Quality Computers ™

II ALIVE

CELEBRATING THE APPLE II

CELEBRATING THE APPLE II

A QUALITY COMPUTERS PUBLICATION
VOL. 2 NO. 2 - MAY/JUNE 94
PRICE $3.95

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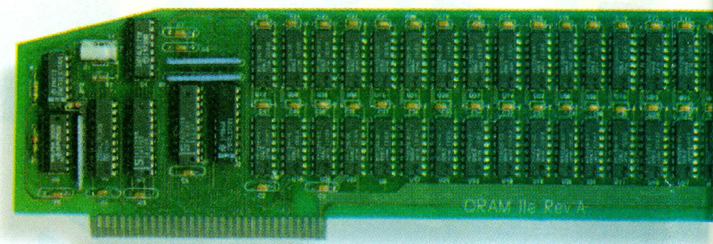

Now imagine all of this convenience and productivity at a price 1/2 of what other 1 MEG cards for the IIe cost. It's true, the new Q-RAM IIe costs only $99.95. At this price, the savings can really add up. You can upgrade your IIe lab and save $100 per computer. Now you can afford more software.

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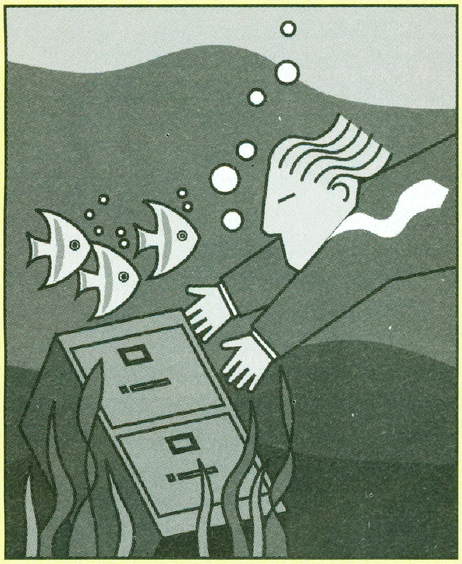

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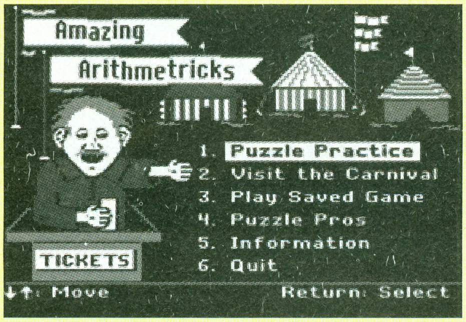

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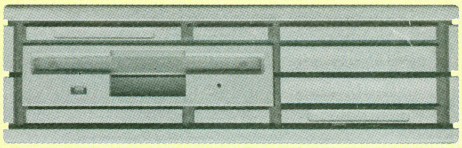

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features

departments

YEAR 2

JERRY KINDALL, EDITOR

A few months ago, without fanfare, we began our second year of publishing *II Alive*. Unfortunately, most of us here were too busy to do much celebrating, or, indeed, to take much notice at all of this milestone. Some of *you* noticed, though, and offered your congratulations. Thanks!

As you may know, this magazine got seriously behind schedule last fall. You see, I'm not only the editor of *II Alive*—I'm also Quality Computers' primary technical writer. And in the summer of 1993, we had a little project called AppleWorks 4. Doing the manual for that package took a lot longer than I expected—and *II Alive* lost about a month. We've been trying to get that month back ever since.

Meanwhile, the *II Alive* design staff is also the Quality Computers art department. They've put out a couple of catalogs—including a completely redesigned full-color edition of *Enhance*—in the last few months, despite hard drive crashes that not once, not twice, but *three* times caused them to lose an entire day's work. Their struggles have indeed been heroic.

II Alive was originally made feasible by the fact that Quality Computers already had most of the people needed to do the work. If we were a new company, starting a magazine from scratch, we'd have to hire so many people that the publication would be far too heavy to get off the ground. I'm convinced that overhead is one of the things that eventually made *inCider/A+* unprofitable for its publishers. I guess I should feel lucky that we don't have that problem here.

A few issues back I announced in my editorial that I'd hired some editorial help and that we'd be back on schedule shortly. If all had gone according to plan, you would have received this issue by the first week of May.

But you know what they say about the best-laid plans. Getting back that month has turned out to be a lot like losing that five pounds you put on over the holidays. During February and March, I was called upon to write no less than six manuals. This issue, which was to be sent to press by the end of March, is about three weeks late as I write this. This means, basically, that we won back a week—better than nothing, but not quite what I'd hoped.

Ironically, last issue's editorial was entitled "The Apple II Time Machine." In the last month I've wished it really *was* a time machine. If I could just send the completed articles back in time to the deadline…

We do appreciate your patience. Please bear with us for the next couple of issues until we get back on track. Give your copy of *II Alive* a little extra time to arrive before calling us. This will help us get back on schedule even faster. Don't worry, we don't intend to stop publishing the magazine! (Some people have actually asked about that, which is the only reason I mention it.)

But the point of this editorial isn't to make excuses for our slipped publication schedule. There's also some good news.

Starting with either this issue or the next, we'll be mailing *II Alive* via second class mail. This will make a tremendous difference in how quickly you receive your copy. In the past, each issue has taken two to three weeks to arrive via bulk mail. Now your issues will arrive as much as two weeks faster. Obviously, this will be good news for our schedule!

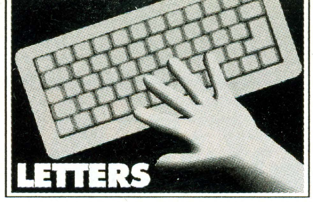
Furthermore, if you move, *II Alive* will be forwarded to your new address (bulk mail isn't). We can also hope for better handling, resulting in fewer damaged and missing copies, which will be good for all of us.

It also looks like our inital problems with international subscribers have finally been ironed out. The transition to converted *inCider/A+* issues (for those subscribers who had paid for both magazines before we took on the *inCider/A+* subscription list) has gone smoothly. We're getting more and more articles from the top people in the Apple II community. The sailing looks smooth ahead.

This month we have the first installment of a new series I'm writing that will take you inside the Apple II's disk operating system, ProDOS. In last month's letters column we promised a block editor (a program which will allow you to read and modify the individual parts of a disk)—you'll find it in that article. This powerful tool, which will become even more powerful in upcoming issues, is our gift to the Apple II community.

In the months ahead, we'll have articles on the Internet (that "information superhighway" that everyone's talking about), MOD (music module) files for the Apple IIGS, and a great series of tip articles for AppleWorks 4 from expert Beverly Cadieux.

As always, we're open to your suggestions, comments, questions, and criticism. What would you like to see? Our address is II Alive, P.O. Box 349, St. Clair Shores, MI 48080. ■



Dear *II Alive,*

I am the owner of two Apple IIc computers and am also an avid Wizardry player. I leaped with glee when I recently found a copy of Wizardry V, The Heart of the Maelstron, recently. It was the culmination of my wildest adventure dreams. The game spans several disks and is a masterful piece of work.

Naturally, though, my Disk F has a flaw which makes it unreadable. Sirtech, the company that produced Wizardry V, is now out of business. If I can't find a copy of this disk, I'll have wasted my money, and, more importantly, will not have the ultimate satisfaction of solving the last and greatest of Sirtech's puzzles.

Does anyone out there share my obsession? Please write; we can talk!

Maryann S. Sharp
500 Chautauqua Ave. #2
Portsmouth, VA 23707

Maryann: Let's find out!—Editor

Dear *II Alive,*

In the first installment of my article on viruses, I mentioned the Trojan Horse in a program called GS.TONER. Since that time, Tony Morales has produced a "defanged" version of the program (releasing it under his Hexman nickname). This version is perfectly safe. The opening screen of the safe version is labeled "Version 2.0" and has the legend "Apple II Forever!" at the bottom of the screen instead of "List me and learn, but modify and get burned."

Thanks to Marty Ritter of the Hartford User Group Exchange for supplying me with a copy of the harmful version for comparison purposes and to Hexman for cleaning up the code.

Doug Cuff
London, Ontario

Doug: Thanks for the update!

Dear *II Alive,*

Thanks for publishing the macro to change the way the cursor moves when the Enter key is pressed on the IIGS keypad ("Macro Exchange," March/April 1994). May I suggest, though, that when you publish something that is going to make us read directions (I didn't have the keypad macros enabled), and is going to make us check the manuals (ba- does not define a macro; ba- - does) and is going to make us think (toggling the macro should not switch it between 0 and 255 and 999, especially when no function assigned to the 999 value), I suggest you put the answers on the last page of the magazine.

On a more serious note—perhaps next time you can explain how one can look at the macros in Seg.AX if they don't have the original AppleWorks disks handy (with the Seg.AX source file).

Raymond Schuerger, DVM
Pittsburgh, PA

Dr. Schuerger: Sorry to put you through all that. As you mention, all references to 999 in the macro should be 255 (or vice versa—the value doesn't matter as long it's consistent). As for the disappearing hyphen in the ba- reference, I think that must have happened at typesetting—part of what we do when converting text for the press is to change double hyphens to nice-looking "em-dash" characters, like the one just before the word "part" in this sentence.

If you don't have your original AppleWorks disk handy, the easiest way to look at the macros in Seg.AX is to go get your original AppleWorks disk. As far as I know, the UltraMacros macro de-compiler only works with the current set, not any other sets which may be floating around in memory.—Editor

Dear *II Alive,*

I enjoyed the editorial about the PowerPC, but was a little confused by part of it. You say that RISC philosophy means Reduced Instruction Set Computer, but then say a RISC chip might require three instructions to do what a traditional chip could do in one! Where is the reduction?

Tom King
San Jose, CA

Tom: The term RISC *means that there are fewer different* kinds *of instructions. In other words, the chip's* instruction set *(the number of commands it knows how to execute) is smaller. Only the simplest instructions are available. The more complicated instructions of traditional microprocessors, while convenient for programmers, were redundant because they could be "built" from the simpler instructions. Naturally, this streamlines chip design and allows faster chips to be produced. But as the number of instructions available for building programs goes down, the total number of instructions needed to perform a particular task goes up. As a simplified example: compare the instruction "add a and b" to "get a, get b, add the two numbers you have." This isn't precisely the same thing as RISC, but it's the general idea.*

Dear *II Alive,*

A while ago, you mentioned you were working on newsstand distribution. What happened to that? I still haven't seen *II Alive* on the stands here in San Francisco. I'm sure there are a lot of Apple II users who don't even know it's available!

Donald Lee
San Francisco, CA

Donald: That was something we were once very interested in doing, but unfortunately we haven't been able to find any distributors willing to carry such a small-volume periodical. And, unlike inCider/A+, *we're not part of an international publishing conglomerate with the muscle to get us into such places. We've basically given up on this idea. Word-of-mouth has, thus far, done a pretty good job of picking up those Apple II users who are adrift in the computer sea—thanks to everyone who has told a friend about* II Alive!

Send comments, questions, and other missives to: II Alive—Letters, P.O. Box 349, St. Clair Shores, MI 48080. All letters become the property of II Alive and are subject to editing for publication.

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II ALIVE

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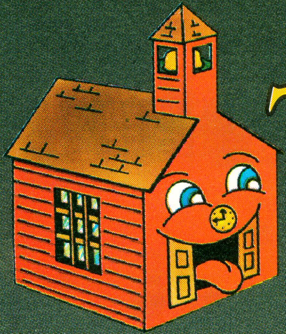

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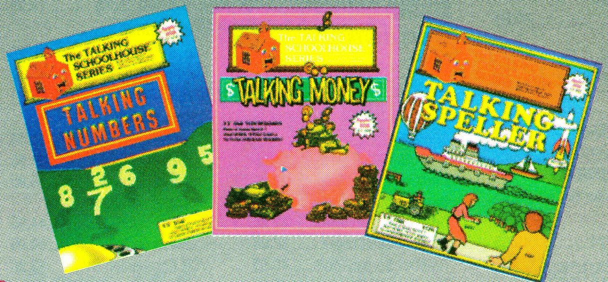

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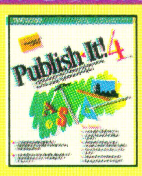

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In 1988, AppleWorks seemed to have reached its pinnacle with the release of version 3.0. But you weren't satisfied and either were we. That's why Quality Computers, and AppleWorks veterans Randy Brandt and Dan Verkade have developed AppleWorks 4.0—the most extensive upgrade in AppleWorks history.

ONE TOUCH COMPUTING

How would you like to automate AppleWorks? You can with AppleWorks 4.0. That's because AppleWorks 4.0 features dozens of built-in automatic functions that you can do with just a keypress. Imagine being able to set up and print an envelope automatically, or open a new data base with pre-formatted fields by pressing a key or two. There's lots of others just like it, and they're easy with AppleWorks 4.0!

TRUE INTEGRATION

Integration, always AppleWorks' strong suit, will become tighter than ever with new features to allow the Word Processor to access data base files, the Spreadsheet to access other spreadsheet files, and the Data Base to access word processor, data base, and spreadsheet files. For example, AppleWorks 4.0 will allow users to create a data base of names and addresses, then "link" the Data Base with a word processor file. Using the glossary function, AppleWorks 4.0 can look up and import an address directly into the current word processing document—without switching modules, copying, or manually formatting. You can also import categories from other data bases (and cells from spreadsheets) and to export information to other data bases, providing the Data Base module with relational capabilities.

EVEN EASIER TO USE

Making AppleWorks, an already friendly program, even friendlier, was something we thought about carefully. We had to be careful that what we were doing was REALLY making AppleWorks easier. We think we succeeded. For example, AppleWorks 4.0 can remember what order you used for each of your reports and will automatically sort the data base for you. The Spreadsheet now features a pop-up list of functions so users don't have to remember codes when entering formulas. The Word Processor uses distinctive symbols for formatting codes (instead of just carets) so boldface and underline can be recognized at a glance, instead of requiring the cursor to be on the formatting code to read it. The "Change Disk" menu allows users to display disk names by pressing OA-? instead of requiring them to know what slot and drive their data disk is in. "Add Files" displays text files and automatically loads them as word processor files instead of requiring users to go to a separate "New File" menu. The Word Processor lets you see and edit tab rulers right in the document. AppleWorks 4.0 even takes away the worry of saving your files with its Auto-Save function.

MORE COOL STUFF

Other major features include built-in support for HP's popular Deskjet printers, faster display and finds in the Data Base, split screen capability in the Word Processor, and data math functions in the Spreadsheet. The Data Base will have improved import and export facilities for exchanging data with other computers, and will feature spreadsheet-style formulas in calculated fields. A global auto-save feature, available in all AppleWorks modules, will protect users' work from power failures; and a QuickPath menu will let users set up a menu of their most frequently-used directories.

Because AppleWorks 4.0 includes TimeOut, adding useful enhancements is easier than ever. In fact, you can even install most enhancements without leaving AppleWorks.

TRUE TO ITS HERITAGE

AppleWorks 4.0 will remain true to the AppleWorks spirit. Menus will remain easy to navigate; commands will continue to be simple-to-remember Apple-key combinations; help will still be available with a single keypress; all previous functions will remain the same.

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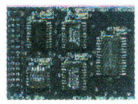

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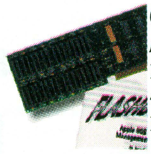

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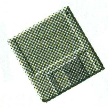

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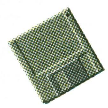

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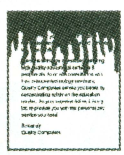

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Wraith, Treasures for Sale, Dog Sled Ambassador & Family Roots

II ALIVE RATINGS

★★★★	Excellent
★★★	Very Good
★★	Good
★	Fair
☆	Poor

WRAITH

★★

Nite Owl Productions

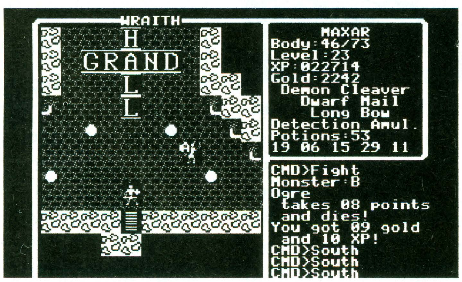
$9.95

Requires Apple IIe, IIc, IIGS with 3.5" drive

Reviewed by Bill Bert

Corruption is running rampant throughout the island of Araithia, and dread monsters roam the land. Since the *Wraith,* an undead being of great might, began granting power to all who would serve it, castles and towns alike have become infested with these unnatural pests. Even the Temple of Good in Tarot is threatened. Then one night the goddess Metiria appears to you in a dream. Naturally, when she asks that you undertake the quest to free Araithia, there can be but one answer!

You start your journey through this single-character Ultima-style adventure with a dagger, leather armor, and a sling. You have only a handful of healing potions, a few pieces of gold, and a smattering of scrolls for casting spells like Lightning, Magic Missile, and Fireball. All in all, you're a good match for orcs, brigands, and bad dogs. You are certainly a *long* way from being ready to take on demons, elementals, and dark mages, let alone the *Wraith* himself.



To build your powers, you must explore the labyrinthine cities, castles, and mines which dot Araithia and a smaller nearby island. Gold you swipe from monsters and treasure chests allows you to buy better weapons and armor—and more healing potions and spell scrolls. You'll also discover many special items, a few of which (such as keys) are actually needed to reach the *Wraith.* Most, such as protective rings and a Secret Door Detector amulet, are merely *very* nice to have.

Killing monsters boosts your Experience which leads to Level advances. Higher Level characters are more effective in combat and have more Hit Points—meaning you do more damage each time you land a blow and can take more hits from monsters before you need to break out a healing potion. Should your Hit Points ever fall to zero, you're dead and are whisked back to the Temple. Happily, Metiria restores your body complete with Experience, weapons, armor, etc. The only catch is that you lose *all* the gold you were carrying!

You navigate entirely by simple-to-learn keyboard commands. The on-disk documentation explains how to maneuver and provides basic background information on towns, monsters, and spells. But mainly, you're on your own. Merchants in taverns may offer hints for the cost of a beer, but most of what you need to know is learned by exploring. With no in-program mapping, it's a very good idea to maintain notes and rough maze sketches right from the start. Fortunately, there are plenty of landmarks. I found some passages and required artifacts rather easily but searched other areas many times before making any progress.

