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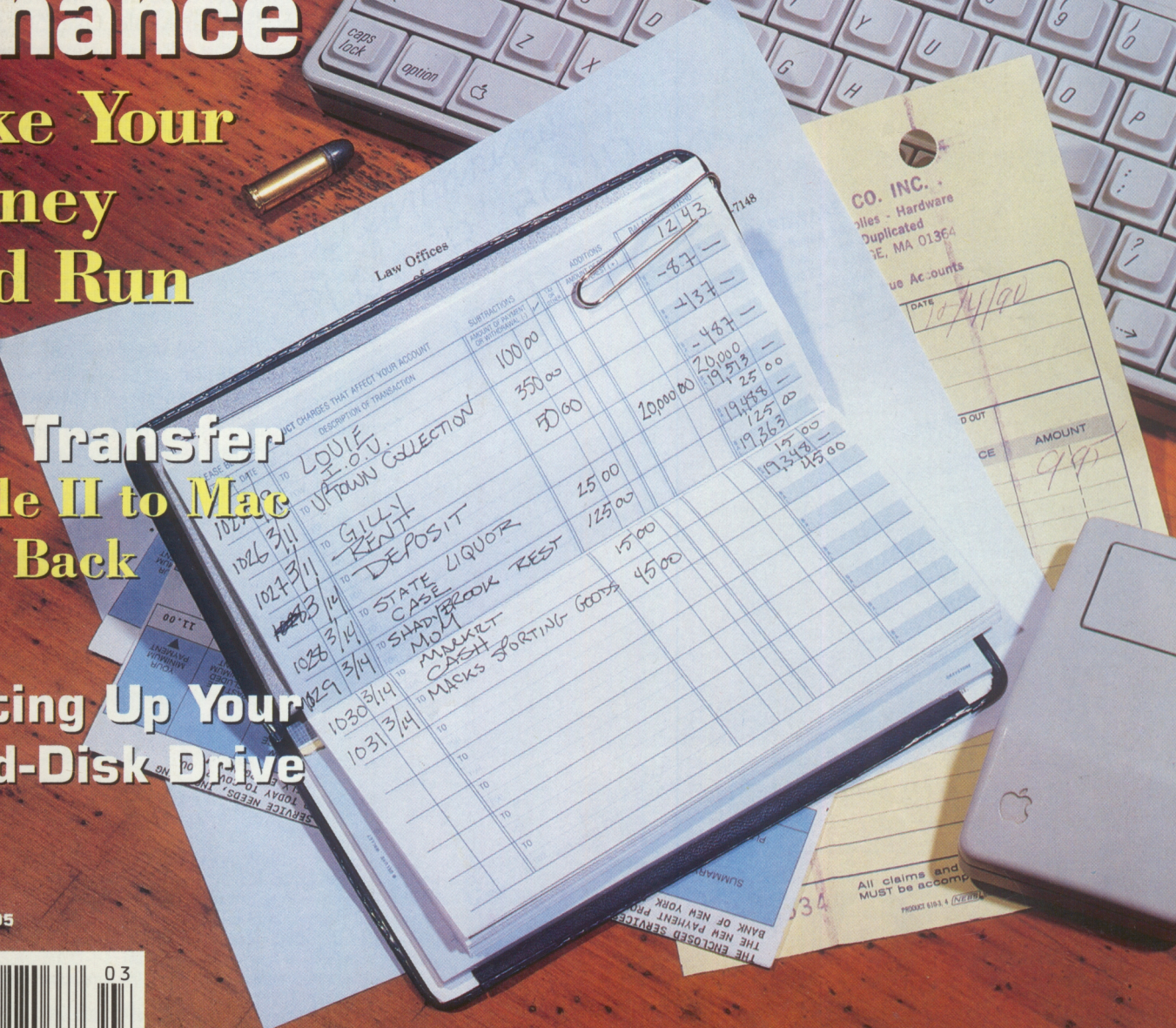
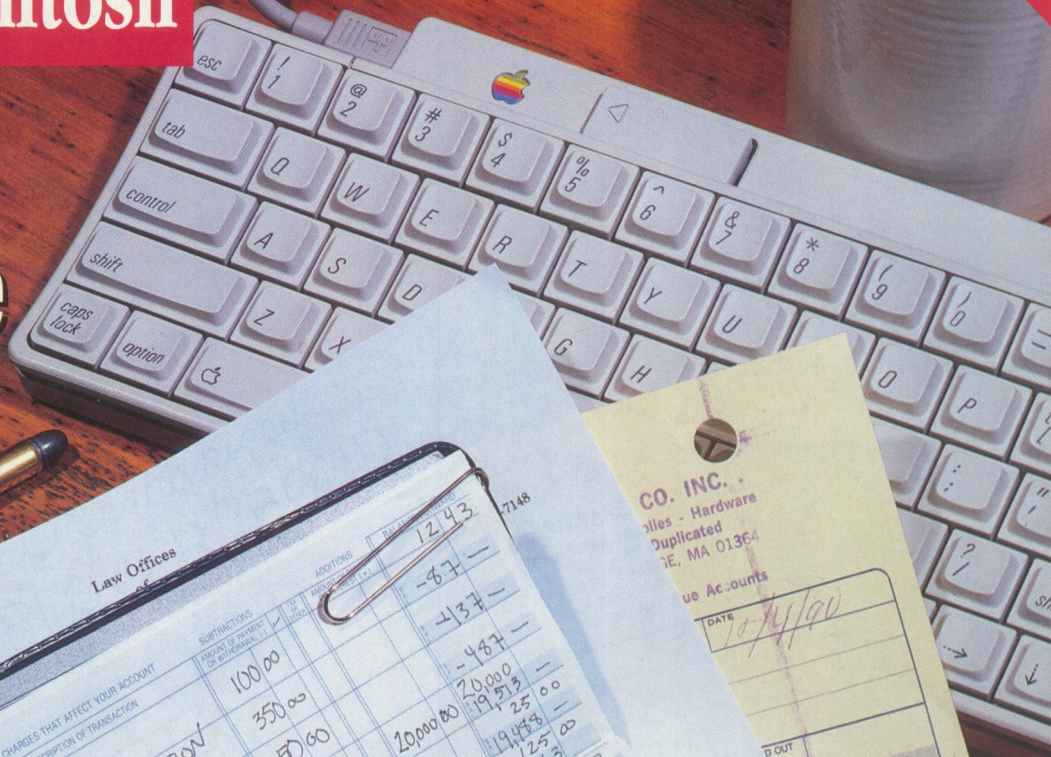
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Apple's Guide to Classroom Computing



Special Advertising Section

A Learning Society

By Bernie Gifford, Vice President of Education, Apple Computer

Children, it's often said, are our most valuable resource. In an age that combines scarcity with ecological awareness, we must tap as much of every resource as we can today, but must also be careful to renew our resources for tomorrow. Our schools can't afford to "lose" a single child — each one is too precious. Apple can help. Apple's commitment to education — a commitment that goes back more than a decade — has never been greater and its vision never clearer.

Apple's vision is a society in which all are learners — young people, grown people, older people, persons of different ethnic and cultural backgrounds, people with disabilities — and the learning doesn't stop just because they happen to have left school.

Apple technology can make that vision real. We imagine a "learning society," in which accidents of birth won't keep a gifted young woman from studying calculus because no one at her rural high school is qualified to teach it; won't prevent her grandfather, retired after 50 years of manual labor, from trying his hand at Spanish; and won't discourage a boy who can't see from learning to love Shakespeare. In short, Apple sees no boundaries.

Educational technology is no longer confined to the classroom. Networking and telecommunications, as well as the growing acceptance of personal computers in the home, are changing the way we view computers as educational tools. Apple's goal is to

empower every individual to learn throughout his or her lifetime.

What can Apple do to make the technology available to every individual? What does Apple mean when it says it must "make computers accessible"? Everyone must have the means to use a computer — both money and time. In the obvious financial sense, every person, and every school, must have

ing the investment schools have made in other Apple products. That commitment is evident from Apple's recent product announcements. The LC runs existing Macintosh software and, with the addition of the Apple II Card, can run almost all of the thousands of applications designed for the Apple IIe. School administrators and teachers can enter into a partnership with Apple

Apple's commitment to education has never been greater and its vision never clearer.

the ability to buy a powerful computer of the highest quality with plenty of software available for it.

Apple addressed this need with the Mac Classic, our first Macintosh computer with a suggested retail price of less than \$1000, and with the Mac LC, the first low-cost color Macintosh. The price/performance ratio of the Apple IIe and the Apple IIGs also continues to be a bargain for educators. These entry-level machines are of particular importance for educators, because they mean that Apple's newest technology, as well as tried-and-true technology, is available even to schools with limited budgets.

To make computers useful to teachers and students at all levels, Apple products are designed to be consistent. Products are designed to take advantage of new technologies, while also protect-

confident that as times change and technology evolves, Apple will continue to actively support its customers.

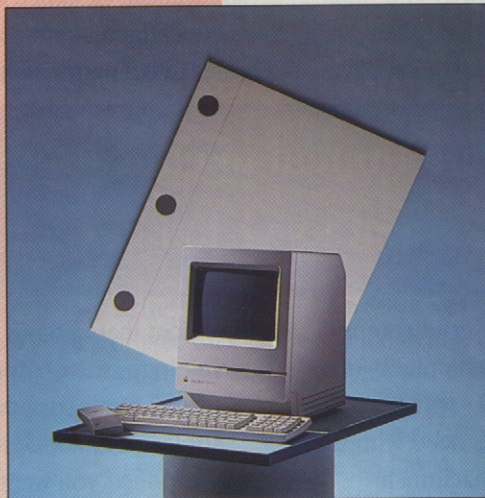
Apple will continue to produce the new products you want, while providing solutions that also protect your investment in Apple computers and software. Apple technology will advance educational technology while maintaining consistency, which makes computing accessible to individuals. This consistency also serves to protect your investment in Apple computers.

Apple's vision is of a world in which children, our most precious commodity, are a "renewable resource" — in which children can continue to grow and learn as they grow older and as times change. Apple technology is also renewable. In times of change, the ability to adapt to change is one of the few skills worth keeping. □

The Mac LC



The Mac Classic



The Apple IIGs



Doing What You Do Best

The choices just got harder. Not long ago, the phrase *Apple II* was synonymous with *educational computing*. But since the introduction of the most affordable Macintosh machines ever — the Macintosh Classic, LC, and IIsi — a teacher's nod can't automatically go to the Apple II. Now you have two decidedly different computer choices for the classroom.

What to do, what to do? You need to make intelligent buying decisions for your class or your school, decisions based on need, on software, on price, and on value. The Macintosh isn't the Apple IIe, nor is the LC the Apple IIGs. Each computer, whether a Mac or an Apple II, does what it does best.

APPLE IIe

If all your software comes from the vast library of classic 8-bit Apple II programs, from Davidson's Math Blaster and Sunburst's Muppets on Stage to MECC's Oregon Trail and Claris' AppleWorks 3.0, the Apple IIe is still a smart and inexpensive pick. Your dollars stretch further when you buy Apple IIes than if you buy IIGs machines or Macs. You can equip more desktops with a computer, or use what's left over to purchase printers or a larger selection of software. An Apple IIe is the most affordable Apple II workstation on an AppleTalk network.

APPLE IIGs

Great graphics and great sound mark the Apple IIGs as the most impressive machine in the Apple II family. Not only does the IIGs run 8-bit Apple II programs — with no extra card required — but it also lets you dip into the 16-bit software well to come up with such sophisticated programs as Seven Hills' GraphicWriter III or Claris' AppleWorks GS. If speech, sound, or music is your design, then the IIGs tops even the Mac. Preschool programs like Stickybear Alphabet talk to tykes, while music-

Apple computers represent both tradition and evolution in educational technology.

The Apple IIe and IIgs support thousands of existing programs,
while the Mac blazes a path into the '90s.

making software such as Music Studio lets older children compose and play their creations on the computer. Don't forget the dazzling color you get with the Apple IIgs, either. Paint programs that turn the screen into an electronic palette abound. If you plan on sticking with Apple II software, but want more power and more software selection, then the Apple IIgs fills the bill.

MACINTOSH CLASSIC

With a suggested retail price of \$999, the Macintosh Classic is the most affordable Mac ever. Period.

It's small and comes with a black-and-white monitor, but the Classic opens the door to Macintosh software, enough of a reason to consider it for the classroom, dorm room, or family room. Developers are rapidly adding outstanding educational software to the already-heavy shelves that feature such productivity and business software as Microsoft Works and Quicken. (See "Macs March Along.")

Right now, though, the Mac Classic makes an excellent, and low-cost, writing workstation. With packages such as MacWrite II, even elementary-school kids can pound out reports, assignments, and stories on the Macintosh. The Classic's smart for simple desktop-publishing chores, too. And because it's Apple's least-expensive computer (even the IIe costs more when you include a monitor and a disk drive), you'll be able to expand your AppleTalk network much faster and further with Classics. The downside? Your Apple II software won't work on the Classic.

MACINTOSH LC

If you want the best of both worlds, the future of the Macintosh and the past and present of the Apple II, the Macintosh LC is the right choice. Unlike the Classic, the Macintosh LC can run 8-bit Apple II software — all you need is the \$199 Apple IIe Emulation Card. That huge collection of Apple II programs won't go to waste if you invest in a Macintosh LC.

