - La Cie ZFP 400: metal
  - MacProducts Magic 380: metal
  - MicroNet MS-404: metal

- **Fuse**
  - IDS VPS340: internal
  - La Cie ZFP 400: external
  - MacProducts Magic 380: internal
  - MicroNet MS-404: internal

---

*Supports A/UX partitioning.

Zero footprint on one-piece Mac
NOBODY DOES IT BETTER!

If your drive doesn't come with these features you are not getting the benefits you deserve.

- Fully tested/burned in mechanisms
- From 40MB to 1.2GB capacities
- As fast as 12ms access times
- External on/off termination with the flip of a switch
- External SCSI address selection
- 1/2 speed fan for quiet cool operation
- Compact lightweight award winning design
- Vertical or stackable orientation
- Cases as small as 2" x 6" x 8"
- Portable - as light as 3.5 lbs.
- Optional carrying case
- External access LED
- Convenience outlet
- Universal power supply; 90-260 volts fully tested/burned in
- Mean-time-between-failure rating as high as 150,000 hours
- 5 year warranty
- Norton Utilities Data Recovery
- Silverlining Universal Hard Disk Management - mice rating by MacUser
- Silverplatter Serial Device Sharing Over LocalTalk
- 5MB of public domain software
- Free door to door delivery in U.S.A
- Toll free support
- TRW on site service
- Hassel free ordering - toll free
- From the makers of Tsunami, Cirrus and ZFP

La Cie offers you more benefits, quality, innovation, service, support and value than any other manufacturer.


"I love this drive." David Kennedy, B.C. Canada.

La Cie has fixed, removable, and magneto optical drives that come in capacities from 40MB to 1.2 Gigabytes priced as low as $439 including the $1000 bonus.

800 999-0143
Call Toll free to order.

*Accepts any one of the major credit cards.

Please circle 414 on reader service card.
### Table 2: Features of Big, Fast Hard-Disk Drives, continued

<table>
<thead>
<tr>
<th></th>
<th>Microtech N320</th>
<th>Mirror MP290</th>
<th>Optima MiniPak 310</th>
<th>PLI PL 320F Turbo</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Price (list/street)</strong></td>
<td>$32,295/$1,950</td>
<td>$1,757/$1,757</td>
<td>$4,395/$3,300</td>
<td>$4,395/$3,075</td>
</tr>
<tr>
<td><strong>Capacity (advertised/actual)</strong></td>
<td>320/330 MB</td>
<td>290/291 MB</td>
<td>306/311 MB</td>
<td>320/320 MB</td>
</tr>
<tr>
<td><strong>Seek time (advertised/actual)</strong></td>
<td>14/16 ms</td>
<td>16.5/19 ms</td>
<td>12.5/25 ms</td>
<td>12/12 ms</td>
</tr>
<tr>
<td><strong>DisKasher! results (seconds)</strong></td>
<td>21.7 sec</td>
<td>21.4 sec</td>
<td>16.8 sec</td>
<td>17.5 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td>Micropolis 1684-07</td>
<td>Seagate ST4350NM</td>
<td>IBM 0651371</td>
<td>Seagate ST4385NM</td>
</tr>
<tr>
<td><strong>Platters (number and size)</strong></td>
<td>four 5.25-in.</td>
<td>five 5.28-in.</td>
<td>eight 3.5-in.</td>
<td>eight 5.25-in.</td>
</tr>
<tr>
<td><strong>SCSI</strong></td>
<td>push button</td>
<td>DIP switch</td>
<td>push button</td>
<td>rotary switch</td>
</tr>
<tr>
<td><strong>Termination</strong></td>
<td>internal</td>
<td>internal</td>
<td>external</td>
<td>externally switchable</td>
</tr>
<tr>
<td><strong>Cable (length, type)</strong></td>
<td>2.5 feet, 50/25-pin</td>
<td>2.5 feet, 50/25-pin</td>
<td>2.5 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td>proprietary, Total Recall, Norton Utilities, 2 MB public-domain</td>
<td>proprietary, CE Software utilities, 11 MB public-domain</td>
<td>proprietary, SUM II</td>
<td>proprietary, 15 MB public-domain</td>
</tr>
<tr>
<td><strong>User-selectable interleave</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Partitioning</strong></td>
<td>•*</td>
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<td>•*</td>
<td>•*</td>
</tr>
<tr>
<td><strong>Password protection</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Data encryption</strong></td>
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<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Disk optimizer</strong></td>
<td>•</td>
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<tr>
<td><strong>Backup</strong></td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td><strong>File recovery</strong></td>
<td>•</td>
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<td>•</td>
</tr>
<tr>
<td><strong>Print spooler</strong></td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td><strong>Case</strong></td>
<td>access, power</td>
<td>access, power</td>
<td>access, power, termination</td>
<td>access</td>
</tr>
<tr>
<td><strong>Indicator lights</strong></td>
<td>access, power</td>
<td>access, power</td>
<td>access, power, termination</td>
<td>access</td>
</tr>
<tr>
<td><strong>Size (L x W x H, in.)</strong></td>
<td>10.5 x 9.75 x 2.25&quot;</td>
<td>12 x 7.75 x 6.5&quot;</td>
<td>7.75 x 6.25 x 2.5&quot;</td>
<td>11.5 x 9.75 x 5&quot;</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>8.5 lb</td>
<td>17 lb</td>
<td>4 lb</td>
<td>12.5 lb</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td>plastic</td>
<td>metal</td>
<td>plastic</td>
<td>metal</td>
</tr>
<tr>
<td><strong>Fuse</strong></td>
<td>external</td>
<td>internal</td>
<td>internal</td>
<td>external</td>
</tr>
<tr>
<td><strong>Supports</strong></td>
<td>A/UX partitioning</td>
<td>A/UX partitioning</td>
<td>A/UX partitioning</td>
<td>A/UX partitioning</td>
</tr>
</tbody>
</table>

*Zero footprint on one-piece Mac

---

*Supports A/UX partitioning.

---

**Case**

- **Fan**: Access, power
- **Indicator lights**: Access, power
- **Size (L x W x H, in.)**: 10.5 x 9.75 x 2.25" (Microtech N320), 12 x 7.75 x 6.5" (Mirror MP290), 7.75 x 6.25 x 2.5" (Optima MiniPak 310), 11.5 x 9.75 x 5" (PLI PL 320F Turbo)
- **Weight**: 8.5 lb (Microtech N320), 17 lb (Mirror MP290), 4 lb (Optima MiniPak 310), 12.5 lb (PLI PL 320F Turbo)
- **Construction**: Plastic (Microtech N320), Metal (Mirror MP290), Plastic (Optima MiniPak 310), Metal (PLI PL 320F Turbo)
- **Fuse**: External (Microtech N320), Internal (Mirror MP290), Internal (Optima MiniPak 310), External (PLI PL 320F Turbo)

**Supports**

- A/UX partitioning

---

**Contact Information**

- **Microtech International, Inc.**
  - 158 Commerce St.
  - East Haven, CT 06512
  - (800) 325-1895
  - (203) 468-6223

- **Mirror Technologies**
  - 2644 Patton Rd.
  - Roseville, MN 55113
  - (800) 654-3294
  - (612) 833-4450

- **Optima Technology**
  - 17526 Von Karman
  - Irvine, CA 92714
  - (714) 476-0515

- **Peripheral Land, Inc.**
  - 47421 Bayside Pkwy.
  - Fremont, CA 94538
  - (800) 268-6754
  - (415) 657-2211

---

* December 1990 MacUser
If you can think of better ways to spend your time than backing up your hard disk, you need FastBack II or FastBack Tape. FastBack II is the world's fastest and most reliable backup software for the Macintosh.

FastBack Tape gives you a fast, ultra-reliable 120 megabyte tape drive, for the ultimate backup system. It even lets you schedule automated, unattended backups to take place whenever you choose. Even when you're otherwise occupied.

After all, you have better things to do.

This product is in no way associated with or has origination in Fisher Scientific or Allied Corporation.

FIFTH GENERATION SYSTEMS
10049 N. Reiger Road  Baton Rouge, LA 70809  (504) 291-7221

For a complete list of features and specifications, or the name of your nearest dealer, call 1-800-873-4384.

Please circle 197 on reader service card.
### Table 2: Features of Big, Fast Hard-Disk Drives, continued

<table>
<thead>
<tr>
<th>Company</th>
<th>MD 320</th>
<th>SA350</th>
<th>Hard 300 Plus</th>
<th>Cobra 330e</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Comments</strong></td>
<td>Fast seek times.</td>
<td>Fastest seek times.</td>
<td>Average seek times and throughput.</td>
<td>Slow seek times.</td>
</tr>
<tr>
<td><strong>Price (list/street)</strong></td>
<td>$3,295/$3,295</td>
<td>$3,115/$3,115</td>
<td>$2,679/$2,679</td>
<td>$3,999/$2,500</td>
</tr>
<tr>
<td><strong>Capacity (advertised/actual)</strong></td>
<td>320/323 MB</td>
<td>350/349 MB</td>
<td>288/291 MB</td>
<td>330/345 MB</td>
</tr>
<tr>
<td><strong>Seek time (advertised/actual)</strong></td>
<td>13/13 ms</td>
<td>12/12 ms</td>
<td>16.5/18 ms</td>
<td>16/19 ms</td>
</tr>
<tr>
<td><strong>DiskBash! results (seconds)</strong></td>
<td>15.2 sec</td>
<td>18.4 sec</td>
<td>20.9 sec</td>
<td>18.1 sec</td>
</tr>
<tr>
<td><strong>Technology</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OEM mechanism</td>
<td>Seagate ST2383NM</td>
<td>Siemens Megafiler 5421</td>
<td>Seagate ST4350NM</td>
<td>Maxtor XT-83805</td>
</tr>
<tr>
<td>Platters (number and size)</td>
<td>four 5.25-in.</td>
<td>four 5.25-in.</td>
<td>five 5.25-in.</td>
<td>five 5.25-in.</td>
</tr>
<tr>
<td><strong>SCSI</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ID selector</td>
<td>rotary switch</td>
<td>push button</td>
<td>push button, software</td>
<td>push button</td>
</tr>
<tr>
<td>Termination</td>
<td>externally switchable</td>
<td>external</td>
<td>external</td>
<td>internal</td>
</tr>
<tr>
<td>Cable (length, type)</td>
<td>2.5 feet, 25/25-pin</td>
<td>1.5 feet, 50/25-pin</td>
<td>1.5 feet, 50/25-pin</td>
<td>2 feet, 50/25-pin</td>
</tr>
<tr>
<td><strong>Software</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bundled</td>
<td>proprietary</td>
<td>proprietary</td>
<td>proprietary</td>
<td>proprietary, Fastback II</td>
</tr>
<tr>
<td>User-selectable interleave</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Partitioning</td>
<td>•*</td>
<td>•</td>
<td>•</td>
<td>•</td>
</tr>
<tr>
<td>Password protection</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Data encryption</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Disk optimizer</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Backup</td>
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<tr>
<td>File recovery</td>
<td>•</td>
<td>•</td>
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<td>•</td>
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<tr>
<td>Print spooler</td>
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<td>•</td>
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<tr>
<td><strong>Case</strong></td>
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<tr>
<td>Fan</td>
<td>•</td>
<td>•</td>
<td>•</td>
<td>•</td>
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<tr>
<td>Indicator lights</td>
<td>access, power</td>
<td>access</td>
<td>access, power</td>
<td>access, power</td>
</tr>
<tr>
<td>Size (L x W x H, in.)</td>
<td>10.5 x 9.75 x 2.5</td>
<td>15.5 x 7 x 5.5</td>
<td>11 x 10.5 x 3.75</td>
<td>14.5 x 7 x 4</td>
</tr>
<tr>
<td>Weight (pounds)</td>
<td>7.5 lb</td>
<td>15 lb</td>
<td>12.5 lb</td>
<td>12 lb</td>
</tr>
<tr>
<td>Construction</td>
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<tr>
<td>Fuse</td>
<td>internal</td>
<td>internal</td>
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<td>internal</td>
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</tr>
</tbody>
</table>

*• = yes

O = no

*Supports A/UX partitioning.

**Zero footprint on one-piece Mac.**
In fact, you can have the sharpest image around for a lot less than you'd expect to pay. With the Magnavox Analog Color (MAC) display, specifically designed to complement your Macintosh II system. And the 14" MAC display is superior to others for a very good reason: it works better.

For superb on-screen resolution, the MAC display is equipped with our fine pitch 0.29mm CRT. We polished the CRT face for crystal clear images, in graphics or text. And added a tilt/swivel base for the ultimate in user comfort.

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Macintosh IIx, IIcx, and IICi compatible.
Apple Macintosh II is a registered trademark of Apple Computer, Inc.
## Table 2: Features of Big, Fast Hard-Disk Drives

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Storage Dimensions</th>
<th>SuperMac</th>
<th>Data Frame XF330</th>
</tr>
</thead>
<tbody>
<tr>
<td>• = yes</td>
<td>• = yes</td>
<td>• = yes</td>
<td>• = yes</td>
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<tr>
<td>• = no</td>
<td>• = no</td>
<td>• = no</td>
<td>• = no</td>
</tr>
</tbody>
</table>

**Comments**
- Fast seek times. Highest throughput. Large case prewired for second drive.
- Slow seek times. Average throughput. Good software.

**Price** (list/street)
- $3,499/$2,300
- $3,599/$2,795

**Capacity** (advertised/actual)
- 325/326 MB
- 330/322 MB

**Seek time** (advertised/actual)
- 13/13 ms
- 17.5/19 ms

**DiskBasher! results (seconds)**
- 14.5 sec
- 19.9 sec

**Technology**
- OEM mechanism
  - Seagate ST2383NM
  - Seagate ST4376NM

**Platters (number and size)**
- four 5.25-in.
- five 5.25-in.

**SCSI**
- ID selector
  - rotary switch
  - software
- Termination
  - external
  - internal
- Cable (length, type)
  - 3 feet, 50/25-pin
  - 2 feet, 50/25-pin

**Software**
- Bundled
  - proprietary, MacTools Deluxe
  - proprietary, DiskFit, SuperLaserSpool, SuperSpool
- User-selectable interleave
  - •
  - 0
- Partitioning
  - •
  - 0
- Password protection
  - •
  - 0
- Data encryption
  - •
  - 0
- Disk optimizer
  - •
  - 0
- Backup
  - •
  - 0
- File recovery
  - •
  - 0
- Print spooler
  - •
  - 0

**Case**
- Fan
  - 0
  - •
- Indicator lights
  - access, power
  - access, power
- Size (L x W x H, in.)
  - 14.5 x 7.5 x 5.75
  - 9.5 x 5 x 6
- Weight
  - 12 lb
  - 12.5 lb
- Construction
  - plastic
  - metal
- Fuse
  - external
  - internal

**Supports A/UX partitioning.**

---

**Criteria**

- **Price** — The list price is the manufacturer's suggested retail price. The street price is an average actual price charged by dealers around the U.S. in August 1990.
- **Capacity** — The advertised capacity of a drive typically differs from the actual formatted capacity — that is, useful storage space. The actual capacity listed is that reported by the Finder.
- **Seek time** — Seek time is the theoretical average time required for a read/write head to move across one-third of the drive's tracks, as reported by the manufacturer. The actual seek time is as reported by our SCSI Evaluator testing. The lower the rating, the faster the drive.
- **DiskBasher! results** — DiskBasher! is a benchmark test developed by MacUser Labs that simulates real-world drive performance during typical read and write operations. The lower the time, the faster the drive.
- **OEM mechanism** — The OEM model name of the disk mechanism used in the drive. Check with the vendor to see if it varies the mechanism.
- **Platters** — The number and size of the magnetic-media disks inside the drive.
- **ID selector** — How do you change the SCSI ID number? Options include software or a thumb wheel, push button, DIP switch, or rotary switch.
- **Termination** — Is the drive's termination inside the case or outside, using a terminator block or switch?
- **Cable** — The length of the SCSI cable and the types of connectors on each end.
- **Bundled software** — Software developed exclusively for a vendor's hard-disk drives is listed as proprietary, and bundled commercial applications are listed separately by name.
- **User-selectable interleave** — Can you specify the desired interleave ratio for the drive?
- **Partitioning** — Does the drive come with the ability to divide one large physical drive into several smaller logical drives, with each one appearing on the desktop individually?
- **Password protection** — Does the drive come with a method of preventing others from accessing it without the appropriate password?
- **Data encryption** — Does the drive come with a method of scrambling its contents to prevent others from accessing the data without the appropriate password?
- **Disk optimizer** — Does the drive come with a utility for reorganizing its contents into contiguous blocks, thereby improving performance?
- **Backup** — Does the drive come with software that copies files from the hard drive to another medium for safekeeping?
- **File recovery** — Does the drive come with a utility for rescuing deleted and damaged files?
- **Print spooler** — Does the drive come with a utility that takes care of printing in the background so that you can continue with your work?
- **Fan** — Does the drive contain a fan?
- **Indicator lights** — What do the lights on the front of the drive indicate?
- **Size** — The dimensions of the case, rounded to the nearest quarter inch.
- **Weight** — The weight of the case, rounded to the nearest quarter pound.
- **Construction** — The primary material from which the case is manufactured.
- **Fuse** — Is the drive internally or externally fused?
Video Production Made Easy.

Truevision's NuVista+ is the ultimate single-slot video card for the Macintosh®. MacroMind® Director® 2.0 is the defacto standard for multimedia presentations and animations. With this combination, professional quality video productions are easier and more affordable than ever.

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Truevision and MacroMind have teamed up to create the Video Production Kit. Purchase a NuVista+ before December 31, 1990 and, you'll automatically receive a copy of MacroMind Director 2.0. Normally valued at $3,690, the Video Production Kit is priced at only $2,995—a savings of $695! It features a NuVista+ (with 1MB of high speed VRAM) along with several special Director diskettes and is ideal for 16 bit/pixel video production. You can upgrade the NuVista+ (for 32 bit/pixel productions) and receive similar savings. So see your Authorized Truevision Dealer for a demo, or call us for more information right away.

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Please circle 174 on reader service card.
MachOne
The MachOne Drive provides up to 600MB of storage with a 1ms access time and transfer rates up to 5MB/sec. All of this at prices which are reasonable, because the MachOne increases productivity, saving time and money. If you are a programmer, and your compile times are cut by 30%, your productivity is increased significantly. You can save more money by sharing the drive with several programmers. If you do graphics and layout and get paid by the piece, the speed of a MachOne can increase your productivity and profitability by a factor of ten. You get more value out of your other equipment too, because it's no longer held hostage by a slow drive.

DOSFloppy
The new DOSFloppy from PLI is a SCSI floppy drive which offers both 360k and 1.2MB disk formats with a single Macintosh drive. Other manufacturers require you to buy two separate drives to fulfill those needs. DOSFloppy is fully daisy-chainable and features external SCSI address and termination switching. AccessPC from Insignia Solutions is bundled, free, with the drive. AccessPC is a CDEV/INIT which causes MS/DOS diskettes to mount on the Desktop, just as if they were Macintosh disks. The files can be opened by double-clicking or copied by dragging in the Finder.

SuperFloppy
The SuperFloppy and TurboFloppy 1.4 are SCSI floppy drives for the Mac, which provide 1.44MB Mac and DOS and 720k DOS diskette compatibility. The SuperFloppy offers the added benefits of 400k and 800k Macintosh compatibility. Both drives are fully compatible with AccessPC and SoftPC from Insignia Solutions. They are also compatible with all of the popular file translation software. This means that, under DOS emulation on your Mac, the floppies will act like DOS drives, and in the Mac's Finder, DOS floppies mount on the Desktop. The drives feature external SCSI ID and termination switches, and auto-eject.
Infinity 40 Turbo

The Infinity 40 Turbo uses removable 44 MB cartridges for convenience and virtually limitless storage potential. It is also extremely fast, with a 20ms access time. The Infinity 40 works on all SCSI Macs and IBM PC AT, XT, PS/2 and compatible computers. MS/DOS files may be accessed on the Mac with our DOSTransfer utility. Bundled free with each (non economy) Infinity 40 for the Mac is Casady and Greene’s A.M.E., the most complete software security package available for the Mac and a $279 value.

Optical Drive

Rewritable magneto-optical drives are becoming more and more accepted as storage solutions for the typical user. The drives offer high-capacity, low cost per megabyte and data integrity far superior to that of conventional magnetic media. They are also surprisingly fast. PLI offers three attractive optical solutions. The familiar single drive Infinity Optical (600MB), the Jukebox Jr. (6.5 Gigabytes) and the Infinity Optical Jukebox (36 Gigabytes). We will work with you to provide the solution you need.

CD ROM Drive

The PL CD-ROM is based on a new, 380ms Sony mechanism. It features a self-cleaning objective lens, audio output through a 1/8” headphone jack and two RCA jacks, full volume control, and external termination and SCSI ID switches. The software supports HyperCard audio XCMDs and multiple volume CD-ROM discs. Also included is a DA, Music Box, which allows the playing and full control of audio CDs in the background.

Peripheral Land Incorporated • 47421 Bayside Parkway • Fremont, California 94538
Call for a catalog or dealer near you (415) 657-2211 or Fax (415) 683-9713
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**Small-town friendly.** We keep in touch with electronic mail and faxes, and by posting messages on our bulletin boards. We even meet in forums to discuss everything from science fiction to sharing software, and to get invaluable personal computer software and hardware support. And that's one of the best things about small towns: people helping people.

**Big-city opportunities.** But we can also shop coast-to-coast at hundreds of nationally known stores, and take advantage of a world-class library. We have access to the latest national and international news. And our special financial files offer complete statistics on over 10,000 NYSE, AMEX, and OTC securities. We can even trade online with our local discount brokers.

**And, just for fun.** We've also got games — everything from trivia to TV-style game shows with live entertainment to interactive space and fantasy adventures. We've got airline schedules, so you can check out the bargains and book your own flights online. We even have listings from over 35,000 hotels.

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CompuServe
Most of the year, MacUser concentrates on business-oriented products: word processors, spreadsheet programs, hard-disk drives, printers, and so on. But all work and no play is, well, boring. To liven things up — and help you shop for the Macophile on your list — we rounded up more than 100 products guaranteed to be entertaining, practical, or just plain strange, and each one costs less than $250. The choices range from tried-and-true utilities to off-the-wall accessories, from shareware classics to Mac-assisted classical music. To round out the list, we solicited ideas from contributing editors Guy The Macintosh Way Kawasaki and Bob Dr. Macintosh LeVitus. Finally, Steven Bobker, who reviewed hundreds of products in Bobker’s Dozen during 1990, reveals his favorites.

If you have the urge to splurge on a certain someone — including yourself — you’re sure to find inspiration in the MacUser 100. For still more ideas, see this issue’s MiniFinders, which contains synopses of previously reviewed products in the categories of education, entertainment, hardware and accessories, multimedia, music, organizational tools, and utilities.
General Interest

**Art Importer**
This nifty program lets you turn EPS and PICT images into PostScript-font characters. Your favorite logos, clip art, signatures, and other graphics are suddenly just a keystroke away, and you can resize images merely by changing the point size. Creating a font is incredibly simple: Just import images to the desired keys, and save the new font. You can have 256 characters per font, including color images. $179. Altsy's Corp., 720 Avenue F, Suite 109, Plano, TX 75074; (214) 424-4888.

**BannerMania**
As the name suggests, this program lets you create eye-catching banners for any occasion — with nary a jaggy in sight. You can use BannerMania’s 50 banner templates, or you can start from scratch with the program’s various fonts, shapes, and special effects. If you don’t like the 19 bundled fonts, you can use any Type 1 font. When completed, your supersized messages print smoothly in color or black-and-white. $59.95. Broderbund Software, 14 Paul Drive, San Rafael, CA 94903; (800) 521-6263.

**Calculator Construction Set**
The Mac’s standard Calculator DA seems awfully limiting to anyone who’s used a full-featured electronic desk calculator. Beefier calculators are available as shareware, but did you ever wish you could create the ideal on-screen calculator for your specific needs? Calculator Construction Set 2.0 lets you do just that. This nerd’s delight comes with several prebuilt calculators, and you can create your own from scratch. By choosing the appropriate keys, functions, and programming, you can simulate anything from a basic adding machine to the supersophisticated HP 41C. You can save the finished product as either a DA or an application. This is no lightweight program — you need a solid understanding of math concepts if you plan to get truly creative, but the results can be worth the effort. $89.95. Dubl-Click Software, 9316 Deering Avenue, Chatsworth, CA 91311; (818) 700-9525.

**CD Companion Series: Beethoven's Ninth Symphony**
**Audio Notes Series: Mozart's The Magic Flute**
If you have a CD-ROM player, you can turn your Mac into the ultimate set of liner notes with one of these HyperCard-based series from Voyager or Warner New Media. Both companies have taken compact-disc audio and combined it with a little multimedia magic to produce recordings that are as entertaining as they are informative. Voyager’s first release was Beethoven’s Ninth Symphony; Warner New Media debuted with Mozart’s The Magic Flute. At press time, Voyager’s follow-up, Stravinsky’s Rite of Spring, was awaiting the release of HyperCard 2.0. Warner New Media was expecting its second release, the Beethoven String Quartet No. 14 in C, Op. 131, by midautumn.

With their real-time commentary on the music, CD-quality audio, and sophisticated graphics, both of these series will hold the attention of anyone with an interest in music. CD Companion Series: Beethoven’s Ninth Symphony, $99.95. The Voyager Co., 1351 Pacific Coast Highway, Santa Monica, CA 90401; (800) 446-2001 or (800) 443-2001 (in CA). Audio Notes Series: Mozart’s
The Magic Flute, $66. Warner New Media, 3500 W. Olive Avenue, Burbank, CA 91505; (818) 955-9999.

**Color MacCheese**

If you’re a casual artist, Color MacCheese offers you 24-bit graphics fun at a price that’s hard to beat. Resolution is limited to 72 dpi and you can save documents only in PICT2 format, but MacCheese has a nice selection of tools, including a polygon and water drop. The rake and transmogrifier—a ray-gun-shaped tool that creates texture effects—are worth the price all by themselves. If you want a professional-quality application, look elsewhere. Otherwise, say Cheese! $99. Delta Tao Software, 760 Harvard Avenue, Sunnyvale, CA 94087; (408) 730-9336. Also available from Baseline Publishing, 5100 Poplar, Suite 527, Memphis, TN 38137; (901) 682-9676.

**Design Your Own Home, Interiors**

**Design Your Own Home, Landscape**

First Abracadata released Design Your Own Home, Architecture, an object-oriented drawing program that lets you create sample floor plans and elevations from supplied templates or from scratch. Assuming you’ve built the house, the firm has now released two programs to complete the process: Design Your Own Home, Interiors, and Design Your Own Home, Landscape. Both packages include sample plans, and you can buy additional libraries of sample plans or region-specific plant libraries. $99.95 each; $29.95 per additional library. Abracadata, P.O. Box 2440, Eugene, OR 97402; (503) 342-3030.

**DeskDraw/DeskPaint**

Whether you’re a dilettante or a professional artist, you’ll find this drawing/painting pair hard to beat. DeskDraw creates object-oriented images, whereas DeskPaint handles bit-mapped graphics. Zedcor packages the two programs together, and each is both a full-featured application and a convenient DA. Version 3.0 adds impressive features to this classic combo’s bag of tricks, including 24-bit color, full rotation, multiple windows, interchangeable color palettes, print previews, and the ability to open and save most file formats. DeskPaint also offers auto-tracing, 180 editable patterns, graduated fills, gray-scale editing, and charcoal and spray-can tools. $200. (For $399.95, you can get Desk, an integrated package of seven DAs that includes the drawing/painting programs plus DAs for telecommunications, word processing, spreadsheets and charts, database work, and appointments.) Zedcor, 4500 E. Speedway, Suite 22, Tucson, AZ 85712; (602) 881-8101.

**EarthQuest**

EarthQuest is an educational HyperCard stack that taps into the growing interest in global communications and the world’s ecology. It has an interdisciplinary approach that combines text, maps, tables, and time lines to show how the earth’s people and systems are interconnected. Four windows let users explore the earth’s natural systems, human history and achievements, environment and ecosystem, and countries of the world. This isn’t a dry presentation—EarthQuest uses animation, interactive games, and samples of languages and music. $79.95. EarthQuest, 125 University Avenue, Palo Alto, CA 94301; (415) 321-5838.

**MacInTax**

Figuring taxes is never fun, but this classic Mac program
can make filing your federal and state income-tax forms slightly less of a chore. MacInTax displays all forms, schedules, work sheets, and statements in the exact IRS format, which you can print on either an ImageWriter or a laser printer. All MacInTax forms are linked, so changes you make in one document are reflected in all others. The 1990 version of MacInTax, including updated federal and state forms, was scheduled for release around Thanksgiving. As they could last year, users who expect a refund can automate the whole process by using MacInTax to file electronically. $99. Softview, 1721 Pacific Avenue, Suite 100, Oxnard, CA 93033; (805) 385-5000.

**MacRecorder**

The Mac comes with a few basic digitized sounds, but some folks demand more. They want to hear their multitaled Macs sound off now and then—in imitation of a trumpeting elephant, or *Star Trek*'s Mr. Spock, or even James Brown singing "I Feel Good!" The three software components of MacRecorder let you record, manipulate, and install an infinite range of new sounds. Farallon also provides a small analog-to-digital sound converter, which can use its own built-in microphone or input from other microphones, CD or audiotope players, and VCRs. $249. Farallon Computing, 2000 Powell Street, Suite 600, Emeryville, CA 94608; (415) 596-9100.

**ParaFont**

This simple program is the quickest, easiest way to create custom fonts that contain fractions, small caps, and ligatures. These special characters are missing from most Mac fonts, but ParaFont lets you easily create a Type 3 font with these refinements, plus old-style writer like me. $129.95. CE Software, P.O. Box 65580, West Des Moines, IA 50265; (515) 224-1995.

**Alarming Events**

Alarming Events is a reminder program that keeps track of appointments and things to do. Appointments pop up no matter what you're doing, your to-do list is updated automatically, and there's an archive of completed tasks. This program is a must if you're a forgetful type like me. $129.95. CE Software, P.O. Box 65580, West Des Moines, IA 50265; (515) 224-1995.

**FlowFazer**

FlowFazer from Todd Rundgren's Utopia Grokware is one of my all-time-favorite programs. It's yet another screen saver, but this one puts a dazzling Lava-Lamp-like display of color onto your screen. Utopia calls it "music for the eye." If you have a color Macintosh, you need FlowFazer. $49.95. Utopia Grokware, 300 Valley Street, Sausalito, CA 94965; (415) 331-0714.

**On Location**

On Location is a must-have. It locates files, by filename or text in the file, at a speed that has to be seen to be believed. It then lets you view or copy text from the file without launching the parent program. Its only flaw is an ugly, nonstandard interface. Still, it's a program I'd have a hard time living without. $129.95. ON Technology, One Cambridge Center, Cambridge, MA 02142; (617) 225-2945.

**Retrospect**

This is the first gift I would give a new Mac owner, because it lets you back up your files unattended. Most people (and I include myself here) don't back up nearly often enough, but because Retrospect has a built-in timer, once you've set it up, you can just about forget it. Retrospect is trouble-free and idiotproof. $249. Dantz Development, 1510 Walnut Street, Berkeley, CA 94709; (415) 849-0293.

**Bob's Best Buys**

Which utilities does Bob LeVitus, author of Dr. Macintosh and Stupid Mac Tricks, have on his supercharged Mac? Here are his five favorites, which are sure to please any discriminating Mac user. He also mentioned that if anybody wants to get him a little something, he'd be quite happy with the $500,000 Uhkitac, featured in the September '90 issue....
numerals or superscript characters. ParaFont creates new PostScript fonts from existing ones, and it can slant, expand, compress, or scale existing font characters. You can even mix and match characters from several different fonts for a unique look. Note: ParaFont creates Type 3 fonts, which are not compatible with ATM (Adobe Type Manager). $99. Design Science, 6475-B E. Pacific Coast Highway, Suite 392, Long Beach, CA 90803; (213) 433-0685.

**SwivelArt**

Tired of 2-D clip art? Then check out SwivelArt. This package of slick, sophisticated 3-D graphics includes 10 fonts and 100 images of equipment, maps, dingbats, and symbols. Using the bundled runtime version of Swivel 3D, you can change the orientation, illumination, perspective, color, and size of the images and then export the finished artwork to other applications in the standard Mac file formats. $129.95. Paracomp, 1725 Montgomery Street, Second Floor, San Francisco, CA 94133; (415) 956-4091.

**The Talking Moose**

One of the most famous Mac novelties, The Talking Moose was originally a shareware offering. Version 3.0, just released commercially by Baseline Publishing, is a full-color animated DA that pops up on your screen at odd moments and says the darnedest things. (The Moose requires Macintosh.) You can choose how often the moose speaks, what he says, and how he says it (he has an interesting Toronto-by-way-of-Neptune accent). This is one of the few Mac gimmicks that doesn't get old quickly. $39.95. Baseline Publishing, 5100 Poplar, Suite 527, Memphis, TN 38137; (901) 682-9676.

**WillMaker**

Drawing up a will is serious business, and if you've been putting this task off, take a look at WillMaker. This program is a simple and thorough way of writing the will you want, and Nolo Press has updated it to include recent changes in the law. WillMaker 4.0 offers more ways to make bequests, provides easier procedures for writing a simple will, and lets you export your will as a word-processing document for custom formatting. WillMaker also provides — on a state-specific basis — the new options for leaving property to children offered by the UTMA (Uniform Transfers to Minors Act). The manual covers the legal concepts of drawing up a will in plain English, and it gives plenty of choices and examples to help you decide what to do with your worldly possessions. $69.95. Nolo Press, 950 Parker Street, Berkeley, CA 94710; (800) 992-6656 or (415) 549-1976.

**Utilities**

**Address Book Plus**

This little application keeps track of names, addresses, and phone numbers and lets you print lists in a variety of formats: mailing labels, envelopes, Rolodex cards, simple phone lists, or address-book pages. You can't customize the predetermined data-entry screen, but there are enough fields and methods of sorting your data to fill most needs and you can use pop-up menus to automate some data collection. Version 2.0, which should be shipping when you read this, adds double-sided printing, extra fields, and the ability to edit entries from a DA. $89.95, or $129.95 with leather binder.
Adobe Type Manager
If you don’t have ATM by now, you should. This ubiquitous utility practically eliminates jagged text on-screen and on paper. It produces sharp, smooth screen displays of PostScript Type 1 fonts at any point size, and it improves the output quality of fonts on non-PostScript printers such as the DeskWriter and ImageWriter. Version 2.0 (just released) is significantly faster than its predecessor. $99. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039; (800) 447-3577 or (415) 961-4400.

After Dark
Protector Shark
The latest Mac gimmick seems to be silly screen savers. Screen savers do have a serious purpose — protecting your screen from phosphor burn-in — but you’d never know it from the bizarre images and ridiculous sounds that erupt from your Mac. After Dark is a classic screen saver, and the latest revision includes 30 modules (many of them new), sound effects (which you can turn off, thankfully), and programmability. Berkeley Systems bills After Dark 2.0 as “the ultimate screen-saver collection,” a bit of hyperbole that is probably warranted by the Satori, Fish!, and Flying Toasters modules alone. $39.95. Berkeley Systems, 1700 Shattuck Avenue, Berkeley CA 94709; (415) 540-5535.

Protector Shark is a screen saver that doubles as a game. When your screen blacks out, a bunch of sharks and little men with harpoons chase each other around the screen. By pressing the space key, you can fire spears from a diver’s harpoon. He gets a point if he hits the shark; if the shark escapes and eats the diver, the shark gets a point. Protector Shark also includes a rubber shark fin to perch on your Mac and SoundMaster files with shark music and screams. $49.95. Ibis Software, 90 New Montgomery Street, Suite 820, San Francisco, CA 94105; (415) 546-1917.

ClickChange
Customizing your Mac’s sounds and desktop appearance is a great way to express yourself, but it usually means cluttering up your System Folder with INITs and cdevs or mastering ResEdit. ClickChange is an all-in-one package that lets you customize the Mac’s buttons, color, cursors, scroll bars, sounds, and windows. You can add 3-D buttons and windows; change the color of buttons, menus, and windows; and replace the five standard cursors. ClickChange isn’t just for fun — the ability to customize scroll bars can be a big benefit to anyone using a large monitor. $79.95. Dubl-Click Software, 9316 Deering Avenue, Chatsworth, CA 91311; (818) 700-9525.

Compactor
This new compression utility is slick. StuffIt may reign as the compression king on most on-line services, but Compactor can compress files as SEAs (self-extracting archives) — something the shareware version of StuffIt can’t do. You don’t need Compactor in order to decompress one of its compressed SEA files. You just double-click on a Compactor SEA, and it unfolds automatically —
Guy's Gift List

The only Mac gift Guy Kawasaki wants is a Mac Plus — strapped into the back seat of a Porsche 911 Carrera/4 with four-wheel drive, ABS brakes, 247 bhp at 6,100 rpm, and a Macintosh interface. List price (1-megabyte version): $70,000. His picks for the rest of us include the new paperback version of The Macintosh Way (HarperCollins, $9.95) plus:

Kiwi Envelopes
All you do with this envelope-addressing DA is copy the name and address from your letter to the Clipboard, launch the DA, and feed your envelope into the printer. It even prints postal bar codes. $49.95. Kiwi Software, 6546 Pardall Road, Santa Barbara, CA 93117; (805) 685-4031.

QuickDex
This simple DA is a database/electronic Rolodex that's a slam dunk to use. It's a little limited in features, but sometimes less is more. What's a field? What's a report? Who cares? $60. Casady & Greene, P.O. Box 223779, Carmel, CA 93922; (408) 624-8716.

Real World PageMaker 4
The inexorable thunder lizard's guide to PageMaker 4.0 by Olav Kvern and Steve Roth, the two guys who know it best. If you know more than this book, you should write one. $24.95. Bantam Computer Books, 666 Fifth Avenue, New York, NY 10103; (212) 765-6500.

StickyBusiness
Label, card, and tag templates for the rest of us. I use only the Avery 5260 template, so I can't claim to be a power user of this product. Just the ability to pick from a wide variety of default labels is enough to make me recommend it, however. $179.95. Williams & Macias, S. 3707 Godfrey Blvd., Spokane, WA 99204; (509) 458-6312.

User-Group Membership
Membership in a user group gives you support and inside information. My favorite is BMUG (Berkeley Macintosh Users Group), which you should join for the newsletter alone. It's thick, irreverent, emotional, and often accurate. Plus you get to say you're a member of BMUG — enough to impress some people. Yearly subscription to BMUG, $40. 1442A Walnut Street, #62, Berkeley, CA 94709; (415) 849-9114.

DynoPage

Dynodex
With DynoPage, you can print any file as double-sided pages. This specialized print driver — accessed through the Control Panel instead of the Chooser — also lets you print custom page sizes, thumbnails of multipage documents, and pages for a personal organizer. DynoPage is a spin-off from Dynodex, an address-book utility similar to Address Book Plus that also can print on one or both sides of address-book or personal-organizer pages. A substantially upgraded version of Dynodex should be available by now. $99.95 each. Portfolio Systems, 21 E. Market Street, Rhinebeck, NY 12572; (800) 729-3966.

HandOff II
This extremely useful utility solves the annoying problem of not being able to open a file because you don't have the creating application. It lets you specify, for example, that Word should open all documents created by MacWrite. HandOff II is also a full-fledged file launcher similar to On Cue. Besides allowing you to launch any application from a pop-up menu, HandOff lets you set the color depth and sound level to be used when launching specific applications, and it enables you to group related files into "briefcases" that can be easily accessed from HandOff's menu. $79.95. Software Innovations, P.O. Box 811, Allen, TX 75002; (214) 727-2329.
How Many Programs To Change A
It's amazing how many kinds of light illuminate our world. From lamps that burn brightly to sparks that flicker warmly, light is all around us. So while nature offers sunbeams that blaze and moonbeams that shimmer, man creates fluorescents that flash and neon that flickers. Yet, perhaps most scintillating is the light that kindles our hearts with its own kind of resplendent radiance— for it shines the brightest of all.

This is no joke. Because now it takes just one program to do everything you see in this ad. In fact, Adobe Illustrator® software Version 3.0 did just that. So if you'd like to discover what this remarkable new program can do for you, call 1-800-344-8335 for the name of your nearest Adobe Authorized Dealer® (outside the U.S.A. and Canada, call your local distributor).

It could be enlightening.
HyperHit

HyperCard isn’t the world’s fastest database application (Apple never said it was). However, it does offer an infinitely flexible interface and thorough control over both text and numeric data. For those who are proficient with HyperTalk scripts and the use of XFCNs and XCMDs, HyperHit 3.0 provides a powerful selection of these external software tools. With them you can mimic high-level programming, and your customized database stacks can always export their data (as comma-delimited text, for example) for later use in a more powerful application. $195. SoftStream International, 19 White Chapel Drive, Mount Laurel, NJ 08054; (609) 866-1187.

HyperTools

This two-package HyperCard tool kit offers sophisticated controls over the usual variables such as button icons, field properties, and cursors. More-elaborate tools handle fonts, object alignment, scripts, sounds, precise graphics, and limited animation. There are also developer-level tools for revealing hidden objects, stack structures, and resources and for defining sorts and formatting data. HyperTools 2.0 supports all incarnations of HyperCard, from the first release to the long-awaited version 2.0. Packages 1 and 2, $99.95 each. Trendware Corp., P.O. Box 2285, Huntington, CT 06484; (203) 926-1116.

MultiClip

MultiClip is a handy utility that lets you expand the Mac’s Scrapbook and Clipboard capabilities, most notably by letting you save more than one item on the Clipboard at a time. It also lets you save multiple Clipboards (which MultiClip calls ClipFrames), back them up, and edit your clipplings. Version 2.0 adds several new features, including pop-up menus of ClipFrames, a search capability, and the ability to print thumbnails of ClipFrames. $129. Olduvai, 7520 Red Road, Suite A, South Miami, FL 33143; (305) 665-4665.

Norton Utilities for the Macintosh

SUM II

Peter Norton Computing, one of the more creative PC software developers, introduced its Norton Utilities for the Macintosh in mid-1990. Mac users anticipated a head-to-head battle between Norton and the popular SUM (Symantec Utilities for Macintosh) — but Symantec liked Norton’s package so much that it bought the company! Now SUM II and Norton Utilities are both available from Symantec. Both packages can diagnose and repair disk errors, recover (most) lost or erased files, and defragment files and optimize disk performance. SUM II and Norton Utilities perform these tasks somewhat differently; SUM has a more established track record on the Mac, but a fair number of Mac aficionados prefer the elegant Norton interface. Norton Utilities for the Macintosh, $129; SUM II, $149.95. Symantec, 10201 Torre Avenue, Cupertino, CA 95014; (800) 441-7234 or (408) 253-9600.

Now Utilities

Most Mac users sort through dozens of utilities before settling on the handful they actually use. Now Software has simplified your search by bundling a dozen basic utilities, most of which are destined to become handy additions to your repertoire (see review, September ‘90, page 105). The offering includes AlarmsClock, which displays
the time and date in the menu bar and warns of scheduled appoint-
tments; Now Menus, which controls the appearance and font styles of
menus, windows, and dialog boxes; DeskPicture, which replaces
desktop patterns with PICT images; Print Previewer, which provides
on-screen print preview for applications that don’t have it;
MemorySetter and Profiler, which configure and analyze the oper-
ating system and hardware; and StartUp Manager and Persistence,
which control the icons and activity of INITs and cdevs. Future
releases will include the popular shareware program Boomerang
(see the “Bobker’s Dozen Best” sidebar). $149. Now Software,
520 S.W. Harrison Street, Suite 435, Portland, OR 97201; (503)
274-2800.