Technologically, *Wraith* is only adequate. It features old-Apple sound effects and hi-res map graphics with animated figures, walls, counters, thrones, and so forth. You can't run the game from a hard drive, but *Wraith* boots quickly enough, and playing from floppy is probably preferable. There's just one Save position per character, and a Save is automatic whenever you're killed. With floppies it's easy to alternate saves on a pair of game copies. A fatal blunder can be corrected just by booting the other disk.

Gameplay highlights include good weapon/spell effects during combats and a smooth-scrolling display. Movement is not in real time, which is fine by me. Exploration and combat are too much fun to rush. I'd much rather my success be determined by how well I've developed and equipped my character than by how swiftly I can twiddle keys or wiggle a joystick.

Despite unglamorous graphics and sound, *Wraith* sparkles from a creative standpoint. There are all kinds of unexpected twists and turns—and heavy doses of wit and humor. The suspense can get pretty thick, too, especially after entering the undead lord's castle. You expect to find the *Wraith* around every corner! Yet, from that point, it took me another 20 hours—and several trips back to the Temple for more healing potions—before I finally had him.

Wraith was my first true adventure, and it is easily the most addictive game I have ever played. I quickly became so obsessed with finding the evil *Wraith* that I spent almost all of my computer time playing the game, including eight hours in one sitting and then six hours the very next day. The result was that most of my computer work didn't get done, but I certainly had a good time—and the price certainly can't be beat.

TREASURES FOR SALE

★★★★

MECC

$59.00

Requires Apple IIe, IIc, or IIGS;
color monitor and printer recommended

Reviewed by Dorothy J. Cordes

Planning a Garage Sale? *Treasures for Sale* could be a big help in preparing copy for the advertisements. Would bandwagon, testimonials, repetition, or just-plain-folks types of advertising attract the most potential customers? Who in your neighborhood might be interested? Answering these questions—and more—is what the new MECC product is all about.

Designed for third- to sixth-graders, *Treasures For Sale* shows students how important advertising is in our everyday lives. As children search for items to sell, interview prospective customers, and create ads, both language and marketing skills are developed. They also learn to become wise consumers of goods and services.

Treasures For Sale features crisp, colorful hi-res displays and Print Shop-style menus with illustrations to lead each student through the steps of preparing a garage sale advertisement. First, you search various rooms of a house to find articles that might be "treasures" for sale to others. After items are selected, you decide upon value and customer appeal. Finally, you create the ad.

For realism, *Treasures For Sale* supplies fifteen simulated children to be potential customers. Interview questions let the user identify customer interests, available shopping time, and the amount of money each customer has. Though the children are not individually named (which detracts a bit from the program's otherwise excellent realism), this market research is a valuable tool for selecting specific items to advertise.

The program introduces eight types of advertising strategies which students learn to use in order to influence potential customers. Starting with pictures of the items to be sold and some ad copy, the seller can add descriptive words and even print out the advertisement. On a color printer, the results are especially attractive.

Treasures for Sale is geared to language arts classrooms, but the program is also suited for use in the home for planning *real* garage sales, and can get your own kids involved in helping to plan the sale. Supplied on 5.25" and 3.5" media, it comes with an excellent loose-leaf

manual packed with copiable worksheets for recording and sorting "treasures," survey forms, and ad examples. User-friendly and entertaining, this is a worthwhile investment. MECC's garage sale package is quite a treasure!

DOG SLED AMBASSADORS

★★★
MECC
$59.00
Requires 128K Apple IIe, IIc, or IIGS; color monitor and printer recommended
Reviewed by Margie Stearns

Not many of us get the opportunity to visit and explore Alaska. If your fifth- to eighth-grade students have ever wondered what it would be like to take a trip by dog sled, MECC invites them to participate in a problem-solving adventure in learning. (Okay, you can come along, too!)

Since this is your first trip, we'd better select "Information" from the handy hi-res menu. As volunteer ambassadors, our mission is to visit several villages along the Bering Sea and collect artifacts for the Park Exhibit. There won't be many stores to buy more supplies, and we'll need plenty of food for our five dogs and ourselves. We're limited to the weight the dog team can pull, so we have to make some decisions before starting our trip.

We will choose our own dog team, guide, and the artifacts we'd like to collect. How? Well, don't pick a dog just because he's cute! There's enough in-program information to guide us to the best selections. (We can even get a printout describing dogs, guides, and so

forth.) Park HQ has arranged for an ample budget for our supplies.

Mush! Finally, we're on our way. Just look at the trail! We can stop at any time to check conditions, rest, eat—the choices are ours. We should "expect the unexpected" along the way. When we arrive at each village, we'll rest, feed our dogs, and visit the village elder. He or she will tell us about local culture and, with luck, will give us a nice artifact to include in the Park Exhibit.

Each of the many expeditions poses a number of challenges and takes about an hour to complete. While *Dog Sled Ambassador's* major objective is to teach kids to make decisions which solve problems, the adventures also teach about native Alaskan cultures. Besides, playing is fun! Once difficulty level (easy, medium, or hard) is set, one student actually runs the program. However, others can join in, offering suggestions and encouragement. Group play is also a good way to include children too young to operate the software alone.

Dog Sled Ambassador features standard hi-res displays and keyboard input, so hardware demands are minimal. A color monitor isn't required but really adds to the enjoyment. A printer is highly recommended because a child who completes an expedition successfully receives a nifty printed certificate with his or her name on it. Students can also print reference material while on an expedition. Unfortunately, map printouts don't look too good—trail lines blend over the symbols for villages, towns, and cabins, making the maps too hard to read. Plan to get a detailed map of Alaska to get the most out of this program.

Shipped with both 5.25" and 3.5" diskettes, *Dog Sled Ambassador* includes a fine loose-leaf manual crammed with worksheets and other materials you can copy and distribute to a class. I highly recommend the package for home use, too. This is entertaining education! Children can look forward to a unique blending of history, science, geography and math when they become *Dog Sled Ambassadors.*

FAMILY ROOTS

★★★
Quinsept
$59.00
Requires 64K Apple IIe, IIc, or IIGS
Reviewed by Susan B. Bruton

Picture yourself poring over a stack of old photos, documents, and piles of note papers filled with scribbled notes gleaned from the memories of your forefathers. So much stuff! You've decided to chart your family tree, but how are you ever going to get started? Just sit down and begin filling notebooks? I think not! Instead, you purchased *Family Roots* from Quinsept. With your trusty Apple, you're ready to produce a family tree chart the way the pros do it.

Featuring responsive text mode displays, *Family Roots* lets you fly through data entry, aided by explicit menus and in-depth prompting. An on-board word processor allows you to

(Continued on page 62)

QUESTION: I'd heard that the IIGS has a menu which allows one to set 50 or 60 Hz operation, enter the control panel, and so forth, by holding down the Option key while pressing Control-Reset. I'm a naturally curious person, so I gave it a try.

Suddenly, strange patterns of lines and dots began appearing on the screen. After about twenty or so patterns in different colors, the screen filled with a jumble of text characters. A while later the screen cleared and a number appeared at the bottom of the screen. One of the digits of the number would change, along with the border color. Finally, a series of tones sounded and the message "System Good" appeared.

This message sounds reassuring, but according to my IIGS owner's manual, some kind of menu should have appeared. Why am I getting this self-test? Is there something wrong with my IIGS?

Chris Friend
Charlestown, IN

PS—How do you change the display back to 40 columns after activating the 80-column display with the PR#3 (or PRINT CHR$(4);"PR#3") statement in BASIC?

ANSWER: The self-test is activated when you hold down the Apple *and* Option keys. The menu you're looking for is activated by *just* the Option key. Try it again, making sure that you are not nudging the Apple key at all. If you still get the same result, it means that your computer thinks the Apple key is down when it's really not. This could be a stuck or defective keyswitch in the keyboard, a faulty ADB connector, or a bad ADB controller chip inside the computer. If you have a joystick on your machine, remember that the buttons on the joystick are the same as the Apple and Option keys. Unplug your joystick, if you've got one, and try it again.

In answer to your PS, the correct way to deactivate the 80-column display inside a program is to simply PRINT CHR$(21). From the keyboard, you can simply press Escape followed by Control-Q. (To switch to 40 column mode but leave the 80-column firmware active, PRINT CHR$(17) from a program, or press Escape followed by 4 from the keyboard.)

QUESTION: The other day, for the first time, I attempted to print a word processor document on my ImageWriter II using 15 characters per inch. Pressing Open Apple-O, I displayed the printer options screen, entered CI, and entered 15 when prompted. Much to my surprise, when I tried to print there was no change from the 12 CPI default setting. I checked the printer codes screen (in AppleWorks' Other Activities) and the proper codes appeared to be defined (Control-O Escape q). I've successfully used CI settings less than 12, but am having no luck with numbers above 12: i.e., 15, 17, 24. Any enlightenment would be appreciated.

Williard Lawrence
APO AE

ANSWER: Somewhere in your document there must be a CI setting for 12 CPI. (AppleWorks' default CI setting is 10, not 12, so the fact that you call 12 the default indicates that you have changed it somewhere.) Most likely you are placing your new CI code *before* the existing one. Press Open Apple-Z (for Zoom) to see the formatting commands embedded in your document, and delete any CI commands that you don't want using the Open Apple-D (Delete) function. Remember, the CI function "takes effect" wherever it is placed in the document, and remains in effect until another CI is found. (Which means that another possibility is that you entered the CI code at the end of the document.)

If you're sure you're doing everything right, try re-installing your AppleWorks program on your hard drive (or using a fresh floppy copy).

By the way, you'll never be able to get your ImageWriter II to do 24 CPI. The printer can do only up to 17 CPI. (Some printers allow you to go higher, which is why AppleWorks lets you type in numbers up to 24.)

QUESTION: What does it mean for a hard drive to be "terminated?" (Mine didn't come with an Arnold Schwarzenegger.)

Doug Whyte
Schaumburg, IL

ANSWER: The term "termination" applies only to SCSI (Small Computer Systems Interface, pronounced "scuzzy") hard drives. If you have an AE Vulcan or AI InnerDrive, or some other non-SCSI hard drive, you don't have to worry about it.

SCSI is designed to let you connect up to seven mass storage devices to a single controller card. This is done by "chaining" one device to the next. A terminator is a special electronic device containing a network of resistors which is designed to keep signals from "bouncing back" when they hit the end of the SCSI chain. Believe it or not, the end of the wire acts much like a mirror, and if the reflections are strong enough, they can interfere with the real signal. The resistors in the terminator absorb electrical energy, so the signals stop at the end of the wire.

The first and last devices in a SCSI chain should be terminated. Your SCSI card is the first device, and it has built-in terminators. This leaves your hard drives. If you have more than one storage device on the chain, only the last should be terminated. Some drives have terminators inside; such devices must always be the last device on the chain, or must have their internal terminators removed, in a chain. A more flexible arrangement includes an external terminator, which plugs onto the unused connector on the last device in the chain.

A related issue is terminator power. (Since terminators are resistors, they do use power.) At least one device on the SCSI chain must provide terminator power. Traditionally, terminator power has been provided by one or more of the hard drives on the chain, not the computer. This is the main reason Mac-compatible SCSI drives often don't work on the Apple II: the Mac supplies terminator power, while the Apple II doesn't. Thus, drives that don't supply terminator power work fine on the Mac, but only work on the Apple II if you have some other device supplying terminator power.

Some devices, such as the newer Quantum drives, supply just enough power for their own terminators—if the first and last devices on the chain do this, you will be fine; otherwise you may have problems. (Newer revisions of the Apple High-Speed SCSI Card do supply power for their own resistors, but there's no way to tell whether you have an older or newer card just by looking.)

This sounds confusing, but it's really not. When buying a hard drive, make sure you ask the vendor if it will work on an Apple II. If they say yes, it probably supplies terminator power. If they say no, or if they don't know, it probably doesn't supply terminator power—but it should still work on the Apple II with a Sequential Systems RamFAST SCSI card (which does supply terminator power) or an Apple II SCSI Card which has been modified to supply terminator power.

(Continued on next page)

APPLE DISK II REPAIR–ON THE CHEAP!

by Ronald Jackle, Guest Tech

I own an Apple IIe with two Apple Disk II 5.25" drives. One day recently I found it necessary to remove and re-install the drives. Shortly after hooking everything back up, I attempted to save a file to the second drive. At once, the power supply burped, the computer crashed, and the drive started to smoke.

I hit the off switch in a flash. I looked inside my computer and noticed that I did not properly hook the drive to the 20 pin connector on the controller card. I pulled all the cards and did a system diagnostic. System OK. I put the Apple II Disk Controller card back in (after disconnecting drive 2) and powered up again. My first drive booted normally, but had developed an inability to write.

I called the service department of my local Apple dealer and explained the problem. They told me I needed an analog board for each drive, which would cost $89.00 for each drive. Ouch! Sun Remarketing's price for the card was about the same with a trade in.

I decided to try to fix the drives myself. I removed the 4 screws on the bottom of Drive 2 and slid the cover off, wincing at the smell of cooked silicon, and noticed one 74LS125 chip was cracked. Several others looked damged as well. The circuit traces and wiring looked fine in both drives. I decided to investigate the availability of these chips and just replace them, if possible.

My trip to Radio Shack was disappointing—that their prices for the chips were more expensive than I anticipated. Remembering my JDR Microdevices Component catalog, I was pleased to find all four chips listed. JDR's prices were as follows:

74LS125	Quad-3-State Buffer	$ .39
MC3470	Floppy Disk Read Amplifier	$1.39
CA3146	High Voltage Transistor Array	$1.19
ULN2003	Darlington Transistor Array	$ .69

At those prices, I ordered the chips—and a few spares for both drives. When I received the chips, I carefully pulled each chip, taking careful note of each chip's orientation, and installed the new ones. With great care, I reassembled the drives, connected them to the interface card (being careful to hook everything up properly this time), and held my breath as I thumbed the power switch.

I booted the drives and put them through a series of tests. To my great relief, they are fully functional again. They work like new and my total cost was under $20.00. I was lucky that these were older drives and the chips were not soldered in as they are in the newer drives. (Even so, someone handy with a desoldering tool could save even those.)

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BottomLine features pull down menus for mouse or keyboard support. A handy, full feature calculator and notepad are also included.

Finding transactions has never been easier. The program lets you search by check number, payee, dollar amount, and text. Tax related transactions can easily be flagged allowing easier reporting at the end of the year.

Up to 800 transactions per month and an entire year can be contained on just one diskette. BottomLine even lets you export your financial information to an AppleWorks® Spreadsheet. This feature is compatible with any AppleWorks® program including the new AppleWorks 4.0. *Suggested retail price: $64.95*

Requirements: Enhanced IIe or later; 128K or greater; 5.25" or 3.5" drive; Printer Optional (Compatible with most popular printers); Mouse Optional. Note: BottomLine is currently not hard disk installablle.

QC's price: $34.95

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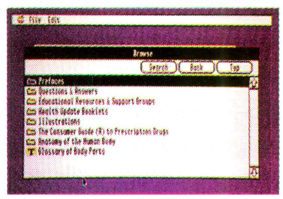

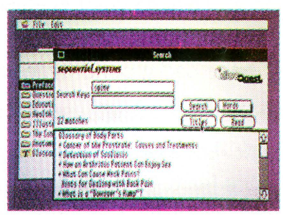

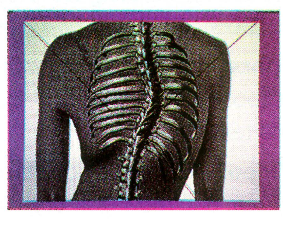

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- Magic System Folder that knows just where to stash your fonts and DA's
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- Boot ProDOS 8 quickly.
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SYSTEM 6 UPGRADE

With the QC System 6.0.1 Upgrade you get the System 6.0.1 disks plus our own System 6 Book with 6.0.1 Addendum, and a free program to customize your desktop—DeskPicture. All for just **$29.95**

1 THE ORIGINAL BONUS PACK

The Apple II Enhancement Guide: This book is packed with information to help you upgrade your Apple II. It covers RAM, hard drives, accelerators, the Finder, and more.

FlashBoot: What is faster than a speeding disk drive? A RAM disk. FlashBoot lets you automatically set up a super-fast, super-convenient RAM disk.

Clip Art: We're throwing in over 100 beautiful clip art images, perfect for desktop publishing or hypermedia applications.

Clip Sounds: Because the IIGS's sound capacity is so great, we're also including over 50 digitized sound files. Some are classics while some are the newest on the market. They go great in HyperStudio and other sound programs, or you can have music playing in the background while you work.

Icons: Over 50 fun, useful icons.

Desk Accessories: Just to give you more to choose from, we're giving you several handy desk accessories including: Enhanced Calculator, Scrapbook, Games, and more.

Fonts: Using the same font for everything is very uncool, so our Bonus Pack includes over 30 display and text fonts.

Video: Our 1-hour video takes you from installation of System 6 to moving through the Finder with speed and agility.

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2 THE NEW BONUS PACK

- 15 New Fonts
- 45 New Digitized Sounds
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3 SIX PACK — An incredible set of Finder Extensions including:

MoreInfo: Displays more information about your files, including their actual type and auxiliary type, access information, and more.

AlarmClock: Displays the time in a window or at the right of the menu bar. Plus it'll alert you for important occasions.

SuperDataPath: Remembers a default data directory for your programs so you don't have to change folders every time you launch an application.

HotKeys: Add dozens of functions to your function keys (on an extended keyboard) or to your numeric keypad.

CDEV Alias: Add any frequently-used Control Panel function (CDEV) directly to the Apple menu.

CPU & Memory Use: Shows visually how much of your computer's resources are being used at any time.

SelectIcons: Select icons in the front window based on partial filename, filetype, modification date, and more!

PrintCatalog: Prints and old-style directory listing on your printer, including filename, filetype, and more.

Encrypt: Save your data from prying eyes! Encrypt creates a password-protected copy of any file.

FilePeeker: Preview the contents of graphics, text, and sound files—and more—without having to launch a separate application!