Roughly three times as expensive as the Classic (see the accompanying price-comparison chart), the LC earns its keep by bringing Macintosh color to kids' desks. For many educators, that alone seals the LC deal. But the LC has more going for it than just color. It's also about twice as fast as the Classic, includes built-in sound input (which will become an integral part of more educational programs as the months go by), and can easily be rigged with an internal hard-disk drive. That hard disk, along with the LC's fast 68020 microprocessor, makes this computer a terrific AppleTalk network file server.

To bridge the gap between the Apple II and the Macintosh you need the LC. In the blink of an eye, it can transform itself from an Apple II act-alike running AppleWorks to a powerhouse Macintosh running HyperCard 2.0. All in color.

Apple's upped the ante and complicated educators' lives by creating the Macintosh Classic and LC. No one said it would be easy.

But more choices mean more opportunities for putting the power of the computer to work in the classroom. New software expands the quality of electronic learning, and hurries the schoolhouse into the 21st century.

The choices may not be easy, but they are exciting. □

Compare the Computers

	CPU	Color Monitor	Drive
Apple IIe	\$829	\$399	\$329
Apple IIgs	\$1149	\$599	\$399
Mac Classic	\$999	n/a	n/a
Macintosh LC	\$2499	\$599	n/a

(All prices are suggested retail and reflect current basic configuration.)

Keith Gall

Gus A. Stavros Enterprise
Institute/Enterprise Village,
Largo, Florida

You know something's going on when fifth-graders ditch their Nikes and insist on dressing up for school. But all you have to do is visit Enterprise Village, an experience in economic education supported by the Largo, Florida, business community and staffed by the Pinellas County school system, to figure out why preteen boys would want to wear power ties and girls would be equally eager to dress for success.

"It's just like real life," says Keith Gall, manager of the Village. Housed in an 18,000-square-foot building and set up like a shopping mall, Enterprise Village boasts some 19 different storefronts, each sponsored by a local business, such as Century 21 Real Estate, Blockbuster Video, Barnett Banks, and McDonald's.

On a typical day more than 100 students come to the Village to hone business and computing skills developed in the classroom. Before visiting Enterprise Village the students learn, among other things, how to apply for a job and how to enter personal information into a database. Teachers act as personnel directors, assigning students to various positions in the Village.

Once "at work" in their Village businesses, the children perform the same kinds of activities real businesspeople do. Clerking at Eckerd's pharmacy entails ringing up sales, for instance, while working in the Better Business Forms print shop means using Apple IIgases (and The Print Shop or Certificate Maker software program) to produce banners and forms for other Village stores. The Village newsroom publishes an eight-page paper each day. After fledgling reporters write articles with AppleWorks 3.0 on Apple IIgases, their graphic-arts counterparts prepare paste-ups with illustrations created on a Mac II.

Young workers deposit the \$15 or so in Enterprise Village wages they earn into their accounts at the make-believe Barnett Bank. The bank is staffed by school-aged tellers and data-entry clerks who mouse around with a HyperCard-based accounting system running on a Mac SE. The children can visit Village stores during their breaks and write checks from their accounts to purchase goods such as T-shirts or videotape rental certificates donated by the sponsors.

Gall's eventual hope is to computerize all the facility's businesses, but for now he's gratified that children leaving Enterprise Village take with them a deeper understanding of economics and the role computers play in the real world.

The Cooperative Spirit

All too often, perception colors reality. For years, people had the impression that the Apple II and the Macintosh mix as well as oil and water. The II's place was in the classroom. The Mac belonged in the office, people said.

Not true. Not even close. The Apple II and the Macintosh are simply two paths through the same educational territory. More and more, these paths parallel each other. Sometimes they even meet and merge.

The Apple II and the Mac can coexist and cooperate in the classroom, peaceably, without either computer giving up its best traits. With the right software you can put a Mac Classic and an Apple IIe, a Mac LC and an Apple IIGs, side by side in the same room and have students switch machines without getting confused.

All you need is software that comes in versions for both the Mac and the II.

Such software, though similar in function and operation from Apple II to Mac, typically takes advantage of each computer's strengths. No crude translations here. Instead, Mac versions make use of that machine's higher video resolution and faster processor to effectively give you a new program. What follows is only a sampling of the act-alike Apple II and Macintosh software that's available.

Carmen Sandiego

Few programs excite kids' sense of adventure like Broderbund's Carmen

Sandiego series, entertaining educational programs that teach geography. In search of clever thieves, kids sleuth their way around the world, the U.S.A. and Europe, collecting clues at each stop in the chase. They then use an included reference work — Where in the World Is Carmen Sandiego? offers an almanac, for instance — to plot the criminals' flight and beat them to the next city. Apple II and Mac versions of Carmen play identically, though Carmen on the Mac is in black-and-white. The most recent mystery in the series, Where in Time Is Carmen Sandiego?, takes kids through time as well as across continents, and is also available for both the Apple II and the Macintosh.

Publish It!

Publish It! 3, the acknowledged leader in Apple II desktop publishing, comes in Macintosh flavors, too: Publish It! and Publish It! Easy.

A full-featured desktop-publishing program, Timeworks' Publish It! is nevertheless so easy to use that students can write, design, lay out, and print newspapers and other school publications themselves.

Publish It! 3 on the Apple II and Publish It! Easy on the Mac are the most alike. You lay out publications by creating *frames*, box-like forms that hold text or graphics. You can wind text around graphics, lay out multi-column pages, and print to either a

Continued on next page.

Cooperative Strategies

At first glance, the Apple II and the Macintosh look like dramatically different computers. However, a more careful look reveals that the two systems complement one another and offer educators a well-rounded computing environment.

dot-matrix or a laser printer. Publish It! 3 for the Apple II lets you import AppleWorks files, while Publish It! Easy accepts most Mac word-processor formats. The next version of Publish It! Easy, available this spring, should foster the Apple II-Macintosh cooperative spirit even more, since it will let

such as the LC, Alge-Blaster looks — and works — much the same on both Apple II and Mac systems.

Children's Writing and Publishing Center

The Learning Company's best-seller is perfect for schoolkids who want a

Center's easy-to-use interface lets youngsters concentrate on the message, not on how to run the software.

The Learning Company is currently working on a version for the Macintosh, scheduled for release in the first half of 1991. Called Writing and Publishing Center, the Mac model will highlight higher-resolution graphics and add new features never seen on the Apple II version, including a spelling checker.

You can equip a classroom with both Apple II and Macintosh computers, and make the transition from Mac to Apple II, from Apple II to Mac, smooth and trouble-free. With work-alike software on both machines, kids don't have to spend time learning how a program works. They can just spend time learning. □

Make the transition from Mac to Apple II, from II to Mac, smooth and trouble-free.

users open Apple II Publish It! 3 files on the Macintosh without losing formatting information.

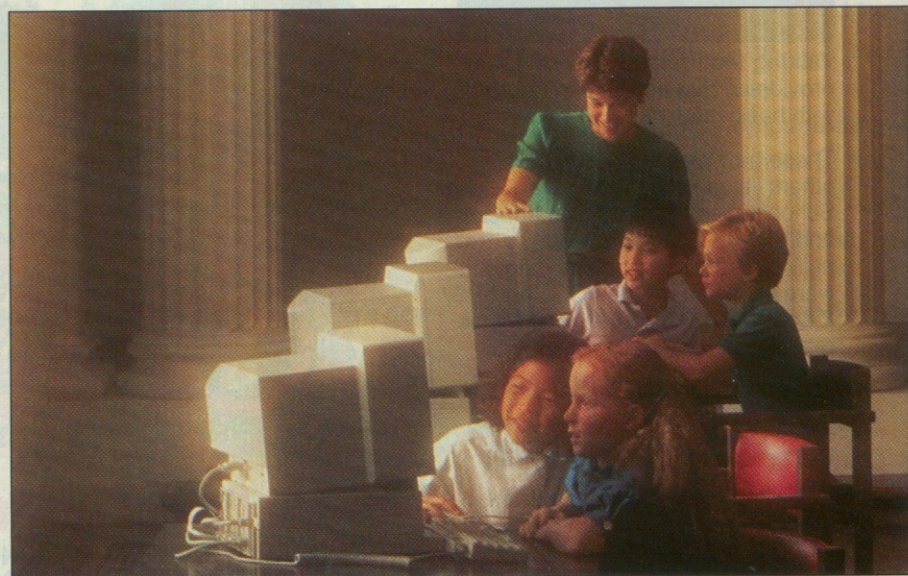
Alge-Blaster

This classic educational game from Davidson teaches the basics of algebra, and then some. Middle-school and high-school students will have no trouble switching between an Apple II and a Macintosh when Alge-Blaster is on the screen.

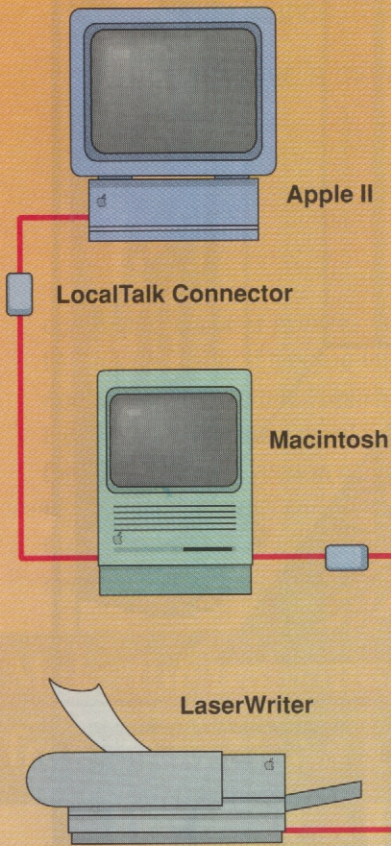
Five activities offer hundreds of equations and other exercises and problems, including translating word problems to algebraic expressions. Alge-Blaster covers everything from integers to equation solving. You can even add your own algebra problems to meet your students' needs.

With the Macintosh version now seen in vibrant color on machines

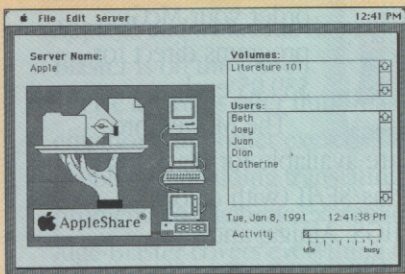
simple, easy-to-use program that helps them publish short newsletters and reports. Children's Writing and Publishing Center eases kids into desktop publishing and gives them plenty of graphics to punch up their publications. On an Apple II, Children's Writing and Publishing



Working The Net



In its simplest configuration, an AppleTalk network lets you share a laser printer. But that's just the tip of the connectivity iceberg.



With AppleShare running the network, teachers and students can share data and applications software.

Connections count — just ask anyone looking for a job. Connections make things happen far faster and more surely than if you're going it alone.

Computers need connections, too. Link Apple II and Macintosh computers and the sum greatly exceeds the parts. Classroom cooperation is guaranteed when you assemble an AppleTalk network.

If you think *network* means all work and no net, or if your only image is one of tangled wire and impossible software, don't worry. Assembling an AppleTalk network is much simpler than most other computer connections, in large part because of the network capability built into all Macs and Apple IIGs computers. Affordable cabling, understandable software, and plug-in connectors make AppleTalk the perfect network for the classroom.

Make It Simple

The simplest AppleTalk network won't let you share files or run software from a central computer, but it still makes your school life easier. If your class or computer lab has more than one computer, you can use AppleTalk to share costly peripherals

such as laser printers, CD-ROM drives, and scanners.

All you need are several LocalTalk Connector Kits, the \$75 packages that include a 6-foot length of cable and a connector. Plug one connector into the back of every Apple IIGs or Macintosh (you can link an Apple IIe computer to AppleTalk, too, though that requires an Apple II Workstation Card), then snap the cable into the connector. Each computer, called a *workstation* in network parlance, can use any of the peripherals connected to the network.

Network printing is only a bit more involved than if the printer is connected directly to the computer. To print on an AppleTalk-linked LaserWriter NT from an Apple IIGs running AppleWorks GS, for instance, you first bring up the Control Panel desk accessory (on a Mac, you'd use the Chooser), then double-click on the LaserWriter icon and select the printer from the list. Now you're connected, ready to print. Select *Print* from AppleWorks GS' *File* menu, then watch the pages slide out of the printer.

With an AppleTalk network connected, you can set up the laser printer in a central location, a lab or media center perhaps, then tie in computers from several classrooms for even more productive printer sharing. (This works best if you use the LaserWriter for final

Continued on next page.

Cooperative Strategies

Networking can range from hooking up two computers to use one laser printer to sharing files and applications among dozens of computers. Apple's AppleTalk network offers a wide range of easy-to-use and affordable connectivity options.

drafts only; for convenience and savings, each classroom should be equipped with an ImageWriter II for printing everything else.)

Serve You?

For more cooperative possibilities, you'll have to spend more money and more time. An AppleTalk network can

then install AppleShare on the server's hard-disk drive. AppleShare is the software that establishes, runs, and manages the network. AppleShare lets you set up folders, both public and private, for storing and retrieving files; it also makes it possible for users to run network-compatible software such as AppleWorks

retrieved and reviewed: computer cooperation at its best.