Palmtop Link
CasioLink
Message Mover

Palmtop Link and CasioLink connect the Mac to
two popular electronic organizers — the Sharp
Wizard and the Casio B.O.S.S. (Business Organizer
Scheduling System). Palmtop Link consists of file-
exchange software and cables for transferring files
between your Mac and the hand-held Wizard. It
includes software for data transfer and conversion,
calendars, scheduling, time accounting, expense
management, and phone and to-do lists. You can use
Palmtop Link to create spreadsheet, HyperCard,

8 Shareware Classics

Shareware programs do their
own work without bells and whistles,
and they give you a pretty good
idea of what features you want
in a commercial product. A
range of shareware applications
is available from user groups,
through commercial shareware
vendors, and from on-line serv-
ices such as Zmac. (Look
elsewhere in this issue for in-
formation on how to join Zmac.)
Be sure to pay the shareware
fees, which are minimal — it’s
really the only way to ensure a
steady stream of shareware in
the future.

Address Book

Address Book keeps names,
adresses, and phone numbers
in a clear and logical mini-
database. You can export the
text when you decide to upgrade
to a commercial database pro-
gram, but you may never want
to. This easy-to-use DA has
good search capabilities and
even dials the phone number
for you. $20.

BiPlane

BiPlane is a fully functional
spreadsheet program whose
spreadsheets can hold 1,000 x
1,000 cells of data. It has no
macros or charting capabilities,
but you can format each cell
according to font, size, and style
and it has more than 30 func-
tions for building mathematical
formulas. Includes a DA. $40.

Calendar DA

Calendar DA is just what it
says. Choose it from the Apple
menu to display a monthly cal-
endar with space for daily ap-
pointments. When you type in
an engagement, the day is
highlighted on the monthly
calendar. Calendar DA will be
around for a long time — it has
dates well into the next millen-
num. $10.

MacBillboard

MacBillboard is as simple as
the original MacPaint, and re-
freshingly so. It has a paint-
brush, pencil, rectangle, circle,
patterns, lasso, and multiple
fonts. But where it really shines
is in letting you compose and
print large-format paintings
such as posters (hence its
name). From CE Software’s Don
Brown. $39.95.

MiniWriter

MiniWriter is a DA for basic
text editing. You can type a letter
with it, but you wouldn’t want
to write a book. It has a standard
Find button and multiple fonts,
and it prints PostScript files on
a LaserWriter. $12.

ZTerm

ZTerm is the most versatile
of the shareware telecommuni-
cations programs that let your
Mac send data through a mo-
dem. It supports several file-
transfer protocols and VT100
emulation. If that isn’t enough,
you probably need a commer-
cial package. If you’ve just
bought a modem or are unsat-
isfied with your modem’s soft-
ware, give ZTerm a try. $40.
database, or other files from Wizard data or to move Mac data into Wizard programs. CasioLink connects the Mac to the Casio B.O.S.S. It includes two cables and a disk with a HyperCard stack; a phone number, address, and business-card directory; an appointment scheduler; and a memo pad that you can use with either the Mac or the B.O.S.S. Palmtop Link, $149.95; CasioLink, $109. Traveling Software, 18702 N. Creek Parkway, Bothell, WA 98011; (206) 483-8088.

Message Mover is software that enables you to transfer text and spreadsheet data to your Mac from the Atari Portfolio palmtop computer. The package includes the necessary serial cable. $149. Computer Friends, 14250 N.W. Science Park Drive, Portland, OR 97229; (800) 547-3303 or (503) 626-2291.

Partner
Partner is a handy tool for anyone who needs to integrate text and graphics. By harnessing the power of MultiFinder, this INIT lets you quickly access graphics applications while still inside another program. Once you’ve created or imported a graphic with Partner, you can edit it on the page in your favorite page-layout or word-processing program without ever returning to the creating graphics application. Partner enables you to save all your publication’s components — fully editable graphics and text — in a single file, and it can place graphics files into programs that normally don’t accept them. Partner works with most word-processing, page-layout, and painting programs. $99. Salient, 3101 Avalon Court, Palo Alto, CA 94306; (415) 852-9567.

Polly MacBeep
This silly-but-fun utility lets you randomize the playing of particular beeps by assigning a “weight” to each sound — the higher the weight, the more often that particular sound is played. Now you can space out how often your coworkers hear those weird sounds — such as high-pitched screams and strange animal noises — that are funny every now and then and incredibly annoying if repeated too often. You can use Polly MacBeep to steal sounds from other applications and documents (as long as they’re saved as standard Mac snd resources), and it comes with a wide variety of beep replacements that should appeal to Macophiles of all ages. (A MacUser favorite is Marge Simpson admonishing, “Be nice!”) Polly MacBeep was created by the same team that developed Color MacCheese. It’s incompatible with several INITs, but because it costs only $10, you may not mind the inconvenience. Delta Tao Software, 760 Harvard Avenue, Sunnyvale, CA 94087; (408) 730-9336.

StuffIt Deluxe
If you’ve used an on-line service for longer than 30 minutes, chances are you’ve run across a .SIT files. These ubiquitous bundles of compressed data are the work of StuffIt, a masterpiece of Mac programming. Developed primarily by Raymond Lau, the original program (still available as shareware) has become the commercial product StuffIt Deluxe.

The new version still compresses graphics, applications, and text documents into files suitable for efficient storage or faster modem transmission, but it also offers some powerful new features. An extension called Magic Menu adds StuffIt commands to the Finder’s menu bar, and built-in scripting automates backups of compressed
files. StuffIt Deluxe offers password protection, handwritten electronic “signatures” for verification, and DES encryption. In case these Mac features aren’t enough, the new StuffIt can decompress IBM-format ZIP and ARC files. Shareware version (StuffIt Classic 1.6), $25; StuffIt Deluxe, $99.95. Aladdin Systems, Deer Park Center, Suite 23A-171, Apts, CA 95003; (408) 685-9175.

**Type Reunion**

**Fontina**

These two utilities can bring order to a disorganized, interminable font menu. Type Reunion alphabetizes the font menu by family name (such as Times) and places the styles and weights in submenus; it can reduce the length of your font menu by up to 75 percent. Fontina takes a different approach: It leaves all font styles on the main menu but reorganizes them so that family members appear together. In either case, you will finally be rid of that nonsensical B Palatino Bold. Type Reunion, $65. Adobe Systems, 1585 Charleston Road, P.O. Box 7900, Mountain View, CA 94039; (800) 447-3577 or (415) 961-4400. Fontina, $69.95. Eastgate Systems, P.O. Box 1307, Cambridge, MA 02238; (617) 924-9044.

**Hardware**

**Jukebox Five**

Jukebox Five is an elegant solution to a simple problem — namely performing unattended floppy-disk backups or formatting multiple disks. This disk feeder attaches to the Mac floppy-disk drive and automatically loads and ejects up to 15 disks. Jukebox Five is completely self-contained: It hangs by a plate on the front of the drive and runs on AA batteries; you can also plug it in to an outlet via an adapter. It’s compatible with the Mac SE, SE/30, and Mac II line. $199. Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809; (504) 291-7221.

**LabelWriter**

Using the Mac to address envelopes looks professional, but feeding envelopes into a laser printer can be a real nuisance. One solution is the LabelWriter, a dedicated label printer that plugs into the Mac’s serial (modem) port. It lets you quickly and professionally print 1-1/3-inch address labels, and you can print to it from within any application. The LabelWriter is compact (3 x 6 inches), and it uses thermal direct printing technology — in other words, you never need to replace the toner. $249.95. CoStar Corp., 22 Bridge Street, Greenwich, CT 06830; (203) 661-9700.

**MacSpeaker**

As sound applications get more sophisticated, the need for high-quality sound grows. If you use CD-ROM, multimedia, or music applications, or if you just want to add a little punch to your presentations, check out MacSpeaker. This pair of speakers plugs into the Mac’s sound-output jack and mounts on the side of any monitor (or you can place the speakers away from your Mac). The speakers are magnetically compensated to protect the monitor from magnetic fields that can affect its picture.
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.

Look at the Service...

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.

Don’t Take Our Word for it...

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.

You, Consider the Alternatives...

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.

DriveWare, our drive utility, provides the best SCSI partitioning, password protection, error correction, diagnostic and help software.

Available with every drive, award-winning utility software packages (Sum II and Virex) plus over 10 megabytes of Shareware and Freeware programs.

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

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You can use MacSpeaker with additional audio equipment such as synthesizers, CD and laser-disc players, and VCRs. $199. Monster Design, 274 Wattis Way, South San Francisco, CA 94080; (415) 871-6000.

**MacTrac**

Ergonomics is “in,” and anything that makes working at your computer more comfortable is attracting attention. With that in mind, MicroSpeed has redesigned its trackball, MacTrac, to fit the shape of your hand. The new model has a longer, sloped design with a wrist rest, making it more comfortable to use than the standard mouse. Of course, a trackball has other advantages too, the major one being that you can use it in a confined space. The people at MicroSpeed also claim that MacTrac can help you play a mean game of Tetris. Mac Plus and 512K interface, $99; ADB interface, $119. MicroSpeed, 44000 Old Warm Springs Blvd., Fremont, CA 94538; (415) 490-1403.

**MousePenMac**

MousePenMac is a stylus-type device that gives you the power of the mouse with the feel of a ballpoint pen. It’s a direct mouse replacement, and it provides you with much more dexterity when doing drawing, painting, CAD, or other graphics. Because it works in a 3-inch-square space, MousePenMac is particularly useful for users of portables and anyone else whose space is limited. $129. APPOINT, 1332 Vendels Circle, Suite 101, Paso Robles, CA 93446; (800) 448-1184 or (805) 239-8976.

The Cordless Mouse removes most of the constraints of working with a mouse attached to your keyboard. Instead of using a cable, the Cordless Mouse transmits an infrared signal, and it can be operated from 5 feet away and at a 45-degree angle. $149.95. Basic Needs, 2342 Meyers Avenue, Escondido, CA 92029; (800) 633-3703 or (619) 738-7020.

**Single Inline Memory Modules (SIMMs)**

Does your Mac sometimes razz you with “Insufficient memory” messages? Is your System Folder so full of INITs and deep-sea screen savers that you can’t load your word processor? Fortunately, plummeting SIMM prices make it easy to add RAM, as long as you’re careful and follow instructions. Mac SIMMs operate at different speeds; if you buy the fastest RAM you can afford, it will probably still be useful when you move up to a faster Mac.

Dozens of vendors sell SIMMs, and prices change daily; check a publication such as MacWEEK for current prices. Be sure you get all the necessary installation tools and instructions. SIMM sources include MacConnection, 14 Mill Street, Marlboro, NH 03456; (800) 334-4444. Microtech International, 158 Commerce Street, East Haven, CT 06512; (800) 325-1895 or (203) 468-6223. Newer Technology, 7803 E. Osie Road, Suite 105, Wichita, KS 67207; (800) 678-3726 or (316) 685-4904.

**Switchboard**

Switchboard is a user-configurable keyboard comprising independent modules that you can rearrange or change to suit your needs and the computer you’re working on. It’s engineered to work with Macs and with the IBM PC XT, PC/AT, PS/2, and compatibles. The
basic Switchboard has a 105-key layout with removable numeric, cursor, and alphabet keypads that can be repositioned into six different layouts. A trackball module is available at additional cost; other modules should be out by the time you read this. $239.95; trackball, $149. Datadesk International, 9314 Eton Avenue, Chatsworth, CA 91311; (818) 998-4200.

The Tandy Connection

Do you covet a portable? Have you stopped yourself from buying Tandy's inexpensive 102 laptop ($350) or WP-2 word processor ($600) because of concerns about Mac compatibility? Fret no more. Cabochon’s 100duet and WPduet interface kits let you upload and download files (with formatting intact) between Tandy portables and the Mac. The interface kits include a cable that connects to the RS-232C port on your Tandy and to the older DB9 or newer mini-8 male connection port on the Mac; an adapter for use with the Tandy Portable Disk Drive; and a word-processing, file-transfer, and translator program for your Mac that supports formats such as MacWrite II, WriteNow, and RTF. *This* is the portable kit for the rest of us. $99.95. Cabochon, 1740 Massachusetts Avenue, Boxborough, MA 01719; (508) 264-4648.

**WristMac**

There are lots of ways to turn your Mac into the ideal electronic Filofax — with a database, an address-book application or DA, or with HyperCard's Address and DateBook stacks. But after you've entered all those names, addresses, phone numbers, and appointments, the most portable way to take all that data on the road is with WristMac. In addition to being a full-featured digital watch, WristMac can transfer up to eighty 24-character messages from — and to — QuickDex, Focal Point, 4th Dimension, HyperCard, and other applications. WristMac's HyperCard software lets you build multiple master lists and can even be used as a stand-alone scheduler and address book. From the plastic-bodied WristMac Standard to the stainless-steel Executive Gold, all systems come complete with watch, cable, and software. WristMac Standard, $149; Colored (red, green, blue, yellow, or gray), $149; Executive, $199; Gold or Silver, $249; Pocket WristMac, $199. Microseeds Publishing, 7030-B W. Hillsborough Avenue, Tampa, FL 33634; (813) 882-8635.

**Accessories**

**Comfort Zone Back Cushion**

**Ergonomic Footrest**

One way to boost productivity is to make your working environment more comfortable — it’s easier to work if you aren’t dwelling on your aching back. Two products that can help are the Comfort Zone Back Cushion and the Ergonomic Footrest. The cushion supports the back and spine so that your posture is improved, reducing the risk of muscle strain. The footrest positions your legs for better circulation. Comfort Zone Back Cushion, $29.95; Ergonomic Footrest, $34.95. ACCO International, 770 S. Acco Plaza, Wheeling, IL 60090; (708) 541-9500.

**Computer Critters**

Looking for something for the Mac owner who has everything? Computer Critters are plush arms, legs, snouts, ears, and tails that let you turn your Mac into a rabbit, dragon,
Although the fasteners bulldog, or bear. For better or worse, they’re the cutest peripherals on the market. Dragon or bulldog, $34.95; rabbit or bear, $29.95. Computer Critters, P.O. Box 5401, Hacienda Heights, CA 91745; (818) 333-7273.

**Deskettes**
These brightly colored acrylic storage drawers are a stylish and efficient way to keep your floppies in order. They can hold a lot of bytes—the smallest model stores 72 disks and the largest model holds more than 1,100. Deskettes come in clear acrylic for shy, retiring types and fluorescent blue, green, or red for the more outrageous among you. Depending on size and color, Deskettes range in price from $14.95 to $219.95. Deskette, 1501 E. Chapman Avenue, Suite 168, Fullerton, CA 92631; (800) 323-6545 or (714) 996-6645.

**Footer for the Macintosh**

**Quake/Grip Desktop Fastening System**
Anyone who experienced last year’s 7.1 earthquake in the San Francisco Bay Area knows that excessive vibration is not good for Macs, their peripherals, or their owners. Even if you don’t live on a fault line, you might want to protect your equipment from unexpected shocks caused by natural disasters or just plain clumsiness. Enter Footers for the Macintosh, a set of four disks (made of a special energy-absorbing compound) that you place under your equipment. The Footers absorb and dissipate vibrations, and for ImageWriter users, they have the advantage of reducing excessive printer noise. Set of four Footers, $49.95. Monster Design, 274 Wattis Way, South San Francisco, CA 94080; (415) 871-6000.

Velcro USA claims that its Quake/Grip Desktop Fastening Systems were 100-percent effective in preventing equipment damage during the San Francisco earthquake among an installed base that includes businesses, hospitals, schools, and households. Quake/Grips are industrial-strength Velcro fasteners that have a holding strength of 5 to 30 pounds each (depending on size). A kit for a compact Mac consists of four footpad fasteners and two “leashes,” which protect the keyboard while still allowing free movement. Although the fasteners are impressively strong (they can even discourage would-be thieves), equipment can still be moved and reattached as needed. Kit prices range from $15.95 to $36.95 (quantity discounts available). Velcro USA, P.O. Box 2422, Capistrano Beach, CA 92664; (800) 666-4302 or (213) 258-4747.

**Hercules Computer Condom**
The Hercules Computer Condom is probably the ultimate in tasteless-gag gifts—a dustcover for the Mac that looks like a prophylactic. It was developed by an engineering student at the University of Arizona to help pay for his master’s degree. The Condom is made of heavy-duty antistatic vinyl and is heat-sealed by a method developed by another UA student. It comes in a condomlike package, but unlike the real item, a Computer Condom can be rerolled and stored in the resealable package until you next need it. $24.95 plus $5 shipping (state computer and monitor type). Byte-Me-Hardware, P.O. Box 3738, Tucson, AZ 85722; (602) 327-4893.

**JetFill**
Owners of Hewlett-Packard’s popular DeskJet, DeskJet Plus, and
DeskWriter printers now have a way to recycle their toner cartridges. JetFill is a cartridge refiller that looks like a huge hypodermic needle and makes a potentially messy job a lot easier. You simply insert the needle into the top of the toner cartridge, and a premeasured supply of ink refills the cartridge. JetFill contains custom-formulated ink, and you can use it to refill a toner cartridge up to ten times. $12.95. JetFill, 2021 Guadalupe, Suite 8A, Austin, TX 78705; (800) 749-2993 or (512) 469-5647.

**Mickey Mouse Mouse Pad**

**MonsterMat**

If you like to whistle while you work, then you’ll probably like Mickey Mouse Mouse Pads. These round, brightly colored pads may not improve your productivity, but they will add to your office ambience. Computer Giftware has a licensing agreement with Walt Disney, so expect more Disney-character mouse pads and disk holders in the future, including a Dick Tracy mouse pad. $15.95. The Computer Giftware Company, 521 State Street, Glendale, CA 91203; (818) 500-7857.

The MonsterMat is a monstrous (30 x 22 inches) mouse pad that doubles as a desk blotter. Why would you want such a gigantic mouse pad? Well, it’s hard to steal; it lets you use your mouse over the entire surface of your desk; and if you spill coffee on it, you won’t damage or stain it. Also, it looks cool. $39.95. Limit Zero, 247225 Ontario, El Toro, CA 92630; (714) 361-2661.

**Neon Ultimate SE Bag**

**Madson Portable Case**

Sometimes you and your Mac have to go places, and on those occasions, it’s nice to have something spiffy to carry the Mac around in. The Neon Ultimate SE Bag features straps and accents in not-to-be-overlooked colors — fluorescent green, hot pink, or brilliant yellow. The case has outside pockets for manuals, mouse pads, and disks, plus padded inside pockets for the keyboard and the mouse. It has a water-resistant shell and high-density foam padding. $139.95. I/O Design, 924 Springdale Drive, Exton, PA 19341; (800) 241-2122.

With the Madson Portable Case, you can create a movable office wherever you are. You can keep airline tickets, keys, pens, paper, battery packs, and disks in the outside pockets, and by partially unzipping the case, you can set up the Portable without taking it out of the case. The Madson Portable case has been updated since we reviewed it in the September ’90 issue (see Pinstripe Picks, page 42): You now have access to the back of the Portable, so you can plug it in without taking it out of the case; there’s a side opening that lets you insert disks; and the pouch for the AC adapter and recharger is attached to the strap with Velcro tabs, $145. The Madson Line, P.O. Box 338, Corte Madera, CA 94925; (415) 927-3600.

**Entertainment**

**The Cycles: International Grand Prix Racing**

**The Duel: Test Drive II**

These black-and-white games are just the ticket when you feel the need for speed. In The Cycles: International Grand Prix Racing, you
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race high-powered motorcycles at 15 race courses that copy those on the actual professional circuit. The Duel: Test Drive II puts you into an expensive European sports car for a driving duel with a computer-controlled car. You race over mountains, through forests, and along coastal roads and highways. Two optional car disks available for The Duel add other European supercars or American muscle cars. There are also optional scenery disks: the California coastline and great highways of Europe. Where else can you drive a hot car as fast as you want and get rewarded for outrunning the highway patrol? The Cycles: International Grand Prix Racing, $49.95. The Duel: Test Drive II, $54.95. Car and scenery disks, $21.95 each. Accolade, 550 S. Winchester Blvd., San Jose, CA 95128; (408) 985-1700.

Darwin’s Dilemma
Darwin’s Dilemma is a challenging game loosely based on the ideas of evolution. Your mission is to get lower life forms to combine and evolve into complex ones. At each level of evolution, you come across new creatures and dilemmas, and you may have a tough time evolving into homo sapiens. This game requires planning and clear thinking, and it can quickly become addictive. The creatures are nicely rendered in color. $49.95. Inline Design, 5 W. Mountain Road, Sharon, CT 06069; (203) 364-0063.

Ishido: The Way of Stones
Ishido: The Way of Stones is one of those rare finds that make you glad you own a Mac. Already nominated for Best Strategy Program of the Year by the Software Publishing Association, Ishido is the master of stone or tile board games such as Shanghai and mah-jongg. The purpose is to make matches of the various stones you draw from a pouch. An easy-to-learn but deceptively challenging game, Ishido is adorned with magnificent graphics and wonderful sound, and the color version is stunning. You can edit and create your own stone sets and playing boards and play solitaire or against another player. Ishido’s oracle answers your existential questions when you’ve completed a coveted four-way match. The oracle’s answers are based on the I Ching: The Sacred Books of China.

Until recently, Ishido was available only in an expensive, limited collector’s edition. Now it’s finally repackaged and affordable for the general public, and you’re in for a real treat. $54.95. Accolade, 550 S. Winchester Blvd., San Jose, CA 95128; (408) 985-1700. A limited number of walnut-boxed collector’s editions ($175) are available from Publishing International, 333 W. El Camino Real, Suite 222, Sunnyvale, CA 94087; (408) 738-4311.

P-51 Mustang
This jewel of a simulator puts you into the cockpit of a P-51 Mustang fighter. You dogfight against the deadly German Me109 and strafe ground targets such as planes, trains, trucks, and buildings. P-51 Mustang has a 3-D simulator with various outside views as well as full views from the cockpit. You have to learn to navigate by sight and compass while you are flying to and from your targets. The built-in video recorder lets you play back
exciting sequences of your mission from any viewing angle. When you’re ready for the ultimate challenge, go head-to-head against another player. Expect a color polygon version of P-51 by the time you read this. $59. Ball’s Eye Software, P.O. Drawer 7900, Incline Village, NV 89450; (702) 265-2298.

**PuzzleMaker**

**Puzzle Suite**

PuzzleMaker is for people who like jigsaw puzzles. It lets you create puzzles out of any graphic image and then move, stack, flip, or rotate the pieces. The real challenge is putting the pieces back together to form the original image. $49.95. ImateQ Systems, 3553 31st Street N.W., Suite 125, Calgary, Alberta T2L 2K7, Canada.

Puzzle Suite is a collection of six classic logic puzzles — Escape!, Pentominoes, Solitaire, Switch, Target, and Triangle. Sample solutions are provided for all puzzles, and you can save and replay solutions one step at a time. (At press time, there was a bug that you could circumvent by moving all the files out of the Solutions folder.) $34.95. Dodeca Graphics Ltd., 7024 W. Wisconsin Avenue, Wauwatosa, WI 53213; (800) 347-1146.

**SimCity**

If you’re tired of the local politicians ruining your neighborhood, SimCity gives you the chance to show them how to do it right. SimCity — a simulation of a city environment, complete with crime, pollution, and natural disasters — is a Macintosh classic. You control the budgets; create industry; build shopping centers, parks, and stadiums; and develop transportation while the city grows and changes before your eyes. You have to meet the ongoing demands of your constituents (called Sims) and juggle a dozen things to keep your city running smoothly. SimCity comes in both black-and-white and color versions. There’s also a Terrain Editor that lets you customize the geography and cities. If you prefer a global challenge, the soon-to-be-released SimEarth lets you mold a planet from a gas cloud through the evolution of life to the nuclear age. SimCity, $49.95 (black-and-white) or $79.95 (color). Terrain Editor, $24.95. Maxis, 1042 Country Club Drive, Suite C, Moraga, CA 94556; (800) 521-6263 or (415) 376-6434.

**Sky Shadow**

Written by the author of the phenomenally popular Crystal Quest, Sky Shadow looks like another winner for Casady & Greene. In Sky Shadow, your mission is to protect your hometown from the evil Razoropers (you’re provided with missiles, bombs, and a protective force field). You pilot a ship that looks like a battered saucepan (or is it a mutant flying pig?) across a colorful landscape. To refresh your supplies, you must land the ship at an airstrip, which isn’t as easy as it sounds (and nearly impossible to master in Mega-Mode). Part of the appeal of this fast-moving, exuberant, offbeat game is the sound effects, such as cheers after you’ve made a successful hit, gasps for breath when things start getting a little hectic, and the cries of the injured. As we said in our October ’90 review (page 82), Sky Shadow isn’t the best game to play in the office. $49.95. Casady & Greene, P.O. Box 223779, Carmel, CA 93922; (408) 624-8716.
Solarian II
Solarian II is a fast-paced action game with 256 colors and great sound. It’s one of the few games on the Mac with a true arcade-quality feel. In fact, Solarian is so good that it’s likely to keep you up nights. The graphics are extremely smooth while still showing off the Mac II’s color capabilities. Solarian’s programming quality rivals Crystal Quest’s, but its performance feels more like that of the arcade game Galaxian. Its addictive theme develops as your expertise grows. $25. Shareware (you can get a copy from most on-line services, including Zmac).

Welltris
Welltris is a more advanced and interesting variation of the hit game Tetris, designed in the Soviet Union and brought to the U.S. by Spectrum Holobyte. In both games, you drop various geometric objects down a wall, moving and turning them to form a row. When you’ve formed a complete row, it disappears and you gain bonus points. If you don’t complete rows fast enough, pieces stack up haphazardly and the game ends. Welltris re-creates this in three dimensions. You look down a square “well,” with objects dropping from any of the four sides. Beware: This may sound simple or silly, but Welltris (like Tetris) has been known to infect even the most resistant minds, turning users into zombielike players. The game comes with beautifully rendered Russian scenes (in color) and lively Russian folk tunes. $39.95. Spectrum Holobyte, 2061 Challenger Drive, Alameda, CA 94501; (415) 522-1164.

Children’s Programs

Cosmic Osmo
Cosmic Osmo is an impressive feat of HyperCard engineering that takes you or your child on a magic journey through a strange universe. You explore the world by clicking on objects on the screen. Everything, from singing potato heads to cotton-swab missiles, has a hidden function. Cosmic Osmo is filled with great drawings, digitized sounds, and animations and an unbelievable assortment of characters. From the creators of Manhole, Cosmic Osmo gives your kids the rare combination of learning and exploration along with great entertainment. The CD-ROM version includes more worlds and more music (playable on an audio-CD player when you want to get your Mac back from the kids or vice versa). Disk version, $69.95; CD-ROM, $79.95. Activision, 3885 Bohannon Drive, Menlo Park, CA 94025; (415) 329-0800.

Discis Books
This CD-ROM series of beautifully produced classic children’s books uses music, sound effects, and the books’ original illustrations to entertain children and encourage them to read for themselves. The titles range from Beatrix Potter’s The Tale of Peter Rabbit to Scary Poems for Rotten Kids. The books on CD-ROM discs available at press time were aimed at children aged 6 to 11, although many younger children (and probably a few parents) will also enjoy them.
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The books appear on-screen as actual pages with text and illustrations. If you click at the beginning of a sentence, it is highlighted and read aloud. By clicking on a word, the child can hear pronunciation, an in-context definition, or a second-language translation (some of the books are available with Spanish, French, or Cantonese dictionaries). Clicking on objects in a picture identifies them. Parents or teachers can customize all these options. If you have kids and a Mac, these wonderful books are one of the best reasons for buying a CD-ROM drive. Discis books cost from $69.95 to $89.95. Discis Knowledge Research, 45 Sheppard Avenue E., Suite 802, Toronto, Ontario M2N 5W9, Canada; (416) 250-6537.

It's a Plot

If you have a budding mathematical genius in your midst, this “take home” exhibit from the Exploratorium, San Francisco’s hands-on science antimuseum, might be just the ticket. Designed for kids from sixth grade up, It’s a Plot enables children to plot constant, linear, quadratic, cubic, sine, sum of sines, exponential, and exponential-sine equations. It has an informative help screen, the ability to test yourself on how a plot will look, and an easy-to-use interface that requires a minimum of Macintosh knowledge. $20. The Exploratorium, 3601 Lyon Street, San Francisco, CA 94123; (415) 563-7337.

KidPix Professional

Although the Mac interface is easy to use, it wasn’t developed for the average four- or five-year-old. KidPix Professional is a kid-sized paint program that introduces children to the Mac while letting them create all sorts of interesting pictures in black-and-white or color. The tools are basic versions of those available in sophisticated paint programs, such as a rubber stamp, pencil, brush, spray can, and other tools that can create swirls, star bursts, or blobs of paint. Kids can add text without using the keyboard: Letters are displayed at the bottom of the screen and can be pasted onto the picture. Originally a public-domain program, KidPix has been enhanced and is now commercially available. New features include a help screen and sounds (for example, letters of the alphabet are spoken when selected). $35. Digital Artworks, 1925 Baily Hill Road, Suite F, Eugene, OR 97405; (503) 344-6541.

List Learner

Learning lists of words, formulas, dates, scientific terms, definitions, or quotations is a chore, and students welcome anything that makes it a little easier. List Learner is an interactive learning tool that was written by Phil Wyman, a member of Apple’s HyperCard development team. List Learner divides information into “items” and their “associations,” much like a dictionary, and students can test their knowledge, using flash cards or matching-quiz modes. List Learner grows with the student: A basic knowledge of the Mac and HyperCard are all you need to start, but users with advanced knowledge of HyperCard and HyperTalk can modify List Learner to suit their needs. $59.95. Selective Memory, P.O. Box 710098, San Jose, CA 95171; (800) 695-0915 or (408) 371-5595.
Once you put MiniCad+ on your desktop...

All your other CAD software will go here. Trash

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.

Discover Our Dimensions

MiniCad+ is an award-winning 2D/3D package. Whether you’re designing a house or high-tech mousetrap, you’ll find the precision you need.

Smarter than the Average Mouse

Our “Smart Cursor” automatically highlights, identifies and aligns relevant snaps, intersections, tangents and parallels. Snap to the precise point every time with more ease than you’ve experienced with any other program. We built the brains into MiniCad+ so you can think of more important things.

Track, Compare, Analyze

Unlike any other drawing program, MiniCad+ provides an integrated worksheet—literally, a spreadsheet and database in one—hot-linked to your drawings. Attach records such as type, cost, P.O. number or size and display at will. As you change an object’s attributes, the worksheet will automatically be updated. Compute area calculations, compile parts schedules and develop cost estimates. No longer will you tediously count objects in your drawing manually—the worksheet will count it for you.

Programmability

Don’t be confined by your CAD program. Extend the capability of MiniCad+ by developing your own palettes with our macro language. You can create your own Facilities Management palette, for instance. We've included a wide variety of special-topic palettes with MiniCad+—others are available from third-party vendors.

Draw on Our Experience

Packed with features, the only thing small about MiniCad+ is the price. There’s not another high-precision, professional package with such a low price tag.

MiniCad+ is the price/performance leader in Macintosh CAD, so don’t throw your money in the Trash. You owe it to your crowded desktop to ask your favorite distributor for MiniCad+, or call us for more information.

Graphsoft

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Canada: (604) 380-6911; Great Britain: (41) 71 731 7930; Australia: (61) 7 369-1204; Japan: (81) 3 360 6531

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The Playroom

The Playroom is an educational program that doubles as entertainment. Our three-year-old tester, Sean, needed only half an hour to learn all the Mac moves required to navigate through the program. He thinks he’s just playing games, but he’s also learning to tell time, count, read, spell, tell stories, and use analytical skills. Occasionally the program’s response time is frustratingly slow, which may tempt preschoolers to repeatedly punch the mouse button in a fruitless attempt to speed things up. In general, though, The Playroom’s six games — The Cuckoo Clock, The Mixed-Up Toy, The Mousehole, The Spinners Toy, The ABC Book, and The Computer — will delight most young children and hold their attention. $49.95.

Broderbund Software, 14 Paul Drive, San Rafael 94903; (800) 521-6263.

Where in Time Is Carmen Sandiego?

The latest entry in the immensely popular Carmen Sandiego series has you chasing Carmen through time. These “games” are actually educational programs that teach geography and historical facts through a detective motif. This time around, Carmen and her gang of thieves (who will soon be the stars of an animated TV show!) are out to heist the world’s priceless treasures from various time periods. You use the Chronoskimmer to follow your suspects to different countries in different times. By searching the area and interrogating witnesses, you gather the historical clues needed to capture the bad guys. Fortunately, the game comes with a copy of The New American Desk Encyclopedia to help you understand and interpret the clues. Other games in this series are Where in the World Is Carmen Sandiego?, Where in the USA Is Carmen Sandiego?, and Where in Europe Is Carmen Sandiego? $49.95 each. Broderbund Software, 17 Paul Drive, San Rafael, CA 94903; (800) 521-6263.

Resources

The Art of Human-Computer Interface Design

This comprehensive volume examines one of the most important aspects of computers — the user interface. It was conceived by S. Joy Mountford, manager of the Human Interface Group at Apple, and Brenda Laurel, who edited the 50 articles on the relationship between humans and computers. Topics range from practical studies to philosophical discussions to prophesies of a world in which cyberspace and multimedia systems are commonplace. This 500-page tome looks daunting, but once you’ve sampled the thought-provoking and fascinating material it contains, you’ll find it very hard to put down. $26.95. Addison-Wesley Publishing Co., Route 128, Reading, MA 01867; (617) 944-3700.

Encyclopedia Macintosh

Encyclopedia Macintosh is just that — a compendium of everything you might possibly want to know about the Mac and its methods. Written by Craig Danuloff and Deke McClelland, the book is divided into four sections: System
Broadcast-quality video is finally coming to the Macintosh.

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INTELLIGENT RESOURCES
Software and Utilities, Applications, Hardware, and Resources. The Applications section features easily photocopied reference pages with hot-key shortcuts for some of the major Mac programs. $26.95. Sybex, 2021 Challenger Drive, Suite 100, Alameda, CA 94501; (415) 523-8233.

**GEM CD-ROM**

**USA Factbook CD-ROM**

For anyone with a CD-ROM drive, the GEM CD-ROM disc contains almost an overabundance of material — 620 megabytes of the newest public-domain and shareware software. (GEM, according to Wayzata Technology, stands for Generous Efforts of Many.) It includes art and graphics, business tools, sound files, INITs and edevs, utilities, and several hard-to-categorize files such as instructional training. Note: The GEM disc was designed with multiple partitions to speed access time and allow the handling of large numbers of files and icons, so you need to use a driver (such as the Trantor Systems Driver and Optical Media International Driver) that supports multiple partitions.

The USA Factbook CD-ROM disc is an almanac of the United States and its territories. This disc is updated annually and includes maps; vital statistics; and information on state geography, government, politics, economies, and traditions. GEM CD-ROM, $119; USA Factbook CD-ROM, $139. Wayzata Technology, 16221 Main Avenue S.E., P.O. Box 87, Prior Lake, MN 55372; (800) 735-7321 or (612) 447-7321.

**Guide to the Macintosh Family Hardware**

This book is a must-buy gift if you know a systems programmer or engineer or if you’d like to investigate the Mac’s inner workings yourself. The second edition of this manual, written by staff at Apple, is the official and definitive guide to the hardware design of all Macs from the Plus to the IIfx (as well as earlier models). Chapters look at major features such as memory and power supplies and describe the way each feature is implemented on each Mac model. There’s a glossary of technical terms and a list of specifications for each type of Mac. This book will prove invaluable to anyone who needs to understand how Mac hardware works, to create compatible software and hardware. $26.95. Addison-Wesley Publishing Co., Route 128, Reading, MA 01867; (617) 944-3700.

**The Little Mac Book**

**The Mac Is Not a Typewriter**

These small, attractive paperbacks, both written by Robin Williams (no, she’s not that Robin Williams), are basic introductions to working with the Macintosh and making the most of its graphic and typesetting capabilities. *The Little Mac Book* is a simple but thorough introduction to using and understanding the Macintosh. It’s written at a fairly basic level, but in conjunction with *The Macintosh Bible*, it’s an ideal gift for a new Macintosh owner, especially the student on your list.

*The Mac Is Not a Typewriter* should be required reading for every writer and designer who uses the Mac. It covers everything you need to know to turn out professional-looking
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The Macintosh Bible
What Do I Do Now?
Calling any book the bible of its kind risks celestial disfavor, but The Macintosh Bible is one book for which the hype is wholly kosher. You’ll find this fat volume (and a very few others) on the bookshelves of Macintosh troubleshooters, evangelists, experienced system managers, teachers, and power users. The third edition of The Macintosh Bible (edited by Arthur Naiman) expands on the already thorough coverage of basic Macintosh hardware, system software, popular applications, and so on.


Macintosh Repair and Upgrade Secrets
In this immensely helpful guide for the technically adept, author Larry Pina clearly lays out the steps required to repair or upgrade Macs ranging from the Lisa and Macintosh XL to the 128K and SE. Pina starts with safety rules and preliminary checks and then launches into troubleshooting to help you diagnose and solve your problems. The book explains upgrade options for audio, video, disk drive, RAM, ROM, and SCSI. Even if you’d rather leave major repairs or upgrades to the professionals, this guide is worth having on your bookshelf just for the education you’ll get and the ability to speak knowledgeable with dealers and technicians. $32.95. MacMillan Publishing, Front and Brown, Riverside, NJ 08075; (800) 257-5755.

Stupid Mac Tricks
Bob LeVitus is probably best known for his book Dr. Macintosh ($19.95, Addison-Wesley), and he’s also responsible for MacUser’s Help Folder (see his gift picks elsewhere in this article). His new book (with companion disk) is called Stupid Mac Tricks, an appropriate title for this compendium of all the silliest Macintosh shareware programs, including MacBarf, the original Fish! screen saver, Sexplosion, a demo version of the Talking Moose, and SoundMaster.

The book briefly but lovingly describes the history of each of the 14 gems included and tells you how to install the programs for maximum enjoyment and minimum disruption to your system. $19.95. (Note: Some of the included software requires you to pay shareware fees if you continue using the software after test-driving it.) Addison-Wesley Publishing Co., Route 128, Reading, MA 01867; (617) 944-3700.
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Bobker's Dozen Best

During the past year, I reviewed and rated hundreds of products in Bobker's Dozen. Here are the 13 that I feel are the cream of the crop and the reasons why. I've tried to pick products in a wide variety of categories, such as hardware, information sharing, and utilities. In categories where there are a lot of products, I've included runners-up. And because some of these products have been upgraded since the original reviews appeared, I've updated the information and noted any new features.

**Boomerang**
The time you spend working at your computer can be separated into productive time and nonproductive time. Maintenance and navigation don't directly produce useful results, but you can't avoid them either. Boomerang is a file-and-folder-management utility that reduces nonproductive time dramatically. It has simply taken over my Open and Save dialog boxes. I don't need to use anything but Boomerang to find any file or put a file anywhere. Since I wrote my original review, Boomerang, which was shareware, has been acquired by Now Software and rechristened Super Boomerang, and it will be added to Now Utilities (see the “Utilities” section of this article). Super Boomerang has a new interface and a couple of new features.

As much as I like Boomerang, Aladdin's Shortcut has much the same functionality, plus the ability to look into compressed Stuffit files. But Boomerang has the edge because of its smooth interface and the way it handles recently opened files and folders. Registered Boomerang owners can get a free upgrade to the commercial version by contacting Now Software, 520 S.W. Harrison, Suite 435, Portland, OR 97201; (800) 327-3611.

**Complete Undelete**
Complete Undelete is a nearly perfect example of a single-function utility. It's elegant and transparent, and it works when you need it, without fail. I move lots of files around, and occasionally I lose a file I want. Every time I make that kind of dumb move, Complete Undelete saves me. It's been criticized for not doing something it was never designed to do: Recover files lost before it was installed. In my view, that's simply sour grapes. The slick power of Complete Undelete makes it my Mac product of the year.

$79.95. Microcom Software, P.O. Box 51816, Durham, NC 27717; (919) 490-1277.

**Disinfectant**
Disinfectant is a free antiviral program remarkable for its power, elegance, and speed. New versions capable of detecting the latest viruses appear on national on-line services within a day or two of a virus's discovery. John Norstad, the author, works with other antiviral-tool authors (including those with commercial products) to analyze new viruses and find ways to neutralize them. The latest version, 2.0, includes a superb automatic-prevention INIT.

As for runners-up, Symantec's SAM 2.0 has a super prevention module called SAM Intercept. Symantec's 24-hour hot line has information that lets users update SAM to combat new viruses. Rival, from Microseeds, works a bit differently from the way most prevention tools do, checking files as they are opened. It's fast and hard to beat—you another five-mouse program.

However, Disinfectant stands apart for its incredible built-in information and documentation file, which just keeps getting better and better. Available free from on-line services such as Zmac. John Norstad, Academic Computing and Network Services, Northwestern University, 2129 Sheridan Road, Evanston, IL 60208; CompuServe: 76665.573; AppleLink: A0173.

**Disk Doubler**
File compression makes saving and transmitting files far more efficient. The resultant time and storage-media savings generally translate to cheaper operation. The old standard, Stuffit, does a good job, but it doesn't save nearly as much space as Disk Doubler does nor is it as quick. Since I last covered Disk Doubler, Salient has released version 2.0, which is faster and has the ability to decompress Stuffit files. Salient is also distributing free INITs and applications that can only unpack Disk Doubler archives. Thus, if you have Disk Doubler, you can send other people your archive and the small decompression utility so they can access everything you sent. $79. Salient, 3101 Avalon Court, Palo Alto, CA 94308; (415) 852-9587.

**Exposure Pro**
This screen-capture utility has gone through a lot in its short life. Originally a lackluster, inconsistent product called Exposure, it's been beefed up and renamed Exposure Pro. The new version is finally reliable, and it can even capture "uncatchable" screens such as active modules in Pyro! and After Dark. Exposure has more graphics capabilities than some basic graphics programs, and it's slick performer once you've mastered its odd and (to my eye) ugly interface. It's still huge (more than 300K), but if you have the room and memory to use it, no other program can do the job quite as well. It's a real productivity champ.

As for runners-up, Capture 3.0 is still the choice when space counts (physically, it's the smallest). Other near-winners in this crowded field are SnapJet and Image Grabber. Exposure Pro, $139.95 (requires System 4.1 or later). Preferred Publishers, 1770 Moriah Woods Blvd., Memphis, TN 38117; (901) 683-3383.

**Number Munchers**
Number Munchers (its verbal cousin is called Word Munchers) teaches a variety of basic math skills to students in grades 3 through 6. The difficulty levels are...
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The easy levels are easy, and the hardest levels will challenge allowing who le classes to use it effectively. The administrative infinitely variable and easy for parents or teachers to set and adjust. The administrative design is as superb as the play mechanics. $49.95. MECC, 3490 Lexington Avenue N., St. Paul, MN 55126; (800) 228-3504, (800) 782-0032 (in MN), or (612) 481-3500.