WorkSet: Remembers a group of files and opens them all at once, with one double-click! Open a group of AppleWorks documents—or a group of folders—or a group of anything—all at once!

FileCompare: Check seemingly identical files for differences you might have missed comparing them visually.

ButtonBar: Places a button bar on the desktop with user programable buttons.

SizeUp: Calculates the size of the currently selected files, including files residing in selected folders, from within the Finder. SizeUp also tells you the total number of files or folders selected.

LaunchList: Provides a list of applications in a window when running the Finder. The LaunchList window can be configured to contain any application, or all of your applications.

XtraSounds: Adds over thirty new sound events to your system. Each of these new sounds is associated with a Finder function. Now you can have the Finder "talk" to you whenever it's doing something.

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Baking Newton Pie

According to a message your Rumormonger spotted on America Online, initial testing has already begun on a utility for linking HyperCard IIGS to any Newton MessagePad. Purportedly, it will allow HCGS to create simple Newton applications and to control a stack running on an Apple IIGS from the Newton. It sounded like a fact but it felt like a rumor. Time will tell!

She Sells Softdisk Shells

Softdisk Publishing announced a new modular menu system for its popular *Softdisk G-S* disk subscription. The new shell is fully compatible with System 6.0 and with *The Manager,* the multitasking application from Seven Hills Software. It will look and feel very much like the old shell, but expect improvements in area such as scrolling, button layout, and sound effects, among others. This is sure to make one of the most enjoyable Apple IIGS disk publications even more enjoyable! For further information call Softdisk at 800-831-2694 or 318-221-8718 in Canada.

ICON go, can you?

Prices for this summers' KansasFest have been set! The conference, now in its sixth year, will cost only $200 before May 15 and $250 after May 15 for the 3-day registration, including lunches. This is a $100 savings over the previous years! The most dorm can be had in the dorm rooms of Avila College for $45 per night for a private room and $35 per night for a double room. Add $50 after May 15. These prices include breakfast and dinner. For more information or to reserve your spot, call 913-469-6502 or write to Resource Central at Box 11250, Overland Park, KS 66207.

ProDOS Secrets—Free

Speaking of Resource Central, did you notice their offer at the end of the File Recovery article this month? The company is offering a free copy of *Beneath Apple ProDOS* for new subscribers to any of their publications. *Beneath Apple ProDOS,* originally published by Quality Software (not affiliated with Quality Computers), is considered a classic in the field and covers virtually every technical detail of how ProDOS works. The book is also available for $12.95, including shipping and handling, if you don't want to (or already) subscribe. You do need to ask for the *II Alive* special and be a new subscriber to take advantage of this very valuable free book offer.

Applied Engineering Defunct

Applied Engineering of Dallas, TX, officially closed its doors late in March. While the company came under fire in recent years for charging Apple II users for technical support via a 900 number, they were, for many years, the premiere supplier of hardware for the Apple II. According to our sources, AE had very little surplus stock left over—don't expect to see any kind of closeout sale on AE merchandise.

Hang Ten with Apple II Publications

Kula Software, of Honolulu, Hawaii, announces the release of the 1993 edition of the Kula Index. The Index is an AppleWorks database covering articles and reviews from the major Apple II publications for the past year. The publications featured in this edition are *A2-Central, inCider/A+, II Alive, Scarlett,* and *Shareware Solutions II.*

Also available are publication-specific indexes for *Nibble, A2-Central,* and *inCider/A+*. Each of these indexes provides coverage of the respective publication from its first issue through its last.

Each record in a Kula index includes the article title, author's name, subject (such as "telecommunications"), publication name, date, page number, a two-line article summary, and a list of key terms for searching.

Each edition of the Index is priced at $9.95 and can be ordered directly from Kula Software, 2118 Kula Street, Honolulu, Hawaii, 96817, (808) 595-8131. The Index requires 128K and AppleWorks, and is available in both 5.25" and 3.5" disk formats. Kula also has an extensive catalog of public-domain and shareware Apple II and IIGS programs.

Shareware Solutions II News

Shareware Solutions II, former *inCider/A+* columnist Joe Kohn's highly acclaimed bimonthly Apple II newsletter, has new subscription rates. A one year, six-issue subscription that begins with the current issue is available for only $20 (U.S. and Canada; $35 for other countries). A two-year, twelve-issue subscription that begins with the July, 1993 premiere issue—you receive all back issues upon subscribing—costs $35 (U.S. and Canada; $50 for other countries).

Kohn, who previously wrote all the articles for his newsletter—which covers all aspects of Apple II computing, not just shareware—will soon be sharing the masthead with fellow former *inCider/A+* contributor Cynthia Field, who will be writing about new Apple II products for her own column. ■

APPLE II GAME CLASSICS

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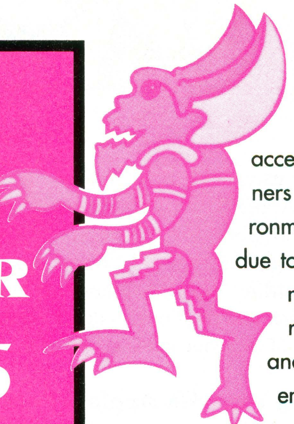
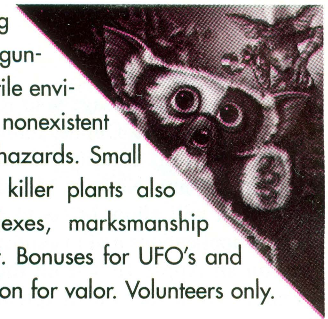
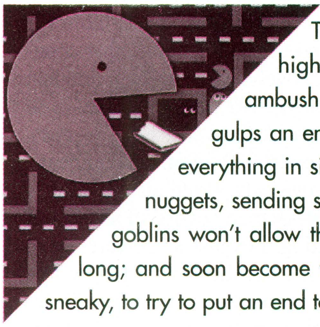


GREMLINS

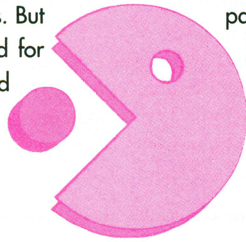


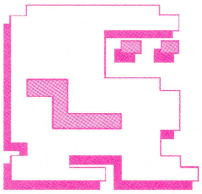
Applications being accepted for replacement gunners in high-risk job. Hostile environment. Road conditions nonexistent due to meteor and crater hazards. Small native population of killer plants also reported. Quick reflexes, marksmanship and diving skills a must. Bonuses for UFO's and enemy tanks. Recognition for valor. Volunteers only.

PAC-MAN

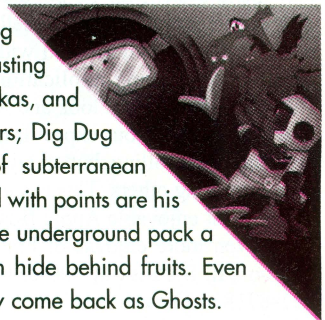


The refinements of dot chomping lead to high scores as hungry Pac-Man avoids ambush by voracious goblins. When Pac-Man gulps an energy dot he can turn the tables and eat everything in sight. . . that includes yummy bonus nuggets, sending scores into the thousands. But goblins won't allow themselves to be gobbled for long; and soon become their old selves, fast and sneaky, to try to put an end to Pac-Man's three lives.



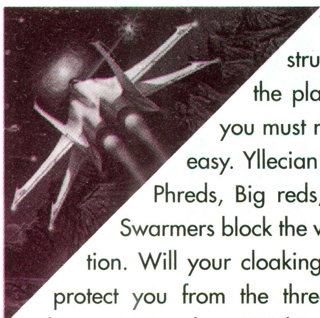


DIG DUG



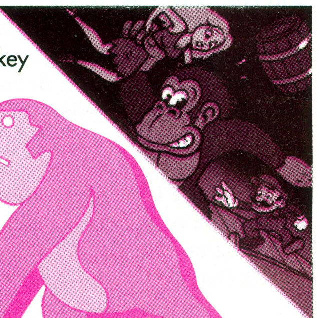
Dodging and blasting Pookas, and dropping rocks on fire-breathing Fygars; Dig Dug burrows his way through a maze of subterranean paths. Ripe fruits and veggies, loaded with points are his passion. But the evil denizens of the underground pack a potentially lethal wallop, and can hide behind fruits. Even when Dig Dug kills them they may come back as Ghosts.

STARGATE



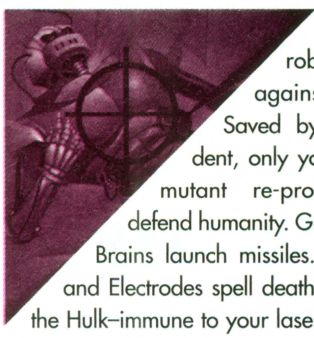
The entire universe is your enemy as you struggle to rescue humanoids stranded on the planet surface. To take them into a Warp you must reach the Stargate. But getting there isn't easy. Yllecian space guppies, Dynamos, Space hums, Phreds, Big reds, Munchies, landers, Baiters, Pods and Swarmers block the way spewing death and destruction. Will your cloaking device protect you from the threat within. . . Mutant humanoids?

DONKEY KONG

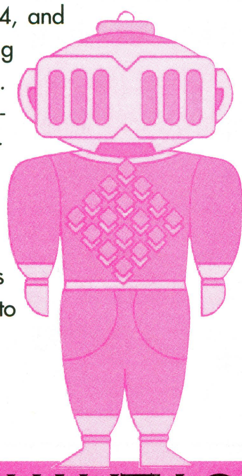


You can feel an excitement tingle up and down your spine when you play Donkey Kong at home, just like at an arcade. Your joystick guides Mario, the fearless carpenter, up the girders and elevators as he attempts to rescue his sweetheart from the clutches of Donkey Kong. All the thrills of the arcade game.

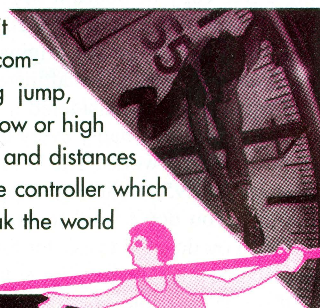
ROBOTRON: 2084



It's the year 2084, and robots are turning against their masters. Saved by a genetic accident, only you can resist their mutant re-programming and defend humanity. Grunts close in. The Brains launch missiles. Tanks, Sheroids and Electrodes spell death. And then there's the Hulk–immune to your laser. Your mission is to rescue, evade and destroy. Good Luck.

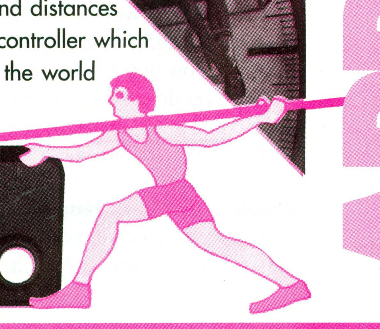


TRACK & FIELD



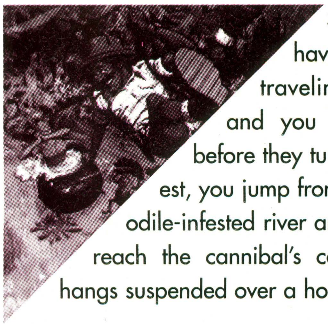
You've worked long and hard to make it this far. Now it's time for head-to-head competition in the 100 meter dash, long jump, javelin, 110 meter hurdles, hammer throw or high jump. You're out to beat the best times and distances on record. Included is a special arcade controller which gives you everything you need to break the world record in athletic competition.

COMPLETE WITH ARCADE CONTROLLER



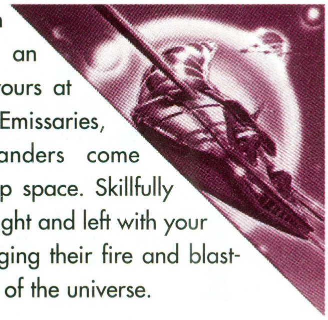
GAMES $9.95 EACH APPLE II GAMES 3 FOR $19.95 APPLE II GA

JUNGLE HUNT



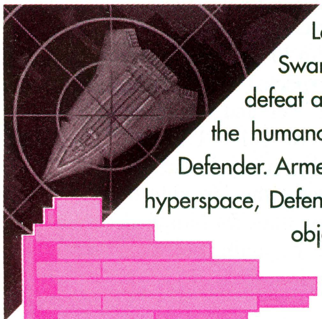
Savage cannibals have kidnapped your traveling companion, and you must rescue her before they turn her into stew! In the deep jungle forest, you jump from rope to rope. Then you brave a crocodile-infested river and a landslide of huge boulders. You reach the cannibal's campsite just in time–your sweetie hangs suspended over a hot cauldron of boiling goo!

GALAXIAN



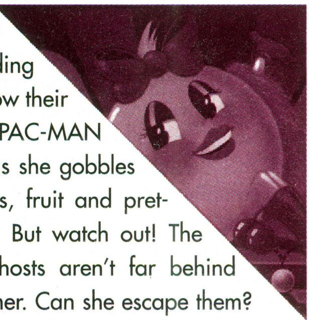
You feel that spine-tingling exhilaration every time you play GALAXIAN in an arcade. Now the same sensation is yours at home. Wave after wave of Drones, Emissaries, Hornets and Commanders come winging in from deep space. Skillfully you slide your ship right and left with your joystick, dodging their fire and blasting them out of the universe.

DEFENDER



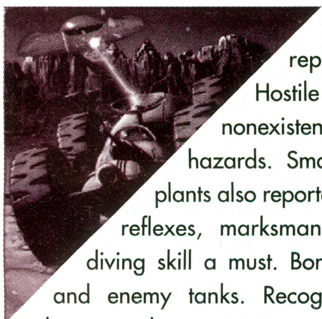
Landers, Bombers, Baiters, Pods, and Swarmers. The alien attack has come, and defeat at the hands of crazed invaders threatens the humanoids. Their only hope is the spaceship, Defender. Armed with smart bombs and able to shift into hyperspace, Defender evens the score only to become the object of another foul attack: kidnapped humanoids transformed into killer mutants.

MS. PAC-MAN



It was the love match of the century, PAC-MAN, star of the arcade, and his leading lady the unforgettable MS.PAC-MAN. Now their romance continues. You guide MS. PAC-MAN through four different mazes as she gobbles up dots, energy pills, fruit and pretzels. But watch out! The ghosts aren't far behind her. Can she escape them?

MOON PATROL



Applications being accepted for replacement gunners in high-risk job. Hostile environment. Road conditions nonexistent due to meteor and crater hazards. Small native population of killer plants also reported. Wuick reflexes, marksmanship and diving skill a must. Bonuses for UFO's and enemy tanks. Recognition for valor. Volunteers only.

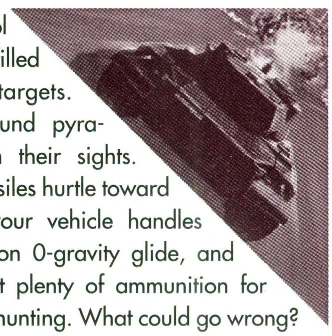
JOUST

In days of olde, when knights were bolde—they never saw anything like this! You don your helmet, hoist your lance and mount your ostrich to do battle with the evil Buzzard Riders in deep space! Pterodactyls to the right of you, alien eggs to the left–learn to fly so you won't die so very far from home.

CENTIPEDE

An insidious invasion of multiplying insects (centipedes, jumping spiders, poisonous scorpions, and frenzied fleas) pose different perils to the mushroom patch. You must repeatedly blast enraged creepers and stubborn obstacles or lose your enchanted fungus. Remember to listen for distinctive sounds of the attacking bugs; and watch out for blasted centipede segments, each one grows a new head.

BATTLEZONE



You have full directional control through an entire landscape filled with hazards and targets. Tanks maneuver around pyramids to get you in their sights. Guided missiles hurtle toward you. But your vehicle handles like a dream on 0-gravity glide, and you've got plenty of ammunition for saucer hunting. What could go wrong?

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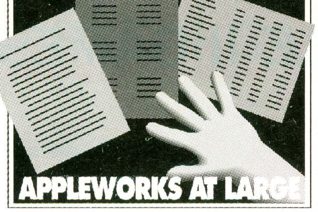


AppleWorks GS Spring Training

by Bill Bert

Baseball is full of numbers. A 3-2 count. Bottom of the ninth. Runner on third. Trailing 6-5. A 90-mph fast ball. A .345 hitter with 10 home runs and 46 RBI.

Take away the numbers and it's just not the same. A good coach needs to get the most out of those numbers, and to do that it's necessary to compile and manage them.

You could search for one of the few good statistics program available for the Apple II. That would involve finding the program, shelling out some cash, learning to use it, and then, perhaps, being limited to tracking only the statistics the program's designer thought were important. But if you already have a spreadsheet program, you have everything you need to track your team's or your own individual statistics. No search, no cost, no limitations.

We'll create an AppleWorks GS spreadsheet template that will allow tracking just about every statistic imaginable. It should also be applicable to AppleWorks Classic, although we won't cover that program in this article. If there is another stat you want to follow, you can add it with just a little knowledge of spreadsheets.

GETTING STARTED

Create a new spreadsheet file by clicking the spreadsheet icon in the Open File dialog and clicking New. You also may select New from the File menu, click on the spreadsheet icon and then OK. Don't let the expanse of empty blocks intimidate you. Each of these is called a *cell* and can contain text, numbers, or formulas that generate results based on data entered into other cells.

Spreadsheet formulas can involve rather complex computations, but for our stat form, we'll deal only with simple additions and divisions, so you can stop breathing so heavily. We can enter a few formulas only once and then copy them to succeeding cells, making our task much easier. (See Chart 1 for examples of formulas we'll use.)

Change the width of the cells by selecting Change Default Width in the Options menu. Since most columns will contain no more than two figures, the width can be shortened to allow more cells to fit on the screen at a time. Drag the right side of the yellow box to about one-third of its original width and click OK. This will require us to expand the width of cells that contain names and averages, but the majority of cells will remain this width.