Low-Cost Macs, Low-Cost Network

Most of the expense in setting up an AppleTalk network is in the file server. That's another reason to applaud the introduction of the lower-priced Macintosh Classic, LC, and IIsi computers.

Though the Macintosh Classic is no speed demon, it fills the file-server requirement nicely if your network is small — say, six to ten computers. A Macintosh Classic with a hard-disk drive costs less than \$1500, much less if it's purchased on a school-district or state educational-discount plan.

The Macintosh LC makes an even better file server. Its 68020 micro-processor runs rings around the Classic's 68000, speeding up file transfers and trimming the time it takes to load programs from the server. Since you can't currently use the file server for anything else (Apple's working on a new version of AppleShare that lets you use the file server just as you do any other workstation), you can cut your network expenses by using a black-and-white monitor with the LC.

Whatever your school connections, AppleTalk can plug you, your students, and your computers into a working network. For full cooperation between the Apple II and the Macintosh, there's nothing better. □

Whatever your school connections, AppleTalk can plug you, your students, and your computers into a working network.

do more than simply share printers if you put a *file server* on the line.

Any Macintosh with a hard-disk drive will do as a file server, the computer that manages the network and stores all the software and files the network's users require. The bigger the hard-disk drive and the faster the Macintosh's microprocessor, the more software you can make available and the faster files transfer and applications load to each computer on the network.

Apple IIGs and IIE computers connect to this full-blown AppleTalk network via a built-in AppleTalk port or through an Apple II Workstation Card, respectively, and link to the file server through the same LocalTalk cabling. All you do is include the Macintosh file server on the network,

Multi-User or MacWrite II.

Once up and running, the network works wonders if you're mixing Macs and Apple IIs. A student writing with AppleWorks 3.0 on a network-connected Apple IIE, for instance, creates a prose masterpiece, then sends it to the file server over AppleTalk, posting the file in the teacher's folder. The teacher then calls up MacWrite II, which can open AppleWorks word-processor files directly. The teacher makes comments and corrections, saves the file in AppleWorks format (MacWrite does that, too), then puts it in the student's folder, where it can be

Donna Heiner

Living and Learning Resource Centre,
Lansing, Michigan

The Living and Learning Resource Centre is an organization that literally stops traffic — or so it seems when drivers listening to the Centre's public-service announcements on the car radio pull off the freeway and phone the agency to seek additional information. "We've even gotten calls from grocery stores," laughs Donna Heiner, director of the facility (601 West Maple, Lansing, MI 48906, 517-487-0883). "Shoppers hear our PSAs over the loudspeaker system and then use phones at the front of the store to call us."

What is it about the Living and Learning Resource Centre that compels people to interrupt the task at hand and drop a dime in a pay phone? Simply put, the statewide agency is committed to sharing information about microcomputer-based assistive technology for special-needs students.

It's not unusual for the Centre to field some 200 calls each month from parents, physicians, and insurance-company representatives as well as teachers and therapists. (Modem users can also reach the Centre via its America Online ID: LLRCPIAM.)

Heiner and her staff also conduct teacher tours to demonstrate how adaptive hardware devices, such as large-screen monitors, the Echo II speech synthesizer, TrackBall, TouchWindow, Muppet Learning Keys, PowerPad, and a wide assortment of keyboard-alternative switches can interact with educational software to foster independence.

The Centre also serves as a practicum site for student teachers from Michigan State University's special-education program, and assists people who drop in to copy programs from its 500-disk public-domain software library. But perhaps the most gratifying of the services offered by the Resource Centre are the consultations staff members conduct with special-needs children and their parents, teachers, and therapists.

Citing a recent example, Heiner describes a 15-year-old boy from a local school whose cerebral palsy and visual impairment prevented him from using an off-the-shelf keyboard and monitor. "We put him on an Apple IIgs with a switch and a 26-inch monitor," Heiner explains. "Then we ran a program called Interaction Games; it lets people play games together. Because he was an older student, we chose Concentration — and he beat me. It was absolutely great!"

The power of a PSA to stop traffic is impressive enough. But it's the ability of a dedicated staff to open new avenues of achievement for special-needs students that gives parents and teachers pause.

How to Get Along

Apple II and Macintosh computers can live together and work together in the classroom. Nowhere is it written that the Apple II and the Macintosh are mutually exclusive machines that must be kept apart for fear of some spontaneous chip combustion.

Together, these computers offer far more than the sum of their parts. One links to an enormous collection of software accumulated over years of use; the other launches you and your students toward the 21st century.

Getting computers to get along sometimes isn't much easier than getting different people to work together. But with these ten strategies, you can nurture the cooperative spirit of the Apple II and the Macintosh.

1. Look for Software That Shares

All software is not created equal. If you want consistency in your classroom, use programs that have versions for both the Apple II and the Macintosh. They may not work exactly alike, but their similarities will outweigh their differences, and make the transition from Apple II to Mac (and back) a snap for the kids.

2. Connect, Connect, Connect

You can guarantee cooperation by building an AppleTalk network in your class or school. Set aside one Macintosh as the AppleShare file server, then connect the other computers — Macintosh or Apple II — with LocalTalk cabling and the computers' built-in AppleTalk connector. (Remember that a IIe needs an Apple II Workstation Card.) The file server runs AppleShare, software that lets you use network versions of software like AppleWorks and MacWrite II on multiple workstations simultaneously. Even more important, though, is AppleShare's ability to transfer files and documents from one user to another.

3. Write for Your Life

As a writing tool, there's little that compares with a personal computer and a good word-processing program. AppleWorks and MacWrite II make it possible for even the youngest school kid to write, edit, and rewrite with ease. And since word-processing files are by far the simplest to transfer from Apple II to Mac, or Mac to Apple II, mixing machines in writing labs and classroom centers presents few problems.

4. Borrow the Printer

It's just good sense to share a laser printer. Since five to six ImageWriter II printers equal the price of one

Sometimes it's not easy to get along. Like rival siblings, the Apple II and the Macintosh display obvious differences; however, they also boast inherent similarities in design and philosophy that make it easy for the two to coexist — even thrive — in the same environment.

Personal LaserWriter NT, link six to eight computers to one printer and you're ahead of the game. Best of all, the results are stunning, and you can mix and match machines all you want. All Macintosh and many Apple IIgs packages print in PostScript, a page-description language used by Apple laser printers. And AppleWorks output, though not in fancy fonts, comes out of a laser printer clear and clean.

5. A Touch of Color

The Macintosh Classic may not have a color screen, but that shouldn't keep you from creating color art. As long as you have an Apple IIgs and a copy of SuperConvert, a IIgs graphics-file conversion utility marketed by Seven Hills Software, you can turn black-and-white Macintosh artwork into bright GS vistas. The secret is .GIF, a graphics file format that CompuServe made popular.

6. Telecommunicate

Set up an electronic bulletin board (BBS) to make it easy for students and teachers to send files, share information, and even keep up with homework during an extended illness. To a bulletin board, all computers are alike — it won't make any difference whether you send a text file from an Apple IIe or a GS, or read messages with an Apple IIc Plus or a Mac LC.

7. Homeward Bound

Just because there are Macs in the classroom doesn't mean you have to have one at home, too (though it helps). Keep pounding out assignments, reports, and more on your homeworking Apple II, then tote the

software shelf. Use each computer for what it does best.

9. Don't Ask Too Little

On the other hand, push the machines you've got for all they're worth. You can produce good-looking

Push the machines you've got for all they're worth. You can produce good-looking newsletters and reports on an Apple IIe with desktop-publishing software.

AppleWorks file to school, where you run it through Apple File Exchange on the Macintosh. Once the file is on the Mac, load it into a word processor, add clip-art graphics, and print it in an attractive font.

8. Don't Ask Too Much

Don't expect the Apple II to measure up to the Mac in desktop-publishing prowess. And don't kid yourself into thinking that the Mac can match the Apple II yet when it comes to depth on the educational-

newsletters and reports on an Apple IIe with desktop-publishing software. And look for Macintosh educational software that shows its colors, literally, on the LC.

10. Rest in Peace

When a computer outlives its usefulness, retire it from the classroom. If it's not being used — perhaps because a more powerful computer has replaced it or you've switched to software that demands more memory — don't just let it gather dust. Pass along your Apple II Plus computers to the kindergarten class or donate the IIgs computers to the music department when you buy Macintosh LCs. □

Hypermedia: All Together Now

Hypermedia's not just another chic '90s buzzword that the experts bandy about. It's a slick ensemble composed of Apple computers, peripheral hardware, interactive software, and — most important of all — teachers and students.

Even in its simplest configuration, hypermedia lets the modern educator choreograph text, graphics, video, and sound in ways you may not have imagined possible with a personal computer. Thanks to software such as Apple's HyperCard for the Mac and IIGs and HyperStudio (also for the GS) from Roger Wagner Publishing, you and your students can design audiovisual databases, explore living atlases, write branching mystery stories, develop historical time lines, test scientific models, or create multimedia pen-pal postcards — with no prior programming experience required.

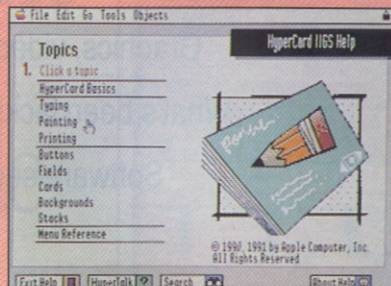
HYPERLANGUAGE

Like economics or chemistry, hypermedia has a jargon all its own, but its vocabulary's simple to grasp: It stems from your everyday teaching experience. Take a typical lesson outline, for instance. In hyperdialect, your topic and its associated subtopics become a *stack* and *cards*, respectively.

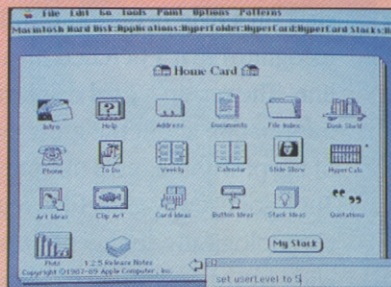
A class outline's subtopics are often richly detailed. That's why hypermedia authoring software gives you multiple ways to express those facts and figures. However, unlike the traditional index cards that contain words — and maybe a few doodles — hypermedia cards can literally sing and dance. All you have to do is push the right "buttons."

In fact, cards in a hypermedia stack often sport a variety of these "hot spots" that control actions that you, as the author, orchestrate. A student might click the mouse on a "Continue" button in order to flip to the next card in the lesson, for instance. Or he or she might click on an icon (a picture of an object) to take off on a different but related subject. When he or she is ready, the student clicks on an appropriate button on the ancillary card to return to the initial pathway.

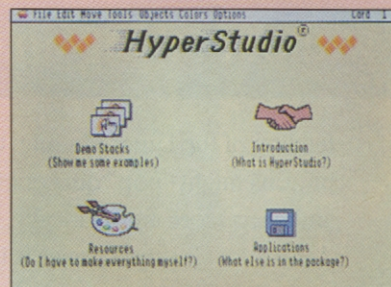
Buttons perform other actions besides just linking cards, though. In a music-theory stack, for instance, a student could click on a woodwind icon to listen to an oboe soundtrack played through the computer's speaker. Or he or she might click on a button that activates a laser disc- or CD-ROM-based software sequence featuring an instrumentalist playing Mozart's *Oboe Concerto in C Major* — with full orchestral accompaniment played



HyperCard IIGs



HyperCard for the Mac



HyperStudio for the IIGs



Tutor-Tech for the IIGs

Continued on next page.

Applications

Graphics, video, and sound have existed on the personal-computer scene for years.

What's been lacking is a conductor to orchestrate how these technologies work together.

Software such as HyperCard may be the tool educators have been waiting for.

through external stereo speakers wired to a multimedia workstation.

In a history stack, students could click on a date (a button traveling incognito) that's perched on a time line. The result: a card displaying information about the great pyramids of Egypt with pictures of some of King Tut's going-away gifts. Clicking on a chronologically younger button might elicit a card describing the care and

No question about it: Stacks, cards, and buttons are where it's at in the 21st-century classroom. But can the average, already-overworked classroom teacher really harness this power without taking an extended sabbatical? You bet.

TOOLKIT BASICS

Depending on the computer hardware you already use — or plan to

As easy as the implementation is, planning your stack is still key. If you've been teaching awhile, you've probably already done the hard part: selecting a topic, dividing the lesson into subtopics, and fleshing out the subtopics with relevant information.

Consider, in theory at least, the kinds of embellishments that might help enhance your lesson's impact. Among the possibilities: clip art or original computer paintings; computer-based animation; transitional special effects such as wipes, fades, or dissolves; stills (single frames) or sequences from a video-cassette recorder (VCR) or videodisc player; sound effects, CD-quality music, and even the human voice.

Virtually all hypermedia authoring packages come with a host of ready-to-use graphics and sound files to get you started, but no hypermedia product offers every text, graphics, or sound tool you might eventually need. For that reason, you may want to explore how word processors, paint programs, music software, and so on can round out your multimedia construction kit.

Most hypermedia authoring systems can import text that's been previously cleaned up with a word-processing program's spelling checker.