SuperGlue II
SuperGlue II is a standard. People use it because they can share documents without everyone's having the actual application. SuperGlue is a print-to-disk utility that turns any file — text, spreadsheet, database, page layout — into a PICT graphic that can be viewed page by page, edited, and printed with the SuperViewer DA. Or you can simply pop the captured images into another publication. SuperGlue lets you insert information into programs that don't accept many file formats and preview images, even though your application doesn't have a preview option. If you send the freely distributable Glue Viewer DA with your images, other users can open and print them. The package also includes GlideNotes, which lets you add the electronic equivalent of Post-it notes to the images. $119.95. Solutions International, 30 Commerce Street, Williston, VT 05495; (802) 658-5506.

SuperLaserSpool
There's no reason to wait for even the fastest printer — a good spooler will always be faster. SuperLaserSpool is the best, most reliable spooler on the market. Don't be put off by the "Laser" in the name: You can use this spooler with any printer. Even ImageWriter users will want it in preference to SuperSpool. SuperLaserSpool is the first spooler to work with the DeskWriter. Indeed, it's so useful that you should consider it a basic part of any DeskWriter package. Fifth Generation Systems, 10049 Reiger Road, Baton Rouge, LA 70809; (504) 291-7221.

Shanghai
No other game has endured as long as Shanghai, a testament to its quality and addictiveness. Shanghai can be played on many levels, and most games take roughly the same amount of time to play, no matter what their level. This is great, because other multilevel action games can take forever once you've become good. Anyone can win at Shanghai, although good players will win far more frequently (a nice change from adventure games that can be won only by the young and the quick). Shanghai is also a very attractive game, especially in its color versions.

Shanghai's runner-up is PipeDream (Lucasfilm), an arcade game that rewards foresight and planning. Its main drawback is that games take too long (half an hour or more) once you've gotten really good. Shanghai, $29.95. Mediagenic, 3885 Bohannon Drive, Menlo Park, CA 94025; (415) 329-0500.

Silverlining
Silverlining has bailed me out of so many tough situations that I've lost count. It works well on every brand of hard disk I've used, and it's easy to use. As a bonus, the newest versions include a disk-optimization feature. There's a lot of power in Silverlining, and that makes reading the manual mandatory, as careless use can damage your files. For real power use, there's a "secret" diagnostics menu that you can display by typing Command-D. Be very careful when using these tools! $99.95. La Cie, 15652 S.W. 90th Street, Tualatin, OR 97062; (800) 999-0143 or (503) 691-0771.

Virtual
You can never have too much memory, even if it isn't physical RAM. Virtual gives you up to 14 megabytes of effective RAM — finally, you have the working room to use MultiFinder effectively. It's very reliable, but for those who have problems, Connectix runs one of the best technical-support operations I've come across. Virtual should be a strong contender even after System 7.0 is released. Requires a 68030 CPU or separate PMMU. $199; $275 with PMMU chip. Connectix, 125 Constitution Drive, Menlo Park, CA 94025; (415) 324-0727.
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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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Hot Multimedia Tip

Do your multimedia presentations lack punch? Incorporate the excitement of music with MIDIplay, new from Opcode Systems. It’s an easy to use MIDI playback device that allows a soundtrack to be played alongside your Macromind Director, HyperCard or SuperCard files. You can create your own soundtrack with EZ-Vision and you can even have the sound come directly from your Mac’s speaker with Passport’s Sound Exciter. For additional information on how to enhance your multimedia presentations with music, contact one of CDA’s Mac/MIDI consultants.

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<td>AE DataLink Express w/MP-5 External</td>
<td>$1099</td>
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<tr>
<td>AE DataLink Mac Internal (Mac II)</td>
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<td>Zoom 2400 Baud w/cable &amp; software</td>
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<tr>
<td>Prometheus 2400 Baud Internal (Mac II)</td>
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<tr>
<td>Compserve Information Service</td>
<td>$23</td>
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<tr>
<td>Compserve Navigator 3.0</td>
<td>$49</td>
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</table>

**Prometheus ProModem 2400**

This full featured 2400 baud external modem is AT-command compatible and comes complete with MacKnow-ledge communications software and cable. The nonvolable RAM allows you to stores numbers and your favorite configurations for immediate access. $189

**Networking**

<table>
<thead>
<tr>
<th>Networking</th>
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<tbody>
<tr>
<td>Euroallion PhoneNET StarController 300 MB</td>
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<td>Euroallion PhoneNET StarController EN</td>
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<td>Euroallion PhoneNET Connector (DIN-8)</td>
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<td>Euroallion PhoneNET Connector 10-Part</td>
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<td>Euroallion Timbuktu 3.1</td>
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<td>Euroallion Timbuktu/Remote 1.01</td>
<td>$123</td>
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<td>Euroallion Timbuktu/Remote Access Pack</td>
<td>$815</td>
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<td>Dayna Communications DaynaTalk PC</td>
<td>$209</td>
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<tr>
<td>Dayna Communications EtherPrint</td>
<td>$549</td>
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<tr>
<td>Asante MacCon + IEET</td>
<td>$554</td>
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<tr>
<td>Asante MacCon + SE/30ET</td>
<td>$534</td>
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</table>

**PhoneNET Card for Ethernet**

Now Mac SE/30 and Mac II family users can use the increased speed and bandwidth of Ethernet running over ordinary phone wire. The built-in 10BASE-T transceiver lets you attach twisted-pair phone cable directly to your Mac — no external connector or transceiver needed. (Timbuktu software included) $439

**The Rival 19” Monochrome Display by Mega Graphics**

MacWorld Magazine rated the Rival the top performing WYSIWYG big-screen — outranking dual-page displays costing much more. Its darkened glass screen effectively enhances contrast and reduces glare. MacUser Magazine.

Rival 19” Monochrome w/video card. $1199

Rival 19” Gray Scale (Mac II) w/video card. $1195

Rival 19” Gray Scale (SE/30) w/video card. $2169

**Monitors & Video Cards**

<table>
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<th>Monitor</th>
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<tr>
<td>Magnavox Mac Color 11” RGB</td>
<td>$159</td>
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<td>NEC MacSync 11” Color HVC</td>
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<td>Apple High Resolution 14” RGB</td>
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<td>E-Machines Color Pr-26 w/video card</td>
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<td>RasterOps 24” Trinitron w/8 bit card</td>
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<td>Micron 8-bit Video Card (Mac II, SE/30)</td>
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<td>Apple Display Card 8.24</td>
<td>$719</td>
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<td>Generation Systems Publisher SE Card</td>
<td>$560</td>
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<tr>
<td>Generation Systems 24-bit Video Card</td>
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</tbody>
</table>

**Video Upgrade** - Upgrade your 4-bit Video Card to 8-bits and display up to 256 shades of gray or color simultaneously. $89

**Video Adapters by Generation Systems**

Now you can output directly to a television and/or VCR for color display and video recording.

TV Board is an 8-bit video card and NTSC output in one. Installs in the NuBus Slot of any Mac and displays up to 256 colors. $459

TV Box is an external NTSC output device which uses the RGB signal generated by Apple's color video boards to reproduce 256 or 16.7 million colors at once w/Apple's 8 or 24-bit cards. $279

**Mass Microsystems QuickImage 24**

QuickImage 24 features a live preview window which lets you see the incoming video images.

With QuickImage 24 you can instantly capture 24-bit, full-motion, color or 8-bit grayscale images and import them directly into publishing, presentation, and graphic applications. $699

**Mass Microsystems DataPak**

Whether you're doing desktop publishing, generating mounts of spreadsheets, or producing thrilling desktop videos, you need a DataPak. The DataPak removable cartridge drives are an easy way to add storage capacity at an affordable price. Each drive comes with a free copy of DiskDoubler software and two year warranty.

DataPak (25MB) footprint. $979

DataPak Duet (40MB footprint) $299

DataPak Duo (Mac II, II, lfx footprint) $899

DataPak Duet II (55MB footprint) $1599

DataPak Hex (Mac IIc, lfc footprint) $825

**Input / Output Devices**

<table>
<thead>
<tr>
<th>Device</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>DataDesk Mac 101 Plus</td>
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</tr>
<tr>
<td>DataDesk Foreign Language Keyboard</td>
<td>$159</td>
</tr>
<tr>
<td>Mouse Systems Little Mouse</td>
<td>$75</td>
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<td>Kensington Turbo Mouse ADB</td>
<td>$109</td>
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<td>Altex Felix</td>
<td>$119</td>
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<td>Wacom Tablet</td>
<td>Please call for pricing</td>
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<tr>
<td>Kurta Tablet (8 1/2” x 11”)</td>
<td>$279</td>
</tr>
<tr>
<td>Microseels WristMac (Executive Mode)</td>
<td>$189</td>
</tr>
</tbody>
</table>

**Switchboard by Datadesk**

Arrange your keyboard layout into a position that is most comfortable for you! Datadesk's Switchboard is designed for right and left handed users and is compatible with both Macintosh and IBM computers. $175

Trackball & Function Key Option Available
Adobe Illustrator 3.0 w/ATM

Now more powerful than ever with all new advanced text handling, graphing, blending capabilities, and presentation graphics options. Comes with Adobe Separator, ATM, Pantone Matching System, free technical support, an advanced tips and techniques guide, and a whole lot more! $279

Virex by Microcom

Eliminate the possibility of ever loosing important files and data due to virus infection. Virex continuously monitors your systems so that all virus infections are prevented from entering. Virex will also repair files, disks or drives that are already infected $252

Security
A.M.E. by Casady & Greene $165
Sum V.02 by Symantec $87

Spreadsheets
Excel V.2.2 by Microsoft $245
Wings V.1.1 by Informix $245

Utilities
Drive Management Can Opener V.1.1 by Aibbot Systems $64
Norm Utilities V.1.0 by Peter Norton $84

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At CDA we offer only top quality products that have proven to be the best in the industry. If an item does not meet our rigorous quality standards, we won't sell it to you. All of the items listed in this advertisement have been selected as the best within their category. If for any reason you're not 100% satisfied with any product you've purchased, you can take advantage of our 30 Day Money Back Guarantee!

Adobe Illustrator

The Magic of Mac, The Power of People

CDA Computer Sales

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Looking Back

THE YEAR IN REVIEWS

To help you put 1990 in perspective, here are the highlights of MacUser's product coverage in the major software and hardware categories.

The year 1990 was a busy one at MacUser — we reviewed, tested, and pondered the merits of nearly 1,500 Macintosh products. In our quest to shed light on all things Mac, our coverage ranged from the sublime (the new Mac IIIfx, in May) to the ridiculous (a half-million-dollar UltraMac, in September). To put 1990 in perspective and to give you a running start on 1991, we offer this quick overview of MacUser's 1990 product coverage, along with a few hints about what to expect in the year ahead. For a detailed directory of product reviews in all categories, see the MiniFinders that appeared in the August issue (MiniFinders is also available on-line via Zmac).

By Bruce Mewhinney


**Accelerators**

In August MacUser Labs tested and dissected 30 accelerator and cache cards that can be used with most Macs. These products supersede the Mac's CPU (or add math coprocessor and PMMU chips) and offer a substantial performance boost. We found that Apple's own upgrades were competitively priced and sometimes clearly superior to other upgrade options. Apple's "wicked fast" IIfx upgrade (for Mac II and IIx owners) scored the ultimate five mice. Our May issue included favorable reviews of two cache cards for the Mac Iici and Mac II: DayStar's Fast Cache Iici and Dove Computer's MaratHlon Racer.

In March we tested four SCSI accelerators to see how much they speed up data transfer between the Mac's CPU and a hard-disk drive. The winner? There wasn't one — none of these specialized NuBus boards did much more than put a dent in your wallet. However, these boards were pushing fast DMA (direct memory access) long before Apple officially sanctioned it, so we may see improvements on these products in 1991.

**CAD**

A wave of flashy, powerful computer-aided-design software arrived in 1990. In August we surveyed the professional CAD packages available on the Mac. Although many of these packages are adapted for use in specialized markets, the majority offer 2-D and 3-D tools for a broad range of industrial design. After examining products from 60 companies in various categories, we suggested you look at AutoCAD, Ashlar Vellum, MicroStation Mac, DynaPerspective, and Architrition II or put together a combination of packages to suit your specific needs. Some of the newer programs deliver numeric machine control, animation, or photorealistic image-rendering; many also provide output to color printers, plotters, and video recorders. Reviews of CAD products also appeared in March (Super 3D, Swivel 3D, Origins), April (Aperture), May (StrataVISION 3d and Ashlar Vellum), July (Blueprint), August (Radius QuickCAD Graphics Engine), and October (MacDraft).

**CPUs**

The superfast Mac IIfx workstation and three entry-level, affordable Macs made their debut this year, but so did GUI (graphical user interface) kid stuff — namely, Windows 3.0 for IBM PCs and compatible computers.

In May we turned our spotlight onto Apple's newest high-end Mac, the IIfx. With some slick microchip engineering and speedy video refresh, the IIfx is the computer for the most power-hungry power user. A $2,999 IIfx upgrade for the original Mac II offers a relatively painless way to maximize performance. In 1991 and beyond, many of the IIfx's high-performance features will be available in more-affordable Macintoshs.

In September we profiled some serious competition to Apple's elegant Mac Portable: the Outbound Laptop System, Colby SE/30, and Dynamac SE/30. Despite being the heavyweight, the Mac Portable survived our road tests and led the pack with a 4.5-mouse rating. Apple and Outbound clinched a midyear rating, however, with Apple officially sanctioning Outbound's light, modular design. With sluggish sales of the original Mac Portable, Apple has dropped the price a full $1,000.

Also in September, we compared Windows 3.0 (Microsoft's mousey new graphical user interface) to the Macintosh's Finder and operating environment. Our authors, with many years' experience using both PCs and Macs, declared a tie for raw performance (at similar prices). The Mac was a solid winner in the ease-of-use and functionality categories, but Windows 3.0 had the edge in affordability. Apple's new System 7.0 and Microsoft's OS/2 (with Presentation Manager) for high-end PCs may turn 1991 into an interface battleground.

"In Search of the Ultimate Mac" (September) highlighted two monster Macs surrounded by an overwhelming wish list of pricey, high-powered peripherals. For those of us on a real-world budget, the article also included a souped-up Mac Plus. Finally, Apple's long-awaited introduction of low-budget Macs (see "Three Cheers for Three New Macs," in this issue) helped dispel suspicion that the Mac has evolved into a computer for the well-heeled.
Connectivity

Superfast networks and efficient mainframe links are no longer the impossible dream for corporate Mac users. In our May comparison of two active-star concentrators for use on LocalTalk networks, Farallon's StarController edged out Nuvotech's TurboStar. In June our Networking Buyer's Guide offered a complete education in connectivity concepts, technology, and available hardware/software. Articles included "How to Set Up the Perfect Network," "Are You Ready for Ethernet?" and "EtherTalk-to-LocalTalk Routers." In this issue, "The Invisible Bridge to Mainframe Data" looks at three products that connect your spreadsheet and database applications to your company mainframe's vast data resources. As lively as the connectivity market was in 1990, it will surely accelerate in 1991, as Macintoshes continue to invade corporate networks.

In Bridges, our monthly section dealing with networking issues, we discussed file-transfer software, fax modems, and the finer points of TCP/IP and UNIX. In 1991, Bridges will continue to help Mac users adapt to multiplatform environments.

Databases and Forms

Although still catching up to established PC systems, relational database programs for the Mac offer improved speed and sophisticated features. In January our coverage of forms-management software showed how such programs can combine database links and graphic-design tools. We reviewed SmartForm, TrueForm, and Fast Forms and peeked at several programs about to be released. The September issue contained favorable reviews of Fast Forms and the newer Informed Designer.

Our June issue featured the four strongest Mac databases: 4th Dimension, Omnis 5, Double Helix 3.0, and FoxBASE+/Mac. All received positive reviews, with 4th Dimension earning a five-mouse rating. In later issues, we reviewed File Force (September), Acius' new midlevel database software that's compatible with 4th Dimension, and C•A•T III (October), relational database software for marketing-contact management.

Desktop Publishing

After much anticipation, quality color and prepress capabilities are finally wending their way to the Macintosh. Our May issue offered a comprehensive look at color publishing on the Mac, from input technologies through processing techniques to output options. In our monthly DTP section, we discussed the rapidly evolving fields of color calibration (March) and prepress links (November) and questioned whether Pantone works as an electronic color standard (May). The DTP section also provided sage advice on choosing a service bureau (May), handling registration problems and color proofing (July), auto-tracing and generating outline fonts (August), and choosing a type-manipulation program (see "Type" in the DTP section in this issue).

The page-layout market was also in high gear during 1990. In January our review of then-current contenders gave the nod to QuarkXPress over PageMaker and Ready, Set, Go!. At year's end, that recommendation stands, despite a plethora of upgrades and new products. Besides the impressive QuarkXPress 3.0 (reviewed in November), other new high-end releases we reviewed include PageMaker 4.0 (September), DesignStudio (June), and RagsTime (June). In 1991 long-document publishing should finally gain a foothold on the Macintosh, thanks to Mac releases of FrameMaker (reviewed in November) and Ventura Publisher (scheduled for release this month).

Display Systems

In April we tested 19 monochrome Mac display systems. Apple's 15-inch Portrait Display was our first choice; runners-up included RasterOps' ClearVue, Sigma Designs' 19-inch L-View and 21-inch SilverView, and the Apple Two-Page Monochrome. Our May Buyer's Guide examined 18 full-color display systems and gave a thorough technical overview of hardware and software variables that affect a purchase. Our small-screen favorites were the E-Machines ColorPage T16 and Apple High-Resolution RGB. Among the large-screen displays, we recommended the RasterOps 708+ Display and the SuperMac 19" Trinitron Color Display.

"The Golden Age of Gray Scale" (October) reported on tests of gray-scale display systems from CalComp, Radius, RasterOps, and SuperMac. All performed well, but the SuperMac 19" Platinum Display earned a five-mouse rating. Unless another vendor offers similar quality for less money, SuperMac will remain the gray-scale leader in 1991.

Graphics

The Macintosh's numerous graphics file formats—PICT, TIFF, EPS, and so forth — can be a major source of confusion. To help you sort it all out, we produced the "MacUser Guide to Graphics Formats," a pull-out poster in our September issue that contained
a comprehensive glossary of file formats plus extensively researched information about format compatibility and conversion capabilities for 43 applications.

In April we reviewed ten object-oriented drawing programs; our picks included Canvas for everyday use, FreeHand for type-intensive or mixed-format art, Illustrator for professional PostScript graphics, and Dreams for precisely dimensioned drafting. We also looked at Photoshop (July), a popular new color-retouching program. By early 1991, we should be seeing a new generation of graphics programs, including Illustrator 3.0, FreeHand 3.0, Studio/32, and some amazing new animation applications.

Money Management

In 1990 Mac software expanded its role in business accounting, especially for small- and moderate-sized companies. In March we analyzed five programs for preparing federal income-tax returns. MacInTax Federal 1989 earned a five-mouse rating for its wide selection of forms, worksheets, and tools: 1989 Personal Tax Templates, an inexpensive and customizable template package, was the runner-up.

In May we reviewed 17 accounting packages and made recommendations for one-write, corporate, and consolidated systems. Our picks included atOnce!, Mind Your Own Business, MultiLedger, Computerized Classic Accounting, and Insight.

OCR

Optical-character-recognition software now offers a wider range of "intelligent" features for text analysis. In July we examined the top contenders in OCR software and gave the highest marks to OmniPage, with AccuText running a close second. For high-volume scanning, we suggested looking at Calera’s TopScan or Caere’s Parallel Reader. More recently, Caere has announced Typist, a hand-held scanner with built-in OCR software that scans a page and exports the text directly to any active Mac application.

Printers

The past year saw better, faster color printing as well as higher-quality, less expensive black-and-white printers. In May we looked at the complex science of color printing — including inkjet, thermal wax transfer, and sublimal-dye thermal transfer — and analyzed software that translates PostScript images for non-PostScript color printers. We tested 14 color printers. The Tektronix ColorQuick was our favorite inkjet printer. The QMS ColorScript 100 Model 10 (with PostScript) was tops among thermal wax printers. The high-end Mitsubishi S340-10 wowed the crowd with sharp, realistic sublimal-dye colors (despite its $13,995 price and difficult setup).

In September MacUser Labs reviewed Apple’s new line of personal laser printers and gave thumbs-up to the “classy, inexpensive” Personal LaserWriter SC and Personal LaserWriter NT. With increasing competition in the printer market, we predict even lower prices in the future.

For our October issue, we thoroughly tested 19 PostScript printers. The Texas Instruments micro Laser PS35 came out on top in the personal-printer category. The Dataproducts LZR 1260i won our vote for both DTP and corporate use. We rated the higher-resolution VariType VT600P best for camera-ready output that doesn’t have to be "magazine quality." In “The Next Wave of Personal PostScript Printers,” we previewed five soon-to-be-released PostScript contenders. We’ll review these promising newcomers in upcoming issues.

In April MacUser Labs examined print spoolers — software that buffers LaserWriter and ImageWriter print files. SuperLaserSpool and SuperSpool topped the list (both are now sold by Fifth Generation). In November, we examined the latest in QuickDraw printers.

Scanners

“The Art of Scanning” in the May Color Buyer’s Guide surveyed scanner techniques and technologies and examined data-compression, color-correction, and image-manipulation software. In September MacUser Labs took an inside look at 29 scanners in five categories: flatbed, sheetfed, overhead, hand-held, and slide models. The flatbed Microtek MSF-300Z proved best for color work, and the Agfa Focus II 800GSE topped the list for gray-scale scans. For very-high-resolution images, we chose the Truvel TZ-3 overhead scanner. Nikon’s LS-3500 was judged the best slide scanner, and Thunderware’s LightningScan emerged as the best hand-held scanner.

Charts and Statistics

In January we explained how to create drawings prevalent in business — organization charts, programming plans and procedures, and flowcharts. The three software packages reviewed — DiagramMaker, MacFlow, and TopDown — all earned four-mouse ratings. A recent upgrade may put TopDown at the head of the class, however; look for a review in an upcoming issue.
In April we looked at four heavy-duty statistical-analysis programs: Data Desk, Exstatix, JMP, and StatView. Citing the diverse qualities of these programs, we found no clear winner; instead, we recommended carefully matching their strengths to your needs. In November we followed up with a report on three high-end statistics packages. We liked SYSTAT for its Mac-like interface and SPSS for its wide range of functions, and we recommended Minitab for users with limited funds and hardware.

### Storage

In 1990, the options for affordable mass data storage multiplied— as did the risks of losing data.

**Magnetic Hard-Disk Drives.** In February we examined the speed, reliability, service/repair options, and bundled software of 101 hard-disk drives with capacities of up to 100 megabytes. The Jasmine DirectDrive 40 and Microtech Nova 40, which both used the Quantum ProDrive 40S mechanism, were our favorites. Jasmine now sells its direct drive with a Fujitsu mechanism. Both Jasmine and Microtech sell their products by direct mail-order only. We recommended Apple’s expensive 80-megabyte Hard Disk 80SC and the 40-megabyte Heart HD 1040 for people who prefer the convenience and security of buying from a retail outlet. In this issue, look for our picks in big, fast hard-disk drives (see “Moving Up to a Big, Fast Hard-Disk Drive”).

March’s “To the Rescue” showed you how to cope with disaster—floppy-disk- and hard-disk-drive crashes, data loss, corrupted desktops and drivers, and even dreaded SCSI termination.

**Optical Drives.** The year 1990 brought important news in optical media. Although read-only compact discs may slowly replace traditional book libraries, erasable optical discs now offer the most economical mass storage option.

In March we reviewed six CD-ROM players. The CD Technology Porta-Drive and the more expensive Toshiba XM-3201 A1 MAC rated four-and-a-half mice. Apple’s AppleCD SC and Optical Media International’s OM! ProCDP rated slightly lower. Our conclusion: “Speed will improve in the next few years, but it will never approach that of hard drives or nonstandard optical media.” That is, CD-ROM has emerged as an effective distribution medium but is not as practical in daily data retrieval as are other media.

In November we tested 20 erasable optical drives. The fast FWB HammerDisk 600S and the Storage Dimensions MacinStor were our favorites. The drives we tested showed that cost-effective erasable optical technology has arrived. Next year will bring a battle between them and the established, lower-capacity SyQuest removable-hard-disk drives.

### Telecommunications

Modems are going from fast to faster, but the fastest aren’t necessarily reliable or even compatible with each other. In January, MacUser Labs subjected eleven 9,600-bps modems to an exhaustive suite of tests. The winners were the CONNECT V.32 Service, Racal-Vadic 9632VP, and U.S. Robotics Courier V.32. We also revealed that Microcom, Farallon Computing, and other manufacturers would soon offer lower prices and built-in ISDN (Integrated Services Digital Network) capability.

In July we surveyed the overall performance of five electronic-mail software packages for all-Mac or mixed networks—QuickMail’s extensive feature lists gave it a narrow edge over Microsoft Mail—and explored the mysteries of routers, bridges, and gateways.

“On the Line with MacUser” (July) was a friendly introduction and complete user’s guide to Zmac, the CompuServe on-line resource for MacUser and MacWEEK. Reviews of telecommunications software also appeared in March (AmericaOnline and Prodigy), May (White Knight), and June (MicroPhone II).

### Word Processors

Just when you thought that Mac word-processing programs were all grown up, developers borrowed features from page-layout programs, databases, and utilities. When we took a detailed look at Mac word-processing programs in February, Microsoft Word and Nisus shared top honors. During 1990, our Power Tools section revealed ways to increase your word-processing productivity—see Power Tools in June, July, August, September, and this issue.

### Looking Ahead

What’s new for ’91? With the introduction of System 7.0, expect to see applications that transparently share data (and a lot of books on System 7.0). Voice input should also be hot—it’ll let you do things such as add spoken memos to your files. And 1991 may be when we see a new lighter Mac portable and a workstation-quality 68040 CPU.
Dvorak, The Doors Or A Database.

CD's can hold a lot of data in an easy to handle, durable form. They're useful for much more than music. Each CD holds about 600 megabytes of data. That's roughly 250,000 pages of text! With quick and easy access that makes it a snap for you to find what you're looking for, whether your favorite passage of music or information from a large database.

Chinon's new CDA-431 is at the forefront of this new technology. This drive offers one of the fastest access rates anywhere — 350 milliseconds — at a price you will find surprisingly affordable. Use it with your Mac to access huge amounts of information quickly — or hook it up to your audio system to play any kind of music on CD. Chinon's CD Audio-Play software makes it all easy.

Every day there's more software published on CD — reference works, databases, graphics libraries and more — all in a convenient, easy-to-use format that can take a lot of heavy use. The CDA-431 reads any disc written in the "High Sierra" or HFS standard formats, giving you access to a vast library.

Experience the CDA-431 for yourself. Call TOLL-FREE for the dealer nearest you, or for more information. Whether for work or play, data or audio, it'll be music to your ears.

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Toll-free (800) 441-0222  In Calif. (213) 533-0274

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"There was Pantone 485 everywhere. She wiped a tear.

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 Precision-Color 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.
He had a big 19" display and his choice of 8, 16, or 24-bit color. He chose 24. He also went with QuickColor, a graphics engine that allowed his screen to fill and scroll up to six times faster. That was good. It was all good. Except for Brenda’s evil twin. He was gonna fix her, all right. Make her hair gray. Turn her lips purple. He wasn’t sure but he was gonna get that dame. • For your nearest Radius reseller, or for a color systems brochure, call 1-800-227-2795.  

In Canada, call 1-416-738-3920.
Wouldn’t it be great if new customers were this easy to spot?

Now they can be, with Lotus® MarketPlace.

It’s the first desktop product to combine quality prospect lists with software that helps you quickly target the customers you want.

Which means you’ll be able to develop direct mail and prospecting lists right at your Macintosh®—with unlimited use of every list you create. What’s more, MarketPlace helps you generate leads for sales and telemarketing groups, research and analyze your markets and plan sales territories. And it’s so versatile you can use it to print mailing labels and contact reports, and even use its data with your favorite software programs.

There are two versions of MarketPlace delivered on compact disc. MarketPlace: Business® has data on over 7 million U.S. businesses and lets you select prospects using criteria like type of business and sales revenue. MarketPlace: Households** gives you information on 80 million U.S. households with selection criteria like age, estimated income and shopping habits.

So as you can see, MarketPlace is information you direct. And this kind of control means you’ll be spending time closing sales, not looking for prospects.

For more information about MarketPlace or a free demo kit, call 1-800-343-5414, ask for part #DFE. After all, you’ve always known new customers were out there. Now, you’ll know where.

Introducing Lotus MarketPlace
earlier this year, MacUser asked readers to complete a survey that included such simple questions as “What software do you use?” and “What would you do if you ran Apple?” (May '90, page 275). We reported some of the responses in previous issues (see “Special Delivery,” August '90, page 12, to see what advice readers would like to give Apple). Now here’s a chance to see what “typical” MacUser readers are like — what kind of Macs they use, how often they use their Macs, and what issues they think will matter to Apple and Mac users in the '90s.

By Victoria von Biel
Our Readers Write Back

Figure 1: Issues and Trends

We culled these responses from close to 1,000 surveys. We make no claims about scientific polling methods or statistical accuracy in compiling the results; these figures reflect only the views of those readers who chose to respond. With these caveats in mind, read on to see whether you recognize the "typical" Mac user.

MacAverage

One thing we can report with the utmost reliability: The MacUser reader does not suffer from false modesty. More than a fifth of the respondents (21 percent) consider themselves Mac "gurus"; a hefty 58 percent think of themselves as "power users"; 15 percent categorize themselves as "hackers/developers." Fewer than 5 percent think of themselves as "novices," although one respondent — a little confused but on the right track — labeled herself a "novice power user." (See the "More Than You Know?" sidebar to discover how you rate.)

Nor do these Mac aficionados slack off when it comes to taking care of business. A large majority of respondents (75 percent) use a Macintosh at home and at work. The average amount of time spent using their Macs came to a whopping 30.5 hours per week.

And what kind of machine does our average reader have? Forty-two percent use a modular Mac (the Mac II line), but a larger group — 48 percent — use the compact Mac Plus, SE, or SE/30; 2 percent said they used the Mac Portable most often. (Neither the IIx nor the new CPUs reviewed in this issue were on the market when we conducted the survey.) Respondents also demonstrated that they're not skimping on memory and storage. The average amount of RAM came to 4.5 megabytes — more than many MacUser editors have! — and the average amount of hard-disk space was 65 megabytes.

Software Hit Parade

There were no surprises when it came to the software our readers use — the top three applications are word processing (used by 97 percent of the respondents), drawing (85 percent), and spreadsheets (82 percent). More unexpected is that a third of the respondents use some sort of programming tool — a reflection, perhaps, of MacUser readers' sophistication.

Besides the Big Three applications, the top categories are painting (76 percent), utilities (74 percent), databases (68 percent), telecommunications (66 percent), and page layout (62 percent). It's not all work, however. Forty-two percent of the respondents enjoy entertainment packages, and 20 percent said they use music or multimedia applications. However, the age of artificial intelligence has yet to reach the Mac — only 1 percent said they work with expert systems or artificial-intelligence software.

We also asked respondents to rate the companies they deal with. As expected, large companies with lots...
of products, such as Microsoft and Aldus, came out on top. There was a pleasant surprise in the business-software section, however: Intuit, whose only program is the personal-finance package Quicken, placed third in popularity after giants Microsoft and Claris.

**Opinions, Opinions**

Readers were not shy about offering ideas for ways in which Mac products could be improved. One respondent suggested, “All programs should have better manuals or training methods. The great programs now available require training, because it’s too hard to just insert the disk and learn as you go.”

An obviously disgruntled Mac user said, “Telecommunications programs need a preprogrammed function for sending complaints to John Sculley.” Another reader wrote that “Apple or Claris should develop a modular programming system that would let you combine PageMaker with Illustrator or QuarkXPress with FreeHand and Microsoft Word.” And one respondent has a product idea that would probably make millions: “I’d like to see a ‘canary’ utility that could predict system bombs and help prevent them.”

Which issues and trends are going to make a difference to Mac users in the long run? Our readers voted for connectivity, color applications, and laptops (see Figure 1 for a complete rundown on how respondents ranked the issues). As for technologies, read/write optical storage was an unexpected big issue (see Figure 2). CD-ROM and the impact of RISC on CPUs had a strong showing as well.

**And the Winners Are . . .**

As we promised, ten survey respondents will receive a library of computer books published by Microsoft Press. The winners are: Deborah Burcham of Newark, Delaware; Robb Wesche of Grand Rapids, Michigan; Bradley H. Martin of Lowellville, Ohio; Patti Arredondo of Findlay, Ohio; Rick Bush of Gainesville, Florida; Lori Martin of North York, Ontario, Canada; Brian Will of Vernon, Connecticut; O.J. Ford of Boulder Creek, California; Joe Seale of Fredericksburg, Texas; and John B. Hudson of Idaho Falls, Idaho.

Each of the winners will receive *The Apple Macintosh Book* by Cary Lu; *The Big Chip* by W. R. Philbrick and Bruce Jensen; *Computer Lib/Dream Machine* by Ted Nelson; *Desktop Publishing by Design* by Ronnie Shushan and Don Wright; *Excel in Business* by the Cobb Group; *Inside SuperCard* by Andrew Himes and Craig Ragland; *Learning with Interactive Multimedia*, edited by Sueann Ambron and Kristina Hooper; *Microsoft Works for the Apple Macintosh* by Charles Rubin; *PowerPoint Presentations by Design* by Roger C. Parker; and *Working with Word* by Chris Kinata and Gordon McComb.

Congratulations to the winners, and our thanks to Microsoft Press for supplying the prizes.
Our Readers Write Back

More Than You Know?

If you're among the 21 percent of MacUser readers who classify themselves as Macintosh gurus, here's a little quiz that should be a breeze. These trivia questions are taken from the first Boston Computer Society's Macintosh Jeopardy! tournament, held last August. As with the perennial TV quiz show, the gimmick is that the answers to all the questions (in a variety of categories) are provided — you just need to come up with the questions. Score one point for each correct question; the questions and a scoring key are shown below.

Menu Bars
In this category, you must identify the program with the main screen that shows the following menu bars:
1. File, Edit, View, Special
2. File, Edit, Goodies, Font, Font Size, Style

Mac Math
3. Of the Mac SE, the Mac IIX, and the Mac IIX, it's the only machine whose number of expansion slots is not a prime number.
4. The number of years between the Mac's earliest possible clock date and the year the Mac was publicly introduced.

Easter Eggs
Easter eggs are hidden dialog boxes and other undocumented goodies that software developers leave as little surprises for savvy users (and yar product managers).
5. This word processor's least-professional feature is a secret command that translates English into pig Latin — but it's only in the beta version.
6. If you play this arcade game on December 25, you'll find that the Black Knight has planted a Christmas tree in the grand hall of his castle.
7. Your Mac Plus displays this incriminating message if you press the programmer's switch and type @ 402118.
8. The first release of MacPaint version 2.0 contained a hidden picture of a zebra-woman, which was scanned from a cover of this comic magazine.

Mac in the Movies
9. Robocop is a killer android sports a user interface that is identical to the Mac's, except that the Apple menu has been replaced with this symbol.
10. This Mac-produced animated film showed the antics of a MacPaint tool on a real desktop.

Jobs, Woz, or God
In this category, you must identify the source of the quotation as Steve Jobs, Steve Wozniak, or the Bible.
11. "We want people to use really great computers, and one way to do that is to make them, which we do."
12. "Dreams come true through lots of hard work; you want to be a fool, you do it through lots of words."
13. "You've never heard about what operating system the Mac runs because nobody thinks about it."
14. "Happiness is the only thing life's about...you don't do anything in life unless it's for happiness."

Non-Mac 'Macs'
15. Apple changed the spelling of the Mac's name after threats of litigation from the creators of this stereo company.
16. Shakespeare described this tragedy as "A tale told by an idiot, full of sound and fury, signifying nothing."
17. According to Betty Crocker, you need sugar, egg whites, almond extract, and coconut to whip up a batch of these cookies.

Prehistoric-Period Programs
18. To help lure John Sculley to Apple in 1982, Andy Hertzfeld wrote a Macintosh graphics demo featuring jittering bugs, dancing Macintoshees, and a twirling group of bottle caps from this beverage.
19. This 1982 program — the only Mac arcade game Apple ever marketed — combined Alice in Wonderland with the heart-stopping excitement of chess.

Viruses
20. It was the first virus written in HyperTalk. It's also the only known virus named after a presidential candidate.
21. This virus will hardly create industrywide mayhem; it infects only Atari ST's running Mac-emulation software.
22. At least this virus entertains you as it infects you; it causes your mouse pointer to ping-pong wildly around the screen.

Macintosh Potpourri
23. If your computer unexpectedly shows you a dialog box that says, "Don't Panic!" you should — you've just been infected by this virus.
24. This former Apple celebrity once said, "In a Mac company!" T-shirts aren't worthless trinkets; they're part of the development process.
25. The Macintosh hardware supports the use of 281.5 trillion of these, but software imposes a limit of 16.8 million.
26. It's the only standard Apple system font with the same name as a type of Pepperidge Farm cookie.
27. Of a Macintosh Portable, a Macintosh IIFX, or a Cray II supercomputer, this one costs the most per pound in its minimum configuration.
28. Apple manager Mike Scott established January 1, 1981, as the deadline for eliminating all these machines from Apple's offices.

Scoring
Give yourself a point for each correct question. Here's how to tell how close you are to Mac guruhood:

**Fewer than 5 correct:** You've never read even a page of Inside Macintosh — you've probably never even heard of Inside Macintosh.

**5 - 15:** You've heard of Inside Macintosh, but you're waiting for the movie.

**15 - 20:** Not bad. Most likely, you're a basically healthy Mac user whose frivolous activities and interests — such as a job, a family, or a social life — keep you from reading Inside Macintosh as much as you'd like.

**20 - 25:** You're a veritable font of Mac wisdom — or you're pretty good at reading upside-down text.

**25 - 30:** OK, Smarty-pants, so you make up the quiz next time!
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Claris
FileMaker Pro .................. New 218.
Fox Software
FoxBASE+ vMac 2.0 ............ 292.
Odesta
Double Helix 3.5 .................. 389.
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Calculator Construction Set v. 2.0 ... 45.
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Preferred Publishers
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Vantage 1.5 .......................... 52.
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Quantum 60 MB Raw Drive ....... 489.
RasterOps
RasterOps Colorboard 264 ....... 689.

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Davidson
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Lingua-ROM .......................... 279.
Learning Company
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By Aileen Abernathy

SuperCalibration: One of the biggest headaches in desktop color is calibration — ensuring that the color you see on-screen matches what appears on paper. Radius and Barco both offer products that color-correct monitors, and Tektronix’s TekColor calibrates monitor and printer colors. But neither technology provides a complete solution to the problem of WYSIWYG color. Now SuperMac is about to introduce SuperMatch, the first system that calibrates both spot color and continuous-tone color from scanner to monitor to printer. Unlike its competition, SuperMatch is an open system, allowing any company to provide the necessary data for support of its products; participating vendors include Agfa Matrix, Barneyscan, Howtek, Kodak, Nikon, QMS, and Sharp. SuperMatch has two parts: the Display Calibrator, a $699 luminance sensor (à la Radius and Barco), and the SuperPicker cdev (bundled free with SuperMac video boards), a replacement for Apple’s Color Picker that uses the TekColor technology.

Publications for publishers: AgfaCompugraphic’s An Introduction to Digital Color Prepress is an excellent primer on desktop-based systems that contains nary a sales plug for Agfa products. The booklet’s clear explanations and excellent illustrations will benefit prepress novices and seasoned veterans alike. To get your free copy, call Agfa’s Marketing Communications department at (508) 658-5600. The hottest newsletter on the DTP circuit is MacPrePress, faxed out weekly by Steve Hannaford and MacUser contributing editor Kathleen Tinkel. Its practical advice is liberally seasoned with juicy gossip and inside scoops that keep the industry buzzing. A one-year subscription is $250; to order, call (203) 227-2357 or fax (203) 454-4962.

Letraset lowers lists: Letraset has slashed prices in an effort to revive its stalled Studio line of graphic-design software. ColorStudio has been marked down from $1,995 to $995 — the better to compete with Photoshop — and the new Shapes Annex, which adds text and drawing tools, will be bundled free through January 1, 1991. ImageStudio 1.5, now $250, should give Digital Darkroom 2.0 a run for the (gray-scale) roses. The venerable Ready,Set,Go! has been repositioned as an “entry level” page-layout program and given a price tag to match ($295). This places RSG! — originally marketed as a high-end solution — in the same ballpark as Publish It! Easy and Personal Press.

On the flip side, Letraset appears to be giving up on StandOut!, once considered the most promising presentation product. It’s still sold on request, but Letraset has no plans to upgrade or actively market the program.
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Twisting, Shouting Type

Whether you’re a part-time publisher or a full-time designer, you’ll find that creating unique display type has never been easier.

By Eric Taub

Not long ago, about the most imaginative thing you could do with type on your Mac was to rotate it or set it on a circular or irregular path, using a program such as Adobe Illustrator or Aldus FreeHand. But in the past year or so, three programs have emerged for which such feats are child’s play. Adobe’s TypeAlign, Broderbund’s TypeStyler, and Letraset’s LetraStudio all let you rotate, skew, stretch, distort, and otherwise “empretzel” type to create distinctive logos, headlines, and display type. All these programs let you manipulate type, but each has different features and requirements, not to mention price tags. Whether you want to liven up a newsletter or need to create logos and display type on a daily basis, this article will help you pick the type-manipulation program that best suits your needs.

TypeAlign 1.04

Adobe’s TypeAlign ($99) is the simplest — and least expensive — of the type-manipulation programs (see review, May ’90, page 55). It’s a DA that works on any Mac from a Plus on up, as long as you also have Adobe Type Manager (also $99) installed. TypeAlign does its font rendering on the fly, using a combination of its own INIT and ATM. As a result, it works only on fonts that are compatible with ATM — that is, fonts that adhere to Adobe specifications for Type 1 fonts. TypeAlign’s reliance on ATM means that its display type always looks smooth on-screen and prints at the best possible resolution on both QuickDraw and PostScript printers.

TypeAlign is a model of simplicity. You can easily create display type and get it quickly into other applications, either via the Clipboard or by saving it as a PICT, EPS, or Illustrator I.I file. The program has tools for drawing elliptical, straight, or irregular paths, and after you’ve drawn a path, the text tool is selected automatically. Once you’ve entered text for a path, you can edit it just as you would in a word processor as well as change the characters’ size, typeface, style, color, kerning, and letterspacing. If you want to further stretch and distort type, you can select it with the pointer tool and then drag on handles that...
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Figure 2: If you want to create display type with a true perspective effect, not all the type-manipulation programs can fill the bill. Adobe's TypeAlign (top) has the most problems. Notice how horizontal elements such as the crosspiece of the T remain parallel to the baseline, compromising the perspective effect. In Broderbund's TypeStyler (center), horizontal elements are properly angled, but it's impossible to change the width of individual characters within a text block. Notice that the "far away" characters on the left are as wide as the "closer" characters on the right. You can create a more accurate perspective effect in Letraset's LetraStudio (bottom) by creating an envelope for the text and carefully manipulating the Bezier points.