We will place the name of each team in cell A1, but for this template, just enter "Team stats" there. Use the mouse to move the crosshair over cell A1 and click the button. When the cell turns black, it's ready to receive data—type "Team stats." This will intrude into the next cell unless the width is changed, so move the mouse to the vertical line in the yellow area at the top between A and B, hold the button down to get the double arrow cursor, and drag it to the right.

You'll use these two procedures repeatedly to create the template. Remember to save your work often; you don't want to have to start over.

ROW LABELS

Continuing down the A column, in cell A2 put a heading for the column by typing "Player." The next cells will contain player names one after the other, but in our template we'll use numbers to signify the names to be entered each season. Use as many cells as you have players. (Remember, it's simpler to leave room for more players than you have now than to add players later.) I've used 18 players.

The next cell is labeled "Totals." After a blank cell, enter a "Pitchers" label and number the next several cells up to the maximum number of pitchers you expect. I like 6. Follow this with another "Totals" cell and two blank cells. Label the following two cells "Us" and "Them" to allow for score by innings in each game.

That completes the left side titles, but we still have the top titles for hitting stats, pitching stats and score by innings to enter before we get to the formulas.

COLUMN LABELS

Hitting stats will go on the same line as Player. In the next cells to the right, enter these labels and adjust the cell widths as needed: Positions played, Avg., Slug, OnBas, Fldg., blank cell, AB, R, H, BI, 2B, 3B, HR, PO, A, E, SO, BB, RB, SB, blank cell. (Baseball abbreviations are explained in Chart 2.)

In the line starting with Pitchers, we'll start with a blank cell, then designate Column C as ERA and Column D as Pct. Then, starting in Column H, we'll designate the next columns as W, L, IP, H, R, ER, BB, SO, Sv. The next several columns remain blank. If you track other pitching statistics, you can add them.

The Line Score figures start in column H. Designate the next 12 columns in the blank row above Us starting at H as V/H, 1, 2, 3, 4, 5,

Chart 1 — Formula Basics

All formulas start with =. Samples:

=sum(H3..H20)	Sum of all cells from H3 to H20
=(O3+P3)/(O3+P3+Q3)	Sum of O3 and P3 divided by sum of O3, P3 and Q3
=W3+AL3+BA3+BP3	Sum of designated cells

Note parentheses used to make sure figures are added before sums are divided.

Chart 2 — Baseball Abbreviations

AB — at bats	R — runs scored	H — hits	BI — runs batted in
2B — doubles	3B — triples	HR — home runs	PO — put-outs
A — assists	E — errors	SO — strike out	BB — base on balls
RB — reached base†	SB — stolen base	W — wins	L — losses
IP — innings pitched	ER — earned runs	Sv — saves	Ex — Extra innings

† Reached base includes any other way of reaching base, such as hit by pitch and catcher interference.

Chart 3 — Formulas to Compute Averages

Statistic	Baseball Formula	Spreadsheet style	My formula
Batting Average	Hits / At Bats	H/AB	=J3/H3
Slugging Percentage	Total Bases / At Bats	((H+2B+(2*3B)+(3*HR))/AB	=((J3+L3+(2*M3)+(3*N3))/H3
On-base Percentage	Hits + Walks + Reached Base / At Bats + Hits + Walks + Reached Base	(H+BB+RB)/(AB+H+BB+RB)	=(J3+S3+T3)/(H3+J3+S3+T3)
Fielding Percentage	Put-outs + Assists / Total chances	(PO+A)/(PO+A+E)	=(O3+P3)/(O3+P3+Q3)
Earned Run Average	Earned runs / Innings Pitched *Innings per game	(ER/IP)*9, or less	=(M24/J24)*7
Win Percentage	Wins / Wins + Losses	W/(W+L)	=H24/(H24+I24)

If you are following my instructions precisely, your formula should read as my formula.

6, 7, 8, 9, Ex., T. The Ex. will include all runs scored in innings beyond the ninth. There is no need to change the template if you play less than nine-inning games. The V/H column is used to designate who is visitor and who is home since your scores will always be on the top line whether away or home.

Since we want to be able to see our titles—both left and top—no matter how much scrolling through the template we do, we want to establish title lines. Go to the Options menu and drag to Set Titles. Click to X both top titles and left titles and designate Rows 1 through 2 and Columns A through A. Note that you will see these lines twice, and you must work in the actual spreadsheet and not in the title areas.

That completes the basic setup. But we still must copy the statistics columns for the number of games played and enter the formulas.

ENTERING THE FORMULAS

We'll save time later if we enter the formulas for totaling the columns now. Beside Totals under AB, type =sum. Then, without pressing Return, click the mouse button on the AB cell beside Player 1 and drag the mouse to the AB cell beside the last player, then release the mouse button and press Return. AppleWorks GS will fill in the cell reference, which should read =sum(H3..H20). We can use the fill function to copy this figure over the other columns. Click on the AB Total and drag to the right to the SB Total. Go to Edit and drag to Fill.

Follow the same procedure for the pitching stats. Do the same for Score by Innings under the T column, but remember to add from left to right instead of top to bottom.

Duplicate this set of stats to create areas for individual game stats. Start with the column labeled AB, click on the letter in yellow at the top of the column (if you've followed me exactly, it is H.) This should highlight the entire column. Press the right arrow key at the bottom to scroll the spreadsheet to the right until you get to the end of your labels. Put your cursor on the letter in yellow at the top of the blank column after SB (mine is V), hold down the shift key and press the mouse button. This should highlight the whole range of stats.

Go to the Edit menu and drag to Copy. Highlight the first cell under the column to the right of that one blank cell (W for mine) and select Paste in the Edit menu. Do this over and over to the right for the number of games in your season. Again it is better to have too many than too few.

MORE LABELS AND FORMULAS

We need to distinguish each section of stats by defining them on Line 1. Go to the cell above the first AB and type "Statistics through all games." Don't worry if the label extends across cell lines. Then go above each subsequent AB and type "Game 1," "Game 2" and so on.

Now it's time for more formulas. Let's start with the averages. (You may even want to designate these as such by typing "Averages" on Line 1 above Avg.) All of these will be computed by using the Statistics through all games. Click on the cell under Avg, and to the right of Player 1. Since average is hits divided by at bats we want to type =, click on the H column (not AppleWorks GS's column H, but the *hits* column, which we have placed an H into) beside Player 1, type /, and click on the AB column. If you are following me, the formula will read =J3/H3.

Follow the same principle to set the other three hitting averages and continue to do the same for pitching. Chart 3 shows what these should be.

All these formulas will show Error until you play your first game and enter statistics. The message does not mean you made a mistake. You need enter these formulas for the first player only and then fill them to the others. Highlight Average for Player 1, hold the mouse button down, drag it to Totals under Fielding, and release the button. Go to Edit and drag to Fill, select Down and OK. Do the same thing for the pitching averages.

Finally, we enter formulas for the overall stats to add up all the individual game stats. Click under Overall Statistics AB opposite Player 1, type =, then click on each AB column for Player 1 for individual games, separating them by a +.

This tedious step needs be done only once. Fill this cell across through SB and fill that entire line down through Totals. For pitching, Copy the cell in Totals under AB and Paste to Pitcher 1 under W. Fill that cell across through Sv and then the whole line down through Totals. For the score by innings, copy Totals under W to Us under 1, fill this down to Them and then across to Ex.

FINISHING TOUCHES

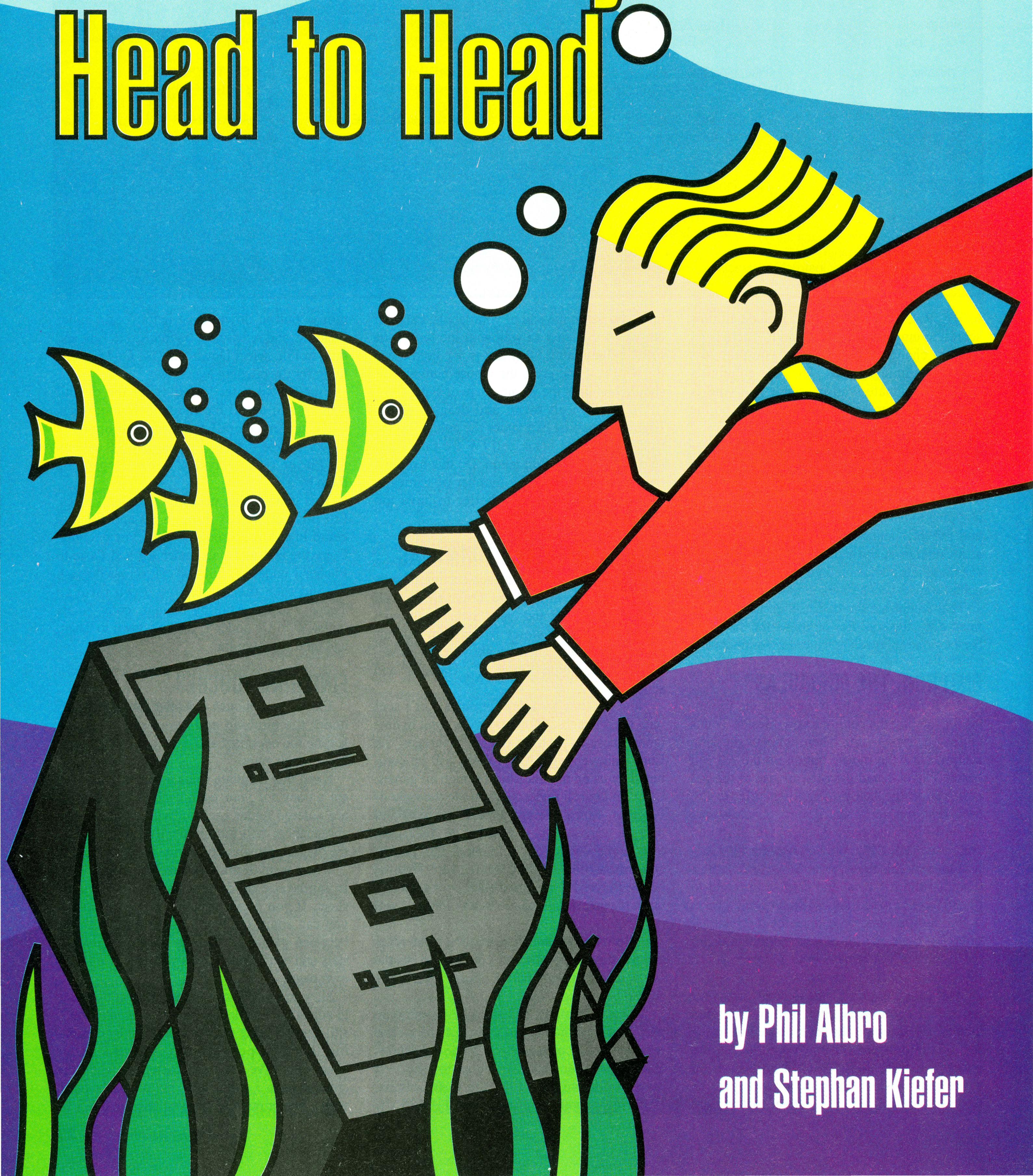
Extras you should consider are underlines under the pitching and line score titles and adding the opponent and date to the label numbering each game.

Keep this template (plus a backup) and create a copy for your team each year. Statistics are entered under each individual game. The spreadsheet will automatically total these to the overall statistics and compute the averages.

If you want to print the results, you can do it in landscape mode and have a continuous sheet. If you prefer printing in portrait mode, you can adjust the width of the blank column between games so that the averages, overall stats and each game's stats will appear on their own page.

Now that you know the basics, don't hesitate to adjust the template to suit your needs. You'll still have to make the decisions, but by compiling this data perhaps you'll have a better chance to have the right batter up when the count goes to 3 and 2 in the bottom of the ninth with a runner on third and you're behind 6-5. ■

File Recovery Utilities: Head to Head



by Phil Albro
and Stephan Kiefer

"Getting errors trying to read directory at..."
"I/O Error"
"Error $0027" (beep)

What were you doing the last time you encountered errors like these? Were you trying to open your almost-done, 12-page term paper (or marketing proposal) with AppleWorks? Or, perhaps you were loading your graphic masterpiece into the paint program for final touches. Whatever you were doing, as computer experts say, you can't get there from here! You have a damaged disk. No problem—you have a backup, right? No? Maybe you don't mind starting your project over from scratch? You do?

Then what you need is a file recovery utility. These are sometimes called disk repair utilities, but since they act on information (which is contained in files), not physical objects (such as disks), the former term is preferable. (None of these utilities can recover data from a disk with major physical damage—only corrupted directory and file information can be corrected.)

This article describes the performance of three Apple IIGS-specific file recovery utility programs in a head-to-head comparison. The programs are *Deliverance v.1.1, ProSel-16 v.8.84,* and *UniverseMaster v.1.02. Deliverance* is a dedicated, stand-alone program, while the others include this capability with other utility functions.

Test Design and Limitations

The programs being compared are limited to ProDOS-formatted disks (which includes disks formatted within GS/OS through the PRO.FST). We are not concerned with problems involving block zero (the boot block); if a disk has lost the ability to boot but is otherwise intact, all one has to do is copy its files to another properly formatted disk.

The damaged disk may have bad blocks, meaning the operating system is either unable to read the block header (placed on the disk when it was formatted) or is unable to read the data from the block itself. The information in the disk volume directory may have become incorrect or meaningless. A file's "key block," the one that tells the operating system where the file data is stored, may not be where the directory says it is (or it may contain "impossible" information).

It would have been nice to simulate all possible types of disk damage, but that was impossible. There is no simple way to deliberately damage a block header after a disk has been formatted, for example. We attempted to make some disks with "bad blocks" using a magnet and scratching the disk surface with a needle, but we could not control either effect well enough to produce comparable damage in multiple disks (necessary for a fair comparison of the three programs).

Test Disks

The common types of disk damage we could simulate were accomplished as follows: A new disk was formatted. About 750 blocks of AppleWorks word processor files were copied into the main directory. A subdirectory (DATABASES) was created and loaded with about 750 blocks of ADB files. Each type of file included one tree file (longer than 256 blocks), the rest were sapling files (more than one but less than 257 blocks). There was no special reason to use AppleWorks document files for these tests, but we wanted to use types of files whose structures would allow us to determine whether or not they had been correctly 'recovered.' AWP and ADB files met this criterion.

Three copies of this disk were made, and each of the four identical disks was altered in a different way using a block editor. Disk 1 had zeros written from the end of the volume name

This article describes the performance of three Apple IIGS-specific file recovery utility programs in a head-to-head comparison. The programs are Deliverance v.1.1, ProSel-16 v.8.84, and Universe Master v.1.02.

entry to the end of block 2, effectively wiping out the entire volume directory. Disk 2 had the directory entry listing the DATABASES subdirectory trashed by writing $71 in each byte for that entry. Disk 3 had the entry for one file in the main directory and the entry for a file in the subdirectory overwritten with $7C's. The last disk had the key block data for one file overwritten with $63's. Finally, several copies were made of each altered disk using a block copier. This procedure allowed us to compare the repair programs on identical problems.

Experimental Setup

Initial tests were run using a ROM 03 IIGS with 5 MB of RAM memory, two 3.5" drives, one 5.25" drive, and a 60 MB SCSI hard drive connected through an Apple High Speed SCSI card. All of the memory was available except 800K reserved for /RAM5. To make sure any limitations we observed were not due to the ROM 03 machine, we confirmed any problems on a ROM 01 IIGS with 4.25 MB of RAM. The repair programs were booted from 3.5" floppies containing the system software but no DAs or INITs other than those required to operate the system. *Deliverance* and *ProSel-16* could be installed on these disks so the programs could be booted into directly; *UniverseMaster* was too large to fit and had to be launched from a separate disk.

The Basic Approach

Each repair program was run in its various diagnostic modes to see what it could tell us about each of the altered disks. If the diagnostic routines indicated a particular subset of the repair program's automatic "fix" routines was the logical choice to use on a particular disk, that's what we used. If that succeeded in fixing the problem on a given disk, fine; if not, we tried the "fix everything" option in the program. If that failed to solve all the problems, we ran through each individual repair option in sequence. Finally, we re-ran the diagnostic functions. On another set of disks we started with the "fix everything" option, following any prompts as they came up. In this case, we used the individual options only if prompted to do so. We did not attempt to use the block editors associated with these programs to perform repairs, since obviously we could have reversed the damage we had produced if we wanted to. (That is, what one block editor could change, any other block editor could be used to change back, if the nature of the change was known.)

After we had made our best shot on the four disks assigned to a given repair program, we checked to see if the other programs could find and fix any "residual" problems not fixed by the original program. Since one can take several approaches to a repair of a given disk by a given program, this meant there had to be many sets of the four altered disks run through the testing. When an apparent problem arose relative to the actual running of a repair program (crashes, lockups, etc.), we repeated the sequence of operations with that program under a different operating system (System Software 5.0.4 vs. 6.0 vs. 6.0.1.)

General Results

No automatic disk repair utility can recover a one-block (seedling) file that has lost its directory entry, although such a file can be recovered by someone with enough experience to totally create a new directory entry from scratch with a block editor. Luckily, if you do lose a seedling file, you have by definition only lost a small amount of information—512 bytes or less. Since we didn't have any one-block files on the test disks, the fact that none of the programs could recover such files wasn't a concern. None of the programs ever reported any "bad blocks" (which is good, since there weren't any). None of the utilities could recover the file (disk #4) whose "key block" (analogous to a track/sector list under DOS 3.3) had been trashed.

If we had manually edited the directory entry on disk #4 for the file whose key block had been trashed, marking it "deleted," we could have created a situation in which the disk bitmap would report several blocks "in use" that were not accounted for in the catalog. Of the test programs, only *ProSel-16* would tell us specifically which blocks these were. That would make manual reconstruction of the key block straightforward. However, using the block editor in this way would be a test of *our* knowledge of disk structure, not a test of the programs themselves.