Can the average, already-overworked teacher harness the power of hypermedia without taking an extended sabbatical?

feeding of the Lunar Module. Other buttons might "pop" quiz questions and keep score automatically.

A distinct button species is used to cue animated sequences designed with computer painting tools. Pulsing arteries and contracting heart muscle help students grasp the concepts of fluid dynamics far better than a flat textbook page can. Moreover, hypermedia patients — remember those poor frogs we sacrificed in the name of biology? — need never die: Youngsters can repeat an animated sequence, or any other aspect of the lesson, as often as necessary to reinforce its implications.

acquire — at least four software programs make hypermedia authoring and exploration a snap: HyperCard, HyperCard IIGs and HyperStudio for the Apple IIGs, and Tutor-Tech and Hyper-Screen for the IIe, IIc, and IIc Plus.

Each program boasts different strengths. But no matter which hypermedia authoring system you use, one thing's a given: You don't need to learn any complex computer language to create your stacks. Thanks to Apple's graphical user interface with its pull-down menus and friendly dialog boxes, hypermedia authoring software is even more basic than BASIC. If you can click a mouse, you can begin designing custom courseware.

Continued after insert section.

A few words for those who
believe we're entering
the most difficult decade
in education's history.



Hope. Optimism. Excitement. Opportunity.

At Apple, we understand that the challenges of the 90s are formidable indeed.

But we've been around schools long enough to know that educators are second to none in dedication, imagination and resourcefulness. And that if you provide them with the right tools, they'll find a way to teach just about anything to just about anyone. Consider all they've taught us about computers:

How they can help teachers turn students from

passive observers into active participants.

How they can help change a teacher's role from that of a distant lecturer to mentor and facilitator.

How they can help students of different capabilities and backgrounds work at their own pace, according to their individual learning styles.

We've listened. We've learned. And, once again, we're putting our experience to work by introducing three new personal computers that deliver the power,



flexibility and value schools need today:

The Macintosh® Classic®. A complete system that brings the graphic, intuitive Macintosh way of working into the classroom, at our best price ever.

The Macintosh LC. Offering the spectacular sound, color and graphic capabilities teachers have asked for — at a fraction of the cost of any previous color Macintosh.

The Macintosh IIsi. A computer with enough power to meet the needs of the most demanding administrator, the performance requirements of the most sophisticated multimedia lab and the budgetary realities of the average school system.

Three new computers that reflect the single most important lesson teachers have ever taught us:

Don't focus on the problems. Focus on the potential.



The Macintosh Classic.

The Macintosh LC.



Adopting a new school of thought doesn't mean abandoning an old school.

When it comes to moving a classroom forward, it's very important that no part of it gets left behind.

So we designed the new Macintosh computers to work as well with Apple® II and other computers as they work with each other. That way, you can have all the benefits of Macintosh technology without jeop-

ardizing any of your previous investment in computers and software.

Every Macintosh personal computer comes with sophisticated networking capabilities built in. These capabilities make it easy for you to link all your personal computers together — in a classroom, through-



out a school or even across an entire school district.

You can build a Macintosh network and easily connect all your Apple II or MS-DOS computers to it. Or, if you already have a network in place, you can quickly integrate Macintosh. Either way, you'll be able to share files and send electronic mail between desks or classrooms.

If you don't have a network and don't need one right now, you can simply exchange information between Macintosh and your other computers on a standard 3½" floppy disk. Because the SuperDrive™ built into every new Macintosh will automatically

recognize what kind of computer it came from.

We've even designed an optional Apple IIe card that will let you run over 10,000 Apple II educational programs on a Macintosh LC (in addition to hundreds of Macintosh educational programs and thousands of Macintosh personal productivity and business programs).

In fact, everything about the new Macintosh computers was designed to give you the most flexibility you've ever had. So you can not only protect your previous investment.

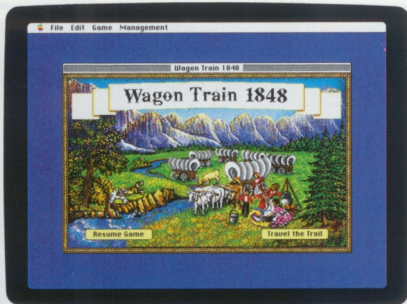
You can also make it more valuable.



Never before have teachers faced so many challenges, or had so many chances to offer them.

At Apple, we've spent years working hand in hand with the leading developers of educational software to create hundreds of new educational programs, designed specifically for Macintosh.

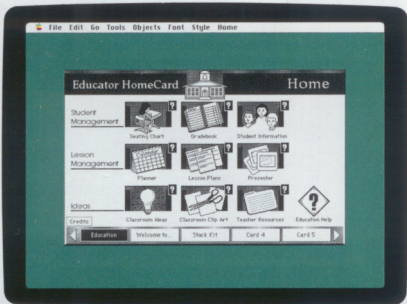
Programs that utilize the unique graphic, sound, interactive and collaborative-learning capabilities of Macintosh to help teachers motivate, stimulate and inspire in new and exciting ways.



Wagon Train 1848, from MECC encourages cooperative learning and decision making on a simulated journey across the Old West.



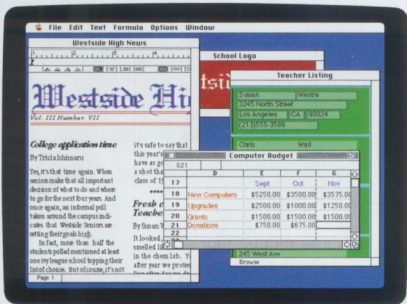
English Express from Davidson and Associates uses multimedia technology to teach English to limited-English proficient students.



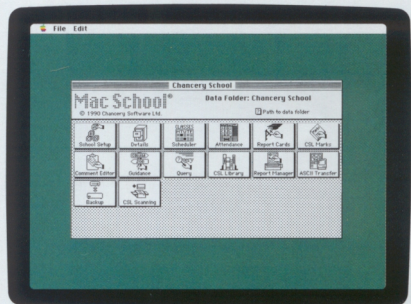
Educator HomeCard from Intellimation uses HyperCard 2.0 to help educators plan and organize their classroom agendas.



Students get hands-on business experience with Automated Accounting for the Microcomputer from South-Western Publishing.



SmartWorks from Leonard Development Group combines 8 programs in 1 and lets students use existing AppleWorks® files, too.



With Mac School, from Chancery and a Macintosh network, administrators can run an entire school right from a single desktop.

Programs that meet the highest standards of any educational software available. Many designed and tested by educators themselves.

Programs that just aren't the same on any other kind of computer.

From advanced graphic simulations that make it very easy for students to visualize the most complicated physical phenomenon.

To simple interactive tools that encourage preschoolers to explore and experience new environments.

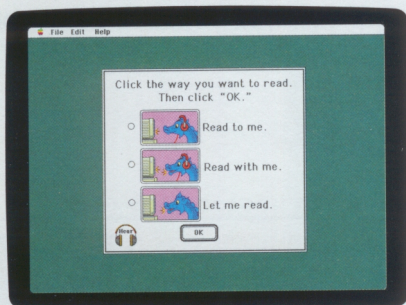
Plus, as many teachers have already discovered, they can create personalized software solutions using

innovative tools like HyperCard.[®] A unique approach to not only managing information, but also to customizing it to fit the particular needs of an individual student or classroom.

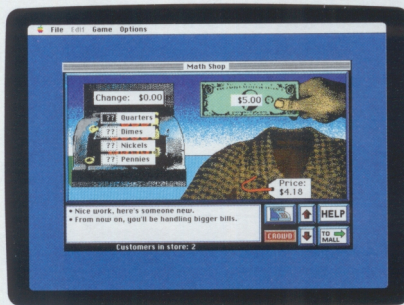
Which means there's really no end to what you can do on a Macintosh.

And best of all, although these programs cover hundreds of subjects at every level of learning, they all work in the consistent, intuitive way that makes a Macintosh, well, a Macintosh.

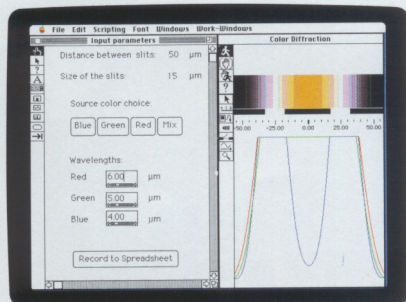
So teachers can spend less time learning about computers. And more time using them to teach.



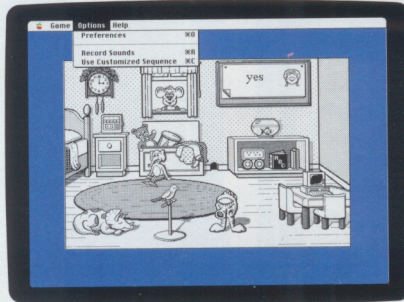
The Primary Integrated Language Arts Program from Jostens Learning helps teach reading through listening, speaking and writing.



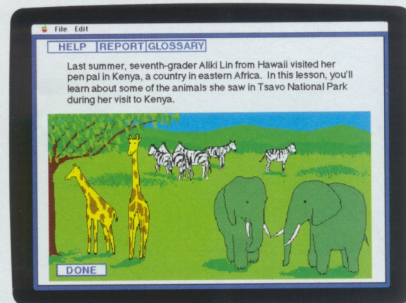
Programs like Math Shop from Scholastic Software make solving math problems easier by putting them in a real world context.



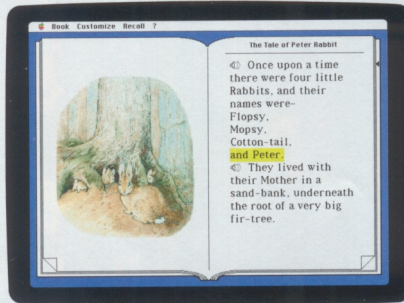
Physics Explorer from WINGS for learning is one of a series of experiment-based courseware packages for the physical science curricula.



With interactive software like Playroom from Brøderbund, very young learners explore a new and stimulating environment.



Readers' Workshop is one of the 26 instructional systems from CCC* doubling achievement rates at the K-adult levels.



The Tale of Peter Rabbit is one of the Discis Books from Discis Knowledge Research that brings reading to life.

If you want to change the future, there's no time like the present.

Technology alone isn't enough. The real challenge is to integrate computers into the learning process. Which is exactly why we've developed our comprehensive planning guide, "Teaching, Learning and Technology."

This guide draws on our long and successful partnerships with educators around the world to help you understand the benefits of incorporating technology into your school or district. And plan

the most effective means of putting it into place.

For more information, call your Apple Education Sales Consultant today (and if you don't know where to reach one, you can call 800-538-9696, extension 490, to find out).

You'll see why so many educators have discovered the words hope, optimism, excitement and opportunity to be synonymous with one other word. Apple.



The power to be your best.®



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Applications

Hypermedia continued.

If you'd like to design custom button icons and original backgrounds for your cards, you'll relish working with a full-featured paint program that makes it easy to perform touchups on digitized or scanned images, too.

If you're a musician — or would like to be — consider using dedicated music software to compose original music for your stacks or to write variations on classic themes. At least one hypermedia authoring system lets you

Video Overlay Card let you capture images from videodisc and tapes, it also lets you superimpose computer-generated graphics over the video image.

HYPER HOW-TO

Once you've collected the software and hardware you need, you're ready to launch the hypermedia authoring software. Pull down the appropriate menu or otherwise activate the function that places a blank card on the computer screen. Want to add a

incorporate even more text and graphics elements into your growing lesson stack.

Hypermedia programs offer a choice of visual transitions that can make your presentation run like a professional slide show. And creating special-purpose buttons for animation, video, or sound effects is as straightforward as adding transitions: Just check off your choices in pop-up dialog boxes. In some cases, you may need to write short "scripts" to control peripheral devices such as videodisc players. These mini-programs are composed of easy-to-remember, mnemonic, or almost-like-English commands that turn selected card buttons into automated remote-control devices.

What makes this revolutionary technology truly soar are the teachers who are already creating custom applications for classrooms and computer labs.

record "real time" sound effects, including human speech, through a microphone and sound-digitization circuit board that's easily installed inside your computer.

Because software's only half the story, take a hardware inventory before embarking on your first courseware authoring adventure.

Not surprisingly, external speakers can make a dramatic difference in a lesson's impact — remember, this is the MTV generation. The Apple II Video Overlay Card for the Apple IIe and IIgs genlocks (merges) pictures from a videodisc player or VCR with the hypermedia stack running on your computer screen. Not only does the

graphics background or a fancy border to the card? Simply choose the appropriate program options.

Draw a text field, size it with the mouse, and drag the field into place. Now enter that compelling prose. Because hypermedia programs are graphics-based, you can experiment with a nearly endless variety of typefaces, sizes, and styles on each card.

Select the program's "import clip art" feature to dress up a card with predesigned illustrations, scanned artwork, or digitized photos. Or use a program's built-in graphics tools to draw custom illustrations directly on the card. Add a linking button, peel off another blank index card from the program's invisible electronic stationery pad, and you're ready to

THE SECRET'S OUT

Hypermedia's here to stay. But what makes this revolutionary educational technology truly soar is the multitude of teachers who are already creating custom applications for classrooms and computer labs.