Figure 3: TypeStyler lets you apply sophisticated fill and shadow effects to display type. In this example, notice how the TypeStyler dialog box lets you position the shadow for a block of text.
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One of TypeAlign’s unique features is the camera tool, which captures a grayed-out image of whatever’s directly beneath the DA’s window (see Figure 1). Using this image as a template, you can create type to fit a specific shape or space.

Although TypeAlign is simple and easy to use, its type-manipulation capabilities are more limited than those of TypeStyler or LetraStudio. You can duplicate all of TypeAlign’s tricks in Illustrator or FreeHand by creating blocks of text consisting of one character each and then carefully positioning, sizing, and skewing each character. If you save a TypeAlign document as an Illustrator file and then open it in Illustrator or FreeHand, you’ll see that each character is saved as an individually sized and skewed font character, not as a letter-shaped outline as in TypeStyler and LetraStudio. This means that you can change any character by using the text-editing features in Illustrator and FreeHand but that you can’t further distort it to create graphic effects.

TypeAlign’s limitations are most apparent when you attempt to create complex effects (see Figure 2). Although you can distort the height or width of individual characters within a text block, you cannot change a character’s relationship to the baseline — horizontal elements, such as the crosspiece on a t, will always remain parallel to the baseline. This can make certain tricks, such as perspective effects, difficult to achieve. However, TypeAlign does have one feature that the other two programs — for all their sophistication — can’t match. Its freehand path tool lets you draw a convoluted curve with multiple control points; the others are limited to single or double arcs.

If you use many Adobe fonts and you’ve already purchased ATM, TypeAlign is a logical and inexpensive way to get the most out of your Type 1 fonts. However, if you frequently need to create display type involving more elaborate distortions and dramatic graphic effects, TypeStyler or LetraStudio may be the program for you.

TypeStyler 1.02

In contrast to TypeAlign, which is a simple DA, Broderbund’s TypeStyler ($199.95) is a full-blown, powerful application (see “Focus: TypeStyler,” September ‘90, page 259, and review, May ‘90, page 110). TypeStyler can convert most PostScript fonts, including Adobe

appear around the text block.

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ClickChange Buttons. Tired of those flat 50's style Mac buttons? Slip on one of our sleek, modern, 3D designs. It's what the next generation of computers is wearing these days.

Figure 4: TypeStyler does an excellent job of converting the outlines of its distorted type into Adobe Illustrator outlines. Notice the economical number of Bezier points on each character. LetraStudio creates an excessive number of points on each path, so that making even the smallest change requires you to carefully move dozens of points.

Figure 5: LetraStudio's envelopes let you create sophisticated typographic distortions. The Envelope submenu (top) contains predefined envelopes that you can customize by manipulating Bezier anchor and control points. Holding down the Option key lets you drag individual objects within an envelope (bottom). The distortion of any object you move is then based on its new location within the envelope, as the word Ever illustrates in this example.

began available, addresses most of these shortcomings.

The program prints to PostScript and non-PostScript printers, and it produces excellent color output. Its outline fill, and shadow effects are impressive, but if you go overboard, you can easily create files that take hours to print from your LaserWriter—if they print at all.

TypeStyler lets you save art to the Clipboard or as EPS, PICT, or Illustrator files (saving in any of these file formats...
See a Kodak Diconix M150 plus printer demo and get a free Kodak Weekend 35 camera, but only until Dec. 31. A great reason to get a Kodak Diconix printer for your Mac, now.

Whether your Macintosh computer is a laptop or a desktop, the Kodak Diconix M150 plus printer is a perfect match. Only 3.1 lbs. and 6.5" x 10.8", it fits any briefcase with room to spare—and saves space on any desktop. It's one of the smallest, lightest printers in the world. Carry it between home and office, or print presentations and overheads on the road! It prints PostScript®-quality outline fonts using Adobe Type Manager™ software.

Right now, until December 31, 1990, the Diconix M150 plus printer is more tempting than ever, because you get a certificate good for a free Weekend 35 camera from Kodak, just for watching a Diconix printer demonstration at a participating dealer. For the name of your nearest dealer in the U.S. or Canada, call 1 800 344-0006.

Macintosh computer and new Kodak Diconix printer

WHAT'S ONE WITHOUT THE OTHER?

The new vision of Kodak

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The SmartBundle is a collection of four easy-to-use, award-winning applications bundled together at an incredible price—the best value in Mac software today!

And because each application has won a MacUser Magazine Eddy Award recognizing it as the ‘best’ in its field, you know each part of the SmartBundle is extraordinarily capable—a claim other starting Macintosh® packages simply can’t make.

The SmartBundle: Easy, powerful, and affordable... the smart choice in software for new Macintosh buyers!

<table>
<thead>
<tr>
<th>QUICK COMPARISON</th>
<th>Word Processing*</th>
<th>Database Management*</th>
<th>Spreadsheet &amp; Charting*</th>
<th>Painting &amp; Drawing</th>
<th>Retail Price</th>
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The four applications in the SmartBundle include:

- WriteNow
- QuickCompare
- SmartPaint
- RecordReader

Each application has been recognized with an Eddy Award, making it easy to create impressive-looking display type and logos in a hurry. Its manipulation capabilities are good, but they’re not as sophisticated as LetraStudio's. If you need the utmost in typographical precision, Letraset’s LetraStudio may be the program for you.

LetraStudio 1.5

LetraStudio ($485) was the first Mac program that let you interactively reshape type (see review, May ’89, page 183). It’s still the most powerful and most expensive type-manipulation program available. When LetraStudio was first released, it worked only with LetraFonts, LetraStudio’s special set of graphic fonts. These fonts had limited usefulness, and even worse, they employed an awkward copy-protection scheme. Copy protection is long gone, and now LetraStudio, like TypeStyler, supports Type 1 fonts. When you launch LetraStudio, it automatically scans your System Folder for printer fonts and adds them to its menu of available fonts.

The program lets you place text on an elliptical path or on a straight line, which can then be extensively modified. As with TypeAlign, you can simply type and edit your text without using any intervening dialog boxes, and as with TypeStyler, you can add geometric graphic shapes to your artwork.

LetraStudio has a powerful Effects menu, from which you can choose several predefined baseline effects, such as single and double arches. You can also modify your text block’s baseline by moving each individual Bezier control and anchor point. As with TypeStyler, there’s an anchor point at each end of the baseline, as well as in the middle. This extra point can be used to create a curvier, more precise baseline than is possible in TypeStyler. LetraStudio gives you greater options.
This Ad Isn't Big Enough!

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Too many fonts for one page. This is the Image Club Typeface Library.

We offer over 600 typefaces in the US, Europe and Canada.

For use with all PostScript® printers. Fonts are available in diskettes, on the LetterPress™ CD-ROM (which contains our entire inventory of 600 typefaces), or on the Art+TypeVendor™ CD-ROM.

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The Art+Vendor® CD-ROM has a complete library of typefaces and clip art on the CD-ROM for use with any PostScript® printer. Fonts are available in diskettes, on the LetterPress™ CD-ROM (which contains our entire inventory of 600 typefaces), or on the Art+TypeVendor™ CD-ROM.

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This Image Club Typeface Library is compatible with Ventura Publisher®, Adobe PageMaker®, Adobe PageMaker®, Adobe PageMaker®, Adobe PageMaker®, Adobe PageMaker®, and all other powerful desktop publishing applications.

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than do the other programs for formatting individual characters within a text block. You can change the font, size, vertical spacing, color, and other properties of any character whenever you want.

What really sets LetraStudio apart from the competition, however, is a concept called envelopes. Envelopes are predefined shapes that can contain one or more text or graphic objects. By modifying an envelope’s shape, you determine how LetraStudio distorts the shape of objects within it (see Figure 5). There are several predefined effects you can apply to an envelope. The most interesting effects can be achieved by directly modifying the shape of an envelope, using Bezier control and anchor points located at each corner and at the midpoints of the top and bottom sides of the envelope. The Bezier points don’t simply affect the shape of the envelope — they also affect how objects within the envelope are distorted. Move the control points closer to the anchor point, and the objects within the envelope will shrink as they approach the anchor point. Stretch the handles, and the objects will similarly stretch. Like using Bezier points to define a path, envelopes are more complicated to explain than to learn.

LetraStudio has kerning, letter-spacing, and leading controls, and you can specify colors and shades for outlines and fills, although without all the elaborate options available in TypeStyler. On a color or gray-scale monitor, LetraStudio uses anti-aliasing to reduce on-screen jaggies in text, and you can copy this anti-aliased type to the Clipboard to paste into any application that supports color PICT.

The program saves files as PICT, EPS, or Illustrator files as well as in a file format that can be read and edited by FontStudio, Letraset’s font-editing program. If you want to edit a character’s outline, it may be better to do it in FontStudio, rather than in Illustrator or FreeHand. LetraStudio outlines have a considerable number of points closely distributed along every path, so even the simplest reshaping of a character created by LetraStudio requires moving scores of points (see Figure 4).

Although LetraStudio is in many ways the most powerful of these three type-manipulation programs, it’s not without shortcomings. When you launch it, it automatically scans every Type 1 outline font in your System Folder. Unfortunately, if you have too many fonts in the folder, LetraStudio will run out of memory and refuse to load, even if you’ve devoted several megabytes of memory to the program. Therefore, if you’re a heavy-duty user of Type 1 fonts, you’ll need to move the outline fonts you don’t want to use out of the System Folder.

LetraStudio can’t match TypeStyler’s built-in 3-D and shadowing effects, but whether this is a drawback or not really depends on how you’re using the program. If you’re an artist looking for the ultimate in type manipulation, such effects probably aren’t as important as the sheer power. LetraStudio gives you for controlling type. Its envelopes, with their multiple Bezier points, provide the most sophisticated effects of all the programs, making LetraStudio the obvious choice for anyone interested in high-end design. Now that LetraStudio can make use of Type 1 PostScript fonts, it’s becoming an indispensable tool for serious designers.

High Road or Low?
There is no real winner or loser among these programs — each may be just the thing you need to solve a specific problem. If your type-twisting needs are light, TypeAlign offers ATM users an economical and easy-to-use solution that can produce professional-looking results quickly. If you need a more sophisticated program, TypeStyler gives you a full repertoire of easily applied graphic effects. LetraStudio provides the fullest and richest tools for type manipulation — with a price to match.

**Directory**

- **Adobe Systems**
  - 1585 Charleston Road
  - P.O. Box 7900
  - Mountain View, CA 94039
  - (415) 961-4400
  - **TypeAlign**, $99
  - **Adobe Type Manager**, $99

- **Broderbund Software**
  - 17 Paul Drive
  - San Rafael, CA 94903
  - (800) 521-6263
  - **TypeStyler**, $189.95

- **Letraset USA**
  - 40 Eisenhower Drive
  - Paramus, NJ 07653
  - (800) 343-8975
  - **LetraStudio**, $495
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Now it's easy to use.

The new tools you'll find on the moveable Tool palette are: the Polygon Picture Box tool for multisided picture boxes and design elements; the Rotation tool for manual rotation of objects; and the Zoom tool for enlarging or reducing the document view.

You can specify page view percentages from 10% to 400% in 1-point increments. View percent can be specified in a field with mouse clicks or by clicking and dragging with the Zoom tool selected.

A variety of specifications—such as font, size, style, leading, location, angle of rotation—are displayed for text boxes, picture boxes, and lines. You can change values interactively on-screen without using a menu or dialog box.

Creating multiple-page documents is easy with a new palette that enables you to insert, delete, and move pages graphically by dragging page icons.

A pasteboard lets you position pictures and text off the page, create bleed spreads, and design multipage spreads up to 48" x 48".

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Creating a Picture Font

In a few simple steps, you can turn conventional artwork into a PostScript font.

By the editors of Verbum magazine

Guess? Inc. uses the Mac to create promotional pieces for its various clothing and product lines. Until recently, all the company's product logos were conventional artwork that had to be stripped into layouts. Guess? wanted to create electronic versions of the logos that could be easily inserted into Mac-produced publications ranging from advertisements to letters and invitations, eliminating the need for mechanical paste up.

At Guess?'s behest, Doug Isaacs of DeskPrint, a Los Angeles service bureau, converted 18 logos into a PostScript font called GuessType. Each logo was scanned; edited; and then turned into a font character with Altsys' Art Importer, a program with the unique ability to create Type 3 PostScript fonts from EPS and PICT images. Collecting the logos into a PostScript font offers several advantages: All the logos are just a keystroke away, resizing means simply changing the point size, they can be imported into programs such as word processors that don't accept EPS graphics, and they always print with high-resolution PostScript quality.

All of Guess?’s product logos were converted from conventional artwork to a PostScript font, making it easier to use them in promotional materials produced on the Mac. Five characters from the GuessType font are shown here.

Verbum: The Journal of Personal Computer Aesthetics can be reached at Box 15439, San Diego, CA 92115; (619) 233-9977.
2. Scanning the Artwork

Black-and-white stats of the logos are enlarged and scanned as a 600-dpi TIFF image to ensure that all details of the handwritten script logos are faithfully captured. The logos are scanned vertically to take advantage of the maximum image length of the scanner.

3. Auto-Tracing the Logos

Each TIFF image is auto-traced in Streamline and saved as an Illustrator 1.1 file. The high-resolution scans produce accurate PostScript auto-tracings that require little touch-up, and Streamline automatically fills the traced areas with black to match the original image.

4. Editing the Images

Each logo is rotated 90 degrees, and the baseline is shifted a few degrees until it looks right. The finished logo is now ready for Art Importer to convert into a font character.

5. Converting Type to Graphics

Some logos use typefaces that resemble Adobe fonts. For example, the Charles David logotype is similar to Adobe's Memphis font. Editable font outlines are created from the appropriate fonts with Metamorphosis or TypeStyler.
**STEP BY STEP**

**6. Adjusting the Outlines**

Converting the fonts into graphic objects eliminates the need to have the Adobe printer fonts installed, and it lets the designer correct typeface discrepancies between the Adobe fonts and the Guess? logos. Using the original Charles David scan as a template (top), he adjusts the leg of the R in the Memphis outline (center) and then fills the corrected R with black (bottom). The edited type is combined with a horizontal rule and an auto-traced drawing of a shoe to produce the finished logo.

**7. Recreating the Guess? Logo**

The triangular Guess? logo is constructed entirely in FreeHand, with the scanned images serving as templates. The unique type for Guess? is hand-traced with FreeHand's corner and curve tools. For the other type, font outlines are created from Helvetica and Helvetica Bold.

**8. Creating the PostScript Font**

The finished electronic logos are saved as EPS files and converted into a PostScript font with Art Importer. The process is simple: You select the key, choose Import from the File menu, and select the desired EPS file, and the image is imported and assigned to the key. When the completed font is saved, Art Importer automatically creates Type 3 screen and printer fonts. To avoid a jagged appearance on-screen, the designer creates the screen fonts in several point sizes. (Type 3 fonts are not compatible with Adobe Type Manager.)

**9. Using GuessType**

GuessType can be installed and used just like any other electronic typeface. For instance, if you select GuessType from the Font menu and press the C key, the Charles David character will appear. The logos can be used at any point size, and because GuessType is a PostScript font, they print cleanly. The Charles David and Nathalie M characters were used in this invitation for the Guess? Spring 1991 footwear show.
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Finally there is some software that actually uses networks the way networks are meant to be used: for collaborative computing. My favorite is Aspects from Group Technologies. As I see it, this is the first true groupware product. It works this way: You, Nora, Daniel, Maia, and I are connected on an AppleTalk network. We all open the same Aspects document at the same time. It can be a text, paint, or draw document. We all make changes to the document — at the same time. All of our screens update in the blink of an eye to reflect all the changes. $299 per node. Shipping by the time you read this. Also hot: DataClub from International Business Software. DataClub lets several users on a network share data that resides on their local hard disks. Not news, you say? Here's the twist: All the users see the data, regardless of whose hard disk it resides on, as part of a single AppleShare-type server. Even if you move the data from one machine to another, it still appears in the same folder on the server. $295 for three users; $795 for ten. Should be shipping by the time you read this.

They said it couldn't be done, but Oracle is planning to implement its SQL relational-database server on the Mac. This is the real deal, not a development kit. Of course, you'll want a II{f}x with 8 megabytes of RAM to run it, and Oracle hasn't said what it's going to charge for it. Look for a ship date in early 1991. How about this? DirectServe, the Jasmine product that won a MacUser Eddy and promptly stopped shipping, has competition. ShirtPocket Software now also sells an AppleShare-server-in-a-box. EasyServer, unlike DirectServe, can read from and write to any standard Mac HFS-formatted hard-disk drive or other storage device. Began shipping in October. $1,995.

OK, I admit it. There probably won't be a whole lot of people who care. But here's some more NeXT news: Although the new NeXT machines have floppy-disk drives, for those of you who need one for your old cube, Pacific Microsystems' PM1.44 Floppy Disk Drive for the NeXT can now read and write Macintosh FDHD (1.4-megabyte) floppies. Sorry, it still doesn't support 800K floppy disks. The price has dropped from $995 to $849, which makes the PM1.44 a much better buy than it was when we reviewed it in October '90 (page 222).
Sharing Your Mac

Ever wish you could show someone how to do something on a Mac — without leaving your office? Now you can, with Timbuktu, Timbuktu/Remote, and Carbon Copy Mac.

By Henry Bortman and the MacUser Labs staff

Your friend calls you on the phone. “I can’t print,” he says. Half an hour later, you’ve figured out why — the LaserWriter driver in his System Folder has somehow gotten corrupted — and you’ve guided him through the necessary reinstallation procedure. This is all done over the phone, of course. All the while, you kept wondering what he wasn’t telling you — which was precisely what you needed to know.

Headache factor: two to three Excedrin. What if you could dial his computer instead, see his screen in a window on your screen, and control his Mac with your mouse? Science fiction? No. The software products Timbuktu and Timbuktu/Remote (from Farallon) and Carbon Copy Mac (from Microcom) let you share — and control — other Mac users’ screens.

Although screen-sharing programs are sometimes billed as the ultimate in collaborative computing — the hype says they enable multiple users to work on the same document at the same time — this is neither a particularly practical nor a particularly common use for them. Until the day when word-processing, drawing, layout, and other applications are designed specifically for multuser access, collaborative computing will remain an enticing fantasy.

A more typical use of screen-sharing programs is for technical support, as in the example above. Training classes are another good use for these programs. Let’s say you’re teaching a class on how to use FileMaker. All the students have a Macintosh at their desk, and they’re all connected on a network. You want everyone to see what’s on your monitor. You can project it on a big screen at the front of the class and hope that the people in the back can see it. Or you can install screen-sharing software and let everyone observe your actions directly on their own screen. Network managers also find these programs useful. When a server has a problem, screen-sharing software running on an AppleShare server can save you a lot of walking, driving, or even flying time.

Timbuktu ($145) was the first screen-sharing product on the market; version 1.0 shipped in December 1987. It could be used only over AppleTalk LANs (local-area networks). A year later Timbuktu/Remote ($195) shipped.
providing screen-sharing capability over modem and direct serial links. Both products have been upgraded since their introduction. Microcom — which has had a similar product, Carbon Copy Plus, for PCs since 1984 — threw its hat into the ring with Carbon Copy Mac ($199 for one user; $299 for two) in April 1990. Now that the product category has matured, MacUser Labs decided to set the programs up in the NetWorkShop to see how well they do their job.

**The Basics**

These three products allow one user to observe and/or control another user's Mac. They all display the host screen in a resizable window on the guest screen. (In screen-sharing parlance, the host is the computer whose screen is being observed or controlled; the guest is the computer observing or controlling the host.) When used on a network, these products let multiple guests simultaneously observe or control the same host machine. All three programs also provide Mac-to-Mac file-transfer capability. And they all offer a measure of security by allowing a host to restrict guest access.

There are some significant differences, however. The most obvious one is that Carbon Copy Mac integrates AppleTalk and modem connections in the same product (see Figure 1). Farallon gives you only AppleTalk connections with Timbuktu and only modem connections with Timbuktu/Remote, so Carbon Copy Mac is a less expensive option for those who want both types of connections.

Timbuktu and Timbuktu/Remote, however, allow a Mac to be both a guest and a host simultaneously (see Figure 2). Carbon Copy Mac doesn't. Suppose we're both in an office on the East Coast. We want to observe a demo of some software being developed by an engineer on the West Coast. You and I are on the same network but in different buildings. I can connect via Timbuktu/Remote to the engineer, you can connect via Timbuktu to me, and we can both watch the demo. Only one phone call is necessary, and my Mac is a host and a guest at the same time. (We had some trouble with this feature with version 3.1 of Timbuktu; version 3.1.2, which arrived just as we went to press, seemed to have had the bug fixed.) With Carbon Copy Mac, you have to alternate between being host and guest.

Timbuktu has yet another significant advantage: It lets a guest connect to multiple hosts simultaneously (see Figure 3). Each host screen appears in a separate window. The only limit on the number of possible hosts is your computer's available memory — each screen requires about 50K of RAM. Carbon Copy Mac, even when run over AppleTalk, allows only one connection.

Another difference is how the programs handle the problem of a host screen that doesn't fit entirely inside the window on the guest screen. Timbuktu and Timbuktu/Remote use scroll bars (see Figure 3) that let a guest navigate around the host screen. Carbon Copy Mac has no scroll bars (see Figure 4); instead it uses automatic panning, which means that when you move your cursor off the edge of the host window, the contents of the window move by.
Installation

All three programs are easy to install. Each includes an INIT, a DA, and some additional files required by the system. Timbuktu and Timbuktu/Remote use Apple's Installer program; Carbon Copy Mac requires you to use the Finder and Font/DA Mover. With Timbuktu and Timbuktu/Remote, however, if you don’t want to install the DA directly into your System file and prefer to use Suitcase or Font/DA Juggler, you have to use the Finder anyway. You also have to use it if you install Timbuktu on a Mac IIIfx or on the new IIi or LC. The Timbuktu installer disk contains System 6.0.4, but the IIIfx requires 6.0.5 and the IIi and LC require 6.0.6.

For the Privileged

Before you can be a guest on someone else's Mac, its user must first grant you access. For screen sharing, all three programs offer the same two guest-access privileges: view (or observe) and control. If you have viewing access, you can only watch another person’s screen. If you have controlling access, you can control the host machine with your mouse. Carbon Copy Mac offers one access feature that Farallon's products lack: The host receives a notice when a guest is trying to log on, which allows the host to refuse access.

When it comes to file-sharing options (see Figure 5), all the programs allow a...
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host to grant a guest the privilege to get files (from host to guest) or to send files (from guest to host). To these two options, the Timbuktu twins add two more privileges. The first is to remove files, which lets a guest delete files from a host disk volume. The second is to send files from a guest to a host without revealing the host computer’s file-directory structure to the guest. You can set up a drop box in a specific location on the host’s disk drive or let Timbuktu or Timbuktu/Remote do it automatically.

In the area of security, Timbuktu and Timbuktu/Remote offer more security options than does Carbon Copy Mac. The Timbuktu allow a host to create different “classes” of users, each with a different set of privileges and a different password (see Figure 5a). Carbon Copy Mac allows the host to set only a single password for all guests (see Figure 5b). Timbuktu/Remote and Carbon Copy Mac display all passwords as a series of bullets; Timbuktu, unfortunately, displays the full text of passwords in plain view to anyone who opens the Guest Privileges dialog box.

Although Timbuktu and Timbuktu/Remote’s controls are more extensive, their Set Guest Privileges dialog box is a nightmare. It tries to cram too many different types of information into too small a space, and although its icons are reasonably intuitive, the clutter of the dialog box can overwhelm users. This is Timbuktu’s biggest shortcoming. To its credit, Timbuktu/Remote offers the additional security of modem dial-back —
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you call a remote modem, but it has to call you back before you can make a connection — a feature that Carbon Copy Mac lacks.

Reach Out and Draw

When the image on a host screen changes, screen-sharing programs use two different methods — bit maps and QuickDraw commands — to tell a guest machine to update its screen. Say your Mac is the guest and mine is the host. When you make the initial connection to my Mac, my Mac sends a complete bit-mapped image of its screen to your Mac. Each pixel is represented by one bit of data. After that, some changes on your screen result in another bit map being sent over the connection and others result in QuickDraw commands. Typically, bit maps require more data than do QuickDraw commands to describe a screen change, although data compression can reduce the amount of data needed.

MacUser Labs devised tests that looked at both QuickDraw and bit-map-update performance. The QuickDraw test is an indicator of what kind of response you can expect from the Mac’s user interface — menus being pulled down, dialog boxes being opened, file lists being displayed in the Finder. All these actions use QuickDraw to do their work. Timbuktu and Carbon Copy Mac perform at virtually identical speed.

When pulling down menus, opening dialog boxes, and the like, Timbuktu and Carbon Copy Mac perform at virtually identical speed.

Pixel This

To test bit-map updates, we timed the redrawing of an 8-bit-color photograph in Photoshop. This test involved sending a bit-mapped-screen update across the connection between host and guest. Although the QuickDraw test is a good indicator of general interface responsiveness, the bit-map test indicates responsiveness of images drawn inside an application’s windows. And although it may seem that this would apply only to painting programs, which produce bit-mapped images, many drawing programs — and even some word processors — update the screen with bit maps rather than by using the text-drawing routines built in to QuickDraw. (Some notes of caution: All three programs work only in black-and-white, and none does a great job of displaying an 8-bit-color or grayscale host image. Illustrator previews are particularly pesky. You may want to set a host to 1-bit mode while its screen is being shared.)

When a host sends a bit map to a guest, the type of compression used can be

You could have the pleasure of mixing and matching software for your new Mac.
significant. Proper compression reduces the amount of data required to send a bitmap update over the connection. Both Farallon and Microcom build proprietary compression schemes into their screen-sharing products. In Timbuktu and Timbuktu/Remote, compression is always on; Carbon Copy Mac makes it optional. Unfortunately, the latter’s manual does a poor job of telling you when to turn it on and when to leave it off. The only time you really want it on is when you’re using a 2,400-bps-modem connection. Performance actually degrades by up to 50 percent when compression is used over a network. We left it on for the modem tests and turned it off for the network tests.

Bit-map updates over network connections show that Timbuktu has a slight edge over Carbon Copy Mac (see Figure 7a). When four guests were logged on to the same host simultaneously, Timbuktu’s lead increased (see Figure 7b). This is because Timbuktu sends bitmap-update data over the network only once, addressing it to all guests at once; Carbon Copy Mac sends a separate bitmap-data message to each guest, which takes longer.

We were intrigued to see that when using screen-sharing programs, Ethernet doesn’t offer much of a performance boost over LocalTalk. Even with bit-map updates, the amount of data being transmitted from host to guest is not enough to overwhelm a LocalTalk network, so Ethernet doesn’t offer much help. Of course, we did our tests on networks that had no other traffic on them. If you add Timbuktu or Carbon Copy Mac to an already busy LocalTalk network, everything may slow down unacceptably and Ethernet could help in such situations. (See “The Limits of LocalTalk,” September ’90, page 299, for more information about the impact of combining screen sharing with printing, mail, and file serving on a LocalTalk network.)

At 9,600 bps, Timbuktu/Remote performed only slightly better than Carbon Copy Mac did on our bit-map-update test. At 2,400 bps, the two programs performed nearly identically—they were both slow! Farallon and Microcom don’t recommend 2,400-bps operation with their programs, and our test results show you why (see Figure 8). If you plan to share screens over modems, figure on buying 9,600-bps modems—or on being very frustrated.

File-Transfer-Test Results
For those looking for an easy way to transfer files from one Macintosh to another without investing in a dedicated file server, all three of these screen-sharing programs offer a reasonable solution. We don’t recommend buying them primarily for this purpose: There are other, less expensive programs that have higher performance (see “The End of SneakerNet?” September ’90, page 281). It’s a great “bonus” function, however, and one that fits naturally with screen sharing. Figure 9 shows the time it took each program to transfer a 275K file from one Mac to another. We tested the same file transfer running under both the Finder and MultiFinder. With the Finder active, Timbuktu is slightly faster than Carbon Copy Mac. When you’re working under MultiFinder, the difference is far greater.

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<table>
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<td>Warranty</td>
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How the right brain sees MacTools.

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- **Make exact copies of floppies fast. MacTools takes full advantage of your computer’s memory to reduce disk swapping and lets you make as many copies as you like.**

- **Encrypt financial data, employee records, and other sensitive information in a format nobody can crack.**
  - Except you.

- **Make exact copies of floppies fast. MacTools takes full advantage of your computer’s memory to reduce disk swapping and lets you make as many copies as you like.**

- **You wouldn’t drive without a seat belt—don’t operate your Mac without one either. MacTools copies critical volume information daily (or more often) to protect against hard disk crashes and accidental initialization.**
Carbon Copy Mac is much slower. But wait — there's a really good reason for this difference! With Timbuktu, users who initiate a file transfer can't put the transfer process into the background; they must wait until it finishes to regain control of their Mac. With Carbon Copy Mac, file-transfer initiators can put the transfer into the background (still using MultiFinder, of course). So it may take much longer for the file to get where it's going, but the person who starts a transfer can do other work in the meantime.

And the Winner Is . . .

For people who need to share screens, any of these products can do the job. Farallon's Timbuktu is the most full-featured, with its ability to log on to several host machines simultaneously. It is an excellent product at a very good price. Timbuktu/Remote is also a good product, but given that it provides modem connections only, it's a bit expensive. For users who need to share screens over both network and modem connections, the combination of Timbuktu and Timbuktu/Remote is far too costly. For users who don't mind Carbon Copy Mac's main limitation — a user can be only a host or a guest (not both at the same time) — Microcom offers in Carbon Copy Mac a solid product that supports both network and modem connections at a much more affordable price than that of Farallon's Timbuktu and Timbuktu/Remote combination.

The Bottom Line

Timbuktu ($149), the oldest, most mature of the three screen-sharing programs we tested, is also the best. It performs well, and it has two significant features that Carbon Copy Mac — even when used over networks — lacks. It lets users "cascade" screens (one user can log on to a second user's screen, while the second user simultaneously logs on to a third user's screen, and so on). Timbuktu also lets a user log on to more than one other user's screen at the same time.

But Timbuktu supports only network connections. If you want both network and modem connections from Farallon, you must buy two products: Timbuktu (network) and Timbuktu/Remote (modem). Timbuktu/Remote costs $199 per user, which is pricey. When each user has to buy both products to get both connections, the cost is close to $350 per node. That's too expensive!

Carbon Copy Mac ($299 for a two-user pack) has a big advantage here: It offers both network and modem connections in the same package. But Carbon Copy Mac has one annoying feature: Users can't cascade screens, as they can with Farallon's products. A Mac can be either a host or a guest, not both. If you can live with this limitation, Carbon Copy Mac offers the best alternative for budget-conscious users.

How the left brain sees MacTools.

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Behavior Mod, Mac Style

When you can’t afford to upgrade your network, try changing the way you use it. Printing habits are a good place to start.

By Kurt VanderSluis

Networks have a tendency to grow. They have a corresponding tendency to become overloaded. Users experience overloading as sluggishness when they try to print, send E-mail, or access a file server. Then they complain.

If you’re a network manager, it’s your job to solve these problems. This often involves redesigning the internet: dividing users into different groups; adding printers, servers, and routers to reduce traffic; and perhaps switching some users from LocalTalk to Ethernet. These are expensive solutions, however, and you don’t always have the budget for a hardware-intensive redesign. In such instances, it’s your job as network manager to help people learn to accomplish their business and computing goals by using network resources efficiently. (Actually, this is a good idea even if you do have a big hardware budget.) This month I’ll take a look at some of the common ways people use networks inefficiently — albeit to accomplish valid business goals — and I’ll suggest some free (or inexpensive) ways to improve efficiency. Some of them involve a minor network redesign, but others rely entirely on changing users’ behavior.

Editing On-Screen

One of the most important ways people use AppleTalk networks is to share laser printers. Printing is also one of the most abused network services. Users figure: The printer’s there; why not use it? Then they complain that the network is slow.

One printing practice I like to discourage is the printing of draft copies of documents. Novice computer users print drafts most, because they aren’t used to editing on-screen. Sometimes you can encourage them to try to

Figure 1: Apple’s AppleShare Print Server, a network print spooler, can slow down network responsiveness. In the top configuration, a print job must travel the same network twice — from workstation Mac to spooler and from spooler to printer. If you install router software, such as Farallon’s Liaison, on the server, you can put your printers onto a different network. In the bottom configuration, a print job still travels from workstation Mac to spooler and from spooler to printer, but the two network tasks occur on separate networks, lightening the original network’s load.
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**Trouble Shots**

Do more editing on-screen and use the LaserWriter less. I jokingly tell them that I notice that their wastebasket and recycling bin are full of paper and that a few more trees could stand tall and proud if they got used to editing on-screen.

Another reason why people print drafts is that the Mac is not truly a WYSIWYG device, because it relies on QuickDraw for screen information and on PostScript for printed output. Sometimes on-screen items look very different from the same material in print. To people who want to see how their output looks on paper, you might suggest that they use a product such as ATM (Adobe Type Manager) that enhances an on-screen image to make it look more like actual output. (Version 2.0 of ATM is much faster than its predecessor, making this option a bit more palatable.) This may reduce the number of drafts they need to print.

Another practice that strains network resources is printing huge documents during the day on shared printers. Sometimes this can't be helped, but you can encourage users to do large printing jobs during off-hours. Sometimes investing in a large paper bin makes this more attractive, in that users don't have to contend with adding paper to the 200-page tray that comes with, for example, an Apple LaserWriter IINT. With a print spooler, users can specify when a job will get printed. The cheapest print spooler, PrintMonitor, comes free as part of Mac system software, but it requires that you have enough memory to run MultiFinder. Those who use the ASPS (AppleShare Print Server), a network spooler, have probably figured out that although ASPS has a lot of features, one of the drawbacks is that all print traffic goes through the network twice—once to get from your Mac to the spooler and again to get from the spooler to the LaserWriter. You might try putting your printers onto a different network, which involves running ASPS concurrently with a software router such as Apple's Internet Router or Farallon's Liaison (see Figure 1).

**Don't Print That Message!**

Another practice I try to discourage is printing E-mail messages. One of the benefits of E-mail is that it can reduce the amount of paper in an office, but printing messages negates this advantage. Each time a message is printed, it has to be transmitted over the network twice if you use a network spooler. An E-mail message sent to 20 people and printed by 10 should probably have been photocopied.

But did all ten of those people really need to print the message? I've heard users give two main reasons for printing their E-mail. The first is that they want to keep a record of their correspondence so that they can reconstruct the paper trail that led to a decision or action. A reasonable goal, but you may be able to reduce network traffic if you can provide an electronic alternative to paper trails. Some E-mail packages such as QuickMail let you create electronic folders in which you can store old messages. If users on your network take advantage of this feature, encourage them to also avail themselves of another feature your E-mail program may have: the ability to store messages on a local hard disk, rather than on the mail server. Rereading a message stored on the server adds network traffic.

I use a message-storing database created in HyperCard. I wrote a custom script that creates the text of a message and copies it to the appropriate fields of a card in my Mailkeeper stack (see Figure 2). I use KnowledgeSet's HyperKRS as the basis of a script that searches my stack for cards that match the keywords I specify. This method works much better for me than keeping the messages in electronic or paper folders.

Another reason people give for printing their E-mail messages is that they are only in the office for a short time each day and they want to be able to read them later. Remote access to the mail server might be a worthwhile alternative for such users. Perhaps they already have a computer and modem at home or can borrow the necessary equipment from their company. Using a remote computer lets them respond electronically to messages as they read them.
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HyperCard 2.0

It's been a long wait—but Apple (oops, Claris) is finally shipping HyperCard 2.0 (initially, with the new Macs). You can read Michael Swaine's review of the new version in this issue. For a different kind of look at what's new with 2.0, we turned to the two most creative stackheads we know—Rand and Robyn Miller. Here, and in an accompanying stack available exclusively on Zmac, the authors of The Manhole and Cosmic Osmo unearth for us the Forbidden Secrets from Beyond HyperCard.

By Rand Miller and Robyn Miller

First there was HyperCard, the powerful software that defied all classification but put the power of Mac programming into the hands of the people. Behind HyperCard's ease of use was the secret power of the HyperTalk scripting language, and now this secret power has been enhanced and improved. This article presents four ideas for new things you can do with HyperCard 2.0. If you want to see these ideas working in their finished form, you can download the complete Forbidden Secrets from Beyond HyperCard stack from the Zmac on-line service.

Our main purpose in this article is to give you an idea of HyperCard 2.0's new capabilities. We've included some HyperTalk scripts, but they're only a start. You should use them as stepping stones for your own projects. This article doesn't attempt to teach you HyperTalk scripting, but if you download the stack from Zmac, you can learn a lot by studying the complete working scripts.

Cool Revelations

Sometimes revealing forbidden secrets can be kind of cool. When developing stacks such as The Manhole and Cosmic Osmo, we always enjoyed trying to think of things to do with HyperCard that nobody else had thought of. It was while trying to think of ways to use HyperCard 2.0's ability to display color PICT graphics that we came up with the idea for the first of the four projects described here: Cool Revelations. You need to start with a new stack and a PICT graphic (in color if you have a color-capable Mac). HyperCard 2.0 can display color PICT graphics, and it lets you control a graphic's size, type, position, and scroll, and even its scale.

The idea is to create a card in a stack that has a simple black-and-white illustration on it. We used a map of an island for this example. The PICT graphic that we mentioned is an exact replica of this simple black-and-white illustration but with more or different detail or with color. By using some fairly simple HyperTalk handlers, we can let the user move a viewport around the card that appears to reveal some interesting
underlying details as it passes over different parts of the illustration (see Figure 1).
See Example 1 for the key HyperTalk scripting that you’ll need to get started.

HyperCard 2.0’s Picture command is a built-in XCMD that opens a window with a PICT image on top of the current card. In our example, the fun really begins when you exploit HyperCard 2.0’s ability to set parameters for the rectangle (the location and size) and to control the scroll (what part of the PICT it shows) of this new window.

In addition to setting these key elements, you also need to know when someone clicks in the picture. When that happens, HyperCard 2.0 sends a mouseDownInPicture message. The handler for the mouseDownInPicture message will need to move the picture window to the location of the mouse and set the scroll to correspond to that position. This handler can be placed in the card script, as shown in Example 2.

Menu Maker

Another new feature of HyperCard 2.0 is its easy access to the menu bar. You can create or delete menus; add, enable, or disable menu items; set the check mark; specify a menu message; and even reset the menus. Although HyperCard 2.0’s menu-handling capabilities are easy to use, the number of options and combinations can make things tedious. A card that lets you construct a menu and then automatically produces the code necessary to implement that menu would be a useful feature.

The basic elements of a new menu are the menu name, the menu items listed under that name, and the menu messages that the menu items send when selected. A menu-maker stack in its most basic form should have fields for entering these elements. If you want to get fancy, you can add optional control of whether a menu item is enabled, disabled, or checked. When the menu information has been entered into the fields, clicking on a button should automatically do the HyperTalk scripting necessary to create the menu.

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command and the Put command. There’s a sample of both in Example 3.

Our menu-maker stack can use the information that was entered into the fields to do all the scripting for the desired menus, thereby saving the effort of typing numerous lines of HyperTalk code. The menuMsgs (PlayItNow and StopItNow) are handled in the card, background, or stack we’ve created.

Radio Grouper
If you’ve ever put radio buttons into a HyperCard stack, you know you’re in charge of scripting a group of buttons so that clicking on one turns the others off. Wouldn’t it be better if you could drag a box around the radio buttons to define a group and then have all the scripting done for you?

Anyone could have written the script to group radio buttons in the old HyperCard. But HyperCard 2.0 lets us use a windoid to make the function more accessible. (Windoids existed in HyperCard 1.0. You may have used the Link To windoid to quickly designate what card or stack you wanted a button to point to. A small window would appear after you selected Link To and then automatically disappear after you moved to the destination card or stack and clicked on OK.)

The first step in creating a windoid in HyperCard 2.0 is to use the PaletteMaker,
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which comes with the authoring version of HyperCard 2.0. To make sure the palette is big enough to look like a windoid, you have to use a dummy button—otherwise the palette will shrink to fit the picture or the buttons. The GroupButtons button should have a script that says something original, such as groupButtons. The Cancel button should likewise be scripted with something such as cancelGroupButtons.

You can display this windoid, using the Palette command, and it will stay displayed until the user clicks on one of the buttons. Now here’s the complicated part. The user can go to another stack, but the handlers for groupButtons and cancelGroupButtons are in the stack you just created. You can use HyperCard 2.0’s new user-definable message hierarchy, which lets you send messages to your original stack even if it’s not the active stack or if it’s closed. In the same button script that displays the palette, we also add the stack to the list of places that HyperCard 2.0 checks for things that contain the start using command.

Line 1 in Example 4 sets up a global variable, GPath. Line 2 puts the full path to this stack into GPath. Line 3 checks to see if we already have access to the full path and, if not, starts using it in line 4. Line 6 is where the windoid is displayed. Putting the full path into GPath gives us easy access to it when we’re ready to stop using it, as scripted in Example 5.
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**Relays**

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**Sigma Designs**

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**Monitors & Video Cards**

**Micron**

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**Communications - Network**

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**VGA**

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<td>22554</td>
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**Accelerator & Expansion Boards**

**Aapps**

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<tr>
<td>22310</td>
<td>Send Fax Adapter</td>
<td>$79</td>
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**TI microLaser**

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<thead>
<tr>
<th>Code</th>
<th>Description</th>
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<tr>
<td>22856</td>
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<tr>
<td>22851</td>
<td>35-Font PostScript Printer</td>
<td>$1995</td>
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</tbody>
</table>

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AE Quadralink 26917 $205

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Kent marsh LTD
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30398 The Night Watch v1.03 .... $65
30370 MacSafe II .................... $105
Supermac
30396 Sentinel ....................... $86

Screen Saver Utilities
Berkeley Systems
30425 After Dark ................. $24
Fifth Generation
30396 Pyro .......................... $21

Viruses Detectors & Eradicators
HJC Software
30313 Virex ....................... $51
30414 Virex (10 Pack) ........ $346
Symantec
30342 SAM .......................... $63

Other Utilities
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30350 Affinile ..................... $44
Microseeds Publishing
30376 Screen Gems ................ $39

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Shark Screen Saver
$34

Data Security Utilities
Fifth Generation
30406 DiskLock ..................... $106
Kent marsh LTD
30368 QuickLock v1.0 ........... $55
30398 The Night Watch v1.03 .... $65
30370 MacSafe II .................... $105
Supermac
30396 Sentinel ....................... $86

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Berkeley Systems
30425 After Dark ................. $24
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Shark Screen Saver
$34

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<table>
<thead>
<tr>
<th>Application</th>
<th>Price</th>
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<tbody>
<tr>
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<td>Microsoft ProVue</td>
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**Office Productivity Programs & Utilities**

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<td>My Advanced MailList</td>
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<td>101 Macros for Excel</td>
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<td>Microsoft Works 2.0</td>
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**Spreadsheet Programs & Templates**

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<td>Deja Vu II</td>
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<td>Colony</td>
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<td>Fokker Tri-plane</td>
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<td>P51 Mustang Flight Simulator</td>
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**Communications**

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<td>CompuServe Navigator 3.0</td>
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<td>Connect</td>
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<td>Timbuktu Remote 1.0</td>
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<td>White Knight II</td>
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<td>Microphone II 3.0</td>
<td>$213</td>
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<td>LapLink Connectivity</td>
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<td>QuickMail 5 User v2.2</td>
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<td>QuickMail 10 Pack 2.2</td>
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<td>InOut 6 User</td>
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<td>InOut 10 User</td>
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<td>Timbuktu 3.0</td>
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<td>Mylar</td>
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<td>101 Macros for Excel</td>
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<td>Excel 2.2</td>
<td>$245</td>
</tr>
<tr>
<td>Microsoft Works 2.0</td>
<td>$177</td>
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</table>

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27592 Turbo Pascal ......................... $67
lcom Simulation
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27590 QuickBasic .............................. $64

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.$53
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............... $28
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28726 Kings Quest 2......................... $28
28728 Kings Quest 3......................... $28
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28646 Beyond Dark Castle ................ $33
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.......... $31
28650 Dark Castle ..... ....................... $32
Sir-Tech
28730 Mac Wizardry
...... $34
Software Toolworks
28660 Hunt for Red October .............. $31
Spectrum Holobyte
28604 Welltris .....
.. ................... $19
28606 Tetris ...................................... $18
28610 PT-109
.............. $25
28614 Falcon 2.2
......... $30
Spinnaker
28616 Sargon IV ......
.. .............. $29
Springboard
28618 Hidden Agenda ....................... $35
Sublogic
28620 JET .
.. .......................... $31
XOR
28622 TaskMaker
.............. $26
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28626 Road Racer ............................ $39
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.. .......... $51
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29784 Freehand 2.02
......... $326
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29204 MacDraw 111 .1 ..................... $291
29206 ClarisCAD 1.0
.............. $578
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29234 Cricket Draw .. .. ................ $173
Deneba Software
29232 Canvas .....
.. .................... $186
Innovative Data Design
29238 Dreams 1.1
........... $315
29241 MacDratt ..... ......................... $192
Silicon Beach
29222 SuperPaint .. ......................... $129

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29202 MacPaint 112.0 . ..
Computer Associates
29236 Cricket Paint ..
Supermac
29230 PixelPaint Pro ..
29228 PixelPaint ..