Disk 1
(block 2 trashed)

It is an axiom that a disk with block 2 badly damaged is hopeless. As usual, the axiom is incorrect. *ProSel-16* did refuse to try to fix disk #1 as soon as it discovered the reference to the location of the disk bit map was invalid. *Deliverance 1.1* reconstructed block 2, found the subdirectory and made a link to it in the main directory (thus restoring all the files in that subdirectory), but could not recover any of the AppleWorks files that had been listed in the main directory. Even searching for "orphan structures" (files that are intact on the disk but not referenced in any directory) produced no results. Exactly the same thing occurred with *UniverseMaster*—it could rebuild block 2 and recover all files from the DATABASES subdirectory, but it could not find the orphaned files that had been in the main directory. In both cases, the disks partially repaired by *Deliverance* or *UniverseMaster* could now be almost completely restored by *ProSel-16*. It became clear that the manner in which *ProSel* locates orphaned files (which it calls "lost" files) differs from that used by the other two programs.

Disk 2
(entry for DATABASES destroyed in the main directory)

All three programs eventually found the subdirectory and restored it. In the case of *Deliverance,* it was necessary to go back and delete the damaged remnant of the original subdirectory entry, but it appears all the programs can handle this type of disk problem. Restoring the subdirectory entry in the volume directory effectively "recovered" all the files listed in the subdirectory as well.

Disk 3
(one file entry trashed in the main directory, and one trashed in the subdirectory)

Several different approaches with *UniverseMaster* failed to recover the two files. In fact, this program wrote its "disk map" file over one of the orphans, so there was no way it could ever be recovered. *Deliverance* found several errors, indicated them fixed, and declared the disk free of errors. However, the two orphaned files were still missing. *ProSel-16* had no trouble finding and restoring these files. Again, its "recover lost files" function seems to be extremely effective. The biggest problem is that only the first 256 blocks of orphaned tree files (files with more than 256 blocks) are recovered.

Documentation

The *ProSel-16* manual provides a good description of the types of errors it can find and repair. It tends to assume that anyone who will be running these utilities will understand that "testing directory structure" and "recovering orphan files" are totally different things. It does not warn you there may be problems on the disk that Test mode will not report, even though the Main Directory Repair and Recover Lost Files functions can fix them. There is no tutorial on using the disk repair functions.

The manual for *Deliverance* is adequate only when combined with the READ.ME file on the disk. It is essential that the user study both the printed manual and the doc file if potential disasters are to be avoided; we hope they will eventually be combined in one place. *Deliverance* has online help for the disk repair options, but it is too bare-bones to be of much help. The manual's discussion of disk structure and types of potential damage is too vague and generalized to be of much assistance. The manual does list several books the user can obtain and study in order to really understand what needs to be done to repair disk damage.

UniverseMaster dedicates a separate section of its manual to a discussion of disk structure and repairable problems. This section could well serve as a textbook on disk repair. There is also an excellent tutorial on how to use the repair utilities on different types of "problem" disks. If there is any weakness in the manual (which we consider to be the best of the three for this particular topic), it is that exactly what the utilities do to "fix" a problem is not specified. Since a disk repair utility can just as easily destroy a disk or make its problems worse if the problem is "fixed" in the wrong way, the user needs to know what the programs propose to do to the disk when each problem is detected.

Safety Aspects

All three programs and manuals are well supplied with warnings about the possibility of making disk problems worse by inappropriate attempts at repair. The average user will, however, feel that the disk in question is unusable in its present condition, so why not try to repair it? These warnings actually serve as disclaimers of responsibility, not anything helpful to the user. However, we do suggest you heed the warnings to make a backup copy of the disk and try to repair the backup first—just in case something does go wrong.

Deliverance and *UniverseMaster* give the user the option of making temporary repairs, in memory only. At some point the user will have to decide whether or not to write the changes to disk. Neither program provides the user with enough information to make that decision on any logical basis, since neither program describes what it did in making its "fixes." What seems like a basic safety feature becomes much less of one in practice.

When *ProSel-16* recovers "lost" files, it insists they be recovered directly to a volume different from the one being repaired. (This guarantees that the file will not overwrite some other files which you also want to recover.) When *Deliverance* recovers a file, it provides the option to copy the temporary memory image to another volume, but does not require that you do so. *UniverseMaster* could perform the copy operation, but it would have to be from the repaired disk, not from the temporary memory image.

ProSel-16 provides only one option in Fix mode—whether or not to change the volume bitmap when blocks are marked in use but not so indicated in the directories and key blocks, or when blocks are marked free that the directories and key blocks say are used. That is, *ProSel* lets the user decide whether the bitmap or the directories are the more likely to be correct. The manual lists two situations in which the bitmap is likely to be incorrect; the implication is that when neither of these two situations apply, trust the bitmap. We have not yet run into any situation where that implication was clearly invalid. Both *Deliverance* and *UniverseMaster* are inclined to simply "fix" problems with the bitmap, which may or may not be appropriate. Again, the user is not given enough information to know whether the bitmap should be modified or not.

Other Issues

UniverseMaster is the only one of the programs that has an option to repair the boot block of a disk. The other two programs could, through their block editors, let you copy the boot block from a good disk to a damaged one, but neither of them mentions that possibility in their manuals.

All three programs had what we consider a deficiency in that they would frequently report a disk as having no errors, when we knew there were files that had not been recovered. *ProSel-16*'s Test function does not actually test for all the problems its other functions are capable of repairing. In particular, it does not test for orphaned files. Only by asking the program to recover such files would you realize they existed on the disk. *UniverseMaster* catches orphaned subdirectories very well, but does not detect the presence of a dozen data files orphaned from the main directory. Of course, their presence makes the bit map inconsistent with the directories. *UniverseMaster* simply "fixes" the bit map, then claims the disk has no errors. *Deliverance* looks at a file entry in a directory where every byte in that entry is messed up and corrects only the date bytes. Once it realizes the key block reference is impossible, it suggests you either skip or delete the entry. If you delete it, the program considers the disk "fixed." So all three programs may, in their test modes, mislead you into thinking a disk has no problems when, it in fact, has some doozies. (And we submit that offering to delete a file with which there are serious problems is less than helpful.)

The programs also differ in what they consider to be a directory "error" that needs fixing. For example, *UniverseMaster* considers a file creation date later than the file modification date intolerable. But this is often an intentional situation, marking that file as one that has been copied by a particular installer program. All the programs will, when they dislike a date in a file entry, change the entry to [no date]. We did not consider this necessarily an improvement. None of the programs consider it an error when a file's "length in bytes" is much greater than could fit in the number of blocks the file supposedly occupies. Well, such an entry could mean that this is a sparse file, and therefore valid, but it could also mean this is a restored file whose key block has been messed up. We would have preferred the programs at least flag such entries, so we could check out the latter possibility.

When AWP files were recovered by a search for orphans, the directory entry was always written as though the file completely filled all of its blocks. If you try to load such a recovered file into AppleWorks, AppleWorks crashes. (As an aside, running these recovered files through Change-A-File, a shareware AppleWorks file fixer by Harold Portnoy, will solve that problem by putting the correct "end of file" data into the directory entry.)

Even *ProSel-16* can not recover a GS/OS (forked) file orphaned from the main volume directory. It will find the lost parts, but will "recover" the data and resource forks as though they were separate files. Even a file that has an empty data fork, such as a Truetype font or an rSound, will be recovered as though it were an ordinary data storage type.

Block Editors

Thus far we have avoided the issue of manual editing of disk blocks to repair errors. None of the programs do, or could be expected to, provide information on byte-level disk structure adequate for a novice to perform block editing. All three programs do, however, provide tools for block editing if the user has acquired the knowledge needed to use them. Since any (ProDOS) block editor can change any byte in any block on any (ProDOS) disk to any other byte, the question becomes mainly one of which program makes it easiest.

One can edit a volume, in which case one selects blocks by number. One can edit a particular file, in which case one follows "relative" blocks within that file only. Or one can edit the directory information about a file such that only directory blocks are accessed. *ProSel* and *Deliverance* support all three operations; *UniverseMaster* seems to lack a "follow file" function. *ProSel* provides a volume editor by default, switching to a "file follower" on request. If the file being "followed" is a directory file, the third function obtains. *Deliverance* has "edit [directory] entry," "edit file," and "edit volume blocks" as separate selectable options. *UniverseMaster* and *Deliverance* will format a directory entry so the user can easily see what file parameter is being changed; *ProSel* does not.

UniverseMaster and *Deliverance* have Find and Replace functions built into their block editors. *ProSel* has only a find option. While one can copy an entire block from one volume to another with *ProSel's* editor, the other two programs can copy all or part of a block (through the clipboard). Editor functions are always listed on screen in *ProSel,* but without explanation. *Deliverance's* online help briefly explains the editor. The block editor in *Deliverance* is "called up" during disk repair operation; block editing is a separate issue in the other two programs. We would tend to consider the block editor in *Deliverance* the cleverest of the three. However, if the block editor in *Deliverance* is used from Fix mode rather than selected from the main menu, attempting to write any edited directory blocks to disk will cause the program to lock up. This is considered a safety feature by the authors of *Deliverance,* but a real pain in the neck by the authors of this review.

Suggestions for Upgrading

ProSel-16 seems to have a missing but needed capability. When it recovers orphaned files, it assigns file type zero, auxtype zero (since it has no way to know what types the files were originally). Even if the correct type/auxtype assignments are known, *ProSel-16* has no built-in means to change file types or auxtypes (except through the program's block editor and a thorough knowledge of the ProDOS disk format). This should be added.

No repair program should write extraneous information on the disk being repaired. *UniverseMaster* does so. This "feature" can make deleted or "missing" files permanently nonrecoverable by overwriting their contents, and ought to be removed in a future version.

No program should deliberately lock up such that a reboot is required. If one is not supposed to write altered directory data to disk during a repair sequence, then that option should not be offered. *Deliverance* should be modified to eliminate that problem.

The Bottom Line

Besides making frequent disk backups, there is one simple thing Apple II users can do to make loss of data much less probable. Data disks should have nothing listed in the main volume directory except subdirectories. All data files should be in one or another of the subdirectories. It is fairly easy for all file recovery utilities to deal with such disks, but much more difficult to cope with data files lost from the main directory.

Another thing we learned was that owning two of these utilities can save your bacon when no one of them can do the job. Running either *Deliverance* or *UniverseMaster* first, then following with *ProSel-16,* could salvage the files on test disk number 1 (trashed volume directory) when neither of the utilities could handle the whole job alone. Another tip—once you've finished repairing a disk using any of these utilities, copy all the files to another, newly formatted disk. What went bad once, can go bad again. That repaired disk shouldn't be trusted too far, just in case the problem was caused by some kind of media flaw.

Finally, we repeat a recommendation made in the manual for *Deliverance*—if you are somehow able to find copies of "Beneath Apple ProDOS" by Don Worth and Pieter Lechner, and "ProDOS Inside and Out" by Dennis Doms and Tom Weishaar, get them! These two books will teach you everything you could want to know about the detailed structure of ProDOS disks. With this knowledge, you can use a good block editor to recover everything recoverable from any damaged ProDOS disk, including files whose problems far exceed the power of general purpose file recovery utilities to solve in their "automatic" modes. ■

Sources of Products Mentioned:

Deliverance, v.1.1
(Part of Salvation Supreme)
Vitesse, Inc.
P.O. Box 929
La Puente, CA 91747-0929

UniverseMaster, v.1.0.2
Econ Technologies, Inc.
P.O. Box 195356
Winter Springs, FL 32719

ProSel-16, v.8.84
Harold D. Portnoy
521 State Road
Princeton, NJ 08540

Change-A-File, v.4.02
Glen E. Bredon
1431 Woodward
Bloomfield Hills, MI 48302

Resource Central
Box 11250
Overland Park, KS 66207

Prices

Change-A-File
$10 from Harold Portnoy

ProSel-16
$89.95 from Glen Bredon

Salvation Supreme
$89.95 from Quality Computers

UniverseMaster
$79.95 from Econ Technologies, Inc.

Beneath Apple ProDOS
$12.95, including shipping and handling from Resource Central.

Resource Central offers Beneath Apple ProDOS—FREE—to any new subscriber of any of their disk- based publications who mention II Alive and asks for the free book. This offer is valid until August 1, 1994.

AN INTERVIEW WITH TOM WEISHAAR

by Tara Dillinger

Tom Weishaar has been a pillar of the Apple II community for over a decade. His knowledge and skills have earned him a respected position in that community and the affectionate title of "Uncle DOS." Head of Resource Central, and former owner of GEnie's Apple II Roundtables, he's still heavily involved in "releasing the power."

II ALIVE: How did you first got involved with computers?

WEISHAAR: Long ago and far away, when I was in college in the late 60s, I took nine hours of computer electives while getting a degree in English and Radio/TV/Film at the University of Iowa. I didn't have much access to computers after that, but when my wife and I bought our first house in 1978 in Kansas City, we designated one of the rooms as the "computer room." It wasn't until 1980 that we actually bought a computer for it, however.

Some salesmen had stopped by the company I worked for trying to sell us color terminals for our mainframe and I asked them if they had a personal computer version of the terminal—it played a very colorful and illegal game of Monopoly. They said they did, and I went to a computer store to buy one. The salesman at the store said they *did* have that computer, but it was back at the factory for the third time being fixed. He then asked me if I'd ever seen an Apple II. I hadn't, but within a few weeks I had one in my computer room. That's how it all started.

II ALIVE: Later, you did some work for the Beagle Bros. How did that happen?

WEISHAAR: I enjoyed the Apple II so much that about a year later I quit my job as a managing editor at a news service and stayed home to teach myself assembly language programming. I was thinking about going into the business of teaching people how to use computers, and I thought what the computer world needed was what is known today as a "presentation" package. So I wrote one of the first of those and sent it to Bert Kersey and Beagle Bros.

Beagle Bros hadn't published much by outside authors, but the week Bert got my program, which was called *FrameUp,* he also got one called *FlexText* from a fellow named Mark Simonsen, who eventually bought Beagle Bros, and he decided to publish both of them. Later I wrote an Apple DOS 3.3 speedup utility called *ProntoDOS* for them.

II ALIVE: How did you start your first publication?

WEISHAAR: Well, all during this time, Bert was writing a monthly column for a magazine called *Softalk,* which was the premier computer (and Apple II) magazine of the day. He told me it was taking too much of his time and that he couldn't handle it anymore, so I asked him to suggest me as a replacement when he quit. He did, and I took over the column, which was called "DOStalk." It was a neat little thing with DOS tips and tricks, and explanations of how it all worked. Most of the columns (both Bert's and mine) were later combined into a book called *The DOStalk Scrapbook.*

Softalk went out of business in August, 1984. I was involved in writing two computer books about that time: *ProDOS Inside and Out,* with Dennis Doms, and *Your Best Interest,* a book that explains how interest rates work and how to do interest rate calculations with a spreadsheet program. When *Softalk* folded, I felt sure that it wasn't because people weren't interested in it. I decided to take what I thought were the best parts of *Softalk*—the letters to the editor, the question and answer column, and "DOStalk," and continue them in a newsletter format.

The newsletter was called *Open-Apple,* and it had a logo that incorporated the Open-Apple key and space bar from the IIe. The first issue was published in January, 1985. Later the name of the newsletter was changed to *A2-Central.*

II ALIVE: How did Resource Central, the company, come about?

WEISHAAR: For the first few years I worked out of my house, and the business was organized as a sole proprietorship. In 1989, it had grown to the point that I thought it should be organized as a corporation. That's where Resource Central, Inc. came from.

II ALIVE: What were the publications under the under the Resource Central umbrella at that time?

WEISHAAR: Our only publication was *Open-Apple,* then. We also had a small business selling books, hardware, and software to our subscribers, and I was managing the Apple II RoundTables on GEnie. I'd been doing the GEnie work for about a year. The Apple II RoundTable was known as "A2", so when we officially became Resource Central we changed the name of *Open-Apple* to *A2-Central.* It was then that we started *A2-Central On Disk,* which was our second publication.

Our next publication was originally called *Stack-Central.* It was designed for people interested in Roger Wagner Publishing's *HyperStudio.* We still publish that, but now it's called *Studio City.* (We change names a lot to show how flexible we are!)

Soon after that we started a disk for AppleWorks and TimeOut users, called *TimeOut-Central.* Then came one for HyperCard IIGS users—*Script-Central.* Nowadays we call these three *(Studio City, Time-Out-Central,* and *Script-Central)* our "special interest group" publications. They are all published six times a year. Randy Brandt, the project leader for AppleWorks 4.0, is the editor of *TimeOut-Central.* Bill Lynn, known around the world as the Stupid Button Trick guy, edits *Studio City.* (Let me clarify that. He's a smart guy who comes up with stupid button tricks—that is, things you didn't know *HyperStudio* could do—not a stupid guy who comes up with button tricks!)

II ALIVE: Tell us a little about *Script-Central.* Now that HyperCard GS is available from online services and user groups, it sounds like a great idea!

WEISHAAR: *Script-Central* was originally designed by Bo Monroe and Hangtime, and, in my humble opinion, never really got the attention it deserves from the Apple II community because HyperCard GS never took off. Maybe now it will. It's a stunning publication. Every issue opens on the street outside the Script-Central "building." You enter the building, and the issue's "features" are in different rooms. You navigate the issue by moving from room to room. Hangtime continues to edit it and add new features.

II ALIVE: You also have a few non-Apple II publications.

WEISHAAR: Hangtime, the editor of *Script-Central,* does a monthly Macintosh disk for us called *Macrocosm.* And we even have a new monthly disk for Windows users, too, called *Solid Windows.* We also do a version of *Studio City* for the Macintosh. That covers everything we currently publish.

II ALIVE: You've had some strange names for your publications. Like *Fishhead's Children.* What was that one?

WEISHAAR: *Fishhead's Children was* a strange name. So strange the publication never got off the ground. It was designed for people who use more than one kind of computer—the idea was if you'd already read the manual for the Apple II, it would teach you how to use a Macintosh and Windows without making you read the manuals for those, too, by building on what you already knew. I see that one of the Mac magazines now has a monthly feature on a similar topic. But when we tried to do it, we just couldn't get anyone to subscribe, and we had to stop publishing it.

II ALIVE: So are all your publications disk based now?