Your school probably already has some of the tools you need to begin developing hypermedia applications of your own. With a Macintosh or Apple II computer and the right software, the possibilities are nearly endless. Although creating educational courseware that appeals to students with diverse learning styles looks like a monumental challenge, no one has to know how easy it really is. □

Tom Plati

Shrewsbury High School,
Shrewsbury, Massachusetts

Teachers in a suburban New England town are quietly planting the seeds of a new American Revolution. This time the revolution's in education — and it's happening in Shrewsbury, Massachusetts.

"My job is to set the vision," says Tom Plati, coordinator of educational technology for the Shrewsbury public school system. Translating that vision to the classroom has meant investing in some 20 Apple IIs, 150 Macintoshes, and more than a dozen videodisc players.

As early as kindergarten, children begin to learn some life-enriching lessons: that communications skills are fundamental to success in any field, that the trick is knowing how to locate the information you need, and that the best teachers aren't human vending machines dispensing facts, but coaches encouraging you to use the tools at your disposal to reach your potential.

Plati recalls the story of a second-grade special-education student who was so hyperactive he couldn't write even a single sentence — that is, before Apple computers were introduced into his classroom. Now, thanks to "excellent teachers and the proper tools," says Plati, the youngster has finished his 11th Dazzle Draw illustrated story. The second-grader who couldn't write a sentence is now writing well-constructed paragraphs — and saying he wants to be an author.

"That's not an exception," adds Plati. Before writing reports, middle-school kids gather information from Grolier's CD-ROM encyclopedia and videodiscs such as GTV and Animal Pathfinders. "We believe very sincerely," says Plati, "that we can't teach kids the facts — we have to teach them how to think for themselves."

Their high-school experience empowers Shrewsbury's students with even more tools, including sophisticated CD-ROM-based materials such as Facts on File and the Reader's Guide to Periodical Literature. And it's not unusual to find eighth-graders and freshmen alike performing database searches on line by telecommunicating with Dialog Information Services.

"When the students look up a topic like AIDS, they also get information about Ronald Reagan's hearing aid," Plati chuckles. "They quickly learn to narrow things down."

Every curriculum area, it seems, has been touched — and transformed — by the revolution brewing in Shrewsbury. Whether they teach biology, social studies, art, or English as a second language, teachers in Shrewsbury, says Plati, can't imagine going back to "the old ways."

Macs March Along

When it comes to computers, the promise of power is as enticing to a teacher as it is to a corporate manager. Each wants top-flight software. But the best and most sophisticated software demands the best and most powerful machines, no matter whether that software teaches biology or balances the books.

The new Macintosh Classic, LC, and IIsi deliver on that promise of power. These models bring the Macintosh within the reach and budget of more schools and households. To complete the promise, you need Macintosh software for the classroom. Packages already available or under development take advantage of the Mac's ease of use, of its great graphics and intuitive interface, as well as the color and built-in sound input in the LC and IIsi.

Many of the programs developers are readying for the classroom are new. Others are adaptations of successful software on other computers, such as the Apple II or the IBM PC. All put the power of the Macintosh in the hands of the people who count: schoolkids.

Take a look at just some of the newest Mac software for the classroom.

Mad for Math

Scholastic Software's Math Shop, Math Shop Jr., and Algebra Shop help children of all ages master the intricacies of mathematics, from basic problem solving through equations to square roots and factoring. Great

Wave Software's NumberMaze Decimals & Fractions makes number learning fun with more than 70 maze levels that teach 18 decimal and fraction math skills. Color and black-and-white versions are available, as is a network version that lets teachers monitor students' progress. Davidson's Alge-Blaster makes it to the Macintosh from the classic Apple II program, and keeps its entertaining approach to first-year algebra. Scott, Foresman's Macintosh programs, available this spring, let secondary-school students do everything from measure and modify geometric shapes with GeoExplorer to conduct statistical analysis with StatExplorer. And kids will want to try out Milliken's Math Sequences, which features real-sounding human speech and teaches addition, subtraction, division, multiplication, and more on the Mac.

Coursework & Curriculum

Integrated systems of instruction are crucial to some schools' computer use. Long the domain of the Apple II, curriculum software sets are now making an appearance on the Mac. Two early entrants into this important area are CCC and Josten, both well-known providers of computerized learning systems. CCC's Instructional System offers 26 courses in the core areas of math, science, reading,

Continued on next page.

Applications

The Apple II boasts a software library with thousands of top-notch educational programs. The introduction of the new low-cost Macintosh, however, is also attracting the attention of software developers.

language arts, and computer literacy, and includes nearly 3000 hours of instruction for primary and secondary schools. Children learn at their own pace and teachers can even customize lessons for individual instruction.

Josten's Basic Learning System now features 1800 full-color lessons in math and reading on the newest Macintoshes. And Josten has two more Mac learning systems slated for May release: the Learning Management System for creating individual instruction and an integrated language-arts program for K-3 readers and writers.

Study Up

Get ready for the SATs with Davidson's new Your Personal Trainer for the SAT, a study aid for this crucial college-entrance exam. After the test, high-school seniors can run Heartbeat Software's MacLife 3.0, a guide to

colleges and universities that shows photos from some college campuses.

Publish or Perish

Schools subsist on paper. It's no wonder that publishing programs often top educational-software sales charts. Macintosh desktop-publishing packages such as Timeworks' Publish It! Easy, Scholastic Software's Springboard Publisher, and Broderbund's BannerMania are on shelves now and are cranking out newspapers, yearbooks, and banners. Planned programs for 1991 include The Learning Company's Writing & Publishing Center, a Mac adaptation of the popular Apple II program, and Pelican's Pelican Publisher, another entry-level program that's perfect for the classroom.

Get Scientific

To keep pace with advances in science, high-school classes need a

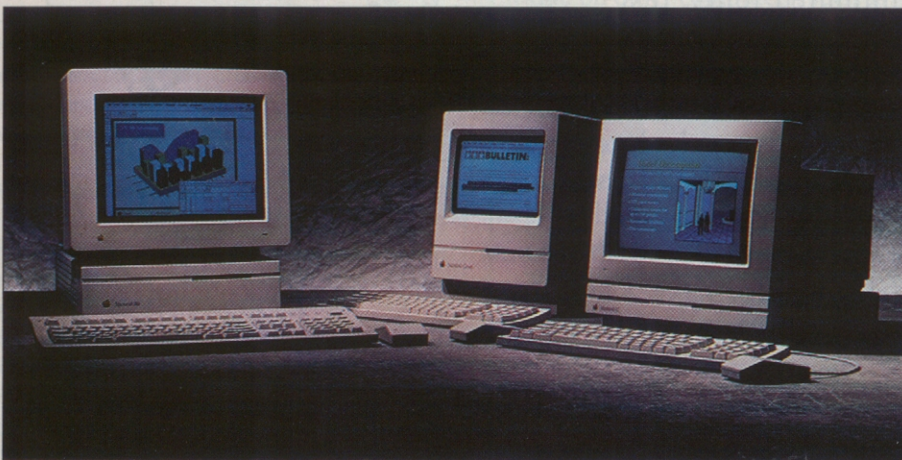
Mac as much as they need Bunsen burners. Recent science-software releases only reinforce that need. Wings for Learning's Physics Explorer simulation and four accompanying modules let students scrutinize the physics of gravity, harmonic motion, waves, and the human body. Interactive Physics, from Knowledge Revolution, now adds color to its hands-on approach to Newtonian physics experiments.

Laser Guided

Laser videodiscs and CD-ROM discs open up new vistas to both teachers and students. You can combine these cutting-edge educational technologies with the Mac today, and present fascinating lessons to your class.

ABC Interactive's newest release, AIDS, examines all aspects of the epidemic, from its impact on medicine to its effect on the afflicted. Like other ABC Interactive products, AIDS includes HyperCard stacks for the Mac.

Discis takes a different tack, putting classic tales like Cinderella and Peter Rabbit on its Discis Books. These CD-ROM discs, complete with full-color illustrations and spoken narration, even give definitions when kids click on words they don't know. Ten stories are available, with additional tales (and translations to Spanish, French, and other languages) to follow. □



The newest members of the Mac Family: the IIsi, the Classic, and the LC.

Michael Hoy

San Juan Elementary School,
San Clemente, California

"We all remember the handprint we made in clay in kindergarten," says Michael Hoy. "Today when students use computers to create a HyperCard stack or design a videotape, that's the new clay handprint, drawing new pictures in children's minds about themselves and their futures."

Hoy sees firsthand how crucial it is for students to enjoy visions of a positive future: He's principal of California's San Juan Elementary, a school where classes are populated largely by students who've emigrated from nearby Mexico or the more distant lands of Central and South America.

On the bright side, Hoy says, "We're fortunate we're dealing with only two languages, as opposed to many schools that have to deal with 20 or more." Yet Hoy's school faces the dual challenge of using technology to empower Hispanics while reassuring the Anglo community that the school can offer opportunities for learning not found elsewhere.

"On the Mac," Hoy explains, "we use the Spanish version of WordPerfect, which has Spanish pull-down menus." Students use option-key commands to generate Spanish-language characters on the computer screen. "Last year," he continues, "we used the Apple IIgs, the Video Overlay Card, and HyperStudio to create a couple of videotapes that aired over local public-access [TV] channels."

One videotape was based on the holiday classic "Twas the Night Before Christmas." Working in pairs, students first read the story and then designed illustrated panels with HyperStudio to create decorative borders and to type the story's text. The youngsters translated the story from English to Spanish and typed that version at the bottom of the screen.

To produce the videotape for TV meant the students had to film the completed panels, dub in Christmas music, and step in front of the camera at the appropriate moment to read their respective lines in English or in Spanish. The ten-minute tape aired for two weeks during Christmas vacation and reportedly thrilled kids and parents alike as they watched the credits roll by at the end of the film.

Using technology this way is just another way of "holding up the hoop of high expectations," says Michael Hoy. "We encourage the students to aim high, and we always say, 'We know you can do it!'"

Make Mine A Mac

The Apple II and the Macintosh work together remarkably well in and out of school. That cooperative spirit will grow stronger as the Mac becomes more important to educators and more common in the classroom.

But there are some things that the Macintosh — because of its powerful microprocessor, its copious memory, and its third-party developers — can do that an Apple II computer simply finds impossible. Much of what the Macintosh can do that the Apple can't depends on software unlikely to make the move to the II.

Here are two classroom applications unique to the Mac.

You Too Can Mold Worlds

SimEarth, a fascinating simulation that lets you play with planets, is a one-of-a-kind Macintosh program. Created by Maxis, the company that developed SimCity, a successful city simulation, this planet maker is so much fun that you and your class may forget it's also educational.

SimEarth includes several worlds to remake, from Mars and Venus to Earth of the present and Earth of the prehistoric past. Or you can work with a new world that SimEarth builds for you.

As planetary overseer, you have complete control over climate, life

forms, even natural disasters like volcanoes, earthquakes, and tidal waves. SimEarth encourages you to experiment with the planet's every aspect. You can literally move mountains (or entire continents), raise and lower the level of the oceans, place plant and animal life, and promote the development of civilization when higher life forms appear. Shower the world with meteors and see the results. Increase the surface or ocean temperature and then watch what happens to life on the planet. Or take an inhospitable world and transform it over centuries or eons.

Because SimEarth is so easy to use — you work with your world by pointing the mouse and clicking — schoolkids can immediately play with their planet. And since time flies by in the simulation, you quickly see the results of your tampering. Cause and effect become clear, even to youngsters. SimEarth works on both monochrome and color Macintoshes.

SimEarth gives you an almost instant understanding of the interactions that shape a planet. In a time when ecological studies are so important, a program like SimEarth may be enough reason to consider a Mac for the classroom.

Predict the Weather

Accu-Weather Forecaster, another unique Macintosh program, puts the power of Accu-Weather, the weather

Anything a Mac can do an Apple II can do Not really. Thanks to a faster processor and other powerful traits, there are some things for which the Macintosh is simply better suited. Some programs for the Mac you'll never see on an Apple II.

service used by television stations and major newspapers, in the hands of your students. With stunning graphics and TV-like images, Accu-Weather Forecaster is an interactive, entertaining way to learn more about meteorology, track storms as they develop, and try your hand at weather forecasting.

Weather-forecasting software exists for the Apple II (National Geographic's Weather Machine is an outstanding software-telecommunications package), but Accu-Weather Forecaster's TV-quality graphics, flexibility, and in-depth data make weather studies even more dramatic on the Mac.

You use a modem, the computer add-on that lets the Mac communicate with other computers over the phone, with Accu-Weather Forecaster. You or your students simply select the information you want, from recent light-

ning strikes and satellite cloud-cover photos to contour-colored maps showing the jet stream, precipitation, and temperature. You even get to choose the National Weather Service

and charts that Accu-Weather Forecaster downloads and creates are dazzling, and nearly as impressive as those you see on television. Accu-Weather Forecaster is one of the

Dozens of other Macintosh packages provide new learning opportunities.