............ $94
... $176
.... $387
.. .... $223

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29266 Photoshop .. ..................... $498
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29242 Studio/1 .. ..
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29790 lmageStudio ......................... $273
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29210 Videcworks II Hypercard ........ $60
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29804 Cricket Presents 2.0 .............. $283
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29217 Director
.......................... $436
29258 Accelerator .......................... $124
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29248 Smart Ar1 2 .............................. $83
29250 Smar1Ar13 ..
. ......... $91
T/Maker
29252 Click Arl Business ................... $32
29254 Click Arl Holidays .................... $32
29256 Click Arl Christian ..
.. ...... $37
29816 EPS Illustrations ................ $83
29818 EPS Business Arl ..
......... $82

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complicated programming.
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Silicon Beach
27581 Supercard 1.5 ....................... $197
Smethers Barnes
27588 Prototyper .
.. ................ $183
Symantec
27582 Just Enough Pascal . ............... $46
27584 THINK Pascal v3.0 ................ $160
27586 THINK C............................... $163

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Fifth Generation
30402 Suitcase II .............................. $47

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HyperCard 2.0's Picture command is a built-in XCMD that opens a window with a PICT image on top of the current card.

There's one final trick you need to use when you create window applications such as this one. When you close a palette, it doesn't immediately disappear the way a real window would. Instead, it stays on-screen until HyperCard has finished running your scripts (idle time). You must hide a palette to make it disappear. This makes it go away immediately, and you can then close it at your convenience (see Example 6).

Cyanimation

Doing animation within HyperCard has always taken some creativity. You can flip cards, change the icons of buttons, or even create your own fonts. But now with the help of HyperCard 2.0's large card size (704 x 488 pixels, compared with the old limit of 512 x 342 pixels) and its ability to scroll to any position on a card, we can bring you the most bizarre type of animation yet — Cyanimation (modestly named after our software-development company, Cyan).

The key to Cyanimation is to use HyperCard 2.0's ability to create large card sizes to put every frame of your animation onto a single card and then reset the window size to show one frame at a time. By changing the scroll location of the window, through scripting control, you can instantly flip from one frame to the next.

The script in Example 7 assumes that the size of the stack window is 128 pixels wide and that each frame is therefore 128 pixels wide. (Don't forget that the stack itself is actually much wider than 128 pixels but that you're looking at only a 128-pixel-wide portion at a time.) If you do the math, you can see that when the frame number is 1, the scroll is at 0.0. When the frame goes to 2, the scroll is at 0.128, which moves you instantly to the next frame. Typing goFrame 5 in the message box scrolls the card directly to...
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The basic elements of a new menu are its name, the items listed under that name, and the menu messages.

The animation artwork can be created or edited with HyperCard’s painting tools, because the entire animation will reside on a HyperCard card. The possible number of animation frames depends on the size of each frame and the amount of memory in your Mac.

Script for Yourself
The best way to learn the secrets of HyperCard 2.0 is to experiment on your own. If you’ve never tried using HyperCard, now’s the time to find out what it can do. The added power and flexibility of HyperCard 2.0 make it easier than ever to create customized solutions.

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12 Power Works Tips

If you aren't using all these features of Microsoft's integrated package, you aren't getting your Works' worth.

By Darryl Lewis

Long before there was a Microsoft Office, there was Works, Microsoft's integrated word-processing, database, spreadsheet, charting, and communications package. None of Works' individual programs is the most powerful in its class, but that hasn't stopped Works from becoming Microsoft's best-selling package ever. And with reason: Works is a rich computing environment that's capable of a surprising variety of operations. Here are 12 frequently overlooked or underused Works features.

The Draw Module

The Draw module is a hidden treasure that you can use only in conjunction with the word-processing or spreadsheet program. You can use it to dress up documents or as a graphics program. Objects and text created in the Draw module exist in a separate layer from the word-processing or spreadsheet information — similar to an acetate overlay — so you can read underlying text through a graphic if you choose.

The module lacks a vertical ruler and precise sizing tools — serious omissions, but you can precisely position objects in two ways: A snap-to-grid system lets you specify grid increments down to 1/16 inch or 1/16 centimeter, and the keyboard arrow keys and the directional arrows in the tool palette let you move objects one pixel at a time.

Spreading Text

Works' Draw module has some exotic features. It can make text follow and spread evenly along an arc or diagonal line (see Figure 1). You can also use this technique to adjust letterspacing.

Cut or copy your chosen text to the Clipboard, and draw an arc or line in the Draw module. Make it invisible by selecting White or No Line on the Line Pattern menu, and then select the Spread Text command on the Format menu. Each letter becomes a separate draw object that you can move or size independently. If you group the letters, using the Group Picture command on the Format menu, you can stretch or distort them.

Desktop Publishing

Yes, you can create multiple-column newsletter pages and fliers with Works. To create columns, select the text tool from the palette and hold down the Option key while you draw text frames, just as you would in a desktop-publishing application. To link columns, hold down the Option key and, with the pointer, click on the columns in the order you want. Headings above each column indicate the name or number of the current column and the column it is linked to. You can edit these headings manually with the text tool.

Once you've created the columns, typed or pasted text flows from column to column. This doesn't work as smoothly as it does in conventional DTP applications — you must deselect a column before text reflow occurs — but for occasional use, Works is a competent desktop-publishing application.

Better-Looking Charts

Works is at its best when you use two or more modules together. You can't edit a Works chart in its own window, but if you paste it into a spreadsheet, you can edit it by using standard draw techniques.

To improve a chart's appearance, use the Ungroup Picture command on the Format menu. This breaks the chart into individual draw objects. You can then pull a wedge out of a pie chart, change the fill or line patterns, add additional text labels, circle important information, or draw lines with arrowheads.

Make Works Desktop

The Make Works Desktop command on the File menu creates a file (its icon looks like a desk) that remembers groups of Works documents: Open that file, and you automatically open the whole group. You can use this feature to file any kind of linked documents, such as letters or mailing labels.

Creating a Works Desktop file is simple: Choose the Make Works Desktop command...
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Figure 2: This on-screen invoice was created with Works’ database program. The Extension Price, Subtotal, Sales Tax, Total, and Current Balance Due fields are self-calculating.

on the File menu while the files you want to include are open, and then name the new file.

How can you put this feature to practical use? Try creating a check-writing module with the Make Works Desktop command. You'll need three Works files: a database that contains all the information that will appear on the check, another database that contains a list of companies to whom you write checks regularly (including the check amount, in some cases), and a word-processor document that prints the checks by merging the data from the check-register file. Name this Works Desktop file Banking; double-clicking on it gives you instant access to the three files you need to write checks.

Calculated Database Fields

Figure 2 is an invoice set up in Works’ database program. This form automatically calculates the extension prices, sales tax, and total as you enter quantities and unit prices. The Current Balance Due field gets the unpaid balance by subtracting the payments from the total.

Adding self-calculation to a Works database is easy. Select the field to which you want to add a calculation, and then select Set Field Attributes on the Format menu. This lets you choose the field type (numeric, date, or time only—you can’t calculate text). Then check the Computed box, and click on the OK button to return to the database window. You’ll notice an equal sign in the entry bar. That's your signal to enter the formula that will calculate this field.

You can add values from other fields to a calculation by clicking on the fields. Type subtraction, multiplication, and division signs as needed from the keyboard (if you don’t type an operator, Works assumes you want an addition sign).

Date and Time Shortcuts

Works provides a shortcut — Command-D — for entering the current day’s date into a date field in a database. For time fields, Command-T has an analogous effect.

Alternatively, you can enter a date in the current year by typing month/date (12/22, for example), and Works automatically adds the year. This shortcut works even if you want to display the date in medium or long format. Works will display the date in your chosen format.

Report Totals

Works lets you subtotal and total a report’s numeric fields by using the TotalsPage menu. Here’s how it works:

To print a report of total sales from the Figure 2 database, start by sorting the database alphabetically by the Customer field and then run the report. If you then select both the Customer field in the report and Take a Sub-Total on Field Change on the TotalsPage menu, a subtotal will be printed each time the customer name changes. You can then select the fields you want totaled by selecting the Subtotal field, which represents total sales, minus sales tax and shipping. Select the Sum This Field command on the TotalsPage menu, and do the same for the Sales Tax, Shipping, and Total fields. These fields will now print subtotals for each customer as well as grand totals at the bottom of the report.

If you need only the subtotals and total rather than the whole report, you can get them by selecting the Copy Totals command on the Edit menu when the report is on-screen. This places the subtotals and total on the Clipboard, from where you can paste them into a spreadsheet or word-processor document.

Mail-Merge

All major word processors can print form letters and labels for each entry in a mailing list, but Works does the job a lot more smoothly.

The Works word processor reads directly from the program’s own database, so there’s no need to export the text to be merged. Because of this dynamic
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The Radius Pivot is a beautifully tooled piece of equipment. It's sexy in design. And it's fun to play with...wielding the screen into a portrait or landscape orientation. But ask yourself, are you buying it for fashion or for productivity? If it's productivity, you owe it to yourself to compare the Pivot to our PixelView II display. Let's compare:

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The Pivot's 15" monitor has 30% less screen than our PixelView II 19" display. You pay $15 per sq. in. of viewing area with Radius compared to $6 per sq. in. with PixelView II.

**Which Gives You WYSIWYG Scaling?**
The PixelView II maintains true WYSIWYG scale so that what you see on screen is what you see on the printed page. Everything is shrunk down on the Pivot's 15" screen.

**Which Saves You Desk Space?**
One of the benefits of the Radius Pivot is that it's supposed to take less desk space. But the Pivot actually takes more space than our 19" PixelView II monitor just to pivot. 20" to be exact. And forget about leaning anything up against it.

**Which Works With A Macintosh Plus, SE, SE30 or II?**
Our PixelView II works with the Macintosh Plus, SE, SE30, and any Macintosh II. The Pivot does too, but the pivot feature (that you pay so dearly for), doesn't work on the Macintosh Plus or SE.

**Which Saves You 47%?**
Unlike Radius, you can purchase your PixelView display system direct from the factory. That means savings. No middleman. No retail mark-up. That's why you pay 47% less for our PixelView II.

**Now You Have A Lot Of Good Reasons To Pay Less!**
Let's face it, you buy a large screen display to improve your productivity. A quick comparison will reveal that our PixelView display offers more productivity for your money.

<table>
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<th>PixelView I</th>
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</tr>
<tr>
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</table>

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- PixelView I: $567

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Figure 3: In this print-merged invoice, the letterhead, descriptive words, and thank-you blurb were typed directly into the word processor. The customer, sales, and dollar information were merged from the Figure 2 database record.

The word processor has both standard Print, which outputs one copy of the word-processor document for the currently displayed database record, and a separate Print Merge command, which prints a copy of the word-processor document for each record in the database.

Telecommunications Sessions

Many communications applications forget text that has scrolled beyond the top edge of the window. To review a session later, you must save the screen text to a disk file. This approach has two disadvantages: The file can't be read while the communications session is in progress, and you need a separate word processor or text editor to read the file. But what if you just want to reread information from three screens back?

During a session, Works can remember up to 100 previous screens (the more screens you select, the more memory you need).

Works also permits up to 14 windows to be open simultaneously and supports background communication, uploading, and downloading. You can save text from the screen into a new document, and you can also paste text you want to transmit into the communications window.

Presentation Spreadsheets

Like a high-end spreadsheet program, Works lets you insert charts within a spreadsheet. The main difference is that it's easier in Works: Starting with a chart window on-screen, select the Copy command, switch to the spreadsheet window, and paste in your chart.

Unlike some high-end spreadsheet programs, Works lets you ungroup your charts after you've drawn them. Select Ungroup Picture on the Format menu, and you can adjust the placement of bars, legends, titles, and so on. (Excel users: You can't alter charts in this way in Excel, but you can paste your Excel charts into Works and alter them there. You won't be able to move the altered chart back to Excel, though.)

Spreadsheet Cell Notes

Cell notes are like Post-it notes that you can attach to individual cells. Use them for comments about the calculation for the cell or instructions about what to enter. This information, although useful, is unnecessary in the main display.

To create a cell note, select the cell you want, select the Open Cell Note command in the Edit menu, and type your message in the cell-note window. The notes are saved with the document, and a mark appears in the upper right corner of any cell that has an associated note.
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<thead>
<tr>
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**LIST PRICE**

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<td>$5690</td>
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PC Magazine, Best of 1989 Awards
January 16, 1990 issue

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PC Magazine

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Return to ResEdit

The newest version of ResEdit makes it easier than ever to customize your Mac and amaze your friends.

By Michael Swaine

ResEdit isn’t just for programmers: It’s a tool for every serious Mac user. That’s because there’s a new version out that is easier to use, is more powerful, and has a manual. And there are several ways of using ResEdit that have nothing to do with programming. Here are three types of ResEdit tasks that any user might find useful.

**Trivial tweaks.** Your friends may call them frivolous, but deep down they’ll envy your custom menus with rearranged, hierarchical menu items sporting bullets; spot color; and selective, tasteful underlining and boldfacing.

**Interface refinements.** Apple didn’t do everything right. At least not for you, your department, your company. You can refine the generic Mac interface to better serve your needs, with more-targeted dialog-box text, more-helpful help.

**Essential fixes.** There are some changes you need to make for your software to perform properly. These aren’t merely matters of cosmetics or convenience: When the time comes that you really need more than 13 files open at once, you should know how to override this default limitation.

ResEdit knows about resources, and so should you. Every Mac program, including the System and the Finder, stores much of its functionality in resources, which you can examine and alter without having to rewrite and recompile the program. Typefaces, icons, dialog boxes, menus, and cursors are examples of what is stored in resources. This arrangement allows even nonpower users to modify programs and System software.

That’s what ResEdit is for: It’s a resource editor. Version 2.0 has some new features, but more importantly, it has a new, more graphical interface and a good manual. The specific version current as I write this is 2.0b2, which is not a final release, but this should not deter you. ResEdit spends most of its life in the beta (testing) stage of development. Even the manual is beta or, as Apple puts it, a development document. Both work fine; you should just remember always to work on copies of your files.

**A Few Trivial Tweaks**

Let’s look closely at how you might use ResEdit to personalize your user interface.

When you first invoke ResEdit, you see a goofy-looking jack-in-the-box head bobbing up and down. Let’s say, for the sake of argument, that you like this picture. Let’s grab it and put it to use elsewhere.

Choose Open from the File menu, and choose ResEdit itself as the file to open. (It is vastly wiser to work on a copy of any file you edit with ResEdit, and this is even more important when you’re editing System files or ResEdit itself. We won’t actually change anything in ResEdit, although it’s interesting to note that ResEdit can edit itself.)

You now see a window full of icons. Scroll down to the PICT icon, which represents all the PICT picture resources in the file. Double-click on it to open it, and scroll through the individual PICT resources until you see the jack you like (there are several). Click once on it to select it, and choose Copy from the
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○ ...always add as individual files.
○ ...ask the user what to do.
○ ...always add as folders (IMF).

KCHR resource is where you assign or reassign keystroke combinations, modifier keys, and dead keys — all the different ways of accessing exotic ASCII characters from the keyboard.

Figure 1: Copying a PICT resource from one application to another is easy with the new ResEdit. Here, the ResEdit jack-in-the-box makes a cameo appearance in a Stufflt dialog box.

Figure 2: The KCHR resource is where you assign or reassign keystroke combinations, modifier keys, and dead keys — all the different ways of accessing exotic ASCII characters from the keyboard.

INTL resources. The most obvious change is the order of elements in short-date format: If you prefer D/M/Y to M/D/Y, you can have it. Just open a copy of the System file in ResEdit, select its INTL resource, and choose a date format.

As I mentioned last month, System 7.0 will have a nifty feature called balloon help. Point at something when you’re using balloon help, and a word balloon pops up to explain what the thing is and what it does when you click on it. Apple has done a good job of ballooning the Finder in System 7.0: If you point at a grayed item on a menu, a balloon will tell you what it means for an item to be grayed, why this one is grayed, and what to do to ungray it. Nevertheless, you might someday want to change these helpful help messages. It’s easy, because the message text is stored in resources.

This suggests a theme for several other editing possibilities: A system administrator might want to customize various system messages for naive users or for the particular on-line-documentation needs of a particular site. Apple does a good job of localizing software for different countries and languages, but if, for instance, you’re setting up Macs for English-language use in the U.S. by people whose native language is not English, your on-line-help needs may be peculiar. In general, you can speak your employees’ language better than Apple can, so you may want to customize whatever language Apple has used.

You can even change the defaults for dialog boxes if you notice that Apple’s defaults are not intuitive for your users.
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Some Necessary Fixes

But these are still optional measures; there may come a time when you have no option — when you really need to change a resource.

Just as you can change the default locations of windows, you can relocate alerts and dialog boxes. This isn’t just a simple matter of interface cosmetics or convenience. If you’ve ever been confronted with a dialog box that hides the very information you need in order to respond to it, you know this situation. Apple recently introduced nonmodal dialog boxes to solve this problem in future software (that’s a fancy way of saying that you will be able to move the boxes out of the way). In the meantime, you can change the default position of an application’s dialog boxes only by editing its DLOG resources.

You can also use ResEdit to edit fonts. PostScript (and soon, TrueType) fonts are another matter, but you can edit current bit-mapped screen fonts. You want to be careful of copyright restrictions, but you can modify an existing font to create

20 Questions for System 7.0

System 7.0. It’s Apple’s worst-kept secret and its best hope for meeting the Windows challenge. Delayed repeatedly in its release, features stripped away right and left, it will have to perform superbly when it finally hits the streets. We talked with System 7.0 about several of its new features at its home on our hard disk and found it surprisingly confident.

MacUser: So your new Finder finds; so what? You’ve always had Find File.

System 7.0: My new Find facility is much faster and follows the shortest route to the file. It’s also very fast at searching across a network, because it instructs the server to search locally. It can search on anything I know about a file, and that’s a lot.

MacUser: Is it true that you won’t let me turn off MultiFinder?

System 7.0: That’s right. MultiFinder is no longer optional.

MacUser: I hate MultiFinder. It clutters up the screen with windows.

System 7.0: That’s not exactly a question, but I have an answer anyway. I’ll let you hide applications. This is a good feature; tell me to hide an application, and I’ll make all its windows go away without actually closing it. Unhide it, and I redisplay all the windows immediately. You get a performance gain from this, because I don’t have to spend so much time updating the screen.

MacUser: Fine, but what if one of the applications open under MultiFinder crashes? I suppose you hang and make me reboot?

System 7.0: No. Rebooting is as painful for me as it is for you. I’ll kill hung applications for you without the trauma of a reboot. Just give me an Option-Command-Escape command.

MacUser: Count on it. Will you let me have multiple invocations of a single application?

System 7.0: Generally, no; it depends on how the application was written.

MacUser: Will you still support DAs?

System 7.0: I’ve made it harder to write DAs, and there’s now less reason to write them, because both DAs and applications can be placed on the Apple menu and opened from there. But I’ll still support them as processes.

MacUser: What’s a process?

System 7.0: I’m glad you asked. A process is an open DA or application. All processes are automatically listed under the cooperative multitasking icon at the right end of the menu bar.

MacUser: First “Option-Command-Escape” and now “cooperative multitasking icon.” Have you been hanging out with DOS lately?

System 7.0: One MacUser editor has suggested calling the cooperative multitasking icon the “process server.” Maybe you’ll find that more mnemonic.

MacUser: Fer sure. Can I turn off virtual memory?

System 7.0: Of course. In fact, only you can turn it on or off. Applications that want VM on or off will have to ask you to set it for them.

MacUser: How do I turn it off?

System 7.0: Your user interface for memory management is a cdev called Memory. I trust that’s mnemonic enough for you. You can use it to turn 32-bit or virtual memory on or off or to adjust the size of the cache.

MacUser: Can applications use more than 8 megabytes?

System 7.0: There’s no practical limit other than the size of your hard disk.

MacUser: Do I still have to allocate memory to applications myself?

System 7.0: You do. VM only extends the apparent RAM of the machine; the programming is unchanged.

MacUser: Will there be compatibility problems with virtual memory?

System 7.0: Most applications are already virtual-memory-compatible. Problems are most likely to occur with scanner software and other software that manipulates hardware or processes hardware interrupts. Anything that talks SCSI should be written as a driver. NuBus masters may need a rework.

MacUser: I didn’t follow that; it sounded like programmer advice. But I’ve heard that multimedia stuff is likely to have trouble with virtual memory. Is that true?

System 7.0: Sadly so. Sound applications should be all right if they use my new Sound Manager, which has been upgraded to be compatible with VM. But for video and the like, you should turn off VM.

MacUser: You said something about 32-bitness. What’s that?

System 7.0: If you didn’t follow what I said about NuBus masters, I seriously doubt that you’ll understand about 32-bitness. Suffice it to say that most applications are 32-bit-clean, and that’s good.

MacUser: What about upgrade ROMs for old machines that are not 32-bit-clean?

System 7.0: You do know something about this! That possibility is under discussion and will be announced to the developer community shortly.

MacUser: Can I get at the Finder info about an application when it’s open?

System 7.0: No, yes.

MacUser: And the trash no longer empties on whim, right?

System 7.0: It was never a matter of whim. But you’re right. Now I leave it to you to take out the trash.

MacUser: Well, you’ve certainly got some nifty features, System 7.0. I understand that a few features had to be dropped in order to get you back on schedule, though.

System 7.0: That’s a vicious rumor. I’ve never been on schedule. Ha ha. Just kidding.

MacUser: So, when’s the big day?

System 7.0: Sooner than you think.
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you own special-purpose font. You may need to do this if you have to squeeze a lot of information into a small space. You can also build a picture in a word-processing document, using characters in a custom-designed picture font. To put a visible ruler into a document, create ruler-tick characters in your own font and type the ruler in.

One of the more obscure resources is KCHR (see Figure 2). This resource has nothing to do with fonts or typefaces but controls the mapping between the keys on the keyboard and the characters of the Mac (ASCII) character set. These ASCII characters are just abstract 8-bit data objects; they become particular printable characters only when interpreted by a particular font.

What you might find a KCHR resource good for (where you’ll find one is in the System file) is for creating new interpretations of modifier-key combinations. The Shift, Caps Lock, Option, Command, and Control keys can all modify the action of any key pressed with them, and you can change the modification. This doesn’t mean that you can set a modifier-key combination to perform an action such as opening a file; you need a macro program for that. All KCHR lets you do is associate a particular ASCII character with a particular key combination — but this can come in handy.

You can also use KCHR to decouple paired modifier keys on an extended keyboard so that the Option key on the right acts differently from the Option key on the left, for example. And you can create new dead keys, which do nothing until they’re pressed in combination with another key, usually adding a diacritical mark to the character. Or you can simply examine KCHR to see what dead keys are defined.

Note that editing resources is not the exclusive province of ResEdit. There are specific third-party editors for many of the most common resource types. ResEdit is itself a collection of resource editors, including color pickers and bit-map editors.

You can get ResEdit and its manual from APDA/Apple Computer, 20525 Mariani Avenue, M/S 33-G, Cupertino, CA 95014; (408) 562-3910. The reason ResEdit is sold through APDA and lives most of its life in beta is because it is officially a development tool. But far from being exclusively a programmers’ program, ResEdit should be seen as a behavior-modification tool for Macs.
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HOME ERGONOMICS

Does using a Mac have to mean spaghetti cabling and an aching back? Not necessarily. Here’s how to set up your computer — and why it matters.

By Thom Hogan

Have you ever noticed how everyone is eager to tell you what new gadgets and software to buy but no one wants to spend any time helping you once you’ve bought them? Even more problematic is that many users are never told how to set up and deal with their systems on a day-to-day basis.

Once in a blue moon, a magazine article will pay lip service to the issue of ergonomics but mostly as a ploy to get you excited about the latest in chairs, desks, monitor stands, and other gadgetry. And then there are the rare and frightening articles that speculate on just how many “geogees” of “electrostuff” your system emits, with dire warnings about your inability to procreate without mutations if you continue to use your Mac daily.

Is this what working for a consumer magazine is all about? Let’s see if I can provide a little common sense to contrast with the marketing hype and scare stories you might otherwise be reading this month. I want to cover two basic areas: hardware setup and hardware in day-to-day use.

Setting Up

I’m pretty amazed by some users’ hardware setups. Boxes and wires are strewn haphazardly across working surfaces, no thought is given to how much the various items are used and needed, and the emphasis seems to be on speed of setup rather than comfort. And let’s face it, hardware manufacturers don’t help things, do they? Cables always plug in to the least accessible place on the box, and many units — such as the video monitor — require two cables where one would suffice. If I’m going to plug my monitor into the Mac’s power outlet and video output, why not give me just one cable to deal with? (NeXT has the right idea here).

The laws of hardware setup are many, but several are universal enough to be mentioned up front:

• You always need more power outlets than you originally estimated.
• Cables that manufacturers supply are rarely long enough to provide a decent setup.
• If something can be knocked over accidentally, it will be.
• At least one component you buy will have nonstandard connectors or will require some out-of-the-ordinary connection.

Dealing with outlets should be easy. Before you even begin to set up your machine, buy the largest power strip you can find. If you really want to do it right, make sure the strip is grounded (and that you correctly ground your equipment at two-prong outlets) and that it includes at least some sort of minimal surge protection. If you’re going to move your computer from room to room, install a protected power strip in every room. Yes, I know you think you need only one outlet for your Mac, in the living room, because you enter data only in the living room. But another of those confounded laws predicts that a day will come when you need to plug in a printer, or a modem, or a second disk drive, or a . . . well, you get the picture. Be a good Scout, and start out being prepared.

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little electrical exploring or have someone knowledgeable do it for you. A 20-amp circuit breaker is usually enough to handle a Mac, a printer, and the normal paraphernalia that go with it. But in my office, I also have a television, a copier, a postage machine, a stereo, a fax, a phone system, and heaven knows what else (there seem to be power cables going places I haven't been able to trace). A single circuit can't handle them all, nor can a smaller-capacity circuit handle my Mac equipment alone. Older buildings are especially prone to capacity problems, whereas newer ones (say, post-'60s), if built to code, simply throw a circuit breaker if you exceed the limit. And remember that extension cords — and the cable feeding the power strip — should always be at least as thick as the thickest cable they connect to, or you might create a fire hazard.

I use a Kensington MasterPiece Mac II to handle surge protection and many of the electrical plug-ins. This unit sits underneath my monitor and provides front-panel switches for four devices (above and beyond the Mac itself) as well as a master switch. Unfortunately, my needs run well beyond what the MasterPiece can handle and I've yet to see a similar unit that can handle those little black transformer boxes that seem to come with all moderns and phone equipment (the boxes are too big and overlap into the next plug, they're too heavy to sit vertically, and some of them are just far too big to sit anywhere but on the floor).

I solve the first problem by having other power strips for other systems (all the phone equipment is plugged in to one, for example), and I solve the second problem by using extension cords to connect those boxy transformers and the socket in the power strip. If your setup is simpler than mine (a hard-disk drive, a monitor, a printer, and a modem, say), I heartily recommend the Kensington unit.

If you're like me, with a lot more, the MasterPiece is still handy but it's not as much of a problem solver. It is nice to be able to turn off the printer when I'm not using it (the NEC SilentWriter I own is anything but), but other than that, I usually leave everything powered on all the time.

Fine, power isn't a problem, you say. Let's get those boxes onto the desktop and start working.

Hold on. Let's think about this for a minute. First, where you position the monitor is important. The experts say that it should be slightly lower than your line of vision when you're sitting down. Unfortunately, tilting the monitor up means that overhead lighting is reflected on the screen, creating terrible glare. Furthermore, I argue that you should never set your monitor against a wall, and it shouldn't be against a window or right next to one (outside light is too much of a contrast against the relatively dim monitor, and you're more likely to get bad glare the closer the monitor is to a window).

The reason you shouldn't set your monitor against a wall is simple: You have nowhere to look when you're not looking at your monitor. Eyes are meant to shift focus — if you keep your focus depth at a single plane, your eye muscles will eventually get tired of holding that position and you'll end up with headaches. I have my desk positioned in the middle of my office, with my chair facing the door. The monitor is at the back of the desk, but it's another four feet to the nearest wall. I can look up at that wall or over to (and through) the door or turn to my right and look out the window at the Pacific (well, assuming there isn't any fog, which is not a safe assumption where I live). My eyes get plenty of focus change during the day, and I've never had the tired-eyes syndrome others complain about since I adopted this setup.

There's also been much brouhaha lately about just what a color monitor does to your body. Those mysterious EFI raditions and such are being blamed for everything from birth defects to lack of sex drive. For the farsighted among you, the good news is that the farther away from the monitor you are, the less dosage of anything you're receiving (with Apple's 13-inch RGB monitor, the usual suggestion is to be at least 28 inches away — monochrome monitors aren't as bad; also, the highest emissions from most color monitors come from the side and back, so don't set your chair next to someone.
AW...WHAT THE HECK!

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...
only ten minutes a day (why are you reading MacUser?), fine, put it anywhere—ergonomics and comfort of use mean nothing to you, because you aren’t at the computer long enough to get a stiff back, sore eyes, and a bored mind.

Now you’ve decided where everything goes, the tough part comes into play: putting it there and hooking it up. Cables are the bane of every computer user’s existence. There are cables for everything. The back of my Mac II sports 16 cables in its minimum configuration (just imagine how many there are when I hook up my MIDI keyboard and video equipment). I’ve even gotten to the point where I have so many serial devices that I had to install a switch box!

Two things about cables you need to know: You’ll never get them exactly right or permanently installed, and you’ll need access to them five times more often than in your wildest dreams. Thus, Thom’s First Rule of Cables: All cables should be accessible within seconds. This means that no equipment should be pushed up against a wall unless (1) its cables plug into the front (Fat chance! Not a single piece of equipment in my office manages this.), (2) you have a way to quickly slide the equipment away from the wall (rollers are nice), or (3) you’re a masochist.

Accessibility is even more important because of my Second Rule: All cables should be locked in position, where possible. Most Apple cables have screw locks to hold them in place. SCSI cables have little wire bars that you slide over metal flanges. Cables are easy to snag and pull on, and if the cable isn’t secured, Murphy’s Law predicts, even the lightest pull will dislodge the cable enough so that it no longer makes a connection or, worse still, makes an intermittent connection. (And if you put the computer against a wall, guess what you’re going to have to move to check the connections? See above.)

I also suggest that you label every cable. Get some white plastic tape, cut off a 2-inch piece, wrap it around the cable once, and stick the ends together to make a little flag. Do this at both ends of the cable. Write the type of connection on these flags — for example, you could write “Modem @ Mac” on the connector of the modem cable that plugs into the Mac and you could write “Modem @ Modem” at the other end. If you take the time to perform this little labeling operation, you’ll be much happier the day your child crawls behind your computer and starts pulling on things (you did lock those cables down, didn’t you?).

In summary, setting up a computer involves (1) scoping out the equipment locations for comfort and convenience, (2) placing the equipment, and (3) running and securing the cables.

Using It

Fine. So you’re sitting there using your computer, and your back still aches and your wrists feel like they’ve been gripped by a python. Posture, of course, plays a part here (I’m really bad on this count—the second-worst sloucher I know). But
you're uncomfortable using your Mac, there's a reason. Find it. Eliminate the problem. Common sense is usually all it takes, although having a second party look at your setup sometimes helps find things you've overlooked. Remember, the Macintosh should be a fun machine to use, so don't ruin that fun by shoving it into any old corner.

Thom Hogan is the president of Macreations Publishing Corp., the creator of Tycho Table Maker. His most recent book is Programmer's Apple Mac Sourcebook, published by Microsoft Press.

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Local Color

During this colorful time of year, we can’t resist taking a side road to explore how the Mac supports color output. For those of you following Browser, remember that all things come to those who wait — we’ll be back in January with the final installment.

By Kurt W. G. Matthies and Thom Hogan

The GrafPort data structure (see Example 1), which provides the foundation for all drawing on a Mac, has supported color — the infamous eight original colors: black, white, red, green, blue, magenta, cyan, and yellow — since its inception. Unfortunately, early Macs provided no way to display anything but black and white. Once IBM had delivered its EGA, Mac bashing flourished (with our own anti-editor, John C. Dvorak, as gang leader), with the most vocal complaint being about the lack of color.

With the introduction of the ImageWriter II printer, Apple made an attempt at color output (how many of you remember buying those fat tricolor ribbons at the January 1987 Mac Expo?), but the idea never really caught on among developers and few programs supported this output method (Silicon Beach’s SuperPaint was probably the best of the bunch). Color didn’t become a viable alternative on the Mac until the advent of Color QuickDraw on the Mac II.

Color Me QuickDraw

Color QuickDraw, introduced with System 5 and described in Inside Macintosh, Volume V, provides a wealth of color-supporting utilities. Color QuickDraw is built into the ROMs of all Mac II models and the Mac SE/30. The new foundation of drawing is the CGrafPort (see Example 2), where the C stands for full RGB color.

The CGrafPort structure is based on the GrafPort structure and is conveniently the same size, which means that the window structure doesn’t have to change size to support color (remember that a WindowRecord contains a GrafPort as its first element). But if you look at the side-by-side Examples 1 and 2, you’ll see that some of the fields have changed in both name and type whereas others have remained the same. These changes are, of course, because of the addition of RGB color, and they’re guaranteed to cause grief for those who don’t pay attention to the machine the program is running on (we’ll cover how to handle that at the end of this month’s installment).

Bit-Mapped Displays

Before you can understand how to manipulate color, you must have a solid understanding of how the Mac creates a display in monochrome. The most startling difference between the Macintosh and its predecessors is the seamless mixture of text and graphics on the screen, a by-product of the machine’s bit-mapped display. On a monochrome Mac, every pixel on the screen is controlled by the value of a single bit in video RAM. If the bit’s value is 0, then the corresponding pixel displays white; otherwise, the pixel displays black.

This mapping of the screen’s illumination to a data structure in RAM is the fundamental principle of bit-mapped graphics. On a monochrome Mac, this data is contained in a BitMap structure, an integral part of the GrafPort.
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**Example 1**

typedef struct GrafPort {
  int device;
  BitMap portBits;
  Rect portRect;
  RgnHandle visRgn;
  RgnHandle clipRgn;
  Pattern bkPat;
  Pattern fillPat;
  Point pnLoc;
  Point pnSize;
  int pnMode;
  Pattern pnPat;
  int pnVis;
  int txFont;
  Style txFace;
  int txMode;
  int txSize;
  Fixed spExtra;
  long fgColor;
  long bkColor;
  int colrBit;
  int patStretch;
  Handle picSave;
  Handle rgnSave;
  Handle polySave;
  QDProcsPtr grafProcs;
};

The GrafPort data structure
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BitMap, with its miserly 1 bit per pixel, can contain the data for only two colors: black and white. Enter PixMap.

that you get the screen size by looking at this variable. The code in Example 5 demonstrates the process.

Now that we’ve gone ahead and mentioned the old method, you should know that in these days of multiple monitors, screenBits is no longer adequate. GetGrayRgn, an addition to the Toolbox that is coincident with ColorQuickDraw, returns a handle to the gray region, which describes the entire screen area that’s available to your application. If you’re trying to keep your Mac application state-of-the-art, you must use GetGrayRgn to determine the screen region. The new method is demonstrated in Example 6.

BitMap contains a minimum of data — only the on/off state of its pixels. This minimum information is known as 1-bit-per-pixel video. (How much memory is needed to store all the pixels on your screen? Given that a Mac SE screen has a resolution of 512 x 350 pixels, there are 512 rows, divided by 8 bits per byte, times the 350 rows required to store the screen, which our calculator reports to be 22,400 bytes. Is it any wonder that 128K Macintoshes used monochrome displays, with roughly 20 percent of available RAM allocated to the screen?)

Color and the Powers of 2

To store color information, you need more than one bit of information per pixel. One bit of information has only two possible states — on or off. Two bits of information have four possible states, three bits have eight possible states, and so on. States translate into colors — the number of bits of information you keep per pixel defines the number of colors available for screen display. This range is expressed as $2^n$, where $n$ is the bits-per-pixel value.

The standard Apple color card for the Macintosh II supports 8 bits per pixel. Because $2^8$ is 256, this device can display no more than 256 colors simultaneously. Higher-priced video cards, which contain up to 24 bits per pixel of color information, can support 224 bits per pixel, or more than 16 million simultaneous colors. The key word here is simultaneous — although the video device can display millions of possible colors, the $2^n$ value defines how many colors can be displayed at one time.

RGB Color

As we mentioned earlier, Color QuickDraw supports RGB color. The RGB system specifies a color in terms of three components — a red value, a blue value, and a green value — which correspond to the three guns that generate an image on a color video monitor. Apple has defined a data structure, RGBColor, presented here in Example 7, to hold color values. Each component of the RGBColor
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Example 3

typedef struct BitMap
{
    Ptr baseAddr;
    short rowBytes;
    Rect bounds;
} BitMap;

The BitMap data structure

Example 4

Ptr
findBMRow (int row, BitMap *bp)
{"point to the row of interest
Note: needs bounds checking of row!
"/}
return (bp->baseAddr + ((row - 1) * bp->rowBytes));

Returning a pointer to a particular row in a BitMap structure

Example 5

int resH, resV;
resH = screenBits.bounds.right - screenBits.bounds.left;
resV = screenBits.bounds.bottom - screenBits.bounds.top;

The old method of getting the screen size

Example 6

RgnHandle grayRgn;
register Rect *grayRectPtr;

grayRgn = GetGrayRgn();
grayRectPtr = &(*grayRgn)->rgnBBox;
resH = grayRectPtr->right - grayRectPtr->left;
resV = grayRectPtr->bounds.bottom - grayRectPtr->top;

The preferred method of getting the screen region

structure can have a value within the range 0x0000 to 0xFFFF. Colors, therefore, are expressed as three values, with black being at (0x0000, 0x0000, 0x0000) and white at (0xFFFFFFFF, 0x0000, 0x0000). Shades of gray are expressed as equal values of each component, as in medium gray (0x8000, 0x8000, 0x8000). Primary colors are the result of using a nonzero value in a single component, as in blue (0x0000, 0x0000, 0x0F00). Secondary colors come from blending, as in yellow, which is part red and part green (0x0FF0, 0x0F00, 0x0000), or violet, which is made from red and blue (0x0800, 0x0000, 0x0F00).

Color Tables

Colors are specified as 24-bit quantities, but the available memory on video cards for most Macs limits the screen display to 8-bit-color information. These video cards have a standard 640-x-480-

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Pixel resolution. With 1 bit of information per pixel, this resolution translates into 307,200 pixels, or 38,400 bytes. But if you kept a 24-bit RGB value for each pixel, then the video device would require close to a megabyte of RAM.

To optimize memory usage, 8-bit video cards use a color-lookup table, which works as follows. Every color value is kept in a table (which has a maximum size of 256 colors). Instead of the 24-bit color value for each pixel being stored, what is saved in the pixel map is an 8-bit index to one of these values. The color table is maintained dynamically by the Color Manager, which is responsible for mapping the pixels’ color indexes into the actual 24-bit values. Although this happens below your level of consciousness in Color QuickDraw, you need an awareness of color indexes to know how a PixMap structure maintains color data.

The PixMap Structure

BitMap, with its miserly 1 bit per pixel, can contain the data for only two colors: black and white. Enter PixMap, the data structure that breaks the 1-bit-per-pixel barrier. The PixMap structure is defined in Example 8. Note that PixMap contains BitMap — the structure that maintains baseAddr, rowBytes, and bounds fields — but that new fields have been added at the end to support color.

PixMap can be passed to CopyBits, the Toolbox routine that duplicates a BitMap, and CopyBits is integral to the operations of the Menu Manager, Window Manager, and other fundamental managers. It was for this reason that Apple designers chose to keep the BitMap part of PixMap (the first three members) intact. The PixMap structure is also flexible enough to accommodate many variations in hardware and to support multiple monitors.

For our purposes in manipulating colors, the most important data maintained by PixMap is the number of bits per pixel, also called the pixel depth of PixMap, which is kept in the pixelSize field. Remember that the pixel depth determines how many simultaneous colors you can have in the PixMap structure.

Chunky and Planar Pixels

Another important factor is the arrangement of the data, referred to as the packing type, in the BitMap part.
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Power Programming

To draw in color, you first need to create a color window, but the one thing you don't want your application to do is create a color window on a monochrome machine.

PixMap supports two basic kinds of packing: chunky and planar. With chunky packing, the color index for each pixel is stored in sequential bits of the PixMap structure's buffer, so the offset from one pixel to the next in the buffer depends on the pixel depth. With 8-bit-per-pixel color, neighboring pixels are exactly 1 byte away from each other. In a 4-bit-per-pixel PixMap, each pixel is 4 bits away from the next.

Planar PixMap structures are organized like multiple layered BitMap structures are — adjacent pixels are next to each other, as they are in a one-pixel-deep BitMap. The difference is that a PixMap has multiple bit planes, which must be taken together to get a pixel's color index. These planes can be viewed as separate buffers that map the entire screen but contain only one pixel of color information. The entire color-index value for a pixel is derived from a 2-dimensional sortie into all the planes, followed by a calculation that weights the value found in each plane.

Many graphics devices, such as those produced by Tektronix, are based on the planar model. Generally speaking, though, most current color-display technology uses chunky addressing rather than planar.