WEISHAAR: Yes. When *Fishhead's Children* died, it took the paper version of *A2-Central* with it. We continue to publish an *A2-Central* "newsletter" each month, but it is only available on 3.5 disk, not paper. The same is true for all of our other publications. Except for *Ahs.*

II ALIVE: And what is *Ahs?*

WEISHAAR: *Ahs* is ICON's quarterly newsletter. It's paper-based, not on-disk. We just published our first issue this spring. ICON is the International Computer Owners Network. You see, during the last two years, as we've watched our business plunge at approximately the same rapid rate that it had grown in earlier years, I've spent a lot time trying to figure out what computer users need, what Resource Central can do, and where they overlap. It finally came to me that Resource Central is actually more like a user group than any other kind of company, and always has been. However, most user groups are non-profit. During 1994 my goal is to transfer Resource Central's publications and summer conference to a new non-profit user group, called ICON. I hope those of us who are left as Resource Central employees will become employees of ICON.

II ALIVE: How does one join ICON?

WEISHAAR: ICON membership is open to the public. The annual fee is a measly $8. People can join by sending their name and postal address to us along with the annual membership fee. We're at PO Box 11250, Overland Park, KS. Our email is ICON@genie.geis.com.

II ALIVE: What are the benefits of joining ICON?

WEISHAAR: In addition to Ahs, members get invited to the ICONference, which is our traditional summer conference in new clothes. Members also get access to Apple system software (Apple II and Mac) and to back issues of our publications for just $3 a disk. We have a members-helping-members program in the works, called Help ICON, and we're trying very hard to recreate the sense of community Apple II users have always had the computer universe at large.

By the way, I forgot to mention it, but the annual $8 fee is included in the price of our disk subscriptions. In other words, if you subscribe to any one of them, you are automatically an ICON member, and we waive the $8 fee. These now break down into the monthly disks for the Apple II *(A2-Central),* Macintosh *(Macrocosm),* and Windows *(Solid Windows)* and the Special Interest Group disks for HyperStudio *(Studio City,* IIgs and Mac), AppleWorks *(TimeOut-Central),* and HyperCard IIGS *(Script-Central).* Prices of those run less than $5 a disk.

II ALIVE: The Resource Central Summer Conference (also known as KansasFest) has always been a very exciting way to learn more about the Apple II and to meet fellow Apple II enthusiasts. In the past, Resource Central and the A2 Roundtables were jointly owned, and both benefited from the combination—especially at the conference. But recently, the A2 and all the other RT's once owned by Resource Central were purchased by Dean Esmay. How will this effect the conference, if at all? Will these two entities still continue to work closely together?

WEISHAAR: As Dean mentioned in his interview last month, he has purchased Syndi-Comm, Inc., a corporation that Kent Fillmore and I formed to manage a number of areas on GEnie. I no longer have any responsibility on GEnie, but I continue to be active there. Dean will be bringing his staff to our summer conference as usual. We expect the conference to be better than ever. It's not as technical as many people seem to think. Still, programmers find it to be the primary gathering for Apple II hackers. I hope that tradition continues.

II ALIVE: Do you have to be an ICON member to go to the conference?

WEISHAAR: Yes, the conference is for members only—but since you can join for $8, I don't expect that to keep many people away, especially since the $200 registration fee is $100 lower than last year's, and rooms with meals are only $35 a night.

II ALIVE: When is it, and how do we register?

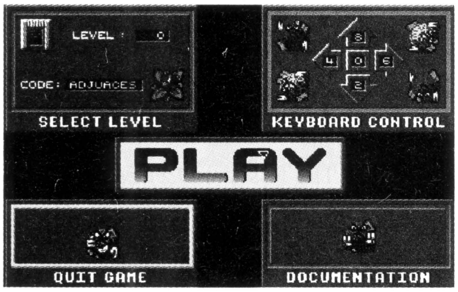
WEISHAAR: The conference will be held at Avila College in Kansas City, Missouri on Thursday, Friday, and Saturday, July 21, 22, and 23. We will have several tracks of sessions on Thursday and Friday. Saturday will be an "unstructured" day. We plan to have tables set up for swap-and-shop type activities on Saturday, and expect folks to stand around the glowing monitors and tell tall tales. To register, call us at 913-469-6502 so we can get all the information we need to make sure you have a great time.

II ALIVE: Sounds great, Tom! *II Alive* will be there! See you in July!

WEISHAAR: Yes, see you there! ■

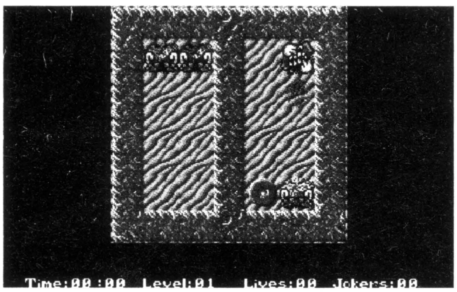
The Tinies, Apple IIGS

by Brutal Deluxe, freeware



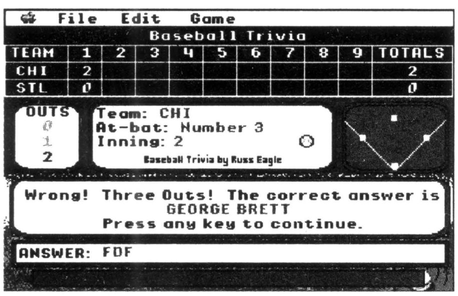
The big news of the month is tiny. Well, it's The Tinies! And it comes to us through the benevolence and programming skills of France's Brutal Deluxe. *The Tinies* gained popularity in the Macintosh, PC, and Amiga markets as a commercial game but was never developed for the Apple IIGS—until now. Evidently, the group has connections with Atreid Concept, the company that developed the commercial versions, and were given permission to port it to the Apple IIGS as freeware.

The Tinies is fun for the young and not-so-young alike. The graphics are very well done with 3200-color screens, the sound effects will make you smile, and you won't want to stop playing until you've mastered all 101 levels. And just in case you become obsessed with it, I've included a separate program with passwords to all the levels and a small patch to fix a bug that prevents you from finishing level 87.



Baseball Trivia v.4.2, Apple IIGS

by Russell Eagle, $10.00 shareware



What better time to practice your knowledge of baseball trivia than during the height of the season? This two player game has three difficulty levels (rookie, all-star, and hall of fame) and an option to show the correct answers. Each player gets 30 seconds to correctly answer each question, and like the real game, you get three outs per inning.

Another Trivia Game, Apple II's

by Rudy A. Guy, Public Domain

Another Trivia Game is another way to exercise your mind. It is played by up to four players or teams who can set the goal at the beginning of the game. One of the nice features of this one is the ability to accept an answer even if it does not exactly match the computer's answer. There is an editor that allows new questions to be answered, making this perfect for the classroom to reinforce the current curriculum. The game is text-based and additional question disks are available from the author.

Change-A-File v. 4.20, Apple II's

by Harold Portnoy, freeware and shareware. $10.00

Change-A-File is a powerful file utility with 5 options designated as freeware (Change File Info, Strip Line Feed, Strip Control Character, Insert LInefeed). The other six utilities can be unlocked by sending in the shareware fee and obtaining the password. Once unlocked, additional options include AWP to TXT File, TXT to AWK file, exhume AWP file, AWP File Doctor, and Restore ADB. This program was recommended in this month's feature on File Recovery programs.

Trax, Apple II's

by Ron Kneusel, freeware

Trax is a collection of utilities that manipulate DOS 3.3 disks. Utilities included are a sector editor, VTOC editor (volume table of contents), DOS utilities (raw data dumps, zapping of DOS commands, changes the name and type of boot program, bad sector scan and more), and an I.D. marker. If you still have DOS 3.3 disks, you'll like this one!

The Shareware Spy Library

Programs mentioned in Shareware Spy are available from most online services and user groups. As a convenience to those without access to a local user group or a modem, we also offer the programs on disk. Send check or money order (in US funds) for $5 per disk to: Shareware Spy, P.O. Box 866511, Plano, TX 75086-6511. (If you live outside North America, include an additional $5 per order for airmail shipping.) Make checks payable to "Shareware Spy." Allow 2-4 weeks for delivery.

Important Note: When you buy a Shareware Spy disk, you are paying for the blank disk, postage, and labor involved in compiling the disk, not the software itself. You are still legally and morally obligated to pay the shareware fee for any shareware programs you decide to keep. (Remember, public-domain and freeware prgrams can be freely copied and distributed, but shareware must be paid for if you use it past the trial period.)

Programs do not include necessary System Software (ProDOS & Basic.System or IIGS System 5.04 or later.)

May/June 1994

8A	3.5 GS	The Tinies
8B	3.5 GS	Baseball Trivia, Another Trivia, Change-A-File, Blockhead
8C	5.25	Another Trivia, Change-A-File, Blockhead
8D	5.25	Trax

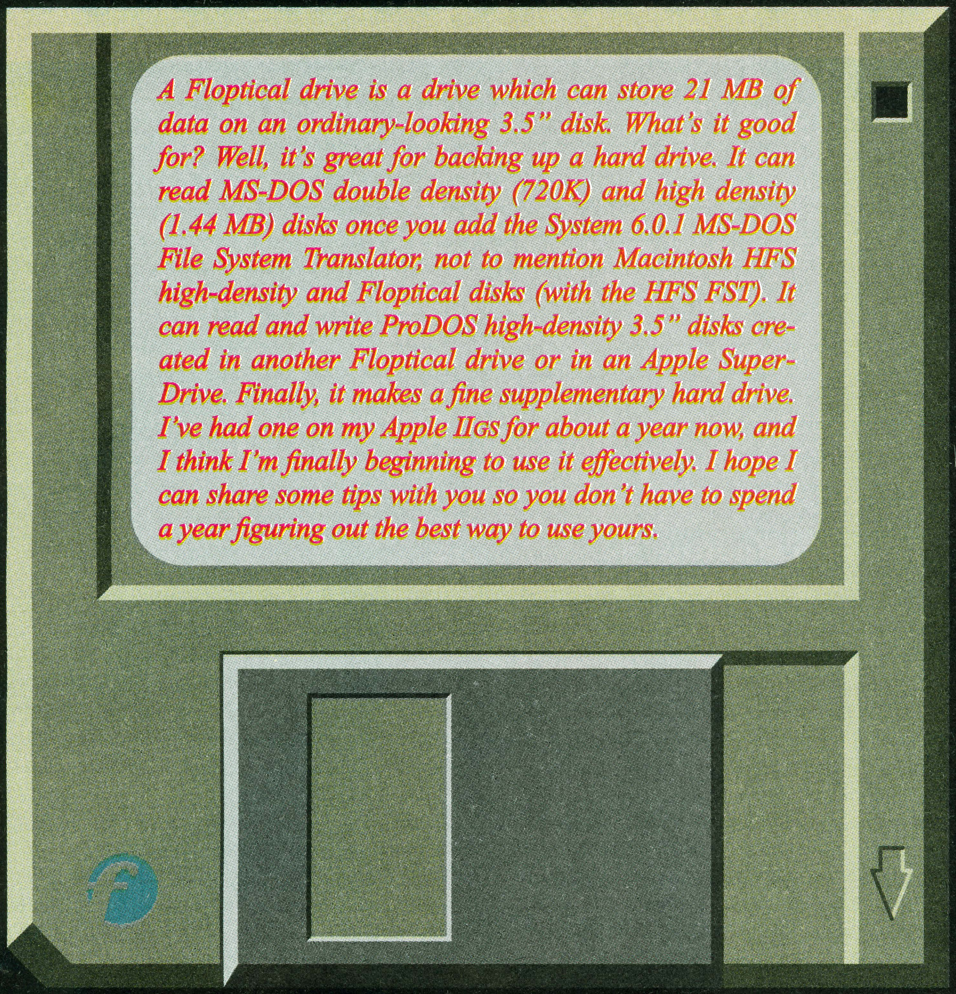
March/April 1994

7A	3.5 GS	Hangman, Plumb Crazy, Yahtzee, Code Matcher, WriteAway!
7B	3.5 GS	DocVu, Ensoniq Peeker, FinderTalk, SynthInit, Eye, Ear,

(Continued on page 54)

The Floppy Disk Grows Up: Floptical Drives and the Apple II

by Doug Cuff



How It Works

A Floptical drive shares technology with both a standard floppy disk drive and a compact disc player. On normal 3.5" drives, due to the expansion and contraction of media with heat (not to mention the calibration differences between drives), the data tracks tend to be wide to allow a margin of error. However, the laser-encoded information on the Floptical disk expands and contracts along with the disk medium, allowing the read-write head to be positioned extremely precisely.

The laser is used only for positioning the read-write head. The data itself is still stored magnetically, so the old warnings about keeping the disk away from magnetism still apply. The trade name Floptical comes from a combination of floppy and optical technology.

There are two brands of Floptical drive mechanisms available—Insite's and Iomega's. I understand that the Iomega drive uses a different optical tracking mechanism, but that the two systems are compatible—disks formatted on one type of drive can be used in the other.

Don't confuse these names of the manufacturers with the names of the companies marketing the drives. Applied Engineering and Tulin Technology were among the first to make Floptical drives available to the Apple II community. These manufacturers, along with others, simply buy mechanisms from either Insite or Iomega, put them in a case, and, in some cases, provide some software. I bought my Floptical from a local dealer.

Although it holds 21 megabytes, a Floptical disk looks pretty much like any other 3.5" disk. It has exactly the same dimensions, but it also has write-protect holes on both the left and right edges (like a high-density floppy), and it bears the Floptical logo—a stylized lower-case F in a circle—which is supposed to prevent you from accidentally putting a Floptical disk into a conventional 3.5" drive and having your drive make a sound like a Cyclops grinding its teeth. (In my case, so far, so good.)

To observe the most visually striking difference between a Floptical disk and a normal 3.5" disk, carefully move the little metal door on one of each. A standard 3.5" disk has a shiny gray-black surface. A Floptical disk is amber, but you won't really notice that until you hold the disk up to the light, at which point it becomes obvious that it's also partially transparent!

The Purchase Decision

Before I bought my Floptical drive, I had two hard drives, both of which were divided into two partitions. The first partition held programs, the second partition held data I used frequently, the third partition held data I used less frequently, and the fourth partition was used as a MS-DOS hard drive with my PC Transporter.

At about the same time my second hard drive suffered a memorable and spectacular crash, Floptical drives were beginning to make their appearance in the Apple II market. The 21-megabyte disks seemed like the ideal backup solution.

That third partition contained data—five years' worth of back issues of computer disk magazines, 6.5 megabytes of a reference book—which I used regularly but infrequently. Say, once a month. It really didn't make sense to take up valuable hard drive real estate with that. The same was true for the MS-DOS hard drive partition. When I heard that the Floptical drive would also allow me to read and write high-density disks, just like the Apple SuperDrive, and for less than the cost of a SuperDrive, I was sold. And I got the ability to read MS-DOS disks in the bargain.

A Test Drive, and Vice Versa

Installing the Floptical drive was simple. It's a SCSI device, which means you need a SCSI card in the computer. I already had a RamFAST/SCSI card with a ROM version that supported the Floptical (v3.00k or later), so I just ran a SCSI peripheral cable from the back of my hard drive to the back of my Floptical. After double-checking to make sure the drive chain was properly terminated, I booted up. Since the RamFAST driver was already in my Drivers folder, installation was complete.

You can also use a Floptical drive with Apple's own SCSI cards. Apple's SCSI drivers will not do the job—you'll need one of the two special drivers available. One driver, by Australian programmer Richard Bennett, is freeware. Also, Tulin Technologies includes a driver with their Floptical drives. This driver, written by Matt Gulick, designer of the Apple High Speed SCSI card, is meant as a replacement for the Apple SCSI drivers. (You should delete or inactivate the Apple SCSI driver if you are using the Tulin driver.)

When you first put a Floptical disk in the drive, you'll hear a short grinding noise reminiscent of the venerable Disk II 5.25" drive. Don't be alarmed; as with the Disk II, this sound is normal.

Formatting a Floptical disk takes twenty minutes or more, but before you do that, check to see if the disks are already formatted. (Many brands are, though they may say "for MS-DOS" or "for Macintosh"—it doesn't matter.) If the disks are preformatted, all you need to do is partition them, which takes about five seconds. If you have a RamFAST card, this is easily accomplished with the SCSI utilities in RamFAST.System; Apple SCSI card owners should use the Advanced Disk Utilities.

Once a Floptical disk is partitioned, you'll notice that you have 19.8 megabytes of space, not 21. The 21 MB measurement refers to the disk's *unformatted* capacity. Actual formatted capacity is somewhat less.

Making a Backup

The first thing I did with my Floptical drive was make a backup of my hard drive. A good thing I did, too, because not long afterward, my *other* hard drive crashed! When I got my new hard drive, the first thing I did was divide it into 19.8 MB partitions.

Once I had created five partitions of exactly the same capacity as a Floptical disk, making a backup was quick and easy. It takes just five minutes for the Finder to back up each partition. (As a comparison, backing the same partition up to 800K 3.5" disks not only takes up the better part of an afternoon, but also requires that you sit by the computer the whole time, supplying a fresh disk every minute or so. By the time it's over, you have a stack of 3.5" disks and a headache.)

Best of all, the backups produced in this fashion are accessible just like the original drive. You don't need a special program to access them, as you would if you backed up to 3.5" drives using *Bakkup* or *ProSel*. You can use the Find File desk accessory to search the backup disk, and restoring a file is as easy as dragging it from one window to another in the Finder. You can even boot from a Floptical backup of your hard drive's startup partition, if it becomes necessary.

Backing up to 3.5" disks was so disagreeable that I made backups far less frequently than I should have. These days, secure in the knowledge that my IIGS doesn't need me to hold its hand the whole time, I make backups of my data partitions once a week—or, sometimes, when I'm working to deadline on an important project (like this article), at the end of the day. Of course, I don't back up the partitions on which I store programs as often as that, since those partitions don't change much.