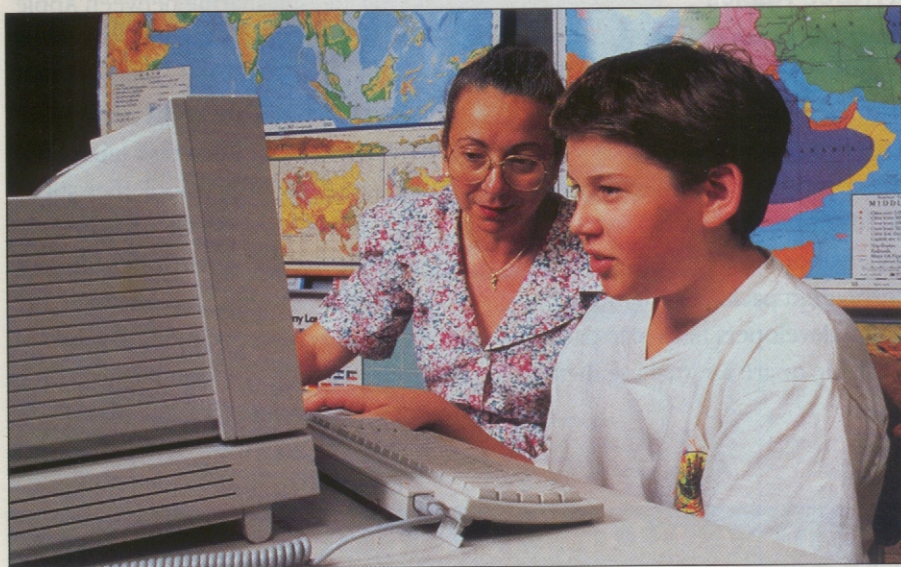
reporting stations you want data from, letting you customize forecasts to include sister schools around the state or the nation. Once set, Accu-Weather Forecaster automatically dials the Accu-Weather database, downloads the information you requested, and then quickly breaks the connection to save you time and money.

The radar maps, satellite photos,

most interesting teaching tools around, and makes a Mac computer a welcome addition to any class.

Mac Has the Momentum

There are dozens of other Macintosh packages that provide new learning opportunities not available on the Apple II. MECC's Wagon Train 1848 uses an AppleTalk network to stress teamwork as kids plan, outfit, and lead an Oregon-bound wagon train. The Macintosh version of Broderbund's Playroom, a collection of word and number activities, lets preschoolers add sound with the Mac LC's and IIsi's sound-in capabilities. And ABC News Interactive's AIDS laser disc and HyperCard combination informs and educates young people with the help of a Macintosh. □



Sandra Cooper

Community School District 27,
Queens, New York

Take children from disparate backgrounds and mix with generous numbers of Apple computers. Fold in a team of dedicated teachers and you'll have a recipe for multicultural awareness much like the one Sandra Cooper formulated for Community School District 27 in New York.

Several years ago, Cooper, the district's director of technology, devised a plan to bridge the literal and figurative gap existing between two schools in the New York City borough of Queens. Some 15 miles apart, the two schools are separated geographically by Jamaica Bay and a toll bridge. "Normally," says Cooper, "these children would not have the opportunity to know one another."

Worse, the children at the two schools would seem to have little in common. One school serves poor minority students who for the most part live in low-income housing, while the other school's a "League of Nations," according to Cooper, who rattles off names like Ecuador, Taiwan, Pakistan, and Romania the way other teachers might name streets in a neighborhood.

Using networked Macintosh computers in their respective classrooms, kids at the two schools track individual interests with a FileMaker II database. They write family histories with the MacWrite word processor. Then they share their creations via modem and MicroPhone II telecommunications software.

Early in the year, students download the personal data file sent by their counterparts at the sister school and learn how to use the database program's find function to look for things they have in common, such as favorite school subjects and best-liked animals. As time progresses, students begin to write pen-pal letters and share information about themselves and the holidays, traditions, and songs of their cultures. Just last year the two schools' seemingly distinct "community of learners" collaborated to write and publish a recipe book.

"Did you know there are at least 20 different ways to cook rice from 20 different countries?" Cooper teases. She quickly turns serious, adding, "Our district is so culturally diverse we needed ways to get people together. If children come together, parents will, too."

With all due respect to rice, it wouldn't be inaccurate to say that the main ingredient in Cooper's recipe for success is her conviction that "all kinds of kids can succeed with computers."

Bring It On Home

A personal computer in the family room helps kids handle homework, write reports, and study up on troublesome subjects. As a learning tool, an Apple II or Macintosh computer in the home can be even more important than the machines at school. After all, there's no waiting line at the computer in the den.

The links between the Apple II and the Macintosh extend into the home, too. Just because your child's school uses Macintoshes doesn't mean you can't buy an Apple II for the home, nor does it mean that you can't do some serious studying on the household's Mac while your children pound on Apple IIs in class. With the right software, your kids can ignore the machine and concentrate on getting the homework and home learning done.

XTNDed Apples

Although you don't need to stock your home-software learning library with the same programs your child uses in school (sometimes it's simply not appropriate, as when the software is closely tied to other classroom materials or is just one part of an entire curriculum package), many educational developers have Mac packages available or are rushing them to

market. If your child loves *Where in the World Is Carmen Sandiego?* on the Apple IIe at school, for example, you can support that interest even if you have a Mac in the family room — Carmen comes in Mac flavors, too.

But if your hardworking student uses the home computer to write reports and complete assignments, it's easy to make the Apple II-Mac home-school connection work. Claris, Apple's software arm and publishers of such programs as AppleWorks 3.0, AppleWorks GS, MacWrite II, and MacDraw II, created and supports XTND, a software technology that, when included in Macintosh programs, lets you open and save files from other applications without losing any formatting information.

Schools with AppleTalk networks that use MacWrite II can best handle XTND and file sharing between Apple II and Macintosh programs. Kids can write their reports and compositions at home with AppleWorks or AppleWorks GS, then stuff a disk into their book bag. Once at school, they stick the 3.5-inch disk in a GS drive and send the file to the network's file server. Finally, they run MacWrite II from the server, open the file, and complete their work on the Mac, picking up just where they left off at home. No time wasted, no work lost.

Even if there's no network, home-based Apple IIs let kids get a head start. Rather than put files on a

Continued on next page.

Applications

Learning doesn't begin and end when the school bell rings.

An Apple II or Macintosh computer at home can help kids, as well as teachers, expand the boundaries of education.

network, kids can run their AppleWorks or AppleWorks GS word-processing files through Apple File Exchange (AFE) on the Macintosh to turn them into Mac-usable documents. All formatting, from boldface text to headers and footers, is kept, and can be opened with MacWrite II.

Research assignments may mean a trip to the library for some, but if you have a computer and modem and subscribe to an online service, your children can do much of that research from home. Online services like CompuServe and America Online feature Grolier's Academic American

users. This online service's special telecommunications software takes advantage of the Macintosh's point-and-click ways, and is almost as easy to use on the Apple II. Even elementary-school students can conduct research and send messages to other Apple II and Macintosh users.

Don't limit your thinking to a traditional school day. Education is ongoing.

And if you have a Mac at home, the integrated package Microsoft Works is a smart software pick for schoolkids. They can bring home 3.5-inch Apple II ProDOS disks containing AppleWorks word-processing, spreadsheet, and database files, then use a nifty translator called Works-Works to transform them into Microsoft Works-compatible files with AFE.

Online for All, All Online

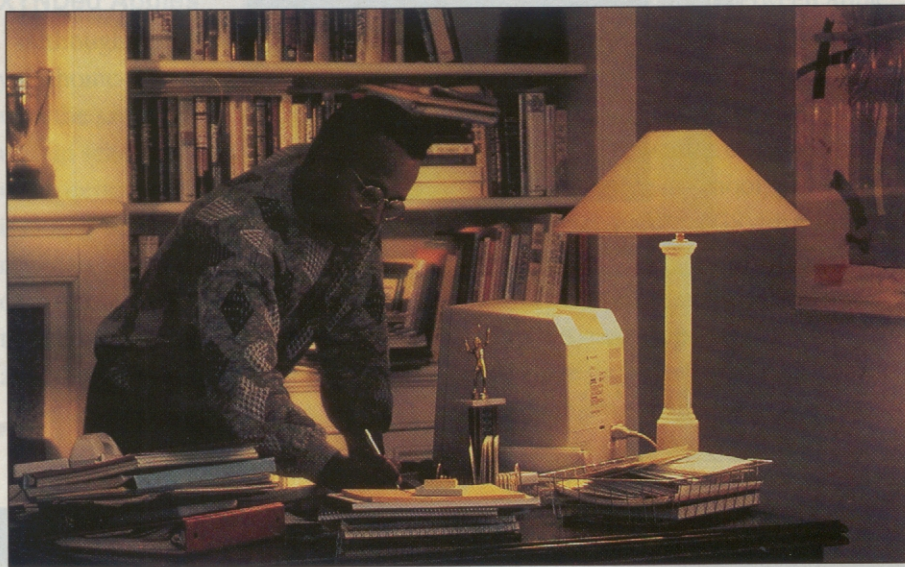
Online services like CompuServe, GENie, America Online, and Delphi provide a smorgasbord of information for children hitting the books at home with a computer. Best of all, online services really don't care if you're connecting with an Apple IIe or a Macintosh LC.

Encyclopedia. Kids looking for information on the British Empire, for example, can simply type in that phrase and see all the articles associated with the topic.

America Online is unique in that it's dedicated to Apple II and Macintosh

Telecommunications doesn't happen just at home, though. Schools are exploring interesting on-line ideas of their own, such as 24-hour bulletin boards where teachers and students post messages and kids turn in homework from a sickbed.

Don't limit your thinking to a traditional school day. Education is ongoing, and Apple IIs and Macs make the grade at school and at home. □



Mike Smith

Meigs Magnet School,
Nashville, Tennessee

If any public school in the United States is wired for success, it's Meigs Magnet School in Nashville, Tennessee. For nearly the past decade, computer coordinator Mike Smith has helped transform this three-story Civil War-era former gunpowder factory into one of the nation's premier middle schools. Thanks in part to a quarter-million-dollar federal-government grant, a half-mile of 22-gauge twisted-pair wire now wends its way through those old brick walls and energizes the school's networked computer system.

Perhaps to no one's surprise, Meigs' hardware inventory reads like a computer teacher's wish list, with 65 Macintoshes, 50 IIses, 27 Iles, 11 Iics, half a dozen Apple IIIs, and a variety of peripheral devices, including scanners, laser printers, and videodisc players.

The school's software catalog is equally impressive. Among the products used on a daily basis are AppleWorks 3.0, HyperCard, ClassWorks, Operation Frog, Oregon Trail, Science Toolkit, Number Munchers, GTV, and MacWrite — not to mention a whole arsenal of administrative programs from Chancery Software Ltd.

Of course, Meigs' student body isn't exactly unremarkable either: Of 11 Merit Scholars graduated from the local high school last year, nine were Meigs Magnet School graduates.

No doubt about it: Mike Smith loves what technology does when it's placed in the right hands, and he's adamant about giving credit for the school's success to the teachers with whom he works. "Computers are literally integrated into every area of the curriculum at Meigs and 100 percent of our faculty use them," he says matter-of-factly. "Moreover," Smith adds, "every teacher teaches 30 minutes longer [each day] at no extra pay to accommodate the students."

This level of commitment to "21st-century education" helps explain Meigs' popularity with area parents and their gifted children. According to Smith, the school can serve only 575 of the most academically advanced students from the 120 schools in Davidson County. Nearly 2000 youngsters are on Meigs Magnet School's waiting list.

It's little wonder that high achievers like these would be attracted to a school where — despite differing educational objectives — the wrestling coach and the principal, the Latin teacher and the band conductor, the art instructor and the chemistry teacher, have something very special in common: Apple computers.

Tomorrow's Classroom Today

Technology in the classroom once meant filmstrip projectors and scratchy records reciting foreign-language lessons. Now it means powerful computers like the Apple IIGs and the Macintosh LC, and state-of-the-art software like HyperCard 2.0 and HyperCard IIGs.

Today's schools live on technology's high ground. When combined with other electronic teaching tools — laser discs, CD-ROM, and telecommunications, to name just three — computers open new worlds of learning to anyone who can point a mouse cursor and click a button. The result? Exciting new opportunities that inspire kids in the classroom and give them the power to blaze their own paths through the jungle of learning.

Apple II and Macintosh computers share the spotlight when it comes to bringing cutting-edge technologies to the classroom. Both have valuable software and hardware additions that give teachers, students, and parents a peek into the classroom of tomorrow.

Gee, TV

GTV has more than just a passing acquaintance with its sound-alike, MTV. Both show up on the small screen, both hit kids where they live, and both put sounds and sights together for action-packed messages. The difference? GTV: A Geographic Perspective on American History appears only in the classroom.

A collaboration of The National

Geographic Society, the state of California, Lucasfilm Ltd., and Apple Computer, GTV is a videodisc-based program that teachers can easily integrate into their lesson plans as is. When paired with an Apple IIGs or a Macintosh, though, GTV becomes a student-driven research tool and authoring system.

Two videodiscs contain two hours of full-motion video, 1600 still pictures, and 200 maps. Divided into 40 chapters, the on-disk images can be used immediately to launch American history and geography lessons and discussions. Or the IIGs or Mac can be connected to a laser-disc player, giving kids and teachers editing control over the material. In minutes, kids can combine photographs, video, and sound to produce original multimedia shows on almost any aspect of our country's history.