Color Windows

With the background out of the way, it's time to do some drawing. Most applications do not write directly to the PixMap; rather, they modify it by drawing in the window. This is where Apple has made it easy. You create color windows with NewCWindow, which is the Color QuickDraw version of the NewWindow routine. Once you've created a window, you're ready to draw in color.

Because the WindowRecord structure is fundamental to the document structure of many applications, Apple decided that it wouldn't modify it. (The CWindowRecord, which contains a CGrafPort instead of a GrafPort, is otherwise identical to WindowRecord.) Instead, the Window Manager maintains an auxiliary window record for color windows to contain the color information. As you create colors with Color QuickDraw, this auxiliary window record is updated with the new values.

Apple has also modified all the standard QuickDraw drawing procedures to enable them to accommodate color. The graphics verbs draw, invert, paint, and frame (as in DrawLine, InvertArc, PaintRect, and FrameRect) employ the window's CGrafPort foreground and background colors, which are specified with RGBForeColor and RGBBackColor.

Detecting Color

To draw in color, you first need to create a color window, but the one thing you don't want your application to do is create a color window on a monochrome machine. If you ignore this basic step, your application will be treated to a bomb box the first time that you try to run it.

SysEnvirons is the call that reports the presence of Color QuickDraw. To test for color, you must check the value of the hasColorQD member of the SysEnvirons structure. If this value is nonzero, call NewCWindow; otherwise, call the old standby NewWindow.

Example 9 demonstrates the color-detection procedure.

Color is a vast subject to tackle in detail. In this installment, we believe that we've gotten you to the point at which you can start writing to the display in a colorful manner. If you take some time to peruse the relevant sections of Inside Macintosh, Volume V, you'll find that there are color patterns, color icons, and even color fonts to play with. Another novelty is the Palette Manager, which supports collections of colors, known as palettes, and removes you from the gory details of machine configuration in a MultiFinder-controlled world. Finally, there's the Color Picker package, which is the standard Apple interface for selecting an RGB value. We'll certainly have more to say on this subject in future columns, but for now, all we have room for is to wish you a colorful holiday season.

Next month: We'll deliver the conclusion of Browser.

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Today the Macintosh is no longer a stand-alone computer. Macs are found in every type of department and every type of business. And they are not just running DTP applications. Spreadsheets, word processing, accounting packages, engineering applications, multimedia – Macs are running whatever business needs. They are interfaced with IBM mainframes, VAXes, Sun and other UNIX workstations, and MS-DOS personal computers.

They're doing all this now and will be doing it even more extensively in the future. Business buyers of Macintosh products have to know how well the products they are considering perform in these challenging environments.

That's why MacUser, the leader in providing brand specifiers objective, thorough and reliable information, announces the opening of the NetWorkShop, a major new extension of its MacUser Labs. The only independent testing facility for Macintosh products intended for networked systems.
THE PREMIER TESTING FACILITY FOR MACINTOSH IN THE 90's

From the moment plans were begun to the time the last wires were punched down, no expense was spared to ensure that MacUser would develop the industry's most authentic workgroup environment dedicated entirely to connectivity, networking and productivity issues. As different platforms and new technologies proliferate, the NetWorkShop will emerge as an indispensable information resource for Macintosh business buyers and vendors.

AN UNPARALLELED INSTALLATION

MacUser Labs' NetWorkShop is a one-of-a-kind facility with the capacity to hold 60 CPUs plus monitors and printers. It has custom-designed racks connecting all the CPUs to a patch panel where any CPU can be connected to LocalTalk, Ethernet or Token Ring. On site are over 30 Mac's of all kinds, a NeXT workstation, a Sun SPARCstation, two micro VAXes, and four IBM compatibles; Novell NetWare and 3COM 3+0 Open File Servers, and a variety of routers and gateways. It incorporates the major operating systems including UNIX, VMS, DOS, OS/2 Windows, and Mac OS. Products to be tested include big servers, 10BASE-T Ethernet cards and concentrators, multiuser databases, routers and gateways, network management products, Mac as a workstation, terminal emulation software, multi-platform and multi-protocol integration, and any Macintosh product capable of operating in a networked environment.

A STAFF OF EXPERTS

Headed by Technical Director Henry Bortman and Labs Director Andrew Eisner, the staff of the NetWorkShop represents a remarkable 40+ years of experience in a field just over five years old. Each lab member has a recognized standing in the Mac industry. Together they form a highly coordinated team with an unassailable reputation for integrity.

REAL WORLD TESTING

No ivory-tower analysis can provide meaningful information to serious buyers. MacUser Labs' NetWorkShop has been designed to simulate conditions likely to be encountered in any modern business environment. The staff contacts vendors and buyers to pinpoint the technical issues and characteristics that distinguish the products, then develops test scripts with the goal of asking the right questions and finding the answers.

SURVIVAL INFORMATION FOR DEALING WITH THE 90's

The real art of lab testing is interpreting data - distilling it into critical information buyers can use to make intelligent purchase decisions. We analyze the data, interpret it, then write insightful recommendations that buyers must have to make product choices appropriate to their specific business requirements.

The value of MacUser Labs' findings is measured by the vast sums that companies are ready to commit, now and in the future. Sums that are always significant and often awesome. MacUser Labs reports save buyers time, money, and take the risk out of their recommendations. Just as any serious buyer needs the information we provide, any serious marketer needs to know how his product performs in these demanding situations.

MACUSER-PREFERRED FOR INFORMATION

MacUser Labs' NetWorkShop is yet another example of the many invaluable services on which MacUser has built its reputation in this highly important, rapidly growing industry. The NetWorkShop employs the same high standards of accuracy, reliability and pertinence that has gained MacUser its remarkable degree of influence among today's Macintosh Brand Specifiers.

Month after month, MacUser produces noticeable, quality results. In testing. In reporting. In its unrivalled combination of editorial and readership. MacUser is simply the best information resource for Macintosh products.
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Do you have an undocumented Macintosh tip you're willing to share? MacUser pays at least $25 for every tip used, and the Tip of the Month earns $100.

Send your tip, together with your name, address, and phone number, to Tip Sheet, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

You can also contribute tips electronically, via Zmac, the on-line service for MacUser. Send your tips to Gregory Wasson at 72511,36. Be sure to include your full name and mailing address along with the text of the tip.

Compiled by Gregory Wasson

PageMaker 4.0

In converting our company's catalog text from MacWrite II to PageMaker 4.0, we discovered that the importation and creation of en dashes is inconsistent.

Our document contained many en and em dashes. Although we had no trouble importing em dashes (Shift-Option-hyphen) in either the page-layout or the story-editor view, en dashes (Option-hyphen) didn't survive the Place or Import procedures.

In the story editor, you can't import en dashes, nor can you create them. The mode's global-change option doesn't recognize them. They import as hyphens.

When you use the Place command on imported text in the page-layout view, the en dashes change to hyphens. You can create en dashes in the page-layout view with the standard Option-hyphen keystroke combination, however.

There is a way around this shortcoming: Cut and paste between applications. Copy the text you want to import from your word-processing file, and then close the document. Open the PageMaker 4.0 file, and paste the text.

Although more steps are involved in this technique, if you have many en dashes in an existing document and want to copy directly to the PageMaker document, this is the only way the en dashes will survive the transition.

Sandra Richardson
Burlingame, CA

Adobe Illustrator 88

The effect shown in Figure 1 is a popular and effective one for logos and mastheads. It's simple to create it in FreeHand, using the Clone and Paste Inside functions. Here's an easy way to get the same effect while using Adobe's Illustrator 88:

1. Ungroup the circle or geometric shape you've drawn (Command-U). Paint it black, and choose the Mask option.
2. Paint the text white, and bring it to the front. Copy the text to another part of the page with an Option-drag.
3. Group the circle and the first text. Now drag the second text precisely over the top of the first. Paint it black, and send it to the back.

Tip of the Month

PageMaker 4.0

Have you wished for a way to group items in PageMaker 4.0? Here's a simple way to do it:

1. Select and copy the items you want to group, and then paste them (all at once) into the Scrapbook.
2. Now place (Command-D) the Scrapbook file (Hint: It's in your System Folder). You can now resize the whole "group" (see Figure 2).

To ungroup the items, open the Scrapbook in the regular way through the Apple menu and then copy and paste the selection into a PageMaker document. You'll once again be able to edit the separate items.

Kevin McDaniel
Rancho Santa Margarita, CA

[Using the Scrapbook file as a convenient place to store graphics or text files can help you get different files into your PageMaker document more efficiently—especially if you're trying to save memory by not running under MultiFinder. When you place the Scrapbook file, PageMaker selects every item in the Scrapbook in turn, pausing after each one to let you determine where you want to put the next one.—Ed.]
**POWER TOOLS**

**TIP SHEET**

The white text masks the circle, and the black text underneath shows only on the outside of the circle.

Kevin Cross  
Alexandria, VA

**Capture**

Whenever you need a thumbnail of some pages, don’t bother using your page-layout program’s Thumbnail print option, because it takes too long to print (especially if the pages consist of halftones and fonts that have to be downloaded and scaled).

Instead, use a screen-capture utility such as Capture to take a picture of the pages one at a time. Paste them into the Scrapbook or directly into another document, reducing the “thumbnails” so that several can fit on a page (see Figure 3).

Although the quality of thumbnails created in this way won’t be as good as that of those generated from within page-layout programs, it will be good enough for examining the general look of a page or document. This method has several advantages:

1. You can choose the exact thumbnail size you want — something you can’t do with the Thumbnail print option in your page-layout program.
2. You can add descriptive copy.
3. Printing is much faster because you’re only dealing with a single bitmap per page.

Saul Adler  
Bronx, NY

---

**Excel 2.2**

I need to print form letters but have always felt intimidated by Word 4.0’s mail-merge features. The manual has more than 20 pages of notes and options, which can be confusing. But one of Microsoft’s other products, Excel, has come to the rescue, simplifying the mail-merge process for me and providing a simple flat-file database as well.

Here’s how to set things up:

1. Create an Excel address database as shown in Figure 4. You can sort, print, edit, or search it. Make sure you save a version in the CSV (Comma Separated Values) text format so Word will be able to access it.
2. Set up a Word “main document” (see pages 69 to 72 in the Word 4.0 manual) — not a difficult process. The first line contains the DATA statement followed by the name of the “data document,” or address database. Text prints as usual. Field names are enclosed in double angle brackets (« — Option-, Shift-Option-»). See the example in Figure 5.
3. Now here’s the good part. See all those field names? They’re common to both the Excel address database and the Word main document (the form letter). Just make sure the name you use in the Word form letter is the same as the name you’ve given the Excel file saved in the CSV text format.

To print form letters, open your main document in Word, select Print Merge, and choose which records (the row numbers in your Excel address database that contain the names and addresses you want) to print. Click on the Print button, and you’ve finished.

Gerald T. O’Neill  
Davis, CA

**DesignStudio**

Those who use DesignStudio and Ready, Set, Go! can get anchored rules by using this tip (PageMaker has a special command for this). Although this method works best with rules wider than 2 points, you should be able to obtain nearly any point size with a little experimentation.

When you’re ready to place a rule in your text block, select Zapf Dingbats from the Font menu and type a lowercase n, the filled-box character.

Highlight the character, set its track value to .25 or .5 by using the Horiz Spacing command on the DesignStudio Format menu, and set its point size to the rule width you need. Place the cursor after this dingbat, and type as many as you need. The rule will appear on-screen as a thick gray line.

At small point sizes, producing a long rule can be tiresome, so after you’ve created a portion of the rule, select it, copy it, place the cursor after the last dingbat, and paste until you’ve filled the column. You can delete the excess. The result now functions as an anchored rule that flows with the text. This “rule” prints as a solid image at both 300 dpi and 2,540 dpi.

One final point — as I mentioned, you may need to experiment to get the point size of this kind of rule to match a tool-drawn rule exactly. For example, to obtain a 1-point rule, you have to set the point size of the dingbats to 1.35.

Jeff Negran  
New Brunswick, NJ

---

**Figure 3:** Printing thumbnails from page-layout programs is fast and flexible if you use a screen-capture utility such as Capture.

**Figure 4:** Excel provides a friendly interface for creating an address-book database you can use in Word 4.0 mail-merge letters.

**Figure 5:** A Word 4.0 document for use as a mail-merge letter.
Macintosh Portable Owners!

How to Carry your Briefcase, a Garment Bag, your Macintosh Portable, and still BEAT THE 2 ITEM CARRY-ON LIMIT

1988

If you just bought a Macintosh Portable you've solved one problem and created two new ones. You solved the problem of lugging the old workstation-style Macintosh from office to your home. However, you still have the problem of getting on airplanes and still having only two hands. Please let me explain.

I recently bought a new Mac portable and couldn't wait to travel. Sure, it's still a little heavy but a lot more moveable than the old Macs. I got ready to leave for the airport, picked up the portable with one hand and my garment bag with the other. I looked over and there sat my briefcase. In the briefcase I had my day planner, cassette player, phone, magazines, note pads, pencils, and business files. There was no way that I could leave my briefcase home yet I seemed to have run out of hands!

The solution was to put my briefcase under my right arm, grab the portable with my right hand and pick up the suitcase with my left. Not comfortable, convenient, or easy to do, but I at least made it to the airport.

At the gate I ran into problem number two. Even though I had found a way to carry all three cases they wouldn't let me bring more than two carry-on's onto the plane. All I could do was send the garment bag off with a baggage man and hope that it didn't end up in garment bag heaven. As I got off the plane I carried my Mac and my briefcase to the baggage claim area only to find good news and bad news. The good news was that my bag had arrived, the bad news was that it had been run over by a truck.

Happily I want to announce a solution to this problem. If you own a Portable Macintosh you need the EXECUbrief Saddlebag. The Saddlebag carries all of your briefcase items in slim, lightweight, leatherette or nylon, executive style. It conveniently fits over the Mac portable case combining the two cases into one attractive carry-on.

The EXECUbrief was specially designed for MacAcademy, the nation's leading Macintosh training organization. MacAcademy trainers travel to hundreds of cities, and need the very best in convenient luggage. Now a traveler can carry a garment bag in one hand and the Macintosh and a briefcase in the other.

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**Word 4.0**

Here's a tip I've found handy when using Microsoft Word and its mail-merge feature.

As you're creating the data file, you might well find that some of your entries are too long or that they just don't fit the pattern you've established in the header information. You can get around this problem by breaking the field entry into two or more lines with a soft Return (Shift-Return). For example, look at the entries in Example 1.

The first entry (John Smith) follows the field pattern nicely, but the second entry (Mary Doe) may look funny if it's all on one line. If you enter a soft Return, the mail-merge will bring that onto the next line without disrupting the field order. Be sure to save the data file as a normal Word document — soft Returns are stripped out of ASCII documents. To see the difference in a Word data file, just be sure that Show Paragraphs is on.

David Zizza
North Billerica, MA

**TypeAlign**

When you're using TypeAlign, the text-distortion DA from Adobe, you can highlight an entire text string without dragging from left to right. Just insert your I-beam tool anywhere in the text, and press the Tab key. It's easier than drag-selecting, which can be difficult with curved text, and it's not mentioned in the manual.

Frank Garcia
Vancouver, British Columbia
Canada

【The manual does mention that you can triple-click on a text string to select it, but the Tab key provides a nice alternative. — Ed.】

**StuffIt 1.5.1**

Users of the shareware file-compression utility StuffIt 1.5.1 by Raymond Lau may start coming across .SIT files that have been stuffed with StuffIt Deluxe, the new commercial version of this useful program. And they will quickly find that they can't use the shareware version to unstuff the files. Well, actually, in many cases they can, but they'll have to get their hands dirty with ResEdit.

Launch ResEdit, and select the .SIT file created with StuffIt Deluxe. Press Command-I (Get Info), and change the

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SuperCard 1.5

A lot of programs on the Mac market create stand-alone applications or self-extracting archives. Two good examples are SuperCard and Compactor.

If you get a project-only version but do not own SuperCard, it is impossible for you to run it. The same goes for Compactor. If you get a Compactor file but do not have the program, you cannot extract the file’s contents.

The obvious answer is just to go out and purchase SuperCard or Compactor, but that’s not always a cost-effective or timely solution.

A different approach is to convert the SuperCard project into a SuperCard stand-alone application or to convert a Compactor file into a self-extracting archive.

The following method requires ResEdit. If you’re converting a SuperCard project, it also requires a SuperCard stand-alone application. If you’re converting a Compactor file, it also requires a self-extracting archive.

Follow these steps (I’ll refer to the SuperCard project/Compactor file as the data file, and the SuperCard stand-alone application/Compactor self-extracting archive as the app file):

1. Run ResEdit.
2. Open the data file.
3. Open the app file.
4. Select and copy all the resources in the app file.
5. Activate the data-file window.
6. Paste the resources in.
7. Close the app file.
8. Save the data file.
10. Change its type to APPL.
11. Quit to the Finder.

Now run the SuperCard or the Compactor file, and it will work perfectly.

Adam Stein
Edison, NJ

[The author of this tip has written an application that automates this process. It’s available in the Zmac Download Library Forum. Search for the keyword SUPERCARD.—Ed.]
Microtek announces the end of the font wars. Introducing the first TrueImage printer.

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Questions anyone? Here's where to get answers from the experts. Bob LeVitus is the author of the best-selling Dr. Macintosh. Andy Ihnatko isn't. But he knows a lot about the Mac, and he's got a heck of an attitude. Together, they're ready to answer your questions about everything Macintosh.

Write to Help Folder, c/o MacUser, 950 Tower Lane, 18th Floor, Foster City, CA 94404.

Don't want to wait for an answer? Post your question on Zmac, MacUser's on-line service, and get a reply from Bob, Andy, or one of the other MacUser experts. See the masthead in this issue for instructions on how to sign up.

By Bob LeVitus and Andy Ihnatko

Too Many INIT Icons

Q. I use a Mac Plus (2.5 megabytes with two 45-megabyte hard-disk drives) and lots of INITs. At startup the INIT icons appear in one long row and the last half of them never show on-screen. Because I use CE Software's Aask utility to turn off certain INITs, I'm never sure which ones are on until I check the Control Panel. How can I see all the INITs I'm loading?

Mary Stiller
West Lafayette, IN

Bob: Many of us have experienced this problem, and it's easy to solve with a freeware INIT called IconWrap, written by Ken McLeod. I've used it for years. Just drop it into your System Folder, and reboot. Voila—the icons automatically go into two rows.

Andy: I use IconWrap, too...it's great. But gee, Bob, I sure do wonder where our readers can get their hands on public-domain and shareware software...

Bob: I guess they'll have to read the next letter...

Where's Layout?

Q. In your July '90 column (page 251), you described a public-domain application called Layout 1.9 by Mike O'Connor. I don't have a modem, so I can't download shareware from Zmac. Where can I order this?

Myra Seifert
Eugene, OR

Bob: The author doesn't sell copies of Layout, but it is widely available from on-line services and user groups. If you don't have a local user group, you can try the BMUG (Berkeley Macintosh User Group) software library, one of the most complete in the country. It offers a catalog of programs (it cost $8 the last time I checked) and sells disks for $4 each, including postage and handling. The BMUG folks are among the nicest, most knowledgeable Mac users I know, and they're a pleasure to do business with. If you don't have a local user group, you might consider joining BMUG just to get its newsletter—a semiannual 300-to-400-page extravaganza.

BMUG can be reached at 1442A Walnut St., #62, Berkeley, CA 94709-1496; (415) 549-2684.

Andy: Don't forget the BCS•Mac (Boston Computer Society Macintosh) Group. Not to smear BMUG, Bob, but at the last Boston Expo, it held a big "Salute to Nonbiodegradables" party. BMUG members went all over town collecting mounds of plastic and Styrofoam and then threw it into the dolphin tank at the New England Aquarium. Kind of a black mark against BMUG, if you ask me.

Bob: That's a lie, and you know it! How can you promote a group such as BCS•Mac, whose greatest cultural achievement is the invention of Macintosh Jeopardy?

Andy: Well, anyway, BCS•Mac also has a nice fat PD catalog and a great monthly magazine. It's located at 48 Grove St., Somerville, MA 02144; (617) 625-7080.

Bob: Those of you who hate Massachusetts and California can call (800) 538-9696 for the name of your local Mac user group. Most of 'em sell shareware disks.

Printer Care and Feeding

Q. How do I know whether a certain material—labels, transparencies, or card stock—is safe to feed through a LaserWriter?

Andrew Rosa
Brooklyn, NY

Andy: The safest way is to feed it through someone else's LaserWriter first.

Seriously, three hazards face a sheet of (fill in the blank) as it meanders through the LaserWriter's intestines. First, the page makes a U-turn as it travels from the paper bin into the printing mechanism. If the page is a sheet of labels, some stickers may peel off while making the turn and get stuck among the inards of the machine. The solution is to feed the page manually to avoid the U-turn.

Problem 2 is page thickness. By exhaustive experimentation (that is, by feeding progressively thicker stock through a pal's printer until a savage paper jam occurred), I determined that 60-pound cardboard (business-card stock) is the thickest stuff that can make it through unscathed.

Finally, there's heat from the fusion rollers at the end of the paper path. It can turn a happy sheet of transparency material into a hard glob of plastic nastiness that's terminal fused to the printing mechanism. Because the lowest temperature of the heat rollers is typically about 150 degrees, you can test a sheet of material by setting an iron to 140 degrees or so and passing it over the sheet a few times. If the iron becomes permanently fused to the ironing board, well, you have the answer.

Bob: Most office-supply stores sell special labels and transparency film for use with plain-paper copiers, which are very similar to laser printers. I've had good results with Avery 5351 labels and Scotch 503 transparency film.

Print from the Finder?

Q. Can you print a document directly from the Finder without opening it?

Harold Rhoda
Marlboro, NJ
Andy: Just select the document, and use the Print command on the Finder's File menu. The Finder will run whatever application created the file and print that sucker right out. This is really useful if you have a whole folder full of documents you want to print. If you select them all and print from the Finder, many applications, such as Word, will show you only one Print dialog box and then print the documents in succession.

Bob: You must have a copy of the correct application on a mounted disk, of course, or you get the dreaded "the application is busy or missing..." error message. And you can't select two files from different applications — this works with only one application at a time. And many applications, such as Word, won't let you print from the Finder if the application is already open.

Digital Photography

Q. Help! I work for a small newspaper that is produced almost entirely on the Mac except for two phases of the operation — the photography and printing the actual newspaper version. We don't expect Macs to print the newspaper (yet), but we think they can bypass the drudgery of chemicals; film; and the rest of the time-consuming, mysterious, arcane, never-the-same-results-twice-in-a-row darkroom process.

We know that digital cameras are available. Which ones can you suggest, how do we find them, and how do we get the image from the camera's viewfinder into our PageMaker layouts so that it's suitable for printing on a LaserWriter? IHT?

George Ziemann
Bullhead City, AZ

Bob: It can be done, but it won't be cheap — plan on spending several thousand dollars to install a complete digital photo halftoning system.

Digital cameras are available from several manufacturers — Canon, Panasonic, and Sony are probably the best known. These cameras use non-standard 2-inch disks, which can hold between 25 and 50 pictures. Most digital cameras require a separate playback unit for viewing the photos. Prices for complete systems start at around $1,000.

Frame-grabber cards, which convert video signals into TIFF or PICT files, are available from RasterOps, Mass Micro Systems Aapps, and several other manufacturers. For added functionality, you can input images from a video camera into a graphic file or use a frame grabber to convert a frame of videotape. You can get a frame grabber for less than $1,000.

Finally, you'll need some image-editing software such as Photoshop, Digital Darkroom, or ImageStudio.

Before you invest in a digital system, I suggest you look long and hard at some samples of work done with similar components. Although you might be able to attain results that are comparable to conventional darkroom/halftoning outputting to a high-resolution imagesetter (1,000 dpi or more), I suspect you'll find that you can't even come close with a 300-dpi LaserWriter.

Andy: Another big problem with electronic photography is that it's still a pretty new field. The electronic cameras I've seen are great for snapshots but aren't nearly as capable as their traditional counterparts. A better solution would be to take pictures with a traditional camera and then scan them in with a good 256-gray-level scanner. That should get you your elusive All-Electronic Newspaper.

I should warn you, though, that all the Big-Time Professional Graphic Artists I know advise against the use of scanned photos in publications. They contend that scans don't print as well as traditionally halftoned photos, and looking at the results, I have to agree.

Phone Cables for the Keyboard

Q. Can I use a regular telephone handset cord to replace my Mac Plus keyboard cable?

Greg Kaplow
San Jose, CA

Andy: No — a pre-ADB keyboard cable can serve as a handset cord but not vice versa. Given Apple's recent bout of litigationiousness, the Phone Company is understandably afraid of being sued by Apple for infringing on its patents. A standard handset cord works if you rewrite it, though. Just swap the colored wires at each end so that the yellow wire runs to the black wire and the green wire goes to the red wire (see Figure 1).

The only caveat here is the length of the cord. The absolute limit seems to be 10 feet: Use a 12-foot cord, and you'll find that keystrokes are keeping dropping out during the long journey from the keyboard to the Mac.

Bob: How do you figure stuff like that out, Andy?

Andy: No comment, except that it gets real boring when both your CD player and your TV are in the shop at the same time.

X Rays and Your Disks

Q: Is it safe to allow my diskettes to be scanned by an airport X-ray machine?

Rene Dubillard
Paris, TX

Andy: If you ask an airline, it'll tell you (without hesitation) that security equipment has absolutely no adverse effects on magnetic media. So far so good. But then, these people also tell you that your 8:00 A.M. flight will leave promptly, so I thought some experimentation was in order.

I formatted 20 disks, filled them with Lotus spreadsheets and HyperCard stacks (so any damaged files wouldn't be a real loss), and separated them into five envelopes of four floppies each. One envelope stayed home as a control. The other four accompanied me to Logan International Airport in Boston and were run through an X-ray machine one, two, three, or four times. The exciting results are summarized in Figure 2 (please... no wagering).

Clearly, you shouldn't trust your floppy to airport security machines. At least not the ones at Logan. In my Never-Ending Quest for Truth, I am, of course,

Figure 1: If your Mac Plus’ keyboard cable dies, you can make a new one from an ordinary telephone handset cord.
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Effect of airport security on floppy disks

Figure 2: An airport might say that its X-ray machine won’t turn your floppy disks into plastic drink coasters, but our empirical observations suggest otherwise.

prepared to undertake a 20-city junket of airports, at MacUser’s expense . . . ) The same caution should apply to hard-disk drives as well.

But fear not for the safety of your data whilst traipsing through airports. As an airline employee told me (as I brought her line to a standstill with the preceding disk follies), “It’s every American’s right to request hand inspection.” Simply put your hard-disk drive and your floppies into a separate bag, and allow 20 minutes for the procedure. In general, you’ll be expected to fieldstrip your bag and prove that your drive works by plugging it in and starting it up.

While we’re on the subject of data predators, the antitheft systems in public libraries and bookstores are unlikely to blitz your data. But beware of the desensitizing machines at checkout stands! These machines (decorated with festive “DO NOT PLACE CREDIT CARDS ON THIS MACHINE!” stickers) contain powerful electromagnets.

Bob: Don’t be so quick to condemn X rays. I’ve heard the magnets in the motors that run the conveyor belts in airport security systems are the culprit, not the X rays. Although you haven’t exactly proven that X rays are harmful, it’s quite clear that X-ray machines are bad for disks.

I’ve always asked for a hand-inspection of my floppies and hard-disk drives, so it’s nice to know that all that hassle was worthwhile.

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3. **WYSIWYG Screen Fonts.** As in What-You-See-Is-What-You-Get. Our printer support kit included with every 290 we sell includes software that lets you see all of the printer’s 35 scalable typefaces before you print them out. Also included are diskettes that allow you to install the fonts on any Macintosh or under Microsoft® Windows™ in the MS-DOS environment.

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**From Works 1.1 to 2.0a**

Q. I had Microsoft Works version 1.1 for some time and created a lot of lists and files with it. When I got version 2.0a, I installed it on my hard-disk drive and kept it along with version 1.1. I'd like to transfer all the information created with the first version into the new one, but I can't seem to find any information about this in the manual. I called Microsoft, but you know how that is. The person I spoke with quickly explained how simple it is, but I still can’t figure out how to do it. Can you help?

Another thing: I read your info on memory upgrades with interest (June '90, page 299). When I heard about System 7.0, I upgraded my Plus to 4 megabytes of RAM. OK, but what do I have now? Aside from the ability to run System 7.0 (which will require at least 2 megabytes of RAM), what does the upgrade do for me? I don’t understand the RAM cache and was told not to mess with it. Because I plan to use HyperCard and PageMaker to keep extensive records and write a book, I thought increasing the RAM would be a good idea. Was it?

Henry Anton
Meriden, CT

Bob: Microsoft was right—it’s simple. First launch version 2.0a. Now use the Open command on the File menu to open any file you created with version 1.1. Once the file is open, select Save from the File menu. That’s it! The file is now in Works 2.0a format.

If you want to save a copy in Works 1.1 format for any reason, use the Save As command rather than Save. Give the new file a different name. (If the original file was called Max, for example, name the new file Max.v2.)

As far as the additional RAM goes, use it to run HyperCard and PageMaker simultaneously under MultiFinder. That way you can have both programs open and copy and paste between them without having to quit one and open the other, which you would have to do with only 1 megabyte of RAM.

Andy: The other advantage to having great big wheelbarrows full of RAM is that you can run as many INITs and cdenvs as you want — within reason. With 1 megabyte, you have to be stingy to ensure that porky programs such as PageMaker and SuperCard can run (even alone), but with 2 or 4 megabytes under the hood you can toss ATM, SoundMaster, and Oscar into the System Folder without worrying about running out of memory.

**Laser Smearing**

Q. This is a simple problem, or should be, but I haven’t gotten an answer from my Apple dealer, print shops, or stationery stores. I have a LaserWriter INT and find the toner used in the cartridges smears on some paper and most kinds of card stock. How can I find out which kind of paper accepts the toner? Some fairly expensive envelopes I printed came out unusable because the address rubbed right off, yet similar envelopes, actually identical to the naked eye, worked fine.

David Parry
Los Angeles, CA

Andy: The other advantage to having great big wheelbarrows full of RAM is that you can run as many INITs and cdenvs as you want — within reason. With 1 megabyte, you have to be stingy to ensure that porky programs such as PageMaker and SuperCard can run (even alone), but with 2 or 4 megabytes under the hood you can toss ATM, SoundMaster, and Oscar into the System Folder without worrying about running out of memory.
HELP FOLDER

Bob: When selecting paper that won’t smear, stay away from coated stocks and other glossy papers. Toner doesn’t adhere well to them. I’ve found that inexpensive copier paper works well for everyday stuff, and more-expensive paper (such as Hammermill Laser Plus or Laser Print) that’s designed for laser printers gives excellent results for more-important work such as camera-ready copy.

If you must use envelopes and paper that are hostile to laser toner, go to an art-supply store and buy a can of spray fixative, the stuff artists spray onto charcoal or pastel drawings to keep them from smearing. I use the Krylon brand, but I suspect that any spray fixative can work as well. After printing the envelopes, pick them up carefully and spray the printed area with a very light mist. That ought to do it.

Andy: I’ve heard that hairspray can also do the trick, but I haven’t had a chance to try it. My hair-care arsenal consists of whatever shampoo’s on sale at K-mart.

Save the Screens?

Q. I’ve heard that screen savers, such as After Dark and Pyro!, can protect my screen from getting burned-in images after the computer idles for long periods of time. Do I really need this type of program to protect my screen? Couldn’t I simply turn the brightness all the way down?

Clint Woker
Okawville, IL

Bob: If you can remember always to turn down the brightness when you leave your computer, then, no, you don’t need a screen saver. The beauty of screen savers is that they never forget. You decide how long you want your computer to sit idle before the screen saver kicks in. After that, the screen saver remembers for you. That’s not the only reason to buy one, though: Screen savers are really cool looking (see Figure 3).

Andy: It’s the old shirt-versus-suit struggle. The college guys in T-shirts can say, “Wow...it’s useless but it puts bodacious fireworks onto the screen!”

Figure 3: Here’s what would happen if you could run the competing screen savers After Dark and Pyro! at the same time. Don’t try this at home!

The corporate executives, on the other hand, have to explain to their bosses that it “prevents costly burn-in” (which happens only if you leave the screen on for, like, a whole month) and that it’s a clever “office-productivity solution,” and so on—if they don’t want to get fired.

I’ve also heard of office managers going berserk at the sudden appearance of fireworks, fish, or flying toasters on-screen: “VIRUS! EEEEEEEK!! IT’S A VIRUS!!! FORMAT THE HARD DRIVE!!”

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The automatic file comparison above sent the cursor directly to the first instance where the files differed, which in this case was Spry versus Spray. Note the noncontiguous text selection works even in any of the 10 editable clipboards. (Note the vertical ruler on the left which allows you to keep track of where you are.)

**Nisus 3.0 and Word 4.0 Feature Comparison**

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<th>Nisus 3.0</th>
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<td>Built-in word processing language</td>
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<td>Noncontiguous text selection</td>
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If you’re new to the Macintosh word processing market you probably want a word processor that is easy to use. If you’ve been around for a while, you undoubtedly want a powerful word processor. Chances are you have tried either MacWrite or Microsoft Word 4.0.

One is easy to use, the other offers power. Both, however, have severe limitations which is why we developed Nisus in the first place. Here with abject brevity are just a few of the reasons we know you’ll find Nisus 3.0 easy to use with all the power you’ll ever want.

**Built-in word processing language**

For power, consider the fact that Nisus allows you to create custom routines beyond what we have already done for you, with our built-in word processing language. You don’t have to use this feature, but it’s there if you need it. It is one of the many features that distinguishes Nisus 3.0 from Word 4.0. It will let you, for example, create routines to index every word in a document, while stripping out and, or, the, but, and other nonessential words. One user even built a routine to index all proper names. Another user developed a method to find and correct all double words, periods, and extra spaces. The opportunities are unlimited.

**Find and Replace virtually anything**

Nisus 3.0 will let you find any text, style, size, or color in any combination. But even more powerful is its ability to find every word in a document at once even in unopened files. For example, suppose you want to index a book where the subject is Ben Franklin. With Word 4.0, you’d have to open each file, go to each instance of Ben Franklin, and index them one by one. With Nisus 3.0 you simply find all Ben Franklins—even in unopened files—and instead of selecting replace, you select index. Think of the time savings on a long document.

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Thoughts don’t always come in the order you want. Sometimes you type a nugget here and a valued phrase there. So why should you have to select text as though you were a perfect serial thinker. Nisus 3.0’s noncontiguous text selection permits you to collect your thoughts on your random walk through the text and bring them all together on one of 10 editable clipboards.

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<tbody>
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<td>$49</td>
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<td>$5,001-$8,000</td>
<td>$89</td>
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<td>$8,001-$11,000</td>
<td>$109</td>
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<tr>
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<td>$129</td>
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<tbody>
<tr>
<td>40 mb</td>
<td>$329</td>
<td>$429</td>
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<tr>
<td>80</td>
<td>499</td>
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<tr>
<td>170 mb</td>
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Phone: 800-367-4222, 206-883-8312, FAX 206-881-3036
Mail: 8461 154th Ave NE, Redmond, WA 98052
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MIDI Data Keyboard ............................................. 125.
MIDI Keyboard Controller .................................... 315.
Music Entry Pad ................................................. 216.
PCM Sound Module ............................................ 718.
Stereo Mix/Amp Speaker ....................................... 135.

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SmalTalk/V5.1 .............................................. 124.

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Ed wondered if a call to Mac's Place might add a little zest to his life.

At last it dawned on Ed what made the guy in the next office so happy. It was all those calls to Mac's Place. Ed decided to call too. He knew that Mac's Place could help him with whatever he needs. Even if he's not sure what he needs. That's because Mac's Place is the only Mac mail order company staffed by people who really know Macintosh hardware and software inside and out. In fact, it's the only one that runs entirely on Macs. So add some zest to your life. Call Mac today.

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Beyond Dark Castle 31.
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Software Toolworks

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Hunt For Red October 31.
Life And Death 31.

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Te:ka (Black & White) 19.
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ADD: Pool of Radiance/Crease 34.
Strategic Studies Group

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Carmen San Diego (World)? 29.
The Playroom 29.

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casino Master Deluxe Color 48.

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Cicero Computing

Imaginariq

Microprose

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Micro League Baseball II 35.

Microsoft

Pirates 35.

Miles Computing

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Colony 23.
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The complete audio production system for the Mac II. Multimedia producers and musicians use these tools to produce, edit, and play back professional CD-quality audio directly from their Macs.

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Calculation Tutor

Toyon, Inc.

Russian

Typing Tutor IV 28.

Vocabulary Tutor

Great Wave Software

Kidstufi 26.

Great Wave Software

Kidstufi 26.

Great Wave Software

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Desktop Help for Excel 49.
HyperGlot Software

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“Use your fax machine—fax us your PO.” —Mac

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TGS Systems Powerful object-oriented language that eliminates the need to use C, Pascal or any other textual language—plus an application builder that lets you generate user interfaces as fast as you can draw them.

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Kraft No software required! Dual axis trim centering for accurate, stable cursor control. Adjust cursor sensitivity, two fire/select buttons for fast action and control. Three function modes: spring-centered joystick, free-float joystick, or mouse.

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- CDC 300MEG 16 Mil Sec
- CDC 300MEG 10 Mil Sec
- CDC 300MEG 5 Mil Sec
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- Syquest Case Platinum
- Mounting Bracket
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- Acco
- American Power Conversion
- Apple
- Texas Instruments
- Apple
- Altera
- Flexi
- American Power Conversion
- Corporate
- Apple
- Altera
- Flexi

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- 7 Outlet Noise/Surge $19
- Mac Tool Kit $14
- Mouse Pad
- Flexi
- Mouse Stick 512K/Plus $63
- Mouse Stick ADS $89
- B.O.S.S.
- SF-7500 $197
- SF-8000 $215
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- DD-Rainbow 10 Pack $19
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- Imagewriter Multi Color $7
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Only $495!

Samsung Full Page Display w/Video Card

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- 870 x 640 resolution
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- paper-white phosphor
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- integrated tilt & swivel base
- SE, SE/30, or Mac II video card

Makes on-screen proofing easy!

Priced too low to print!

QMS Colorscript 100 Printer

Can you afford not to have it? Right out of the box you’ll print near typeset quality 300 dpi hard copies or transparencies in vibrant colors that adhere to PAN­TONE specifications. You’ll have total freedom in composing using shapes and typefaces and over 16 million colors in endless variations.

- 35 resident Adobe fonts
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The clarity and power of full color Postscript printing!

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No more squinting and scrolling! Seeing two pages at once will save you hours of time. The latest in flicker-free monochrome technology provides true WYSIWYG! The video card is based on custom VLSI design, with a minimum power draw resulting in maximum reliability and long life.

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- paper-white phosphor
- 78 Hz vertical, 65 Khz hori­zontal refresh rate
- integrated tilt & swivel base
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Power and function at a competitive price!

$895!

QMS PS-810 Faster printing (8 pages per minute) at an economical price!

Outstanding print quality. An affordable Adobe Postscript laser printer that features the reliable Canon SX print engine. The QMS PS-810 utilizes a 68000 MIPS-based controller operating at 16 MHz with proprietary ASAP technology.

- 2Mb RAM...expandable to 3
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- RS232/422 standard, Centronics parallel and AppleTalk interface
- Speed, flexibility and power!

Now $2895!

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"Now YOU can afford to buy a high-performance Samsung monitor — the best value available today!

When Apple Computer chose Samsung as its primary supplier of monochrome CRTs for the MacPlus, SE, and SE/30, they based their decision on superior quality and value.

I PERSONALLY GUARANTEE you’ll be pleased with the power, performance, and competitive price of these monitors.”

Real Provancher

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Real Provancher
Our buying power gives you your buying power!

$1179
Seiko 14" Trinitron with RasterOps 24-bit Video Card
Amazing color. High-resolution Trinitron tube makes it possible to view 16 million shades of color!
- 640 x 480 resolution
- 14" display, 72 dpi
- 24-bit video card
- integrated tilt & swivel base
43% brighter than the leading competitor!

$1619
RasterOps ClearVue/GS (Grayscale Monitor) Unmatched image quality! Flicker-free images in 256 shades of gray for accurate proofing. Includes Pan/Zoom and Virtual Desktop features for maximum productivity!
- 1024 x 768 resolution
- 19" display, 72 dpi
- paper-white phosphor
- 75 Hz vertical refresh rate
Zoom in to check details!

NEW! Ikegami 19" Trinitron Color Systems!
New generation Trinitron technology...superior to other Trinitrons currently available. Ikegami—the market leader in gray scale monitors—introduces the undisputed champ in color reproduction. Each system comes with an integrated tilt/swivel stand, and auto and manual degaussing. Full antiglare coating, 75 Hz vertical refresh rate, and flicker-free images reduce eye strain and improve user comfort. Coupled with a high resolution 1024 x 768 video card, this combination is the top-of-the-line color solution available today.
The right solution for every budget!

<table>
<thead>
<tr>
<th>System</th>
<th>Colors</th>
<th>Upgradable to 24-Bit Color</th>
<th>Price</th>
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<tbody>
<tr>
<td>Entry Level</td>
<td>256</td>
<td>No</td>
<td>$2995</td>
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<tr>
<td>Professional</td>
<td>256</td>
<td>Yes</td>
<td>$3495</td>
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<tr>
<td>Master's</td>
<td>16 Million</td>
<td>N/A</td>
<td>$3995</td>
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MONITORS w/Cards
- Magnavox 14" w/8-bit...879
- NEC MacSync 14" w/8-bit...869
- Sony Trinitron 1304 14" w/8-bit...1095

Other Monitors Available! Please call.

The best you can buy!
Hardware solutions for all your business needs.

FREE CONSULTATION to help you answer these four questions:
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3. How much RAM will be enough?
4. 8-bit vs. 24-bit, which is for me?
We can help you answer these questions, and can offer you the ideal combination of hardware (and software) for your exact needs.

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$9795 Mac Ilx, w/1 Floppy Drive, 5 Mb RAM, 170 Mb Quantum Internal Hard Drive, RasterOps 8-bit Color Video Card with 19" Sony Trinitron Monitor, Apple Extended Keyboard.

$13,150 MacIIfx, w/1 Floppy Drive, 8 Mb RAM, 300 CDC Internal Hard Drive, Ikegami 24-bit 19" Color Monitor and Video Card, Datadesk Mac 101 Keyboard.

$5625 Mac Ilx, w/1 Floppy Drive, 5 Mb RAM, 105 Quantum Internal Hard Drive, Seiko 14" Color Monitor with 24-bit RasterOps Video Card, Apple Extended Keyboard.