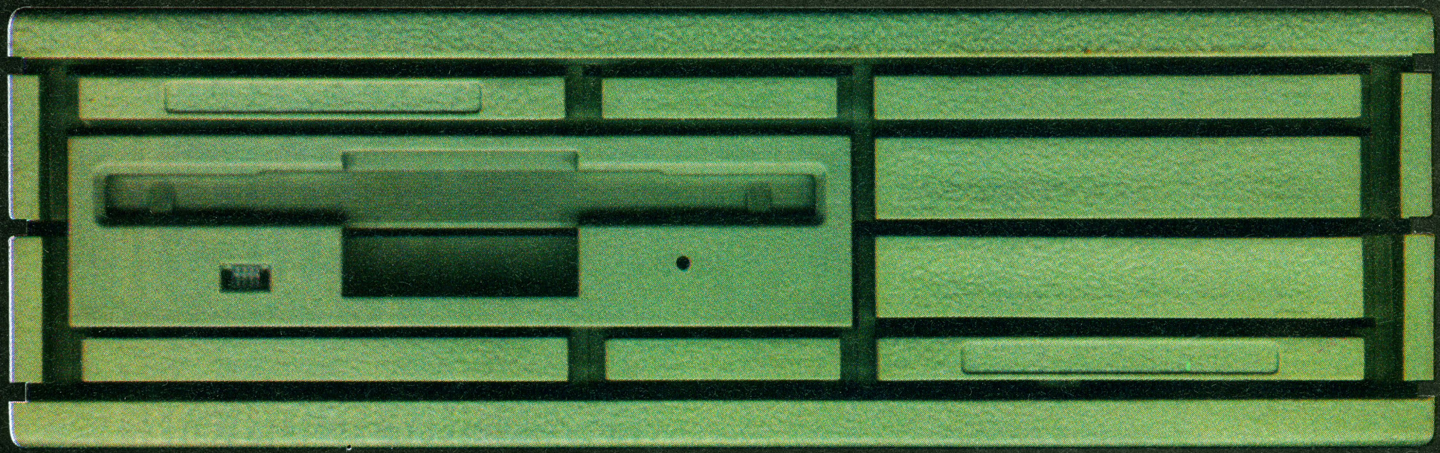
Backing Up A Floptical

The flip side of the Floptical's ease and speed of backing up a hard drive is the torturous process of copying one Floptical disk to another. This is something you're going to need to do eventually, unless you only use your Floptical drive for archival purposes. (In my case, I also use the Floptical for storing those infrequently-needed files, and for my PC Transporter MS-DOS volume, and naturally I want to back those up, too.)

Remember the days of copying a 3.5" disk with a single 3.5" drive on a 64K machine? Back then, you had to insert both the original disk and the copy at least forty-five times, and it took about twelve minutes. Or, at least, it *felt* like forty-five swaps and twelve minutes. Until you've tried it, I'll thank you not to cheapen the phrase "disk-swapping nightmare" on lesser tribulations.

When I backed up a Floptical disk onto another Floptical, copying a disk that was 12.1 megabytes full took 28 minutes, and one that held 17.9 megabytes took 37 minutes. The number of swaps depended on the program used, but varied between 5 and 25. Not really that bad, but not nearly as convenient as the hard-drive-to-Floptical backup.

The main reason it took so long (besides the sheer volume of the data being copied) is that it takes the drive about fifteen seconds to recognize a disk when it's placed in the drive. The Floptical drive has been adapted for and adopted by the Apple II community, but deep inside the Floptical is a standard IBM floppy controller chip. This makes the drive quick to recognize a 720K or 1.44 MB MS-DOS disk, but it takes much longer to recognize a 21-megabyte Floptical disk.



This 15-second delay has serious consequences for copying a Floptical disk onto another Floptical disk. There's a delay of at least 15 seconds every time you insert the original Floptical disk, and at least 15 seconds every time you insert the copy. In practice, that "at least" can range up to 80 seconds. This disk recognition time accounts for the bulk of time spent copying Floptical-to-Floptical—the actual reading and writing of the data takes about 10 seconds.

One solution to this problem is to copy the original Floptical to a blank 19.8 megabyte hard drive partition. Then eject the original Floptical, insert the backup Floptical, and copy the hard drive partition to that. Simple enough, once you think of it. I didn't; Lunatic E'Sex did, and posted it on GEnie.

Of course, if you don't have an empty partition, you have to make a backup of a partition that's in use first. Then, once you're finished duplicating the Floptical, restore the backup to the original partition. Another solution—and, given the price point of the Floptical drives, a not entirely unreasonable one if you frequently need to back up Floptical disks—would be to buy a second drive.

A Supplemental Hard Drive

Although you can boot from a Floptical drive (on a IIGS with a RamFAST, at least), I can't recommend buying one *instead of* a hard drive. GS/OS starts to complain if you removed the Floptical disk you booted with. (Ever tried running GS/OS on one 800K 3.5" drive? Remember the computer asking you to swap disks every time it needed a tool or other file from the startup disk? This is much worse, because of the 15-second delay mentioned above.)

The first law of buying a hard drive is to buy as much capacity as you can afford, and the second law is to buy one size larger than you think you need. That's because the first law of *owning* a hard drive states that data expands to fit the space available. With a Floptical drive, you don't have to worry quite as much, because the space can expand as well. By storing seldom-used data and programs on Flopticals, you can reserve your hard drive for everyday tasks.

Incidentally, the Floptical corollary of the second law of buying a hard drive (which I discovered shortly after buying the drive) states that you should buy twice as many Floptical disks as you think you need. I bought a box of five with my drive, and bought a second box of five a mere three weeks later. Floptical disk costs range from $17 to $25. The cheapest prices are from mail order firms, which means you'll need to calculate the shipping charge into the cost per disk.

I don't use my PC Transporter often, but when I do use it, I need a large disk volume. By popping the MSDOSVOL Floptical disk into the drive, I can have a 19-megabyte MS-DOS hard drive. In fact, I can have as many separate MS-DOS hard drives as I like. It's a bad idea, though, to remove the Floptical disk from the drive—even to swap in another—while the PC Transporter is running. Also, as we'll see, the PC Transporter will not recognize the Floptical drive as anything but a hard drive. You can't use it, under MS-DOS, to read or write standard IBM 3.5" disks.

I don't use my PC Transporter often, but when I do use it, I need a large disk volume. By popping the MSDOSVOL Floptical disk into the drive, I can have a 19-megabyte MS-DOS hard drive. In fact, I can have as many separate MS-DOS hard drives as I like.

As it happens, the only time I use my Floptical drive to run programs is when I'm using my PC Transporter and MS-DOS. The Floptical drive is not really slow—it runs at about the same speed as my older, slower Seagate hard drives, and is much faster than a conventional 3.5" drive. The Floptical drive simply is not as fast as my new hard drive—even with the drive attached to a RamFAST. A Floptical drive attached to an Apple SCSI card is appreciably slower. (For the technically minded, the Floptical drive has an average seek time of 65ms.)

Using Floptical disks with ProDOS 8 programs, such as AppleWorks, presents something of a challenge. Flopticals are only *guaranteed* to work with GS/OS programs, but you may find that you can read a Floptical disk while in AppleWorks. Swapping Flopticals is not a good idea—you may be able to read the new Floptical disk, but not write to it. In any case, since the Floptical drive doesn't have an Eject button, you must use a straightened-out paper clip in the manual-eject hole to get the disk out while in ProDOS 8. ProDOS will notice when you eject a Floptical disk, but has no ready way to figure out when you insert a new disk.

A Supplemental Disk Drive

IBM users tend to assume that anyone with a computer can read their disks—since IBM is The One True Computer System. In the past, people reacted with disbelief when I told them I couldn't read their disks. Now, with my Floptical drive (and the System 6.0.1 MS-DOS FST), I can finally read the double- and high-density MS-DOS disks that others toss my way. With Peter Watson's excellent shareware MS-DOS utilities, you can write MS-DOS disks as well.

Nothing taxing is required to read an MS-DOS diskette; just stick it in the Floptical. Since Floptical drives were built to be attached to IBM compatibles, they recognize the MS-DOS 3.5" disks quickly. Standard 720K and 1.44 MB disks will show up in the Finder and most other GS/OS programs just like any other floppy disk.

The Floptical drive can also read high-density Macintosh HFS disks, as well as Floptical disks formatted on a Macintosh. It won't read 800K HFS disks, but a standard Apple 3.5" drive will read such disks, so that's no problem.

Similarly, the Floptical drive can read and write 1.44 MB ProDOS disks, but can't read standard 800K ProDOS disks. What it will do is make grinding sounds for a couple of minutes in an ultimately futile attempt to do so. If you were thinking of replacing your current 3.5" drive with a Floptical, you can't.

A Floptical drive can only recognize two types of formatting: its own, which is RLL, and MFM, which is used by IBM and compatible disk drives (and also by Apple and Macintosh high-density formats). ProDOS 800K disks use Apple's GCR older format, which the Floptical cannot read.

A Tale of Woe

For most of the first year I used the drive, I was plagued by problems when copying to Floptical disks. When I used the Finder to back up a hard drive partition, the volume copy would proceed splendidly until the last 5000 bytes, at which point the computer would crash into the monitor. If I tried to reboot my IIGS, my RamFAST card would tell me there had been a fatal write error. Only shutting off the power helped.

This was both puzzling and frustrating. Then other intermittent problems began to crop up. I knew I had the proper RamFAST ROMs to support the Floptical drive, but tried updating to the most recent version. In fact, I tried it several times. It did no good. The dealer who had sold me the drive kept offering possible fixes, but nothing worked.

Recently, the dealer found the cause of the problem. He had bought the Insite drive mechanism from his supplier, and mounted it in a

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small and attractive case from Trimm Industries. The case's power supply was creating an electromagnetic disturbance, and the cover was bouncing the interference back at the Floptical drive! Sure enough, when I removed the cover from the drive, all problems ceased. The minute I put the cover back on, my troubles resumed.

The dealer was able to fix the drive quite easily with some extra shielding once he had pinpointed the problem, and I was relieved to find that it was not an intrinsic flaw of the Floptical design.

In Summary

On the credit side of the ledger, we have the facts that a Floptical drive works well as a backup device, functions well in a manner similar to a removable hard drive, and will read high-density ProDOS, MS-DOS, and HFS disks. On the debit side, the Floptical won't read a conventional ProDOS 3.5" disk, does not operate at the same speed as a hard drive, and supports a single-drive copy only if the human operator doing so has plenty of leisure and iron nerves. Although a Floptical can be used as a boot device, that could be inconvenient; a Floptical drive works much better as a supplement to a hard drive.

I'm very happy with my Floptical drive. Look not to me for advice on how it compares with a tape drive or a conventional magnetic removable hard drive; I have used neither sort of system. Don't ask me to predict whether it will become the standard; I never prophesy, as one look at my Beta VCR will tell you. I can only say the Floptical drive has not disappointed me. ■

Sources of Floptical Disks:

Best Computer Supplies
(800) 544-3472

Diskette Connection
(800) 654-4058

Lyben Computer Systems
(810) 268-8100

MEI/Micro Center
(800) 634-3478

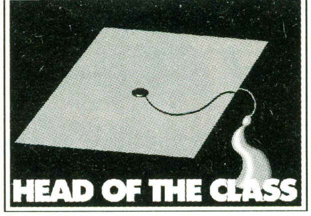
PC Connection
(800) 800-5555

Quality Computers
(800) 777-3642

Sources of Floptical Drives

Tulin Technology
2156H O'Toole Ave.
San Jose, CA 95131
(408) 432-9057

Micro-Peripherals, Inc.
3814 Forest Village Drive
Kingwood, TX 77339
(713) 358-4338



Apple II Developments at MECC

by Ron Evry

Although the number of Apple II software developers has been declining, MECC (the Minnesota Educational Computing Consortium) has been pumping out new titles as if it were still 1985. With MECC products in virtually every elementary school in the nation, they have yet to hear that there is "no market" for Apple II products. In the past year, I have seen and used at least ten new Apple II programs from MECC in my K-5 computer lab—and all of them are top-notch.

DIGITAL EXCITEMENT

The most popular new program among teachers and students has been *Dueling Digits,* a remarkable way to teach and reinforce that old bugaboo of mathematics, place values. Groups of kids who normally groan at the mention of place values cheer when *Dueling Digits* boots up.

The program has the feel of a TV game show—with an announcer, a toothy host, and an array of silly prizes. In the practice mode, students compete against computer-generated opponents in an attempt to place random numbers from an on-screen ball machine into the best possible places to get the highest, lowest, closest or furthest number. Knowledge of place values is essential to win, but even students who fail to grasp the concept in the classroom pick it up quickly using the program. When a student has the hang of it, he or she can play Tic-Tac-Digits against a virtual opponent, or two students can play against each other.

As in most all MECC programs, pressing Control–A at the main menu brings up the Teacher Options, used to set the number of digits and the particular type of game for the practice mode. Positive and/or negative numbers can be selected, making this program an excellent introduction to those concepts. The hosted Tic-Tac-Digit game cannot be adjusted; it is more suitable for 4th grade and higher. This program also has a slightly confusing trivia game (aimed at middle school students) and a nifty random number generator for general classroom use.

GETTING CRYPTIC

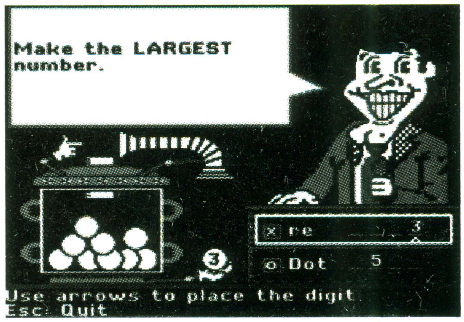
CryptoQuest is a new twist on the Carmen Sandiego-style games that have proven so popular in elementary schools everywhere. Students search in cities around the world for clues to the location of a hidden object, which they must then unlock with one of a limited number of keys given.

The twist here is that the clues are written in code. Before embarking on their quest, students study an interactive tutorial in code-breaking. The tutorial itself is fun and challenging. Here, too, I have seen otherwise indifferent students perk up when they discover how codes work. There's no getting around it—the kids have to use their brains playing this game, but that just heightens the sense of achievement they feel when they unravel a message and figure out where to go to use their key.

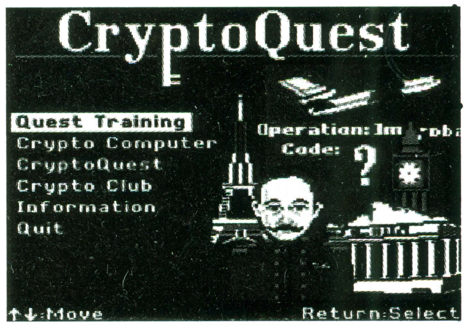
A HOT ONE

Another travel game on the list is *Arizona Mix,* an intricate simulation adventure that takes the student through the state of Arizona in search of abandoned mines. Succeeding at *Arizona Mix* requires good planning (buy the proper supplies for hiking through the desert and digging in dark mines or you'll wind up in need of help), solid note-taking skills (people you meet in this game give you important clues), and map-reading skills.

The player must travel by jeep both on and off Arizona roadways. To help, the program includes an in depth on-screen guidebook covering about a hundred locations, and an atlas showing how to get to any of them from anywhere in the state. You can visit any town or city you pass through to buy supplies or get medical attention. At various points in the game, the player must search at an out-of-the-way site for the hidden mine, remembering to lug water, a compass, a first-aid kit, flashlight, pick and shovel, and a cellular phone (to call in your find). The maps, pictures, and animation sequences in this game are colorful and interesting.

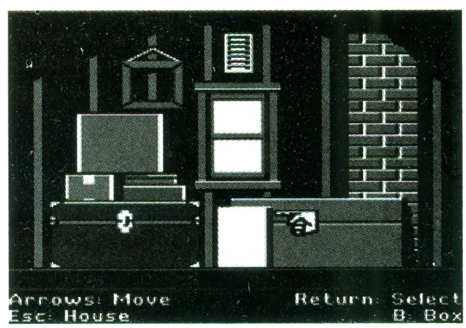


Dueling Digits



CryptoQuest

Arizona Mix



Treasures for Sale

Amazing Arithmetricks

A COOL ONE

We go from the heat of the Arizona desert to the wilds of Alaska in another new MECC game called *Dogsled Ambassadors.* As students embark on a mission to pick up artifacts from far-flung Indian villages for a museum in Nome, they learn about and select the proper dogs to pull their sleds, and position the team in the proper order. The player chooses a traveling companion from a handful presented on-screen; each has varying talents and experience. Careful purchase of food and supplies before setting out will avoid starving, freezing, or losing the dogs.

Although there are limits to hi-res Apple II graphics and animation, *Dogsled Ambassadors* truly captures the look and feel of a trek through the snow with a dog team. Each village the team passes through looks sparse but inviting. The journey through the Alaskan wilderness is educational and thrilling. A completed mission earns a printed certificate—and the game is so challenging that the student is proud to receive it. Only one or two students in a fifth grade classroom will succeed the first time around, but even those who don't succeed at first will want to try again.

FLAWED TREASURE

Treasures for Sale is a near-masterpiece of Apple II programming—with one slight flaw. Much of it is unique and fascinating to students, but out of literally hundreds of fourth and fifth graders who have used this program in my lab, almost all of them agree it misses one key feature.

In this game, students scour through their basements, living rooms and attics looking for forgotten items that they no longer want and wish to get rid of by holding a garage sale. Kids love opening up virtual trunks, boxes and cabinets to uncover old comic books, marbles, chess sets, transistor radios and the like.

After familiarizing themselves with the contents of their on-screen homes and tucking up to four treasures in their boxes, the students get to hit the street and interview up to fifteen kids in the neighborhood about their interests, finances and availability. Armed with that knowledge, they prepare and print advertisements for their sale, using one of eight different techniques presented by the program. *Treasures for Sale* is a wonderful tool for teaching students how marketers target and manipulate them through advertisements.

The flaw? After students create and print their advertisements, the program is over. Without exception, every student who used it in my lab wanted to see the garage sale occur on screen! Perhaps future editions of the program can feature a sale with interviewed characters coming by and buying (or not buying) treasures.

OTHER TITLES

Nutrition Nabbers teaches healthy food selection. Students guide a set of chomping teeth to good food choices selected from categories including vegetables, fruits, grains, and healthy foods. Most kids are familiar with MECC's other Chomper-type programs, so the learning curve is quite gentle.