GTV on the Macintosh uses HyperCard for easy entry into the video bounty of GTV discs. Navigating from one section of GTV to another is as simple as clicking a button on the Mac's screen. The IIGs version, though not based on HyperCard IIGs, is just as easy to use.

Student-produced lessons can be striking. At Forestville High School in Forestville, Maryland, history teacher William Hay showed a class of at-risk,

Continued on next page.

Applications

CD-ROM drives, videodisc players, full-motion video, and telecommunications have replaced overhead and filmstrip projectors. While educators aren't ready to trade in their textbooks, they're buying into the benefits of advanced technology.

nonacademic-track students how to use GTV and asked them to prepare accounts of life during the Industrial Revolution. These short shows, narrated by the students themselves,

teams from across the country and from nearly 20 foreign countries. Data is collected by these teams, then shared with the help of the Apple IIGs, a modem, a phone line, and the Kids

because of informative learning tools like those from Voyager. (Its new Igor Stavinsky: The Rite of Spring, for example, provides HyperCard stacks that analyze and comment on this classic ballet, as well as on the composer's life.)

CD-ROM discs, which are physically identical to the audio CD discs you listen to at home, can hold more than 500 megabytes of information in the form of text, images, and sound. CD-ROM is a natural medium for exhaustive reference works like encyclopedias and dictionaries, though new applications, such as Bright Star's Kaika, a Japanese-language tutor that calls on spoken samples of the language to help students master the tongue, are emerging.

Textbooks may never disappear from the classroom, but with CD-ROM and computers like the Macintosh and the IIGs, they won't be the only easy source of information.

Apple II and Macintosh machines are going to help make the transition from filmstrip projectors to full-motion video happen. They let kids control not only some of what they learn, but how they learn it as well. □

Textbooks may never disappear from the classroom, but they won't be the only easy source of information.

are poignant and revealing, yet brutally honest about conditions the underclass endures.

Apples Link Up

Kids Network provides another sneak peek into the classroom of the 21st century. The basics are basic enough: Several modules that give kids in grades 4-6 hands-on practice in the scientific method. With titles like Acid Rain, Weather in Action, What's in Our Water, and Too Much Trash?, the Kids Network modules ask young scientists to take measurements and make observations. There the similarity with traditional science experiments ends.

Kids Network, a program developed by the National Geographic Society for the Apple IIGs (funded in part by a grant by the National Science Foundation), depends on a telecommunications network to link student research

Network online connections. And as kids share their scientific findings with other classes on the network, they also share information about their culture and customs.

Students also learn that Earth is a very small place. With Acid Rain, for instance, they compare rainwater acidity from sites worldwide, then transmit their data to a working scientist at the National Oceanic and Atmospheric Administration, who analyzes the information and helps the students come to conclusions about its causes and effects. The classroom of tomorrow is one without walls, where information isn't found just in textbooks or even just in school.

Megabytes on Demand

Yet another portent of the future of educational technology is the continued growth of CD-ROM on the Macintosh and the Apple IIGs. Here the Macintosh clearly has an edge,

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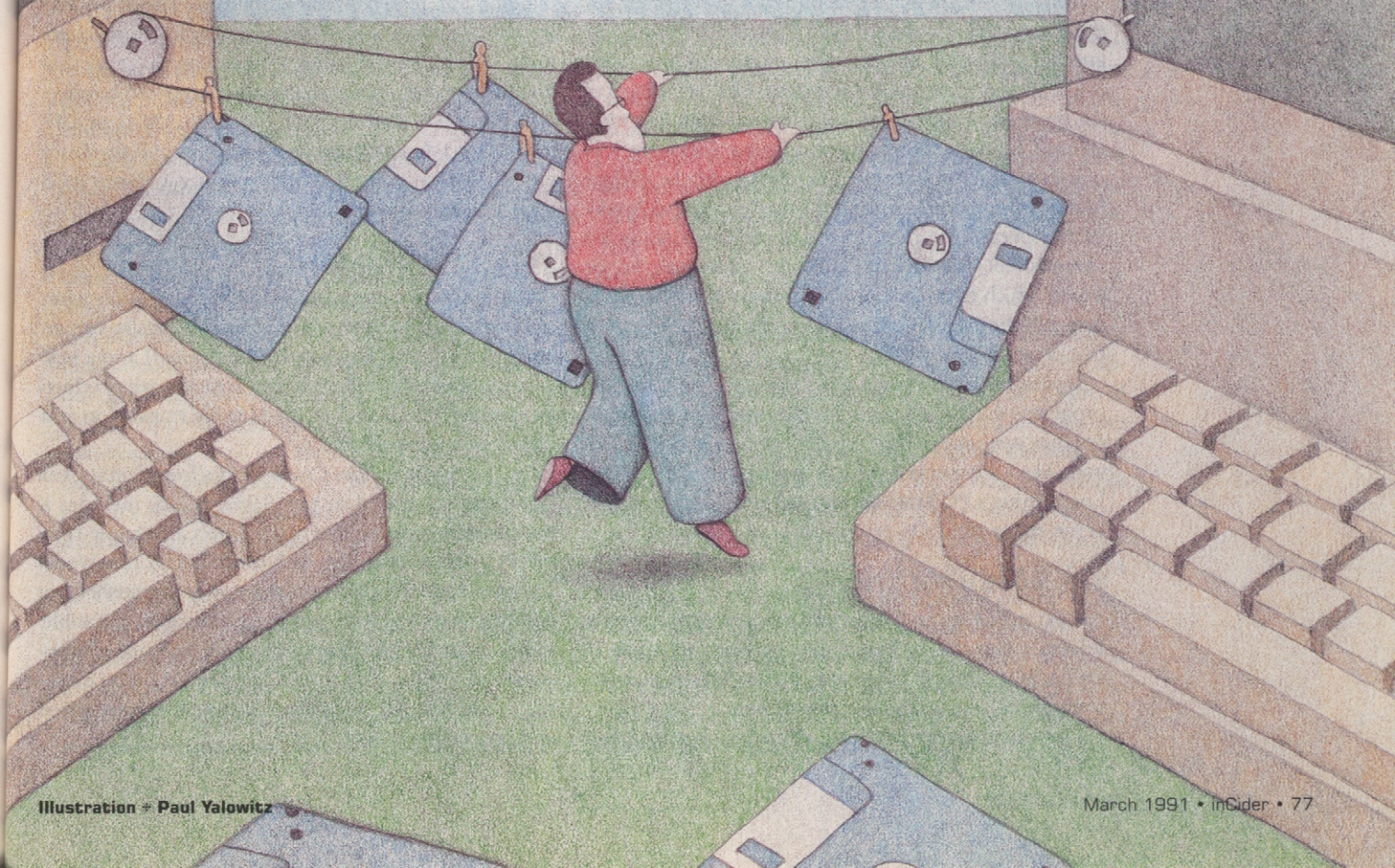
Yes, you *can* take it with you — your collection of documents, spreadsheets, and data, that is.

Switching between your II and your Mac gives you the best of both Apple worlds.

With the introduction of the Macintosh Classic and the LC, more and more Apple II users are thinking about adding Macs to their classrooms or dens. While you may not be able to run all your II applications on your Mac and you can't run any of your Mac applications on your II, the good news is that you can take a lot of your data with you. Until recently, exchanging data between Macintosh and Apple II computers has been a relatively neglected subject, except by a circle of programmers, hobbyists, and network administrators. It's clear that Apple IIs and Macs will coexist for many years to come and that if you have access to both systems, you'll be facing the challenge of Apple II/Mac file transfer and conversion.

Exchanging data between the two systems is surprisingly simple and is getting easier all the time, but it often seems to be a well-kept secret as far as Apple is concerned. Apple's official solution for using Macs and Apple IIs in the same

By Mike Markowitz



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environment is a rather expensive network, which makes the IIe or GS into a terminal attached to a Macintosh file server. This arrangement doesn't let you run Apple II software on the Mac or vice versa; the Mac file server's hard drive just stores the Apple II programs and files. But it does let Mac users access Apple II data and vice versa. (See "Connecting in the '90s," December 1990, p. 66, for more information.)

An AppleTalk network running AppleShare is a great solution for some people, but there are much simpler solutions with less-expensive requirements. In some cases you'll need a modem; in others, you'll need only a 3.5-inch floppy-disk drive. Let's take a look at some of the options for exchanging various kinds of files between Apple's two computer families.

ACCESSING YOUR DATA

What do the terms *file transfer* and *file conversion* mean? There are at least three different levels of connectivity between computers that use different operating systems.

Media access means that a computer's disk or tape hardware can read and write the physical data formats another computer uses. For example, the 3.5-inch floppy-disk drive in a Mac can read and write ProDOS and MS-DOS formats, but the standard 5.25-inch Apple II floppy-disk drive is physically incapable of reading or writing any of the MS-DOS formats used by IBM PCs and compatibles.

Data access means that a program running on one computer can read or write data in a format that's usable on another computer. For example, most word processors can read and write ASCII (plain text) files, regardless of the program or the type of computer on which they were created. In many cases, data transfer involves some loss of information. For example, Microsoft Excel, the leading Macintosh spreadsheet program, can't import an AppleWorks spreadsheet directly. But AppleWorks can save a spreadsheet in a format called *DIF* (*data-interchange format*), which Excel can use. The problem is that DIF files save only the values in spreadsheet cells, not the formulas that created those values.

Application access means that one computer can run programs that were written for the operating system of another computer. That usually requires special hardware, like a coprocessor card, or special software. Applied Engineering's **PC Transporter** card, which lets an Apple II run many MS-DOS programs, is an example.

THE MODEM SOLUTION

With modems and the right telecommunications software, you can exchange data between an Apple II and a Mac almost anywhere in the world, if both computers have access to a phone line.

The most direct method requires coordination

between sender and receiver. The receiving party sets his or her communication software to accept an incoming file. The sender makes sure the text file is saved on a disk the computer can access, and that both parties are using the same baud rate and the same file-transfer protocol, such as *XModem* or *Kermit*. *Protocols* are the rules that specify such things as the size of a chunk of data, or packet, how the beginning and end of a packet are indicated, and how the software will confirm that the data was received intact. The sender dials the receiver, and, when the connection is established, issues the appropriate "send file" command. The details vary according to your particular communications software. (See "Link Up With Telecommunications Software," May 1990, p. 50, for more information on individual programs.)

If both computers are in the same room, you can use a null-modem cable for a direct link between two communication programs, cutting the phone company out of the loop. For a GS connected to a Macintosh, the ImageWriter II cable will work.

One indirect method of modem communication (also called an *E-mail dead drop*) requires that both parties belong to the same on-line service, such as CompuServe, GENie, MCI Mail, or America Online. You simply log on to your service and send your file as "electronic mail" to the user name of the intended recipient. The next time the recipient logs on, he or she will receive notice that incoming mail is waiting. The recipient can then download the file to disk and work with it "off line" (after hanging up). It's a convenient solution. The drawbacks are that the person with whom you want to communicate must belong to the same service you do, and that membership fees and connect-time charges can be steep.

In any case, putting your files into ASCII or DIF format for telecommunication strips out all the fancy fonts and formatting that make owning a Mac or a GS such a typographic delight.

TWO-STAGE TRANSFER

Oddly enough, using an IBM PC or compatible as an intermediary can be an effective way to transfer certain kinds of formatted files between an Apple II and a Mac — a number of excellent hardware/software products for Apple II-to-PC and PC-to-Mac file translation and conversion are available.

On the Apple II side, **Cross-Works** from SoftSpoken Company (reviewed in July 1989, p. 36) includes a multibranching cable that can connect any Apple II to any PC, plus software for both computers. Cross-Works converts AppleWorks word-processor, spreadsheet, or database files to a wide variety of formats compatible with standard MS-DOS applications. The actual conversion is always done on the PC, regardless of the direction of the transfer, to take advantage of greater speed and processing power.

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On the PC-to-Macintosh side, **LapLink Mac III** from Traveling Software is a similar combination product, with cables that allow high-speed data transfer, and format translators for most popular word processors.

Because many Macintosh applications can open and work directly with files created by their MS-DOS counterparts, converting an Apple II file to PC-compatible form may be all you need to do.

SOFTWARE SOLUTIONS

Hidden away in the Macintosh System Utilities (shipped with every Mac) is a remarkable application called **Apple File Exchange (AFE)**. Insert a ProDOS disk into the Mac drive, and AFE reads the directory and displays a scrollable list of files. Normally, only plain ASCII (text) and binary files are convertible. Select the files you want, click on the *Translate* button, and AFE writes the files as Mac text in a matter of a few seconds. AFE can translate in the other direction as well, converting Mac text files and writing them in ProDOS format.

If you're working with AppleWorks Classic files created with a version predating 3.0, the ASCII file you print to disk will contain extra carriage returns that mess up the appearance of your page. The Beagle Bros utility *AWP to TXT* included in **TimeOut PowerPack** takes care of that problem.

MacWrite II, published by Claris, includes an *XTND* (extended-command) file translator for word-processor files created in both AppleWorks Classic and AppleWorks GS. That means you can use Apple File Exchange to move a formatted AppleWorks document to the Mac (no ASCII step in between) and open it directly in MacWrite II, with all your tabs, underlines, and other settings preserved.