Guaranteed: If you don’t like it...
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<table>
<thead>
<tr>
<th>Software</th>
<th>Price</th>
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<tbody>
<tr>
<td>LapLink Mac</td>
<td>119</td>
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<tr>
<td>Liaison</td>
<td>259</td>
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<tr>
<td>MacLink Plus</td>
<td>139</td>
</tr>
<tr>
<td>Microphone II</td>
<td>225</td>
</tr>
<tr>
<td>QuickMail (10 Users)</td>
<td>329</td>
</tr>
<tr>
<td>White Night</td>
<td>81</td>
</tr>
<tr>
<td>Timbuktu</td>
<td>99</td>
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<tr>
<td>TOPS (Mac)</td>
<td>199</td>
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<table>
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<tr>
<th>Hardware</th>
<th>Price</th>
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<tr>
<td>Abaton InterFAX 2400/9600</td>
<td>419</td>
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<tr>
<td>Everex 2400</td>
<td>185</td>
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<tr>
<td>Hayes Personal Modem 2400</td>
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<td>MacFax</td>
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<td>Shiva NetModem 2400</td>
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<td>Shiva NetSerial</td>
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<td>SmartModem 2400M Bundle</td>
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# GRAPHICS

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<tr>
<th>Graphics</th>
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<tr>
<td>Adobe PostScript Fonts</td>
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<tr>
<td>Adobe Type Manager</td>
<td>59</td>
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<tr>
<td>Adobe Type Manager Plus</td>
<td>119</td>
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<tr>
<td>Coach Professional</td>
<td>117</td>
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<td>Design Studio</td>
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<td>FullWrite Professional</td>
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<td>More 2.0</td>
<td>255</td>
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<td>Omnipage 2.0</td>
<td>589</td>
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<td>Pagemaker 4.0</td>
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<td>Read It (OCR)</td>
<td>260</td>
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<tr>
<td>ReadySetGo! 4.5</td>
<td>285</td>
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<tr>
<td>Write Now 2</td>
<td>122</td>
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<tr>
<td>Adobe Photoshop</td>
<td>$569</td>
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# SCANNERS

<table>
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<th>Scanner</th>
<th>Price</th>
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<tr>
<td>Microtek MS 300ZS Color Scanner with Color Studio and Image Studio</td>
<td>$1895</td>
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**Affordable options to enhance your system.**

# ZOOM Modem w/ Sendfax $119

A full-featured 2400 baud modem with the ability to send faxes anytime, anywhere! It includes modem and fax software. 7-year warranty.

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<th>Power Supply</th>
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<tr>
<td>450 AT</td>
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<td>AP 110 SE</td>
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<td>AP 360 XT</td>
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<td>MinuteMan 300</td>
<td>429</td>
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<tr>
<td>MinuteMan 600</td>
<td>695</td>
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# TARGUS PREMIUM CASES

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<th>Case Type</th>
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<td>IV II Case</td>
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<tr>
<td>Mac Plus Case</td>
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<tr>
<td>SE Extended KB Case</td>
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# UPS

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<th>Model</th>
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<td>1.44 MB Floppy</td>
<td>329</td>
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<tr>
<td>Infinity Turbo 40</td>
<td>799</td>
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<tr>
<td>Infinity Dual Turbo 40</td>
<td>1850</td>
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<td>PL 200 Int.</td>
<td>1465</td>
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<td>PL 250 Int.</td>
<td>1765</td>
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<tr>
<td>EMAC 60T</td>
<td>665</td>
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# DAYSTAR ACCELERATORS

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<td>25 MHz</td>
<td>1095</td>
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<tr>
<td>40 MHz</td>
<td>1619</td>
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<tr>
<td>50 MHz</td>
<td>2195</td>
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<tr>
<td>25 MHz</td>
<td>1095</td>
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<tr>
<td>Fast Cache Ici</td>
<td>279</td>
</tr>
<tr>
<td>RAM Powercard</td>
<td>519</td>
</tr>
<tr>
<td>1 Megabyte SIMMS</td>
<td>Call</td>
</tr>
<tr>
<td>4 Megabyte SIMMS</td>
<td>Call</td>
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Mac IIcx Upgrades Available NOW! We handle the shipping and installation.

# SCANNERS

<table>
<thead>
<tr>
<th>Model</th>
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<tbody>
<tr>
<td>Microtek MS II</td>
<td>1129</td>
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<tr>
<td>Microtek MS 300GS (256GS)</td>
<td>1329</td>
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<td>Microtek MS 400GS (256GS)</td>
<td>2859</td>
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<td>ScanMan M32</td>
<td>369</td>
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# UNINTERRUPTIBLE POWER SUPPLIES

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# TARGUS PREMIUM CASES

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# DAYSTAR ACCELERATORS

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<tr>
<td>1 Megabyte SIMMS</td>
<td>Call</td>
</tr>
<tr>
<td>4 Megabyte SIMMS</td>
<td>Call</td>
</tr>
</tbody>
</table>

Mac IIcx Upgrades Available NOW! We handle the shipping and installation.

8 Reasons To Order From Us (besides saving money!)

1. 30-day money back guarantee on all hardware (except for special-order items). No ifs, ands, or buts!
2. Software guarantee. If it doesn’t fit your needs, we will happily refund the purchase price minus the applicable trial fee. No hassles!
3. Toll-free tech support when you need advice or want to order.
4. Pay when shipped. We charge your credit card only when your order is shipped — not when you place the order.
5. Trade-ins accepted. We gladly take trade-ins on Mac CPUs and printers in good working order.
6. Overnight delivery when you need it.
8. Installation & training anywhere in the U.S.

"We’re not happy UNLESS YOU ARE!"
We want you to become a repeat customer. So we give you:
- *discount mail-order prices*
- superior service & selection
- an unbeatable hassle-free warranty
- toll-free tech support
- an unsurpassed return policy.
And we do it all with a smile... because that’s what you deserve.

Several members of our management team: (l to r) Barbara, Jim, Lew, Rea.

We’ll buy it back!
They're all

**HARD WORKING**

- Super fast 14ms to 28ms access time.
- No less than 30,000 hours Mean Time Between Failure.
- Compatible with MacII, IIE, IIC, SE, SE/30, Plus & fx.
- Quality drives from Quantum, Micropolis, Imprimis, Toshiba, Fujitsu and Seagate. Your choice.

And

**HARD CORE**

- Steel case for low heat and added support.
- Whisper-quiet fan for a quiet work environment.
- Power surge protection.
- 24 hour burn-in testing.
- 50-pin connectors for daisy-chaining.

You might say our drives are

**HARD TO BEAT**

- Designed and engineered by the storage experts at Hard Drives International.
- Hundreds of thousands of satisfied customers.
- Lifetime Toll-free technical support.
- 30-day "Worry-Free" Guarantee.
- 1 & 2 Year Replacement Policies.

At prices that are

**HARD TO BELIEVE**

- We buy quality components in huge volume and pass the savings to you!

Now, isn't it easy to see why POWERDrives are

**HARD TO RESIST?**

**POWERDrive**

The POWER of Choice.

<table>
<thead>
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<td>14</td>
<td>NA</td>
<td>3299</td>
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</table>

**Removable SyQuest* $589**

25ms. Complete with a 45Mb removable cartridge.

Extra Cartridge Only $79

**Memory Upgrades**

- 4Mb* $299
- 1Mb* $49

These complete memory kits are ideal for the MacII, IIE, IIC, SE, SE/30 & Plus.

**150Mb Tape Backup**

$599

External unit. Tape included.

Extra Tape Only $29
H.D. Chauffeur
MacTel's Ultimate Hard Disk Driver

- Mac, A/UX and ProDos compatible formats
- Password protection - simple and encrypted
- Partitioning - with DA controlled mounting
- Disk Mirroring - fault tolerance backup
- Testing - verifies and assigns bad blocks
- User-Friendly COLOR interface
- Expert and Novice modes with balloon help features
- Update Drive Button - Install "HD Chauffeur" without reinitializing
- BACKMATIC™ - Automatic backup utility
- AUTOSAVE II™ - Protects against Data Loss
- 14mb of Public Domain Software

H.D. Chauffeur and $255 value Software Bundle accompany ALL INDEX Hard Drives

**Hardware**

**MacTel Extended**

**Keyboard ADB**

<table>
<thead>
<tr>
<th>Type</th>
<th>Price</th>
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<td>English</td>
<td>$99</td>
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<tr>
<td>German</td>
<td>$118</td>
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**MacTel-NET**

(100% Phone-Net Post® compatible)

Microkern Scanners

- MSF 300 GS, incl. cables and software $1175
- MSF 502 ColorScan, incl. cables and software $1495

RasterOps

- We carry the complete RasterOps product line - Call for a low price!
- ColorBoard 208
- ColorBoard 264
- 364 Video Card
- ClearVue/GS System for SE/30
- ClearVue/GS System for Mac II
- BL System
- 24L System
- RasterOps Graphic Accelerator

**Syquest 400 Data Cartridges**

- $72

**Ordering information**

MasterCard | VISA

1-800-950-8411

3007 North Lamar • Austin, Texas 78705
Telephone: 512/451-2600 • Fax: 512/451-3323
Technical Support: 512/458-2222 MacNet: MACTEL

Australia: 800/125-880 • United Kingdom: 0800/89-1428
France: 0033/88-77-8320 • Europe: 0041/46-954020

Please circle 39 on reader service card.
Whether you’re already a Macintosh expert or are just thinking about getting into it, you should talk to one of our Macintosh system consultants. We don’t mind lending an ear and offering our many years of experience to help you reach a viable solution to your hardware problems. In fact, we enjoy it. Call us today; we’re waiting... 1-800-622-7123

**INCREDBLE SAVINGS!**

**Microtek 300ZS**

The Microtek 300ZS color scanner reproduces everything from 24 bit color to 8 bit gray-scale to black and white line art. It’s ideal for desktop publishing, multimedia projects, presentations, even pre-press work. Includes ColorStudio and ImageStudio absolutely free!(alone these two programs retail for over $2,000)

Incredible Savings! $1729

---

**Our Complete Macintosh Systems Are So Affordable!**

**Mac llfx System**
- Macintosh llfx CPU
- Quantum 170mb Internal Hard Drive
- 1.44mb FDHD Drive
- 4 Megabytes of RAM
- MacPro Extended Keyboard
- NEC 14" MacSync RGB Monitor
- RasterOps 24 bit Color Card

Our Price $8489

**Mac llci System**
- Macintosh llci CPU w/built in 8 bit color card
- Quantum 105mb Internal Hard Drive
- 1.44mb FDHD Drive
- 5 Megabytes of RAM
- MacPro Extended Keyboard
- NEC 14" MacSync RGB Monitor

Our Price $5399

**Mac llcx System**
- Macintosh llcx CPU
- Quantum 40mb Internal Hard Drive
- 1.44mb FDHD Drive
- 5mb of RAM
- MacPro Extended Keyboard
- NEC 14" MacSync RGB Monitor
- Express Extended 8 bit Color Card

Our Price $4589

---

**HARD DRIVES**

2 Year Warranty!

- 40mb $339
- Quantum 80mb $539
- 105mb $569
- 170mb $839
- Maxtor 200mb $989
- Imprimis 300 $1559
- 330mb Runner $1879
- 600mb $2298
- Externals add $105
- External Kits HH $125

**DISPLAY SOLUTIONS**

**RasterOps**
- 8L 19" System $4125
- 24L 19" System $5459
- 8bit 19" System $3859
- 24bit 19" System $5329
- ClearVue/PS 19" $1469
- ClearVue/Mono 19" $1199
- RasterOps 264 $499

**Other Solutions**
- Express 8Bit Card $299
- NEC 14" RGB $459

---

Hardware Express • 8711 Burnet Road
Building E56 • Austin, Texas 78758
(512) 454-4739 • FAX (512) 454-0980
Texas Residents please add 8% sales tax.
No surcharge on Visa & MC.

To Order or for Technical Support it’s never been easier than this:

1-800-MACS-123

Please circle 373 on reader service card.
NEW LOW PRICE!
$1749

MICROTEK MSF 300ZS SCANNER
BUILT-IN SCSI INTERFACE!
FREE SCSI SYSTEM CABLE AND TERMINATOR!
COMES BUNDLED WITH IMAGE STUDIO AND COLOR STUDIO!!!

OTEK MSP
NEW LOW PRICE!
$1749

HP DeskWriter
• 300 dots per inch resolution
• Supports AppleTalk and serial
• Now only $699

CMS EXTERNAL HARD DRIVES
New Prices!!!

<table>
<thead>
<tr>
<th>Size</th>
<th>Price</th>
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ACCESSORIES

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<td>45 REMOVABLE HD CART</td>
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<td>A+ MOUSE</td>
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<td>MACDIRECTOR</td>
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<td>SWITCHBOARD KEYBOARD</td>
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<td>SWITCHCARD MODULE</td>
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GRAPHICS

A D O B E  T Y P E  F A C E S

NEWGEN TURBO PS300 2999.00
NEWGEN TURBO PS400 3799.00
NEWGEN TURBO PS600 4899.00
QMS PS810 TURBO PRINTER 3999.00
QUICKLET A0M0N 22.00
QUICKLET DB9 22.00
SCANNAN 322.00
SEIKO 1440 599.00
SEIKO 1445 599.00
SEIKO 1445/COLOR 264 190.00
SEIKO 1450 725.00
SONY 1900 520.00

BUSINESS/PRODUCTIVITY

4TH DIMENSION 469.00
AT ONCE 275.00
MACFLOW V3.0 119.00
MacTRAC $99

MegaGraphics

UNEQUALLED PRICE/PERFORMANCE MADE MegaScreen
RIVAL THE FIRST CHOICE OF KNOWLEDGEABLE BUYERS.
THIS IS A PROFESSIONAL DISPLAY OFFERS:
• 77 Cpi WYSIWYG
• 100 X GREYSCALE
• 7MHz REFRESH RATE
• VIDEO BOARD
• 15W TOWEL STAND

Mac SE, SE30, II, llx, llcx, llic and llici $999
Mac Plus $1099

MacTRAC

High-Performance, ergonomic trackball
with Drag Lock feature.
NOW ONLY $69

CROSSBY CREATIONS

Dust Covers
Mac SE, monitor & trackboard $115
Mac的心态, monitor & trackboard $175
Mac Plus, SE, SE30 & iMac keyboard $95
Mac SE, SE30 & iMac keyboard $95

QUICKTEL

QUESTEL 4800 Baud SendFAX and Data modem,w/firmware $120
QUESTEL 2400 Baud modem with software $110
### PROGRAMMING/UTILITIES

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<td>DISK TOP</td>
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<td>SAMM</td>
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<td>VIREX</td>
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### Apple Specials

**FM WAVES**

- Quality Clip Art on CD and Floppy
- CD Version (5 volumes): $399
- 14" Trinitron display with 24-bit color card, hardware Zoom and Pan, cable and tilt/swivel stand, multiple resolution and flicker-free. **$3595**

**Ikogami and National Semiconductor Monitor System**

- 19" Trinitron display with 24-bit color card, hardware Zoom and Pan, cable and tilt/swivel stand. Multiple resolution and flicker-free. **$3595**

### Mouse Systems

<table>
<thead>
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<th>Mouse Model</th>
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<td>Seiko 1445</td>
<td>Mouse Systems</td>
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<td>ADE &amp; Plus</td>
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<td>Mouse Systems</td>
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### Microtech Hard Drives

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<td>Microtech 10MB EXT HD</td>
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<td>Microtech 20MB EXT HD</td>
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<tr>
<td>Mail Orders</td>
<td>1-800-222-2808</td>
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<td>Calls</td>
<td>4401-8 REDONDO BEACH BLVD. LAWNDALE, CA 90260</td>
</tr>
</tbody>
</table>

Please circle 375 on reader service card.
### Video
MacProducts USA carries a complete selection of video solutions for your Macintosh System.

- 19” R&W Two Page Monitor, 72 DPI 78 Hz Refresh Rate, With Video Card $899
- 19” R&W-MacPlus Version $999
- 14 NEC MacSync w/ Tilt, Swivel $449
- 8-bit Card & 14” NEC MacSync $718
- 24-bit Card & 14” NEC MacSync $798
- 8-bit Card & 19” Triniton $799
- 24-bit Card & 19” Triniton $499

### Storage
- Syquest Cartridges
  - Syquest Magnetic 45 MB Removable $499
  - Magic 45 MB Removable $499
- Magic 150 MB Tape Backup w/ Retrospect $795
- Magic 12.2 GB Tape Backup w/ Retrospect $2995
- Magic 24 GB Tape Backup w/ Retrospect $3495

### Applied Engineering
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200
MACINTOSH
PRODUCTS
REVIEWED AND RATED

Whether you're researching a major Macintosh product investment or just holiday-shopping, turn to MacUser's MiniFinders — the most comprehensive and reliable source of Mac hardware and software reviews. This month's guide focuses on the lighter side of the Mac — including entertainment, multimedia, music, unusual input devices, exotic output devices, indispensable utilities, educational software accessories, and more.

You can find a detailed product review in the issue cited in parentheses at the end of each MiniFinder. For added convenience, a HyperCard stack of the entire MiniFinder database is available on Zmac, our on-line service. You can also obtain the full text of the articles in back issues through Zmac.

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MacUser editors have carefully selected and evaluated each product listed here, assigning ratings from one to five mice, in half-mouse increments. The issue in which a product was reviewed is shown in parentheses (CP means copy protected). All of the ratings are relative within a category, and because the market is constantly changing, our ratings change too, reflecting the most current conditions. We've indicated all of our Eddy (Editors' Choice) Award winners with a *, along with the year in which they were recognized for their excellence.

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Bomber

Bomber is a great HyperCard-based simulation. You attack Germany during WW II, flying a B-17. Great sound (you'll probably need 2 megabytes of RAM); headphones are provided so you don't disturb others. Bomber supports Card 1.2.1 or later; $39.95. In-Line Design, 70 W. 95th St., Suite 26F, New York, NY 10025. (212) 277-4679. (June '89)

Chessmaster 2000

Chessmaster 2000 is a masterful chess program that will appeal to all chess enthusiasts. You can view the board from 2-D or 3-D perspectives and also turn it for a better look. Play is smooth and easy, and the program responds by voice. You may get tired of hearing “Gotcha,” though. Version 1.02. $44.95. The Software Tool Factory, 2901 Florida Place, Chatsworth, CA 91311. (818) 885-9000. CP (July '87)

Chuck Yeager's Advanced Flight

Chuck Yeager's Advanced Flight Trainer doesn't quite have the right stuff to hold interest for long. Simpistic controls, Lacks features found in versions for other computers. Version 1.0. Requires Mac 512KE or later. $49.95. Electronic Arts, 1810 Gateway Drive, San Mateo, CA 94404. (415) 571-7111. (Apr '90)

Handwriting Analyss

Handwriting Analyss produces a personality profile based on answers to questions about your handwriting. It’s simple, and the results will amaze and confound. Version 3.0. $69.95. Casa, 2017 Cedar St., Berkeley, CA 94709. (415) 644-2771. (Apr '88)

Ishido

Ishido is a strategy game with a few twists. The game is good but not great. Its programming is elegant and very polished. There are many options, including solitary and multiplayer modes. Requires Mac Plus or later. $49.95. Accolade, 550 S. Pacific Coast Highway, Redondo Beach, CA 90277. (Mar '90)

Lunar Rescue

Lunar Rescue puts you in the role of a benevolent trader ready to save a moon colony from invasion. Blast the enemy while you travel from town to town trading goods for the supplies you need for your mission. Version 1.0. Requires Mac 512KE or later. $59.95. XOR Corp., 7607 Bush Lake Road, Minneapolis, MN 55435. (800) 635-2452 or (612) 831-0444. CP (Jan '89)

MacRacquetball

MacRacquetball uses digitized videos and sounds of professional players for a realistic simulation. Has lots of settings and can be played with someone else via modem or between hard-wired Macintoshes. Users must turn off hard-disk drives before playing. Version 2.0. $59.95. XOR Corp., 7607 Bush Lake Road, Minneapolis, MN 55435. (800) 635-2452 or (612) 831-0444. CP (Oct '87)

NFL Pro League Football

NFL Pro League Football is a professional football-league simulation that encourages people to play people, not the game. First, with lots of Spotty Annual. Version 1.0. Requires Macintosh Plus or later. $49.95. Micro Sports, Inc., 1410 Mountain Ash Drive, Hixon, TN 37343. (800) 543-6735. (Apr '88)

Pattson vs. Rommel

Pattson vs. Rommel is a traditionally styled strategic war game. Covering events in Normandy in 1944. Although it’s complex, it’s well designed and very playable. $19.95. Electronic Arts, 1820 Gato Drive, San Mateo, CA 94404. (800) 245-4525 or (415) 571-7111. CP (Apr '87)

Pipe Dream

Pipe Dream is an addictive game that demands a nearly perfect mixture of strategy and speed. You must build a pipeline fast enough to prevent the stuff in the line from running out — that’s it. It has 36 levels of play. Version 1.0. Requires Mac Plus or later. $24.95. Lucasfilm Ltd., Games Division, P.O. Box 10307, San Rafael, CA 94912. (415) 662-1902. CP (Mar '90)

Quarterstaff

Quarterstaff is a fantasy adventure game of the typical good-versus-evil variety. Ability to use characters in other adventures gives this game a lot of potential for development. Version 1.2. Requires Mac or later. $49.95. Simulated Environment Systems, 800 S. Pacific Coast Highway, Redondo Beach, CA 90277. (Mar '88)

Shadowgate

Shadowgate is an icon-based graphic adventure. You, as the seed of prophecy, must save the world from the evil warlock. Far surpasses all others with great animated graphics, sound, and adventure. Version 1.0. Requires Mac Plus or later. $55. Intelsil Corp., P.O. Box 57825, Webster, TX 77598. (713) 486-4163. (May '88)

Star Fleet I: The War Begins

Star Fleet I: The War Begins is a space opera à la Star Trek. Rise through the ranks from ensign to admiral in this serialized play-through adventure. Version 1.0. Requires Macintosh 512K or later. $55. Intelsil Corp., P.O. Box 57825, Webster, TX 77598. (713) 486-4163. (May '88)

Strategic Conquest Plus

Strategic Conquest Plus challenges you to discover an unexplored world and conquer it by manufacturing and deploying armies, ships, and planes. A two-person game that doesn’t support an external drive. Version 2.055. Requires Macintosh 512K or later. $59.95. Premiere Technology, P.O. Box 11138, San Francisco, CA 94101. (415) 882-7766. CP (Feb '88)

Synchronicity

Synchronicity is a mind-control software. Based on the IChing, it can be used as a stress-reduction tool. Beautiful artwork and sounds. Even skeptics like it. Version 1.0. Requires Mac Plus or later. $49.95. Visionary Software, P.O. Box 69191, Portland, OR 97201. (503) 246-6206. (Mar '90)

Hardware and Accessories

CasioLink

CasioLink is a hardware and software package that links the popular Casio BOS series of electronic organizers to a Macintosh. The cable is fine. The software is a bit limited and you can’t import and export to text files and HyperCard stacks (there some trouble importing from stacks though). Version 1.0. Requires Macintosh Plus or later. $109.95. Traveling Software, 18702 N. Creek Parkway, Bothell, WA 98011. (425) 483-8088. (May '90)
**The Ergotron Workstation**

The Ergotron Workstation is the best, most versatile computer workstation around. This free-standing or wall-mountable heavy steel unit includes a high stool with a backrest and a swivel, damped arm for your monitor. The unit comes in a variety of configurations. 9006. (213) 578-9712. (Sept '89)

**StarController**

The StarController distributes AppleTalk signals to devices on a network and provides some network-management and troubleshooting capabilities. It’s very reliable, with excellent documentation and tech support. $1,295. Farallon Computer Corp., 1605 Powell St., Emeryville, CA 94608. (415) 560-9600. (May '90)

**Tefax RA211UM**

Tefax is a combination regular fax machine/fax modem. Although this sounds like the best of both worlds, it’s not. The TEFAX RA211UM lacks necessary fax features such as a paper cutter, and the fax/modem software (a custom version of BackFax) isn’t very good. Right now it seems to be a compromise between a fax machine and a fax modem. $1,595. Reliys, 320 S. Milpitas Blvd., Milpitas, CA 95035. (408) 945-9000. (June '90)

**TurboStar**

The TurboStar distributes AppleTalk signals to devices on a network and provides some network-management and troubleshooting capabilities. Performance can be poor in certain wiring configurations. $1,795. Munitech, 213 Bridgeview, Suite 204, Sausalito, CA 94965. (800) 232-9922 or (415) 331-7815. (May '90)

**MacTable**

MacTable is an elegant Danish worktable that holds a Mac and printer with room to spare. The table, 30 inches deep by 58 inches wide is made of particleboard, but it must be assembled. Cabinet is optional. $459; cabinet, $149. ScanCo, P.O. Box 3127, Redmond, WA 98073-3127. (425) 841-5434. (Jan '90)

**Madinson Portable Case**

The Macintosh Portable is Apple’s first portable. Considered by those who have never used one to be big (it is), too heavy (16 pounds), too slow (6800 at 16 megahertz), and too expensive. Loved by all who have owned or used one for a while. A good beginning. $7,597 including modem, extra RAM, and hard-disk drive. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (Mar ’89)

**Portable Attache**

The Portable Attache is a soft case for the Mac Portable that lets you use your Portable without taking it out of the case. The only drawback is the lack of extra storage space. $90. The Madison Line, P.O. Box 335, Corte Madera, CA 94925. (415) 927-3600. (Sept '90)

**The Portable Attache**

The Portable Attache is an attractive alternative to the Mac Portable case. Manufactured by Zero Halliburton, it’s made of aluminum, is approximately the same size as the Mac Portable case, and comes with a handy accessory case (the perfect size for a Mac snack case) inside. The file pocket in the Portable Attache detracts and becomes a portfolio. The Portable Attache is useful for checking on an airline, but the Portable Attache/Transport case (also available exclusively from EDC) is, $329.95. Portable Attache Transport case, $159. Allegro Electronics, 13101 Washington Blvd., Suite 110, Los Angeles, CA 90066. (213) 578-9712. (Sept '89)

**CalComp 2300A**

The CalComp 2300A is a full-featured drawing tablet that lets you resize and reposition the drawing area. Three sizes, six different input devices (pens and pucks), and several software templates are available. AE Template Manager lets you perform all the System and HyperCard menu functions. $195 to $2,495, depending on size. CalComp, 1435 N. 62nd St., Scottsdale, AZ 85260. (406) 948-6540. (Oct ’89)

**Felix**

Felix is a 5.75-inch-square optoelectronic trackball mouse, with room to spare. The focus is on ease of use. Space saver but awkward for lefties. It has a button on top of the pointer handle for mouse clicks. Setting up for absolute movement. MacPlus and ADB versions available. $169. ALTA Technology, 1200 Skyline Drive, Laramie, WY 82070. (800) 726-6153 or (307) 745-7538. (Oct ’89)

**Focus S900GS**

The Focus S900GS is a 400-dpi, 6-bit gray-scale scanner that simulates resolutions up to 800 dpi. It has superior resolution and good halftone quality. Professional-quality software and extensive editing features and printing options. $4,350; software, $495. Agfa Compugraphic, 200 Ballard Vale St., Wilmington, MA 01887. (508) 658-5600. (June '90)

**Mac 105 ADB Extended Keyboard**

The Mac 105 ADB Extended Keyboard is a good alternative to Apple’s Extended Keyboard, with a larger return key, larger and more sculpted keytops, and a lower overall weight. Requires Mac SE or Mac II, $199. QuicKeys, 1899 Cutting Edge, P.O. Box 1299, Evanston, IL 60204. (847) 888-5230. (Aug ’88)

**Mac 101 ADB Extended Keyboard**

The Mac 101 ADB Extended Keyboard is a good alternative to an Apple extended keyboard, with a larger return key, larger and more sculpted keytops, and a lower overall weight. Requires Mac SE or Mac II, $199. Cutting Edge, P.O. Box 1299, Evanston, IL 60204. (847) 888-5230. (Aug ’88)

**HeadMaster**

The HeadMaster is designed for users with little or no use of their hands. It uses ultrasound signals emitted from a handheld control to determine the position of the user’s head. It has a puff tube for the mouse button. Emulates all mouse functions. A variety of on-screen keyboards are available for typing. Available for Mac 512K, Plus, SE, and II. $290. Prenke, Rombach & Co., 1022 Heyl Road, Wooster, OH 44691. (800) 262-1984 or (216) 262-1984. (Oct ’89)

**IS/ADB**

The IS/ADB is a tablet that comes in three sizes with a choice of seven pointing devices, including multibutton pens and multibutton stylus. Options include a controller or relative modes; active-area sizing on a menu is handy for intensive drawing work. Twelve function keys can be used for creating macros. $395 to $656. Kurtz, 3007 E. Chambers St., Tempe, AZ 85284. (602) 276-5533. (Oct ’89)

**IS/ONE Tablet**

The IS/ONE Tablet with Pen works similarly to a cordless pen or mouse and contains a stylus for precise graphics input. Minor bugs with some applications and DAs. Keystroke macros can be launched from the tablet. Minimal documentation. Requires Mac Plus or later, $525 to $955. Kurtz, 3007 E. Chambers St., Tempe, AZ 85284. (602) 276-5533. (Jan ’88)

**LYNX Trackball**

The LYNX Trackball has an encased trackball. Small size makes it easy to use. Requires some wrist movement to access the buttons. Comes in ADB and non-ADB versions. $95 to $189. AlienEngage, 120 Linden Ave., Long Beach, CA 90802. (800) 321-5699 or (213) 590-9950. (Oct ’89)

**MacPoint**

Mac ’N Touch is a touch-screen application for applications requiring a lot of pointing and clicking; works well for programs such as graphic packages that require fine control. Available as an add-in screen for Mac SE and II models and as a snap-on screen for the SE only. Mac ’N Touch Add-In, $745 (SE), $895 (Mac II); Mac ’N Touch Snap-On, $1,595 (SE only). Micro Touch Systems, 3560 S. Raymond Ave., Burbank, CA 91506. (818) 969-9950. (Oct ’89)

**MacRef**

The BitPad Plus offers basic drawing capabilities but no macro-making capability. Uses multibutton pens. Scaling of screen-to-pad ratio must be entered in pixels per inch. Must use MultiFinder to change settings while in an application. $85. SummaGraphics, 60 Silverman Road, Sewell, CT 06483. (203) 881-5377. (Oct ’89)

**CalComp 2300A**

The CalComp 2300A is a full-featured drawing tablet that lets you resize and reposition the drawing area. Three sizes, six different input devices (pens and pucks), and several software templates are available. AE Template Manager lets you perform all the System and HyperCard menu functions. $195 to $2,495, depending on size. CalComp, 1435 N. 62nd St., Scottsdale, AZ 85260. (406) 948-6540. (Oct ’89)
Mcintizer

The Macintizer compares favorably with other tablets in terms of usability and drawing, but lacks some software features. It does not build-in capability for using or creating overlay templates.

MacTablet

The MacTablet is a stylus-driven tablet. Users can easily sketch or trace art using this absolute-positioning device. It works on a working area the size of the Mac screen. Allows concurrent use of the mouse. $495.

MacTRAC

The MacTRAC has three buttons—two lock and two clickers—located above the trackball. Equal ease of use for right- and left-handed people. Light signals when lock button has been pushed. $399; ADB version, $399.50.

MouseStick

The MouseStick is useful where precision is needed. Users can select letters and carry out mouse keyboard functions. Extremely sensitive. $350. McIntyre Systems, 22809 Shagbagh Avenue, Camarillo, CA 93012. (800) 645-5090. (Oct '89)

MouseTouch

The MouseTouch is a touch screen for selecting screens, pulling down menus, and entering numeric information in a standard-type keyboard screen. Can be used with the Apple Macintosh. $99.50; Mirage, 554-55 CH Products, 970 Park Center Drive, Vista, CA 92083. (800) 624-5804 or (619) 598-2518. (Oct '89)

and one atop the joystick. Can be used as a mouse emulator. Come in ADB and non-ADB models. Also available is a peripheral called Mirage that adapts earlier non-ADB CH joystick to ADB use. Macintosh, 1005 8th Ave., New York, NY 10018. (212) 475-5200. (Oct '89)

Diconix M150 Plus Printer

Diconix M150 Plus Printer is the laser/Dot-LQ printer that GCC Technologies shipped as the WriteMove. It can run on batteries or AC and easily fits in a briefcase. Its price is right. A good choice if you’re on the road. $699. Eastman Kodak Co., PPP Customer Information Center, 8130 Eastman Way, Rochester, NY 14653-6224. (800) 344-0006. (Sept '90)

LabelWriter

The LabelWriter is a small serial printer that thermally prints labels individually. Labels can include bar codes but can’t mix text and graphics. The interface is simple. Choose-selectable driver is promised for future versions. This is an addicting and time-saving device. Comes with two Casady & Greene fonts. Requires Mac Plus or later. $24.95. CoStar, 22 Bridge St., Greenwich, CT 06830. (203) 661-9700. (May '90)

LaserWriter Intellitext

The LaserWriter Intellitext is Apple’s mid-priced PostScript laser printer. It’s faster than the LaserWriter Plus, with blacker blacks. Gray scale is less than that of the LaserWriter Plus. Chip makes it very speedy; expandable to 12 megabytes; SCSI hard-drive can be attached for fonts. Requires Mac Plus or later. $4,499. Apple Computer, 20525 Mariarn Ave., Cupertino, CA 95014. (408) 996-1010. (May '90)

LaserWriter RISC

The LaserWriter RISC is Apple’s low-end QuickDraw laser printer. Can be upgraded to IINTX; reasonably fast. Requires Mac Plus or later. $2,799. Apple Computer, 20525 Mariani Ave., Cupertino, CA 95014. (408) 996-1010. (May '90)

MacDot-LQ

The MacDot-LQ is a 24-pin dot-matrix printer that emulates the ImageWriter LQ. It uses the LQ’s dot-per-inch compatibility, but it’s not networkable and costs nearly $200 more. Bug-ridden emulation often loses touch with your Mac. Requires ImageWriter II or LQ drivers’ jumbo fonts for 216-dpi printing. $1,395. Advanced Matrix Technologies, 7033 Antrim Ave., Burnaby, British Columbia V5J 4M5, Canada. (800) 663-8558 or (604) 424-7274. (Oct '89)

MouseTouch

The MouseTouch is a touch screen for selecting screens, pulling down menus, and entering numeric information in a standard-type keyboard screen. Can be used with the Apple Macintosh. $99.50; Mirage, 554-55 CH Products, 970 Park Center Drive, Vista, CA 92083. (800) 624-5804 or (619) 598-2518. (Oct '89)

Wacom SD-510 Cordless Digitizer

The SD-510 Cordless Digitizer is light and very thin. It uses a pressure-sensitive stylus and requires neither a cord nor a battery. The tablet connects to the desktopport. The work area is about 9 inches (overall size is roughly 10 x 13 inches). The resolution is 770 lpi (lines per inch) at high resolution, but more responsive than a mouse. When not in use, it makes an excellent mouse pad. $495. Wacom, W. 115th Street Road, Paramus, NJ 07656. (201) 265-4226. (June '90)

Wrist Mac

The Wrist Mac is a small watch that hooks to your Mac. You can download and retrieve up to 80 screens of characters each. Operations allow two-way communications. Versions with straps are available. And it’s a decent watch. Version 1.2. Requires Mac Plus or later and HyperCard. $200, Microseeds, 7031-B W. Hillsborough Ave., Tampa, FL 33634. (813) 882-8635. (Dec '89)

Output Devices

ColorPro Plotter

The ColorPro Plotter is an eight-page desktop plotter that requires third-party software to drive. It’s fonts are limited to an optional Graphics Enhancement Cartridge that requires some BASIC programming. $1,295. Hewlett-Packard, 20525 Mariani Ave, Cupertino, CA 95014. (800) 752-0900. (Feb '88)

ColorQuick

The ColorQuick is a QuickDraw printer that has reasonable (216 dpi) quality and produces vivid colors. The color range is excellent. It’s fast and offers hard, roll, and cut-sheet paper feeds. $2,345. Tektronix Graphics Printing Division, Wilsonville, OR 97070. (503) 835-6100. (May '90)

Crystalfriend

The Crystalfriend Printer is the first 300-dpi PostScript-compatible printer. Based on a RISC microprocessor, it’s faster and cheaper than the LaserWriter Intellitext. While output quality is excellent, it can handle Adobe fonts. No manual feed or envelope capabilities. $4,499. Quark Corp., 500 Yosemite Drive, Milpitas, CA 95035. (408) 223-2479 or (408) 942-4000. (Sept '89). (Oct '89)

Eddy

The DeskWriter is HP’s Mac-only version of the DeskJet printer, which sweeps the DOS world. Now built-in AppleTalk makes it more versatile. Although it can’t do overheads and the ink can smear, it’s speed is excellent and legibility is equal to that of any 300-dpi laser printer. Uses QuickDraw, not Post-Script, for graphics. Requires special fonts. MacOS version, A.02.00. $1,195. Hewlett-Packard, 19310 Pruneridge

Ave., Cupertino, CA 95014. (800) 752-0900 or (609) 367-3650. (June '89)
printout. Not all colors can be reproduced. Paper handling is a bit slow. B-size sheets, $2.495, Hewlett-Packard, 19310 Pruneridge Ave., Cupertino, CA 95014. (800) 345-9870. (May '90)

**PLP II ****

The PLP II is a bargain-priced 300-dpi QuickDraw laser printer. Excellent performance for a low-price bit-mapped printer. No PostScript support. Requires Mac Plus or later. $1,399. GCC Technologies, 580 Winter St., Waltham, MA 02154. (617) 890-0880. (Mar '90) **89 Edpy QMS ColorScript 100 ****

QMS ColorScript 100 is the first color PostScript printer that uses conventional thermal wax transfer technology. Works on AppleTalk. Excellent typographic capability. Currently supports only a handful of applications. Requires Mac Plus or later. $2,195; Model 30, $1,959; Model 10, $995. QMS Electronic Publishing Group, One Magnum Pass, Mobile, AL 36689. (205) 633-4500. (Oct '89) **88 Edpy QMS-PS 820 turbo ****

The QMS-PS 820 turbo is a good substitute for the LaserWriter NTX. It is slightly faster and slightly cheaper than the NTX $2,989 and can stereo-"trays, each capable of holding 200 sheets. The 820 uses a Canon TX engine. A hard disk drive can be attached for fonts. $6,995. QMS Electronic Publishing Group, One Magnum Pass, Mobile, AL 36689. (800) 631-2692; ext. #420. (May '90) QMS-PS 820 Turbo ****

The QMS-PS810 is an eight-page-per-minute 300-dpi PostScript laser printer that competitors. Requires a desktop INT. Comes with 2 megabytes of RAM standard; upgradable to 3 megabytes. Emulates HP LaserJet, 5745 (HPGL), and Diablo 630. $4,955. QMS Electronic Publishing Group, 7852 Schillingar Park W., Mobile, AL 36608. (800) 523-2696. (July '88)

**Smart Label Printer ****

The Smart Label Printer is a small serial printer that thermally prints labels one at a time. Labels can include bar codes but can’t mix text and graphics. The interface needs some work. Reports a handful of a Mac: $249.5, Seiko Instruments USA, PC Products Div., 1144 Ringwood Court, San Jose, CA 95131. (800) 888-0817; ext. 1000, or (408) 882-2900. (May '90)

Tektronix 4693D Color Image Printer ****

The Tektronix 4693D Color Image Printer is a 300-dpi bit-mapped color printer. Colors look smooth and rich. Uses bit-mapped screen fonts; most type has noticeable jaggies. Requires Mac II with color monitor. Recommended 8-megabyte configuration, $8,995. Tektronix, 1000 Hillview Ave., Palo Alto, CA 94304. (653) 635-8329, Wilsonville, OR 97077. (800) 835-6100. (Oct '88)

**WriteImpact ****

The WriteImpact is a Near-letter-quality dot-matrix printer. It has 25- to 40 percent enlargement and reduction, print preview, smoothing, and 12.8 mystical characters. Bitstream fonts that tend to be large but also work well with ATM. Performance is very good — equaling that of the ImageWriter LT without the problems and the high price tag. $999. GCC Technologies, 580 Winter St., Waltham, MA 02154. (617) 890-0880. (June '90)

**WriteMove ****

The WriteMove is one of the smallest Mac printers. It is an inkjet unit that can produce resolutions of up to 192 dpi. It can run off rechargeable batteries and weighs just 3 pounds. Comes with a good selection of Bitstream fonts. Printing quality varies widely, depending on the paper and ink used. Printer driver, version 1.0. Requires Mac Plus or later and hard disk drive. $599. GCC Technologies, 580 Winter St., Waltham, MA 02154. (617) 890-0880. (Apr '89)

**Multimedia ****

Business Simulato Region ****

Business Simulator is a simulation-game training tool. You have to manage a company through its development. Version 2.0. Requires Mac Plus or later and hard disk drive. $699.5, Strategic Management Group, 3624 Market St., Philadelphia, PA 19104. (215) 387-4000. (Dec '87)

**ColorSpace II/ FX ****

ColorSpace II/FX brings 24-bit video to the Mac. The FX board converts regular TV signals so they can be displayed on the Mac. It also offers sophisticated special effects. The Digitizer DA grabs frames for your movies or live video with computer graphics. Requires Mac II or later. II. $2,299; FX, $3,499. Mass Microsystems, 550 Del Rey Ave., Sunnyvale, CA 94086. (800) 522-7979 or (408) 522-1200. (Mar '90) **88 Edpy MacRecorder ****

MacRecorder is an audio digitizer for adding sounds to your Mac, animations, or HyperCard stacks. Supports an extensive number of sound-manipulation effects. HyperSound Toolkit makes adding sounds to HyperCard stacks easy. Version 2.0. Requires Mac Plus or later. DownloadSound requires HyperCard version 1.2.1 or later. $249. Farallon Computing, 2000 Powell St., Suite 600, Berkeley, CA 94710. (415) 596-9100. (Jan '90)

**MacroMind Director ****

MacroMind Director is the best tool for creating color and black-and-white presentations. Its object-oriented animation capabilities provide numerous editing features. Allows MIDI support. Version 1.0. Requires Mac Plus or later and 2 megabytes for color. $695. MacroMind, 410 Townsend St., Suite 408, San Francisco, CA 94107. (415) 442-0200. (Sept '89) **89 Edpy ScreenRecorder ****

ScreenRecorder is a utility for recording your on-screen Mac activities. Ideal for presentations and training. Uses a tape recorder model. "Tapes" can be saved and browsers can be written to a disk and重磅安装 for easier distribution. Version 1.0. Requires Mac Plus or later. $195. Farallc Computing, 2000 Powell St., Suite 600, Emeryville, CA 94608. (800) 596-9100. (June '89)

**ShowCase FX ****

ShowCase FX is an animated presentation package that provides several textual effects, including Aegis' own Poly fonts, for use in making title sequences. Provides a good introduction to tweening and frame-by-frame animation. Version 1.0. Requires color Mac II and 2 megabytes. $395. Aegis Development, 2210 Wilshire Blvd., Suite 277, Santa Monica, CA 90403. (800) 345-9871 or (213) 592-9972. (Dec '89)

**TV Producer Pro ****

The TV Producer Pro is a NuBus card that overlays Mac graphics and text onto a video signal. Software is clumsy to use. Requires Mac II, Apple video card, and video source. $999. Computer Friends, Inc., 14250 N.W. Science Park Drive, Portland, OR 97229. (503) 626-2291. (May '88)

VideoWorks II Accelerator ****

The VideoWorks II Accelerator compiles VideoWorks II movies to make them run more smoothly. Compares for the QuickDraw screen display. Version 1.0. Requires Mac Plus or later and VideoWorks II; hard disk drive recommended. $195. MacroMind, 410 Townsend St., Suite 408, San Francisco, CA 94107. (415) 442-0200. (Dec '88)

**VideoWorks II Clip Animation ****

VideoWorks II Clip Animation’s Clip Charts, Black and White Movies, and Clip Sounds are separate aids to help you create motion-enhanced presentations. Requires VideoWorks II. $49.95 to $59.95. MacroMind, 410 Townsend St., Suite 408, San Francisco, CA 94107. (415) 442-0200. (Aug '88)

Music ****

Alcchemy ****

Alchemy loads and edits digitally sampled sounds from most commercial sampling cards. Version 1.0. Requires Mac Plus or later, MIDI or R-22 interface, and sampler. $695. Passport Digital, Inc., 625 Miramontes, Half Moon Bay, CA 94019. (415) 726-0280. CP (Oct '88) **88 Edpy Apple MIDI Interface ****

The Apple MIDI Interface is a simple musical-instrument digital interface with a 1-megahertz clock rate. Has only one MIDI input port. Works with all Macs; adapter required for 128K and 512K. $99. Apple Computer, 2525 Manteo Ave., Cupertino, CA 95014. (408) 996-1010. (June '88)

**ConcertWare+ ****

ConcertWare+ is an enhanced version of ConcertWare. Has different instruments and can use any four of a set of eight at any point in a piece. Supports AudioVision's ScoreVision 5.0. $69.95. Great Wave Software, 5335 Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-1990. (Dec '87) **85 Edpy ConcertWare+MIDI ****

ConcertWare+MIDI is a composition and transcription program that can record multiple notes from a MIDI keyboard. Easy to use if you read music. Handles eight tracks of eight voices each. Requires Mac 512K or later. $189.95. Great Wave Software, 5335 Scotts Valley Drive, Scotts Valley, CA 95066. (408) 438-1990. (Dec '87)

**Cue: The Film Music System ****

Cue: The Film Music System is a powerful and versatile assistant for scoring films, Auto-матes spotting and logging cue points and searching for matching tempos. Also performs many minor jobs, such as generating a performing-rights cue sheet. Version 3.0. Requires Mac SE/30, $695 or SE, $395. Opus Code, 3641 Haven Drive, Suite A, Menlo Park, CA 94025-1010. (415) 360-1313. (Feb '89)

**Deluxe Music Construction Set ****

Deluxe Music Construction Set lets you enter up to 48 voices on eight staves, plus MIDI music through the Mac’s internal speaker and/or via MIDI. 

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MINIFINDERS

Version 2.5. Requires Mac Plus or later. $129.95. Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404. (650) 545-4525 or (415) 571-7171. CP (June ’88)

Encore ******

Encore is a multi-rule-based music-notation program with a very nice interface. It supports multiple files and can deal with large scores. Version 1.2. Requires Mac Plus or later. $595. Passport Designs, 625 Mira montes St., Half Moon Bay, CA 94019. (415) 726-0280. Mac (June ’88)

Finale 2.0 ******

Finale 2.0 is the upgraded version of a complex, revolution ary music-notation program. Finale packs power and a much-improved interface and manuals. It’s best suited to users needing absolute control over all the elements in large-scale compositional and/ or publishing projects. Version 2.0. Requires Mac Plus, hard drive, SID, MIDI interface, and PostScript printer. $749. Coda Music Software, 1401 E. 79th St., Minneapolis, MN 55426. (800) 843-1337 or (612) 854-1288. (May ’90)

Harmony Grid ******

Harmony Grid offers an ex perimental treatment to harmony theory. Users are presented with a grid, so they can see scales and chords as repeating patterns. They play these tones by moving the mouse over the grid, resulting in improvisation without requiring any training of the user. The program automatically provides counterpoint as well. Supports MIDI. Version 1.05. $99. Hip Software, 117 Harvard St., Suite 3, Cambridge, MA 02138. (617) 661-2447. (Aug ’90)

Jam Session ******

Jam Session is a music program for users who think MIDI refers to the length of skirts. Without any skill, you can “jam” with rock, jazz, rap, or country tunes. A sort of “Sing Along With Mitch” for the computer set. Requires Mac 512K or later. $49.95. Bridgeboard Software, 17 Paul Drive, Redmond, WA 98052-1126. (415) 492-3200. CP (July ’88)

Master Tracks Pro ******

Master Tracks Pro is a full-featured second-generation MIDI sequencer that adheres to the Mac interface very well. It’s the first program to have graphics-controller editing. Version 4. Requires Mac 512K or later. $495. Passport Designs, 625 Miramontes St., #103, Half Moon Bay, CA 94019. (415) 726-0280. CP (Dec ’87)

MIDIBASIC ******

MIDIBASIC is a simple but highly useful program for writing MIDI software. Good stuff.


Music Mouse ******

Music Mouse is a music program in a genre all its own. Called an intelligent instrument, Music Mouse gives you instant musical feedback as you move the mouse and type on the keyboard, which controls tempo, volume, and volume. On version 2.02. $79.95. Dr. T’s Music Software, 220 Boy ston St., Suite 206, Chestnut Hill, MA 02167. (617) 244-6954. (May ’87)

MusicPro ******

MusicPro, a subset of Finale 2.0, was designed specifically for preparing lead sheets, one-anovalc parts, and small ensemble scores. It’s relatively easy to learn and is a very good performer. Version 1.0. Requires Mac Plus or later. $249. Coda Music Software, 1401 E. 79th St., Minneapolis, MN 55425-1126. (800) 843-1337 or (612) 854-1288. (May ’90)

Perceive ******

Perceive is a multipart music-tracking package. Generally effective tools train the ear. All parts are equally good. Requires any Mac. $99. Coda Music Software, 1401 E. 79th St., Minneapolis, MN 55425-1126. (800) 843-1337 or (612) 854-1228. (Mar ’90)

Performer ******

Performer is a full-featured MIDI sequencer that includes looping, SMPTEd synching, 32 simultaneous In and Outs, unlimited overdubbing, and compatibility with professional composers for transcription. Version 3.4. Requires Mac 512K or later and MIDI interface. $495. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. (617) 576-2760. CP (Jan ’88)

Practica Musica ******

Practica Musica is a classical/harmony course taught as a series of 11 activities that are presented as games. Topics include sight reading, writing, scales, modes, intervals, recognition, chord spelling, and ear training. Supports MIDI. Version 2.2. $125. Ars Nova Software, P.O. Box 637, Kirkland, WA 98033. (800) 445-8866. (Aug ’90)

Professional Composer ******

Professional Composer produces performance-quality sheet music using Adobe’s Aldus postscript font. Scores can be created from scratch or imported from Performer (and can be exported to Performer for MIDI playback). Version 2.3. Requires Mac 512K or later. $495. Mark of the Unicorn, 222 Third St., Cambridge, MA 02142. (617) 576-2760. CP (Jan ’88)

Sound Designer 2.0 ******

Sound Designer set the standard for editing samples on lower-cost samplers, but it still lacks real-time playback. Requires Mac 512K or later, sampler, and MIDI interface. Emix, EII, 2000/2002. $395; all others, $395; Sound Designer Universal, version 1.5. $395; Sound Designer II, version 1.03, $395. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. (415) 688-0600. CP (Oct ’87)

Studio Session ******

Studio Session consists of two programs — Editor and Player — that produce music with six voices of digitized sound. Excellent program and manual make this a good buy. Version 2.0. Requires Mac Plus or later. $349. Digidesign, 1360 Willow Road, Suite 101, Menlo Park, CA 94025. (415) 688-0600. CP (Oct ’87)

Turbosynth ******


UpBeat ******

UpBeat turns the Mac into a front panel for highly complex and versatile drum machine. Input patterns with music, MIDI keyboard, or drum machine. Version 2.0. Requires Mac 512K or later. $349. Intelligent Music with Professor, 85258. (800) 624-2485. (Aug ’89)

Writer’s Dreamtools ******

Writer’s Dreamtools is a set of three HyperCard stacks that can be extremely useful. It comes in G- and X-rated versions. The clichés and catchphrases stacks are fascinating. They’re also a short-cut to using HyperCard and a hard-disc drive to print. Complete set, $59. $35 each. Slippy Disks, P.O. Box 1126, Los Angeles, CA 90069. (800) 522-7234 or (213) 274-3600. (May ’90)

OUTLINERS

Acta Advantage ******

Acta Advantage is an outline creator. It includes drivers for translating Acta outlines into MORE and ThinkTank (both ways) and into MacWrite. WriteNow, Works, and RTF formats. DA, version 3.01; application, version 1.03. Requires Mac 512KE or later. $129. Symmetry, 8603 E. Royal Palm, Suite 110, Scottsdale, AZ 85258. (800) 624-2485. (Aug ’89)

IdeaFisher******

IdeaFisher is a thought processor that’s based on an eight-disc database of words, phrases, clichés, and titles. The database is cross-referenced and indexed in several ways. Useful search techniques are provided and your “conclusions” are held in a separate file. It’s text-based, so it’s fairly quick, but it doesn’t go as far as full blown treatise editors. Authors are unsophisticated, giving equal weight to everything. Requires Mac Plus or later. $495. Fisher Idea Systems, 18881 Von Karman Ave., Irvine, CA 92715. (714) 474-8111. (May ’90)

MORE II ******

MORE II is an outlining and organizational tool that is an improvement over its predecessor, more. MORE II has on-screen capabilities well beyond its competitors’, especially in a multimedia setup. Version 2.0. Requires Mac Plus or later, System 4.1 or later, and a

THE MICROSOFT OFFICE ******

The Microsoft Office is Word, Excel, Mail, and PowerPoint on a CD-ROM disc (a floppy disk version is also available). A full set of Adobesecond fonts, Adobe PostScript fonts, templates, lots of clip-art samples, and other Microsoft applications are included. A must have for everyone involved in office training. Every version from 2.0 onwards is covered in full detail. The book includes an introduction to the Microsoft Office, an introduction to HyperCard, setting up and formatting documents, text editing, and a plethora of tips and tricks. Review copies are available on request. More information can be found at www.microsofthelpdesk.com.

ORGANIZATION AND TOOLS

The Microsoft Office is a comprehensive set of tools designed to help you get the job done quickly and efficiently. It includes Word, Excel, Mail, PowerPoint, Access, and Publisher, all of which are integrated to work seamlessly together. With the Microsoft Office, you can create professional-looking documents, spreadsheets, presentations, and databases. The Office also includes a built-in Web browser, which allows you to access the Internet and other online resources. The Microsoft Office is available in a variety of editions, including the Standard Edition, which includes all the core applications, and the Professional Edition, which adds additional features such as the ability to create and manage databases.
Abaton Scan 300/GS

Abaton Scan 300/GS is a 300 dpi, 8-bit scanner that offers 256 levels of true grayscale scanning. It supports line art, halftone, and grayscale scanning modes as well as mirroring and inverting scanned images. The flatbed design of the Scan 300/GS facilitates accurate alignment of documents up to 8.5" x 14", while the removable lid allows scanning of oversized drawings and maps. It has 255 brightness settings and 255 contrast settings for adjusting the scan of a dark or light original. Abaton Scan DA is shipped with the scanner to allow users to scan images from within any Macintosh application without exiting the current program.

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<tr>
<th>System Requirements</th>
<th>Price</th>
<th>Support</th>
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<tr>
<td>Macintosh—IIx, llx, SE/30, SE or Plus</td>
<td>$1595 for scanner</td>
<td>90-day on-site maintenance service; extended warranty available upon request</td>
</tr>
<tr>
<td>PC—IBM PC, XT, AT, PS/2 or compatible</td>
<td>$295 for PC or Mac interface kit</td>
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System Requirements

Language Master gives you instant access to more than 80,000 dictionary definitions plus 470,000 synonyms from Merriam-Webster’s—the English language authority.

The dictionary contains definitions, usage notes, and hyphenation points. The thesaurus contains synonyms, meanings for each synonym group, and properly inflects all responses.

Whether you’re writing, reading, or simply want to explore the English language in a new and exciting way, Language Master is for you!

Franklin Software
122 Burrs Road
Mt. Holly, NJ 08060
(800) 543-3511
In New Jersey (609) 261-4800

The high-performance Macintosh/UNIX network

uShare networks Macintoshes to high-performance UNIX hosts. Besides sharing files and resources, Macintosh users enjoy large and inexpensive disk capacity and greater processing power. In addition to standard UNIX features and utilities, uShare provides its own electronic mail, remote system disks, and print spooling.

uShare complies fully with Apple’s data communications protocols as well as with TCP/IP protocols. It is completely compatible with AppleShare and with AppleTalk Phases 1 and 2.

uShare works with Macintoshes on LocalTalk and Ethernet and is available for UNIX machines from a dozen manufacturers.

Information Presentation Technologies, Inc. (IPT)
5000 N. Parkway Calabasas
Calabasas, CA 91302
(818) 347-7791
FAX (818) 992-5580
(800) 233-9993
### MiniFINDERS

- **MacPhonebook**: MacPhonebook handles name- and-address lists with up to 500 entries. Its forte is printing lists in large, medium, and small (Little Black Book) formats. Version 1.0. Requires Mac 512K or later. $79.95. MacShack Enterprises, 19 Harrington Road, Cambridge, MA 02140. (617) 876-6343. (Apr '89)

- **My Time Manager**: My Time Manager is a complete HyperCard-based organizer with a full range of nicely implemented tools including an appointment book, an address and phone book, a notes and contacts area, and a dialer. Daily and monthly reports are available for printing. Its performance is good and the publisher support is excellent. Version 2.0. Requires Mac Plus or later. $79.95. MacShark Enterprises, 19 Harrington Road, Cambridge, MA 02140. (617) 876-6343. (Apr '89)

- **Address Book Plus**: Address Book Plus is a very nice name-and-address manager on one side of a page, but it has all the other features you might need. Its sorting and import/export abilities are good. A limited 7-day trial is also available for access to other applications. Version 1.0. Requires System 6.0.2 or later. $89.95. with leather binder. California Address Book, Inc., 29451 Greenfield Road, Suite 216, Southfield, MI 48034. (313) 559-4561. (Sept '88)

- **Electric Dvorak**: Electric Dvorak is the best Dvorak implementation for the Mac. The basic program is an installer that puts the small (3K or so) necessary resources into your System file. Once that's done, you can toggle between the standard key mapping and a Dvorak arrangement with a keyboard command equivalent. Either keyboard can be set as the default startup arrangement. The documentation, which is all electronic, is brief but excellent. A small chart of the Key-Caps layout is provided as well. Version 1.0. Free. Electric Dvorak, 20906 1/2 Freedom Rd., Cupertino, CA 95014. (408) 257-3815. (Mar '89)

- **AutoSave 2**: AutoSave 2 provides insurance against system crashes. It saves your work automatically at intervals from 1 to 99 minutes. Compatible with many applications but not recommended for use with databases. Version 1.1. $49.95. Magic Software, 12206 Franklin St., Bellevue, NE 68005. (402) 242-6243. (Dec '89)

- **Calculator Construction Set**: Calculator Construction Set is a clever program that lets your Mac remind you of important items. Every time you start up, if you've entered a note for the day via Remember? , it displays a window with the details. Its freeware version is easy to maintain. The DA also lets you check your calendar in advance. Implementation is decent. Version 1.3. Shareware: $10. David Wark, 1330 W. North Ave., Chicago, IL 60624. (312) 728-7176. (July '89)

- **Take Control of Cholesterol**: Take Control of Cholesterol is one of a series of health- and food-related programs. It's clearly a port from a simpler interface, but in spite of that, it's a good tool. It's designed to be used with Enter's Choice. A book that tells you how to reduce cholesterol by lowering your saturated-fat intake. The program sets up worksheets and lets you fill out meal plans. Version 2.0. $39.95. Lifestyle Software Group, 63 Orange St., St. Augustine, FL 32084. (800) 211-1153 or (904) 825-0220. (Aug '90)

- **Calc Maker**: Calc Maker is a utility that gives you control of a variety of calendars. Many people use it to create personal calendars. Excellent printing routines. Version 3.3. Requires Macintosh 512K or later and System 4.1 or later. $95. CE Software, P.O. Box 65801, West Des Moines, IA 50265. (515) 224-1995. (Sept '89)

- **Calendar Maker**: Calendar Maker is a utility that creates a variety of calendars. Many people use it to create personal calendars. Excellent printing routines. Version 3.3. Requires Macintosh 512K or later and System 4.1 or later. $95. CE Software, P.O. Box 65801, West Des Moines, IA 50265. (515) 224-1995. (Sept '89)

- **Hot Key**: Hot Key is (MacWrite II version): Hot Keys is (MacWrite II version) is a set of MacroMaker macros for MacWrite II (version 2.1). The MacWrite II contextual macro package is also available. Includes utility macro software and a keyboard overlay. Works well under MacWrite II and any useful macros (some for the MacWrite Green). Version 1.0. Requires System 6.0.2 or later. $39.95. Central Point Software, 3305 N.W. Greenfield Road, Suite 216, Southfield, MI 48034. (313) 559-6965. (Dec '88)

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**Copy II Mac**: Copy II Mac is a collection of powerful yet easy-to-use disk utilities to enhance your abilities and much more. Version 7.2. Requires Mac 512K or later. $39.95. Central Point Software, 3305 N.W. Greenfield Road, Suite 216, Southfield, MI 48034. (313) 559-6965. (Dec '88)
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**MINIFINDERS**

6.0.2 or later, MacroMaker (included), and extended keyboard: $44.95 per version. K.I.S.S. (Keep It Simple Software), 324 Fuller, Suite C-3, Helena, MT 59601. (406) 442-3550. (May '90)

**Icon-It!**

Icon-It! lets you create icons to use as alternatives to menu commands. Use its 100 icon templates to create your own. Version 2.0. $89. Tactic Software, 1361 S.W. 128th St., Miami, FL 33186. (305) 378-4110. (May '90)

**Image Grabber**

Image Grabber is a DA screen capture program that is like an improved version of the old Camera DA. Can capture pulled-down menus and converted 8- and 24-bit-color screens to 2-bit black-and-white files, while preserving large amounts of memory. Has real-time and delayed modes and captures in MacPaint and PICT formats. Version 2.0 Plus or later; System 6.0.3 or later. $49. Sabastian Software, P.O. Box 70278, Bellevue, WA 98007. (206) 863-0450. (Mar '90)

**Mail Rater**

Mail Rater is a large HyperCard stack that takes all the guesswork out of postage. It should be used in a single window for a short time. Includes HyperCard. Version 1.01. Requires Mac Plus or later, HyperCard 1.2 or later, and System 6.0 or later. $49.50. Tight Line Software, 27601 Forbes Road, Suite 50, Laguna Niguel, CA 92677. (714) 452-8907. (Feb '90)

**MasterJuggler**

MasterJuggler is Font/DA Juggler with so many features added that they can't be listed here. It includes such items as a character generator, a cataloger, and a font manager. As neat as it is, it is as good as its last version. Version 1.5. Requires Mac II or later. $80. MicroDesign, Inc., P.O.Box 294, 1660 Spring St., Suite C, San Diego, CA 92101. (619) 230-6322. (Mar '90)

**MathCAD**

MathCAD is a solid, if somewhat quirky, math processor for equation solvers. The program can also create charts, although its data-handling ability is somewhat limited for that use. Data entry needs to be improved and made more Mac-like. Version 2.0. Requires Mac Plus or later. $495. MathSoft, One Kendall Square, Cambridge, MA 02139. (800) 628-4225. (Apr '90)

**MockPackage + Utilities**

MockPackage + Utilities is a set of extremely powerful DAs. Includes a text editor, text processor (with a word processor and LaserWriter), chartier, terminal, several other useful tools, and EZmenus. Version 4.4. $49.95. CE Software, 6640 West Des Moines, IA 50265. (515) 224-1995. (Mar '87)

**Partner**

Partner is an INIT that lets you add a graphics editing application while using a DTP program such as MacWrite II, Word, PageMaker, QuarkXPress, MacDraw, Aperture, FreeHand, FreePaint, SuperPaint, and Canvas. Version 1.0. Requires Mac Plus or later, $99. Salient, 3101 Palmview, Palm Alto, CA 94306. (415) 852-9567. (May '90)

**Pyro!**

Pyro! is the premier Mac screen saver. All the required settings are found in the Control Panel. Current version features modules such as Aquarium and Flashlight. Version 4.0. Requires Mac 12K or later and System 6.0.2 or later. $39.95. Fifth Generation Systems, 2160 Hilgert, Elavon Round, LA 70809. (800) 873-4384. (Sept '89)

**QuickKeys**

QuickKeys lets you make full use of your keyboard. Assign any command (menu choices, DAs, and so on) or series of text blocks and/or commands to any key or key combination. Enormously powerful; necessary for Apple Extended Keyboard owners. Version 1.2. Requires Mac Plus or later. $99.95. CE Software, P.O. Box 65580, West Des Moines, IA 50265. (515) 224-1995. (Jan '89) * 87 Eddy

**SAM (Symantec AntiVirus for Macintosh)**

SAM (Symantec AntiVirus for Macintosh) version 2.0 is a clear winner in virus protection. The most significant new feature is an easy upgrade procedure that lets users upgrade 3.0. A DA to fight new viruses by calling Symantec's 24-hour Virus Newsline. The INIT portion, SAM Intercept, has been enhanced so that your interface has suffered a bit in the process. Virus Clinic (the batch-checking application) now sports a better interface and some new power. Version 2.0. $99.95. Symantec, 10201 Torre Ave., Cupertino, CA 95014. (408) 235-9600. (Dec '89)

**SuperGlue II**

SuperGlue II is the newest and best print-to-disk program. Offers superior slightly, although it has many nice touches, such as Glue Notes (Post-it-like notes) and One-Timer, an Fkey that makes operation immensely easier. Version 2.0. Requires Mac Plus or later. System 6.0 or later. $119.95. Solutions, Inc., 30 Commerce St., Williston, VT 05495. (802) 658-5056. (Nov '89)

**Tablecloth**

Tablecloth is a small package that makes using MultiFinder less confusing and far more pleasant. Hides all but the active window when you triple-click in the window. Version 1.0. Requires Mac Plus or later and MultiFinder 6.0.1. $49.95. User-Tek, 444 E 66th St., Suite C, Tulsa, OK 74124. (918) 885-7540. (Sept '89)

**Stepping Out II**

Stepping Out II is a software alternative to a graphics editing application. Makes you create a virtual screen (as large as memory allows) from the Mac’s 5-inch screen. Automatically scrolls to new document position as you type or draw. Version 2.0. Requires Mac Plus or later, $95. Berkeley Systems, 1700 Shatto Ave., Berkeley, CA 94709. (715) 540-5535. (Oct '88)

**Suitecase II**

Suitecase II is even better than its predecessor. Increases file management capabilities let you open 99 font, DA, sound, or Fkey files at a time. Can display and installed font in any style. Fonts can also appear in their proper typefaces on the font menus. Includes Font Harmony for resolving font ID conflicts, and Reiger & Sound Valet for font and sound compression. Version 1.2.6. Requires Mac II or later. $79. Fifth Generation Systems, 10049 N. Reiger, Baton Rouge, LA 70809. (800) 873-4384. (June '89) * 87 Eddy

**SUM II**

SUM II is an expanded version of the essential SUM data-recovery utility. Includes utilities for partitioning, encrypting, backing up (based on Redundx, and optimizing. None of these modules is preferrable to the dedicated packages available. SUM is a must have. The recovery module is still excellent and has a much improved interface. Version 2.0. Requires Mac Plus or later and System 4.2 or later. $149.95. Symantec, 10201 Torre Ave., Cupertino, CA 95014. (408) 253-9600. (Dec '89)

**Virex**

Virex is an excellent virus preventive, detector, and eradicator that works against known viruses and has an excellent support and update history. Version 2.5. Requires Mac Plus or later and System 5.0 or later. $99.95; annual update, $75. Microcom Software/HIC, 3700-B Lyckan Parkway, Norwood, MA 02062. (917) 498-2727. (Oct '89)

**Virtual 2.0**

Virtual 2.0 is a must-have utility that provides superior slightly, although it has many nice touches, such as menu overlap and menu management. Version 2.0. Requires Mac Plus or later, SE/30, or Mac II with optional 68851 PMMU. $199; with PMMU chip, $275. Connectix, 125 Constitution Ave., Menlo Park, CA 94025. (800) 950-5880 or (415) 324-0727. (Apr '90) * 89 Eddy

**Word Wrapper**

Word Wrapper is the script used for simple utility that you find useful several times a day (if you telecommunicate much). Wraps or breaks Mac-created text files to a user-specified length and also adds line breaks (using some intelligence) to received text files. Requires Macintosh 12K or later. $39.95. International Technology Development Corp., 1653 Lombard St., San Francisco, CA 94123. (415) 929-0924. (Nov '89)

**WorksPlus Command**

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**AutoBackup**: AutoBackup creates copies of non-backed-up data files on another hard disk (or on selected tape drives) whenever you save a file or activate AutoBackup. Applications and System files are not backed up. You can set AutoBackup to back up only selected files. Your options as to what to back up and what not to are a bit too limited. Performance is very good. Version 1.1. $599. Soft Trends, 2243 Pacific Ave., Suite B101, Costa Mesa, CA 92627. (714) 650-2158. (Aug '90)

**Cat/Backup**: Cat/Backup combines disk cataloging and backup. The catalog is as good as they come, but the portion that needs some improvement. Backing up from one partition to another on the same drive crashed the program. Back-up performance was OK. Incremental (which Cat/Backup calls archival) and mirror-image backups can be made. The interface and overall operational procedures need some polishing. Version 1.1. $399.5 Master Manufacturing, 118 N. Cypress St., La Habra, CA 90631. (213) 604-6681. (Aug '89)

**Complete Undelete**: Complete Undelete is a superb file undelete program. Excellent interface, very fast, and capable of recovering even some partially overwritten files. It pays for itself very quickly. Get Fastback up. Requires Mac 512K or later and System 3.0 or later. $49.95. 1st Aid Software, 42 Radnor Road, Bozeman, MA 01515. (617) 782-4676. (Jan '90)

**Fastback II**: Fastback II supports incremental, differential back-ups and offers users a choice of compression levels. Backup configurations can be saved as preference files. Mac language supports automated procedures. Nonstandard dialog boxes are occasionally unclear. Version 2.01. Requires Mac 512K or later and System 4.2 or later. $189. Fifth Generation Systems, 10049 N. Reiger Road, Baton Rouge, LA 70809. (504) 291-7271. (Oct '89)

**1st Aid Kit**: 1st Aid Kit recovers lost or damaged files from floppy or hard disk drives. An excellent manual and the text that teaches HFS. Version 2.8. Requires Mac Plus or later. $99.5. 1st Aid Software, 42 Radnor Road, Bozeman, MA 01515. (617) 783-7118. (June '88)

**HFS Backup**: HFS Backup is a top-class backup program and quick and reliable. Version 3.0. $99. Personal Computer Peripherals, 4710 Eisenhower Blvd., Building A4, Tampa, FL 33634. (813) 884-3083. (Oct '89)

**Redux**: Redux is an excellent increment-backup program. It lets you back up files, folders, or entire volumes. You can write scripts, using the Redux control language, BackTalk. Comes with Redux Restore, a useful utility that can be distributed freely. Version 1.62. Requires Macintosh Plus or later. $499. MicroScribe Publications, 7703-B W. Hillsborough Ave., Tampa, FL 33634. (813) 882-8635. (July '89)

**Retrospect**: Retrospect is a full-featured backup-and-archival package that supports storage devices from floppy to DAT drives. Version 1.1 adds significant programming changes for SCSI devices, most notably tape drives. Version 1.1. Requires Mac Plus and System 6.0 or later. $249. Interpoint Development, 1510 Walnut St., Berkeley, CA 94709. (415) 849-0293. (Dec '89) *89 Eddy

**Shadow**: Shadow is a DA that automatically backs up selected files at specified time intervals and after specified actions. Version 1.24. Requires Mac 512K or later. $499.5. Natural Intelligence, 86 Richdale Ave., Cambridge, MA 02140, (800) 441-4649 or (617) 266-7858. (May '90)

**File/Disk Management**

**Boomerang**: Boomerang is a handy INIT that adds full navigational and search features to all Open and Save dialog boxes. It automatically remembers all the files and folders recently accessed and can be configured to alternate between Open and Save dialog boxes. It can save you a lot of time, and it's shareware! Version 2.0. Requires Mac Plus or later. $30. shareware. Zeta Soft, 2423B Channing Way, Suite 992, Berkeley, CA 94704. Also available for download on Zmac and other on-line services. (Apr '90)

**CanOpener**: CanOpener searches files at a decent clip for specified strings. Can real and display text. MacPaint, PICT, EPS, TIFF, RIFF, and MacDraw II formats. The interface looks odd and is quite easy to master. Version 1.1. Requires Mac Plus or later. $125. Abbott Systems, 62 Mountain Road, Pleasantville, NY 10570. (800) 552-9157 or (914) 747-3116 (Feb '90) *89 Eddy

**Disk Doubler**: Disk Doubler is an INIT that adds a menu with file-compression and expansion options to all your applications. It is very efficient and generally compresses files smaller than Stuffit does. Incremental compression that lets compressed files be expanded with a double-click. The ability to read Stuffit files is promised for a future version. Version 2.0.4. $59.95. Saiient Software, 3101 Avalon Court, Palo Alto, CA 94304. (415) 852-9567. (July '90)

**DiskExpress**: DiskExpress is much quicker and better than its predecessor, DiskExpress. It is by far the best hard-disk backup/defragmentation's available. It can be set to run automatically, in the background, at a preset time, or manually. DiskExpress II is capable of several levels of optimization, and when it's used judiciously, it does a perfect job. Version 2.04. $89.95. ALSoft, P.O. Box 927, Spring, TX 77338-0927; (713) 533-4090. (July '90)

**DiskFinder**: DiskFinder searches disks for files and also catalogs disks. Version 1.07. Requires Macintosh 512K or later. $49.95. Williams & Macias, S. 3707 Godfrey Blvd., Berkeley, CA 94704. (800) 752-4400. (Feb '89)

**DiskTop 4.0**: DiskTop 4.0 is the best Finder-replacement DA. It's very easy to use, is very powerful, and has an excellent interface. The function's multiple operations are unmatched, and it's very fast. It can launch applications and perform batch copies and moves. Version 4.0. Requires Mac Plus or later. $99.5. CE Software, P.O. Box 65580, West Des Moines, IA 50265. (515) 224-1995. (June '90)

**FetchIt**: FetchIt is an INIT that puts a pop-up menu on the desktop small disk icon on the right side of the Open and Save dialog boxes. This menu can be used to navigate your disks or do different Finder-type operations. Performance is good. Although you lose the ability to move up a directory level by simply clicking on the icon, you gain far more in return. Version 2.01. Requires Mac Plus or later. $25. Cra Z Software, P.O. Box 6379, Havelock, VA 23070. (508) 521-5262. (June '90)

**Findswell**: Findswell is an indispensable utility that installs a new button in the Open dialog box of virtually every Mac application. Press the button, type a search string, and click on Find, and Findswell searches for any files that match. Click on Open, or double-click to open the correct file. Version 2.0. Requires Mac 512K or later. $59.95. Working Software, P.O. Box 1844, Santa Cruz, CA 95061. (408) 423-5696. (Nov '87) *87 Eddy

**HandOff**: HandOff solves the annoying problem of not having the exact application to open a document to. It lets you specify, for example, that Word should open all documents created by VistaWorks. Requires Mac Plus or later. $49.95. Software Innovations, P.O. Box 811, Allen, TX 75002. (214) 727-9079. (Aug '90)

**INITPicker**: INITPicker offers a scrollable list of INITs in the System to let you sort INITs in any order. Holding down a predefined key combination at startup automatically shuts off INITs and bypasses the INITPicker screen. Version 1.1. Requires Mac Plus or later. $49. MicroSciences, 7030-B W. Hillsborough Ave., Tampa, FL 33615. (813) 882-8635. (Aug '89)

**Inx**: Inx is a combination INIT and DA that manages your directory tree. It does not let you decide to turn off a set temporarily (until the next startup), and it lacks the "run all" or "skip all" commands found in Aask and INITPicker. Version 1.1. Requires Mac 512K or later. $49.5. Natural Intelligence, 86 Richdale Ave., Cambridge, MA 02140. (617) 266-7858. (Aug '89)

**MacTree Plus**: MacTree Plus allows you to view your files in the form of a hierarchical tree. Can't view tree easily. Good search function. Version 2.0. Requires Mac 512K or later. $69.95. To Go Technology, 918 Northwood Blvd., Second Floor, Incline Village, NV 89450. (702) 831-3100. (Apr '89)

**MultiDisk**: MultiDisk is an excellent software disk partitioner that allows partitions to be resized dynamically, password protected, and even encrypted. Version 1.2. Requires Mac Plus or later. $59.95. ALSoft, Inc., P.O. Box 927, Spring, TX 77338-0927. (713) 533-4090. (May '89)

**On Cue**: On Cue lets you switch applications without returning to the Finder. Under MultiFinder, active applications are listed on a pop-up menu. Can also launch directly to a specific document. Version 1.3. Requires Mac 512K or later. $59.95. ICOM Simulations, 648 S. Whelan Road, Blanchard, ID 83785. (708) 520-4440. (Sept '88)

**Location**: Location finds files and text strings. If you type in a hit", if it's found a file, you can view the contents (for most common document formats); open it in another window; delete, rename, or move it. This is no DiskTop, though.
On Location’s main asset is blazing speed, which it gets from the index file it builds on your hard disk at installation. The index is updated either automatically or on command, and can be saved on disk and used on another disk if you wish. Mac users will cringe at the nonstandard interface. Expensive for a one-trick utility, but there’s a one-year money-back guarantee. Version 1.0. Requires Mac Plus and a hard-disk drive. $129.95. On Technology Systems, Inc., Deer Park Center, Suite 23A-171, Aptos, CA 95003-4723, (408) 685-9175. (Dec ’88)

**PrintBar**


**SuperLaserSpool**

SuperLaserSpool supports the widest range of printers (it’s the only spooler to support DeskWriter) and has generally excellent performance. The installation is a snap, and use is mostly transparent. Support is excellent. Version 2.0. Requires Mac Plus or later. $149.95. Fifth Generation Systems, 10049 N. Reiger, Baton Rouge, LA 70809. (800) 873-4384. (May ’90)

**FileGuard**

FileGuard is a cdew that operates primarily in the background. It offers varying levels of access and access controls. It is unique in that it can generally protect applications as well as data. Overall, it is an excellent security tool. Version 2.0. Requires Macintosh Plus or later. $249. ASD Software, 4650 Arrow Highway, Suite E-6, Montclair, CA 91763. (714) 624-2941. (May ’90)

**FileGuard StuffIt**

FileGuard StuffIt is a cde with StuffIt that operates primarily in the background. It offers varying levels of access and access controls. It is unique in that it can generally protect applications as well as data. Overall, it is an excellent security tool. Version 2.0. Requires Macintosh Plus or later. $249. ASD Software, 4650 Arrow Highway, Suite E-6, Montclair, CA 91763. (714) 624-2941. (May ’90)

**DiskLock**

DiskLock has two parts: an INIT and an application called FolderLock. It has standard locking features and is controlled by a DES key. Supports this is basic security, neither great nor awful. Version 1.0.1. Requires Mac Plus or later. $149. SuperLaserSpool Systems, 10049 N. Reiger, Baton Rouge, LA 70809. (800) 873-4384. (May ’90)

**Secureit**

Secureit is a well-thought-out program that can lock files and folders, make the System Folder invisible to the user, and lock drives using the user-specified approved list, lock disks after use, refresh (replace) specified files with clean copies after use, and password-protect everything. It can also purge files as a disk fills up, but this is too dangerous a feature to use in most cases. Secureit is particularly good at resisting efforts to bypass it. Version 2.2. $99.95. Direct Software, 1032 Irving Street, Suite 143, Los Angeles, CA 90042. (213) 431-1590. (May ’90)

**Sentinel**

Sentinel consists of two parts: an INIT and an application called Sentinel. Sentinel consists of two parts: an INIT and an application called Sentinel. Sentinel consists of two parts: an INIT and an application called Sentinel. Sentinel consists of two parts: an INIT and an application called Sentinel. Sentinel consists of two parts: an INIT and an application called Sentinel.
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<table>
<thead>
<tr>
<th>Quantum Pro Series</th>
<th>2 YEAR WARRANTY!</th>
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<td>210 MB</td>
<td>$548</td>
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</table>

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<thead>
<tr>
<th>Quantum</th>
<th>Internal</th>
<th>External</th>
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</thead>
<tbody>
<tr>
<td>Quantum 40 19ms</td>
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<td>Quantum 80 19ms</td>
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<td>lmprimis 1.2 Gigabyte 16ms</td>
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</table>

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<table>
<thead>
<tr>
<th>Model</th>
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<tr>
<td>Xceed 640 X 480</td>
<td>$345</td>
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<td>Xceed 1024 X 768</td>
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<thead>
<tr>
<th>Product Description</th>
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<tbody>
<tr>
<td>Texas Instruments PS17 Microlaser with AppleTalk Interface</td>
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<td>Texas Instruments PS35 Microlaser with AppleTalk Interface</td>
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<td>Qume ScripTEN Laser Printer</td>
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<td>Qume CrystalPrint Publisher I</td>
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**SyQuest Removable Cartridges $70**

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**MONITORS**

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**IMPRIMIS**

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**MISCELLANEOUS**

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<tr>
<td>Microtek 300ZS Color Scanner</td>
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<tr>
<td>14&quot; Color Monitor with 8 bit Video Interface for Mac II Family</td>
<td>$699 SE/30 $799</td>
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<tr>
<td>Abaton 24/96 Fax Modem</td>
<td>$349</td>
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<tr>
<td>Samsung 15&quot; Full Page Display with Video Interface</td>
<td>$469</td>
</tr>
<tr>
<td>Magnavox 14&quot; Color Monitor</td>
<td>$439</td>
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<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac IIfx</td>
<td>$4790</td>
</tr>
</tbody>
</table>

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Call for catalog!

---

### MAC SYSTEMS

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
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<tbody>
<tr>
<td>MAC SE 2 DR/1 MB</td>
<td>$1750</td>
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<td>MAC SE 1 DR/20MB</td>
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<td>MAC SE/2 MB/40MB</td>
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<td>MAC SE/20 MB/40MB</td>
<td>$3095</td>
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<td>MAC IIcx 2 MB/40MB</td>
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<tr>
<td>MAC IIcx 4 MB/80MB</td>
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<tr>
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<td>$4195</td>
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<td>MAC Portable 40MB</td>
<td>$3795</td>
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<tr>
<td>MAC Reg/Ext Kybd</td>
<td>$99/179</td>
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<td>MAC 8 Bit Color Card</td>
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<tr>
<td>MAC 8/324 Bit Card</td>
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<tr>
<td>MAC 13” RGB Monitor</td>
<td>$710</td>
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<tr>
<td>ImageWriter II/LQ</td>
<td>$435/945</td>
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<td>H.P. Deskwriter</td>
<td>$825</td>
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<td>H.P. ScanJet + Card</td>
<td>$1449</td>
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<tr>
<td>RasterOps 208 Board</td>
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<td>RasterOps 264 Board</td>
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<td>RasterOps 364 Board</td>
<td>$1378</td>
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<tr>
<td>Radius Front Mon/Calendar</td>
<td>$1295</td>
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<tr>
<td>Radius 2 Pr. Mon/Calendar</td>
<td>$1395</td>
</tr>
<tr>
<td>Color Monitor/Cal</td>
<td>$3980</td>
</tr>
<tr>
<td>Laser II SC/NT</td>
<td>$1885/908</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Capacity</th>
<th>Access</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>40MB</td>
<td>12MS</td>
<td>$319</td>
<td>$389</td>
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<td>80MB</td>
<td>12MS</td>
<td>$479</td>
<td>$549</td>
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<td>105MB</td>
<td>12MS</td>
<td>$529</td>
<td>$599</td>
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<tr>
<td>120MB</td>
<td>10MS</td>
<td>$639</td>
<td>$709</td>
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<tr>
<td>170MB</td>
<td>10MS</td>
<td>$779</td>
<td>$849</td>
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**Fujitsu Drives!**

<table>
<thead>
<tr>
<th>Capacity</th>
<th>Access</th>
<th>Internal</th>
<th>External</th>
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<tbody>
<tr>
<td>57MB</td>
<td>12MS</td>
<td>$299</td>
<td>$369</td>
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<td>120MB</td>
<td>10MS</td>
<td>$639</td>
<td>$709</td>
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<tr>
<td>170MB</td>
<td>10MS</td>
<td>$779</td>
<td>$849</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1 MEG SIMMS</strong></td>
<td>80/70ns, Low profile, Surface mnt, All new parts, Lifetime Guarantee</td>
</tr>
<tr>
<td><strong>UPGRADES!</strong></td>
<td>Accelerators (User-Installable!), Motherboards Many types!</td>
</tr>
<tr>
<td><strong>UPGRADES</strong></td>
<td><strong>Prices</strong></td>
</tr>
<tr>
<td>Accelerators</td>
<td>512Ke-Plus $295, 512K-Plus $625, 128K-Plus $695</td>
</tr>
<tr>
<td>Motherboards</td>
<td></td>
</tr>
</tbody>
</table>

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MacUser Marketplace

说着说着，中文助手说：“我可说了，我可说了……”
MacUser is beginning its sixth year of publication. Only Lisa Orsini, the art director, contributing editor Steven Bobker, and I, Mr. Anti-Editor, remain from the original masthead, but the magazine is on pretty much the same path it set in the first issue in October 1985.

Within that issue was a wad of fawning articles telling the then- insecure Mac users that they weren’t idiots for buying a machine that did very little. Accolades and new MacUser subscriptions rewarded any effort that helped keep those early buyers away from the thought that they had really been suckered by Steve Jobs (and his “insanely great” flimflam).

I was brought to the magazine as part of the original formula because I was a known grumpmeister who could throw a wet blanket on any shindig (although in real life I’m a jovial, carefree kind of guy). The founding publisher, Felix Dennis, a swinging rich guy, decided that there was too much rah-rah in the Mac community and that the least MacUser could do was put a professional complainer into the magazine to prove it wasn’t a bunch of lunk-eyes for the Apple PR department.

I started off with a bang by describing the Mac as a “wimp” computer designed for the effete user. This began the tradition of monthly hate mail aimed at me and my column.

But in early 1986, the possibility existed that the Mac would never make the grade. All the insiders knew it. The previous April, Steve Jobs had been removed as Mac manager during a spat with Sculley as Mac sales tumbled to $299 right into the teeth of the PS/I, and regained the educational and “home” market, I would figure they knew what they were doing. Nintendo is selling $3 billion a year worth of bozo game boxes — Apple blew it there. Why didn’t Apple turn the old 64K Apple II into such a box to sell for $150 or less? The potential was incredible.

If, however, you read Sculley’s book, Odyssey, you’ll discover that Sculley has long since given up on the idea that you can market a consumer-oriented computer. Recent history has shown that his orientation seems to be the lure of the upscale “workstation.” Then again, according to the original Apple business plan set forth by Apple’s real visionary, chain-smoker Mike Markkula, the idea was to “rifle-shot the hobby market as the first stepping stone to the major market.” What’s the major market for computers? Business. People with big budgets who can afford the high price of a workstation. Heaven forbid the idealistic goal of computerizing all mankind for the good of the world. Let someone else do it.

Well, Apple has managed to rifle-shot its way past a slew of opportunities and right into the minicomputer market. Oh, boy! The next five years will be a load of laughs.
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<th>40Q</th>
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*One copy of Timbuktu is required for each computer.

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Over in Marketing, you monitor a virus checker running on Mr. Yates' Mac.

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