Claris has made its *XTND* technology available to other publishers, as well. For example, the Leonard Development Group's **SmartWorks** (reviewed in January 1991, p. 66) also reads AppleWorks files; the latest version of Timeworks' **Publish It! Easy** for the Mac, scheduled for a March release, reportedly will, as well. **Microsoft Works** (version 2.0 and later), one of the most popular integrated software packages for the Mac, can convert AppleWorks files to its own formats. If you have an AppleWorks spreadsheet, Microsoft Works can translate it and use it just as easily as a document created on the word processor. (See "Swap 'til You Drop," this month's Bridging the Gap column, p. 100, for more information on file-exchange solutions.)

IF YOU'RE MACLESS

Apple File Exchange is a great solution if you have a Macintosh handy, but what if you have an Apple II and a bunch of Mac-formatted disks with data you need to read? The GS/OS operating system is designed to accommodate *file system translators (FSTs)*, utilities that

can access "alien" file formats directly. The only one Apple has implemented, however, handles the High Sierra format used on CD-ROMs. The long-delayed translator for the Mac's hierarchical file system (HFS) is reportedly still under development.

While we're waiting for the official Apple solution, a useful little public-domain program fills the gap. It's called **A2FX**, by Chan Wilson. Only 23K in size, the program is written in assembly language. We saw a preliminary edition, but an enhanced version should be available early this year. A2FX is a simple menu-driven ProDOS 8 utility that can read data from Macintosh disks and transfer it to a ProDOS disk. It offers several options for dealing with the Mac's complex file structure, which divides a file into "data" and "resource" forks. For simple data transfers, the program works smoothly.

GS/OS introduced the Mac's bifurcated file structure (data and resource forks) to the Apple IIgs. **Resource Spy**, a program by Stephen Chick, converts certain Macintosh resources (icons and fonts) to useful Apple II formats. You'll need some degree of technical know-how to take advantage of this capability, though.

An unusual example of Mac-to-II transfer capability is provided by two file-compression utilities, **NuPak.IIGS** by Joshua Thompson, and **ShrinkIt** for the GS by Andy Nicholas. These programs can extract .SIT-type files created by StuffIt, a standard Macintosh utility widely used to compress files uploaded to on-line services and bulletin boards. Basically, a file-compression algorithm looks for repeating patterns in the file's code. For instance, *BBBB* would become *4B*, which, while incomprehensible to anything but the original compression utility, cuts the required storage space and data-transmission time in half. Compression and decompression of bulletin-board files save time and money for both the person uploading and the person downloading the file. Use Apple File Exchange first to put .SIT files on a ProDOS disk before extracting them.

GET THE PICTURE?

Macintosh graphics images come in a bewildering variety of formats (PICT, MacPaint, TIFF, and encapsulated PostScript, to name a few), as do Apple II graphics (single hi-res, double hi-res, two kinds of super hi-res, Print Shop, and so on). **Graphic Exchange**, a utility program available from Roger Wagner Publishing, converts many Apple II graphics formats to MacPaint documents. (Color-palette information is lost, as MacPaint is limited to monochrome bit maps.) A remarkable GS program called **SuperConvert** translates MacPaint, Atari ST, Commodore 64, and other graphics formats to various Apple II (8-bit) and IIGS formats. **Platinum Paint**, a new GS program from Beagle Bros (Editors' Choice, January 1991, p. 112), can import graphics in MacPaint format directly. ⇨

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For object-oriented graphics (MacDraw or TopDraw) no II/Mac file-transfer solutions are yet available. On the Macintosh you can paste an object-oriented graphic (PICT format) into a document in MacPaint format, then convert it to an Apple II format, but that would leave you with just a bit map — no ability to select and edit individual objects.

For scanned or digitized graphics, the GIF (*graphic-interchange format*) standard lets Macs, PCs, and other systems exchange compacted picture files with color palettes, resolution, and proportions preserved relatively intact. To display GIF images on the Apple IIGs you need the program SuperConvert; a similar program for the IIe/IIc is **IIGIF**. If the GIF file was created on a Macintosh, there's an additional step that requires a program called **GIFStripper**, owing to the nonstandard way the Macintosh adds file-header information to the basic binary GIF data. These shareware programs are available from many Apple II user groups and leading on-line services.

SHARING HARDWARE

Another aspect of Mac/Apple II connectivity you shouldn't overlook is the growing commonality of peripheral devices. Most 800K external floppy-disk drives for the Mac and the Apple II are compatible (except for the UniDisk).

The high-density (1.44-megabyte) floppy disk Apple introduced with the Mac IIX can read and write MS-DOS disk formats as well as ProDOS. For other Mac models, a company called the **Engineering Department**, founded by four of the original Apple II engineers, has produced a little module that plugs into the external floppy-disk-drive port of the Mac and tells the internal 3.5-inch drive how to read, write, and format 720K MS-DOS disks. At press time, an Apple II ProDOS-compatible version of this module was under development. Applied Engineering has also promised an eventual 1.44-megabyte upgrade for its new low-cost **800K 3.5-inch external floppy drive** for the Apple II.

The original Macintosh mouse also works on the Apple IIc. (On the IIe it needs an adapter card.) In addition, most devices that work with the Apple Desktop Bus (ADB) on the Mac SE and the Mac II — mice, keyboards, joysticks, and so on — will also work on the GS. Apple's ImageWriter II printer and the mighty LaserWriter work on either system with the same cable. The GS and the Apple IIc Plus also use Mac-style ("mini-8 DIN") serial-port connectors. What that means is that Apple II owners who decide to trade up to a Macintosh can often retain a large part of their hardware investment, or simply share peripherals.

With a SCSI adapter card, an Apple II can use Macintosh external hard drives. A few vendors even provide formatting software that can create ProDOS and Mac-

intosh "partitions" on a single hard drive, allowing two computers to share one drive — although not at the same time. (For more information on hardware solutions, see "Do You Need a Hard-Disk Drive?" March 1989, p. 47; "Which One to Buy?" April 1989, p. 47; "Do You Know Where Your Data Are?" May 1989, p. 54; "Bit by Bit," January 1990, p. 65; "The ADB Connection," February 1990, p. 51; "New SCSI Card," What's New, June 1990, p. 14; "A Hard Drive Is Good to Find," July 1990, p. 42; "Faster Than a Speeding . . .," Editors' Choice, November 1990, p. 96; "Shopping for a System," January 1991, p. 61; "The SCSI Side of Life," February 1991, p. 47; and "Off the Beaten Track," this issue, p. 88.)

TWO FOR ONE

Software-based emulation, such as the highly successful **SoftPC** from Insignia Solutions, which lets a Mac run many MS-DOS programs, requires a lot of memory and processing power. One Macintosh program, **II in a Mac** from Computer Applications, claims to emulate an Apple IIe on the Macintosh, running Apple II programs as well as converting files to Mac formats. (See "II Links to Mac," February 1986, p. 8, and "II on a Mac," News Line, February 1986, p. 15.)

Apple's long-awaited HyperCard IIGs can, with the aid of HyperMover stacks, translate the command structure and convert and open HyperCard stacks developed on the Macintosh. That's probably as close as we'll ever get to "running Mac software" on an Apple II. Still, it's an impressive accomplishment. (See "HyperCard IIGs: The Apple II Culture Reborn," February 1991, p. 37, for more information.)

Systems in which two different microprocessors coexist under the same roof have until now rarely been successful; the most notable exceptions were the variety of Z-80 cards that let the Apple II run CP/M software. In the II/Mac world, Cirtech's proposed **Duet** card for the GS is a Mac coprocessor (see "Tech Notes," What's New, November 1990, p. 17), although at press time development of the card had been postponed indefinitely, owing to lack of marketing support for the GS, according to the company.

The new Mac LC's optional **II Emulation Card** runs 8-bit programs. It's a 65C02 microprocessor, with 128K of RAM and an integrated circuit for translating between the card and the Mac. The LC handles all input and output, except for a joystick/5.25-inch drive port, so theoretically you should be able to use all the printer, modem, ADB, video, and audio ports on the Mac. (See "Meet the Mac LC: What the Apple IIGs Should Have Been?" in the December 1990 issue, p. 40.)

IN THE HOPPER

The Apple Programmers and Developers Association (APDA) offers a **Cross Development System** that lets

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programmers use the Macintosh to create programs in assembly language, C, or Pascal to run on the Apple IIGs. It's a complex family of software products that run in the environment of the Mac Programmer's Workshop.

Developers would like to be able to pay the high cost of programming new applications just once, and then translate the code automatically into machine-specific versions. Functional differences between the microprocessors of Apple II family (6502, 65C02, and 65816) and those of the Macintosh family (68000, 68020, and 68030), as well as their very different operating-system conventions, make this a remote dream, however.

Consider the machines' Toolboxes, for example — sets of routines embedded in each computer's ROM that handle text editing, graphics, windows, and disk input/output. The GS Toolbox is similar in many ways to the Mac's, but it isn't identical, so code written for one system has to be edited extensively, modified, and debugged to ensure that it has all the proper Toolbox calls for the other system.

The number of programmers who know both systems well enough to do that is small, and the declining market share of the GS means that there's little incentive for new programmers to climb the steep GS learning curve.

Another obstacle is the hare-and-tortoise disparity in performance between the two systems. To run efficiently, a program's code has to be carefully optimized for a specific machine. The Apple II is an 8-bit or 16-bit system running at 1 or 2.8 megahertz, while the Macintosh is a 32-bit system with clock rates ranging from 8 to 40 megahertz. A program that runs fast on a Mac, for example, could be agonizingly slow on an Apple II. On the other hand, a game with reaction-time parameters that make it challenging on an Apple II would become an unplayable blur on the Macintosh, unless the conversion includes careful fine-tuning of event timing, delays, and other factors.

Let's hope that future versions of GS/OS and the Macintosh operating system will provide important areas of convergence, making it easier to port programs as well as files and data across the gulf separating the two systems. Until then, spread the word about file conversion and take a look at some of the current products that can help you take advantage of the best of both Apple worlds. □

MIKE MARKOWITZ IS A FREE-LANCE JOURNALIST SPECIALIZING IN COMPUTER-RELATED TOPICS. WRITE TO HIM AT 550 ORANGE AVENUE #150, LONG BEACH, CA 90802. ENCLOSE A SELF-ADDRESSED, STAMPED ENVELOPE IF YOU'D LIKE A PERSONAL REPLY.

PRODUCT INFORMATION

Apple II Emulation Card, \$199

HyperCard IIGs, \$99
Apple Computer
20525 Mariani Ave.
Cupertino, CA 95014
(408) 974-1010

A2FX

Chan Wilson
3372 Middlefield Road
Palo Alto, CA 94306
(415) 856-2532
freeware

Cross Development System

APDA
Apple Computer, Inc.
20525 Mariani Ave.
MS/33G
Cupertino, CA 95014
(800) 282-2732
\$190

Cross-Works

SoftSpoken
P.O. Box 97623
Raleigh, NC 27624
(919) 870-5694
\$99.95

Duet

Cirtech
A2-Central (US distributor)
P.O. Box 11250
Overland Park KS 66207
(913) 469-6502

Engineering Department

271 E. Hacienda Ave.
Campbell, CA 95008
(408) 446-1444

GIF Stripper IIGIF

shareware

Graphic Exchange

Roger Wagner Publishing
1050 Pioneer Way, Suite P
El Cajon, CA 92020
(619) 442-0522
\$49.95

LapLink Mac III

Traveling Software
18702 North Creek Pkwy.
Bothell, WA 98011
(800) 662-2652
\$189.95

MacWrite II

Clarix Corp.
P.O. Box 58168
Santa Clara, CA 95052
(408) 727-8227
\$249

Microsoft Works

Microsoft Corp.
1 Microsoft Way
Redmond, WA 98052
(800) 426 9400
(206) 882 8080
\$295

NuPak.IIGS

Joshua Thompson
Frontier Technologies

P.O. Box 165
Grosse Ile, MI 48138
\$15 shareware

PC Transporter

\$499
3.5-inch drive, \$279
Applied Engineering
P.O. Box 5100
Carrollton, TX 75011
(214) 241-6060

Platinum Paint

\$99.95
TimeOut PowerPack,
\$49.95
Beagle Bros.
6215 Ferris Square
Suite 100
San Diego, CA 92121
(800) 992-4022

Publish It! Easy

Timeworks
444 Lake Cook Rd.
Deerfield, IL 60015
(708) 948-9200
\$249.95

Resource Spy

Stephen Chick
2-1417 Port Village
Port Island, Kobe
Japan 650
\$15 shareware

ShrinkIt GS

Andy Nicholas
8415 Thornberry Drive East
Upper Marlboro, MD
20772
freeware

SmartWorks

Leonard Development Group
9143 Phillips Highway
Building 390
Jacksonville, FL 32256
(904) 464-0016
\$295
\$129 for educators
\$99 with AppleWorks
trade-in

SoftPC

Insignia Solutions
254 San Geronimo Way
Sunnyvale, CA 94086
(408) 522-7600
\$399

SuperConvert

Seven Hills Software
2310 Oxford Road
Tallahassee FL 32304
(800) 627-3836
\$39.95

II in a Mac

Computer Applications
12813 Lindley Drive
Raleigh, NC 27614
(919) 846-1411
\$69.95