Amazing Arithmetricks presents very challenging math problems in a series of carnival tents. Options include substitution ciphers, magic square type puzzles, and other brainbusters. *Amazing Arithmetricks* works best for bright fifth and sixth graders, middle, and even high school students. In fact, even some well-educated adults might need to think for a while before solving some of these problems. Students find the manner of presentation quite addictive. Fifth graders may groan when first confronted by the contents of each tent—but I have to drag them away when class time is over.

MECC has been producing top notch educational software for schools and homes for over a decade now. Most of their catalog is for the Apple II, and they are continuing to develop new products.

On Stage is aimed at pre- and beginning readers who choose from pictures of cartoon animals engaged in different activities and then place them in logical sequence. An interesting trick that captures kids' attention immediately is to hold down the space bar during the selection process to rotate through the pictures quickly, creating a pseudo-animation. The program also has true animation sequences, accompanied by delightful little tunes. For a spectacular effect, try having a lab full of kids press the Play button at the same moment.

The reading comprehension program *Erieville Library* has more than a passing resemblance to Windy City and Fish School, two older MECC programs with a similar user interface. For 5th and 6th graders, this spooky program has students chasing papers around a haunted library filled with ghosts and poltergeists. When they grab a paper, they must read it and then answer questions about what they read. This is a good program to trot out just before Halloween.

Electrifying Adventures demonstrates electrical circuits for 4th, 5th and 6th graders by simulating a trip into a dark mine—to look for treasures and electrical switches. This program works best in conjunction with planned lessons on the subject, including specific points covered in the program. Unlike some of the other MECC programs, if a student doesn't already "get it," he or she is not likely to pick it up from playing this game. Still, the artwork is colorful, and with patience, the program can be rewarding for students.

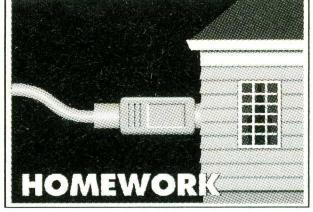
Pizza to Go is a delightful method of introducing simple machines (pulleys, levers and gears) to students. Kids control a cartoon pizza delivery character (either a boy, a girl, or a dog) who has to deliver anchovy pizzas to sharks, blood pizzas to vampires, and porridge pizzas to bears. (It sounds disgusting, I know, but the kids love it.) To get past obstacles, they have to maneuver various weights with the aforementioned devices. Through trial and error, students wind up getting the hang of fulcrums and wheels and deliver their pizzas fresh and on time for on-screen dollars. Once again, there is something amazing about seeing a lab full of 3rd or 4th graders using the principles of force and motion to win a game, and the folks at MECC deserve a big hand for this one.

ON THE MECC TRAIL

MECC has been producing top notch educational software for schools and homes for over a decade now. Most of their catalog is for the Apple II, and they are continuing to develop new products. I spoke to Pat Kallio at MECC, who told me that they make it a point to consult with teachers and Apple II user groups across the country about their programs. They are constantly trying to meet the needs of an ever-changing educational market.

In the 1994-95 school year, MECC plans to introduce even more new Apple II programs. Look for math programs called *Number Jumpers* (a math strategy game) and *Sum Stories* (a promising blend of on-screen math manipulatives and written description). New Social Studies entries include *Rescue in the Outback* and *Caravans to Timbuktu,* which explore old Australia and ancient Africa, respectively. Future language development software for primary grades is *Word Builders* and *Pet Shop,* while a unique program called *Science Giants*, helps 3rd to 6th graders discover great scientists and their achievements by interacting with them.

As many Apple II users know, the power of this machine is still largely untapped. Apparently, the folks at MECC feel the same way. From their current crop of programs, I expect MECC's software developers will continue to explore the potential of the Apple II for many years to come. ■



The X-10 Home Automation System: But can it mow the lawn?

by Art Coughlin

Although it's more like an unpaved road than an electronic super highway, the electrical wiring in your house can be your pathway to home automation. Lights and appliances are under your control with the help of inexpensive, easy-to-use hardware. Wake up to the sound of your stereo. Warm the house, fire up the hot tub, and turn on the lights before you even leave the office. You can do it all with the X-10 system and a little imagination.

It is important to note that *no additional wiring* is required to use the X-10 system. The signals that control your lights and appliances are sent directly through your house wiring. You just plug it in and go. And, best of all, there's a way to let your Apple II control it all.

X-10 Inc. is a major player in the home automation market, so it's no surprise their protocol for communication between the various types of hardware has become the defacto standard. They are not the only supplier of X-10 compatible hardware; other companies such as Stanley, Schlage, Leviton, and Radio Shack sell the same hardware—and I do mean the *same* hardware. No matter who you buy from, you're getting the same equipment; only the names have been changed to confuse the consumer. The X-10 company was formed around 1978 (as BSR) but I didn't discover them until 1983, when a BSR interface was offered for the new AppleCat modem I bought for my Apple II Plus. My house hasn't been the same since!

There are four types of X-10 equipment: modules, consoles, wireless transmitters, and transceivers.

MODULES

Modules are X-10 receivers. They receive signals sent from consoles or transceivers, via electrical wiring, and provide on/off/dim control for lights or appliances connected to the module. There are over a dozen types of modules to handle most types of lights or appliances. The most common type of module is the simple plug-in box, measuring 2¼ x 3 x 1¼ inches. These modules come in three styles: lamp modules (that allow dimming) and two types of appliance modules (two- and three-prong). Plug one of these modules into a wall outlet, and plug a lamp, TV, fan, or coffee maker into the other end.

Another popular module is a replacement for the standard wall switch. It's used to control overhead lighting or switch-controlled machinery, such as a pool pump, ceiling fan, or hot tub. The wall switch module has a push-button on it, rather than the up/down switch found on a standard wall switch, to prevent the manual operation from interfering with the automated operation. It also has a manual lock to defeat the use of the push button if you only want to use it under X-10 control. There is also a 3-way wall switch module that works exactly like its manual counterpart, and a module to replace standard wall outlets.

CONSOLES

Consoles, X-10 transmitters that send the signals to the modules, are the heart of the automation system. There are a variety of consoles available. My favorites include the Maxi-Controller, the Infrared Universal Remote, and the CP290 Powerhouse Computer Interface.

The Maxi-Controller is a tabletop unit with buttons to control 16 devices at a time, within a range of 256 devices, including dim/bright control for lamp modules and a "panic button" that will turn on all lamp modules. The Infrared Remote is a nifty gadget. It's a standard universal remote used to control TVs, VCRs, CD players, etc., in addition to the ability (with an optional infrared receiver box) to control 16 devices. Imagine settling back in the easy chair and being able to control the lighting and room temperature, as well as the TV! An absolute must for the aspiring couch potato.

But by a wide margin, my all time favorite console is the CP290 Computer Interface. It gives me an excuse to mess around with my IIGS and dream up new programs to take advantage of the X-10 system.

WIRELESS TRANSMITTERS

Wireless transmitters provide X-10 users with a new degree of freedom. These battery operated portable devices transmit wireless radio signals to X-10 transceivers. The two I have seen are the handheld remote, controlling up to 8 devices and a keychain remote that can control two devices. The transmitters have a range of about 100 feet, but can be extended another 100 feet or so with a Wireless Range Extender.

TRANSCEIVERS

Transceivers link the wireless transmitters and the electrical wiring in your home. The transceiver plugs into a wall outlet and listens for radio signals from a wireless transmitter. When it hears a signal, it in turn, transmits the appropriate X-10 signal over the electrical wiring.

HOW IT WORKS

The X-10 system is truly "plug and play." Plug your command console into a wall outlet, plug lights and appliances into modules, and you are ready to go; no wiring, soldering, or programming required. It works on a system based on "house codes" and "device numbers," used to identify various devices throughout your home. The system can address 16 house codes (A-P) and 16 devices (1-16) per house code, which means a maximum of 256 devices can be controlled. Each module has two little dials on it, one to set the house code and one to set the device number. Most consoles have one dial to set the house code.

When you issue a command from a console, the house code, device number, and the command information are sent through the electrical wiring to the modules. Every module "hears" the broadcast, but only the ones with matching settings respond. You can have several modules set to the same house code/device number combination and they will all respond as one to commands. (For the technically include: the actual command is a 5 volt digitally encoded signal sent in a series of 120 kHz pulses. Controllers transmit a 5–7 volt signal, while modules require at least a 100mV (.1 volt) signal to activate.)

Standard appliance modules are rated at 500 watts maximum, and lamp modules at 300 watts for incandescent lights. Appliance modules also carry a motor load rating of 1/3 horsepower and a resistive load of 15 amps.

TIMING IS EVERYTHING

A command console and a few modules give you the first level of control. You can turn things on and off in real time, but don't have the ability to schedule events. The second level of control enables you to turn things on or off, any time of the day or night. This requires either a Timer console or the CP290 Computer Interface.

The standard Timer console is pretty limited, allowing you to set two on and two off events for each of four devices. The CP290 will allow 128 timed events. You decide which devices are addressed (any of the 256 can be used) and how many are to be on or off events.

Remote control of your home from anywhere is possible with the Telephone Responder. It allows you to phone home and control up to ten devices using Touch Tone signals. When you're at home, the Telephone Responder can be programmed to flash selected lights when the phone rings, or used as a manual command console, allowing pushbutton control of up to eight devices (as can the Timer console and the CP290).

I haven't achieved the fourth level of control, but I can tell you it has to do with a IIGS connected to a CP290 and an EEG brainwave monitor...

THERE IS A GROWTH IN YOUR HOUSE...

My X-10 system keeps growing; modules seem to multiply like rabbits. I started out with one lamp module and today I have so many I don't bother to keep track of them. I'm so accustomed to home automation that I don't really take notice of things happening in the house; it's all part of the daily routine.

I use an X-10 Thermostat Set-back module to regulate the heat during the winter. This little device sits under the thermostat, emitting warm air, making it appear warmer than it really is. I set my thermostat for 70° and activate the set-back module whenever I want to lower the temperature of the house. I have an event set in the CP290 to deactivate the set-back module 45 minutes before I'm due home from work, so the house is warm and toasty when I arrive. Another event activates the set-back module at 12:30 am to drop the temperature back down to 62° for the night. Another deactivates the set-back module 30 minutes before I wake up in the morning and a final event activates the set-back module for the day. I don't even realize this is going on anymore; when I'm home the house is warm and when I'm out (or asleep), I'm conserving oil.

Sometimes I'm about to do a routine chore, when it dawns on me that I could automate it and save myself time while getting better results. That's what led me to buy a plant watering system. I don't have a lot of plants, but the ones I do have need water a lot more often than I remember to water them. The water system will deliver a 10-20 second spurt of water when power is supplied, then shut down until power is removed and reapplied. I hooked the system to an appliance module and set two events (one on and one off) for seven days a week. Not a single plant has died since I installed the system.

I can't hear people knocking on the kitchen door when I'm downstairs watching TV, much to the annoyance of visitors. X-10 to the rescue! I hooked up a security camera to view the driveway and ran the video signal into a VCR. The VCR is connected to the wide screen TV with a picture-in-a-picture feature, and the VCR and security camera are plugged into appliance modules. Now, with the touch of a button on my universal remote, I can pop a window on the screen with a view of the driveway and kitchen door. All it takes is a little imagination.

CP290 COMPUTER INTERFACE

The CP290 Computer Interface is the heart of my system; it beats a standard Timer console by a mile. If you have a computer (and I'm assuming that since you read *II Alive* that you do), get the CP290 and forget the Timer console.

The CP290 console allows flexible computer access to your X-10 system. It can also control eight devices manually from the buttons on its front panel. It gives you access to all 256 devices, and allows storage of 128 timed events. A timed event for the CP290 consists of the time of day and days of the week to activate, the function to perform (on/dim/off), the house code, and the device numbers (all 16 devices for a house code could be assigned to one event).

Once the CP290 has been programmed, it can be detached from the computer and will operate on its own. Its internal clock carries out programmed events. A nine volt battery backups the clock and stored events in case of a power failure.

If you detach the CP290 from the serial port, though, you won't be able to use it interactively through the computer. Sometimes it's nice to be able to control things without getting up from the machine. If you have used up the available serial port(s) on your Apple, you can always add an A/B switchbox. I use an A/B/C/D switch box to connect an ImageWriter II printer, a DeskJet 550c printer, and the CP290 to the IIGS printer port. The only hard part is remembering to throw the switch to use the correct device!

The CP290 is available for three platforms: IBM, Mac, and Apple II. (Yes, this is one of the few mainstream computer packages that is available in an Apple II version!) Each package contains the exact same CP290 console with the appropriate cable and software included. If you own an Apple IIe or IIc, the Apple II package is for you. The Apple IIe also requires a Super Serial Card. Cables for both Apples are included. The Mac package is suitable for the Apple IIGS, as the cable is identical even though the software won't work. The cables in the Apple II package won't fit the IIGS and the included software won't work through its serial ports.

SOFTWARE

The software that comes with the Apple II appears to be adequate, although I've never used it. The IIe/IIc disk includes a utility program allowing you to access the CP290 with ampersand commands from Applesoft BASIC. I've heard complaints of slowness regarding some of the 8-bit programs, but to be fair, some of the lack of speed can be attributed to the CP290 itself. It communicates at a leisurely 600 bits per second.

The online services are the best place to explore for additional software and information. I use GEnie, and find it to be a great place to exchange X-10 ideas. GEnie has two places to discuss X-10. There are several topics in the Consumer Electronics Bulletin Board, and another in the Apple II Bulletin Board.

Software for the Apple IIGS is tougher to find, as X-10 has never released any. David Hill of Mainframe Software wrote a desktop application for the IIGS in the late 1980s, and although he has discontinued support, he has allowed it to be uploaded to GEnie as freeware. I've never used it, so I can't comment on its performance. I've heard that it will only work with the modem port and that it is not compatible with System 6. A search of the files on GEnie turned up another program, HCS v.8.1 (Home Control System) and a companion patch file to allow it to work on a IIc or IIGS. I have not tried this software, so again, I cannot attest to its useability, but it is available from the A2 RoundTable on GEnie.

Since I couldn't find software to suit my needs, I wrote my own CP290 package for the Apple IIGS. The newest version, which should be available by the time you read this, consists of the following:

X10House: an NDA that provides control for all 256 devices and 128 events. Fast and easy to use, it provides access to the X-10 interface from most 640 mode desktop programs with options to create and update events, print a listing of events, and update the CP290's internal clock.

X10Doctor: a desktop utility program that allows you to save and restore schedules, run the X-10 internal diagnostics and provide sunrise/sunset or daylight savings/standard time corrections to selected events. Includes options to set up the X10ACE, PowerScreen and Virtual10 programs

X10ACE: an init that automatically applies sunrise and/or sunset corrections to selected events.

PowerScreen: an init that uses the CP290 as a "screen blanker" for your monitor, turning it off after a period of inactivity. (Your monitor must be plugged into an appliance module.)

Virtual10: an init that automatically loads different schedules to the CP290 on selected days throughout the year.

All of the applications can access either serial port, and you can leave the slot setting in the Slots Control Panel to "Your Card," allowing use of the slot corresponding to the serial port. All applications require a desktop environment and work with System 6. The package is available from me for $22 (US), or if you would like a more detailed features list, send a self addressed stamped envelope to: Art Coughlin, 230 Clamer Road, Trenton, NJ 08628.

If you would like to write your own software, the CP290 comes with a complete, if somewhat cryptic, programming manual showing the eight commands you can send, the CP290 responses, and how they are formatted.

TROUBLESHOOTING

Nothing in this world is perfect, and that holds true for home automation. While I've found the current X-10 hardware to be quite reliable, you can run into other problems that are perceived as malfunctioning X-10 equipment. When you plug in that new X-10 gizmo and nothing happens, don't panic—check the obvious. Often the problem is caused by an incorrect house code or device number setting on a module, or incorrect house code on a console. Check the device you are trying to control: Is it actually on? Is the wall outlet you are using for either the module or the console controlled by a wall switch? Is *it* on? Is the module or console plugged into a surge suppressor? Surge suppressors can rob strength from the X-10 signal, but the effect can vary quite a bit from model to model.

Distance itself eventually weakens the X-10 signal, so if the module is far from the console, the module might not activate. Try moving the module closer to the console as a test. If distance is a problem, you can purchase a signal booster; unfortunately, they are rather expensive. Distance should only become a problem for long wire runs in homes over 7,000 sq. ft., homes with old or deteriorating wiring, or homes with a lot of heavy loads on the line. Some appliances can also generate noise on the electrical line. You can purchase a variety of filters to counter this problem if it interferes with the operation of your modules. Other devices, such as wireless intercoms, that use the same line can conflict with the X-10 signals. In fact, if you send signals from two separate consoles at the same time, you will experience an X-10 "collision" and the signal will fail. Remember, this is a one-lane road.

Another possible problem occurs when the 220 volt service to the home is split into two 110 volt "legs." If there isn't a "bridge" somewhere between the two legs, you effectively have two separate circuits, as far as the X-10 system is concerned. Modules on one leg won't respond to consoles on the other leg. Worse yet, some 220 volt appliances may temporarily bridge the legs while they are on. This would show up as an intermittent problem in your X-10 system; modules on the other leg will respond as long as the appliance causing the bridge is running and not work when the appliance is off. Fortunately, this can be overcome by connecting a Phase Coupler between the two 110 volt legs in the circuit breaker box. (*Warning:* Even though this is a relatively simple job, it should only be done by an electrician. Good as your X-10 system may be, it still needs you alive to guide it.)

One last caveat—if your neighbor's house is on the same master transformer as yours, it's possible that signals from your house might reach his (or vice versa). This probably won't be a problem if your neighbor doesn't have an X-10 system of his own, but if he does and you experience leakage, you may need to isolate your house electrically (or agree with your neighbor to use different house codes). Again, contact an electrician.

COST

As noted below, costs will vary depending on where you buy your supplies. Listed here are some prices from Radio Shack's catalog:

CP290 Computer Interface	$70
Maxi-Controller	$25
Telephone Responder	$80
Timer Console	$30
Lamp module	$13
Appliance module	$13/$14 (2 prong /3 prong)
Wall Switch module	$13
Set-Back Thermostat module	$20

Generally, you can buy X-10 hardware for less through mail order houses, but when you figure in shipping vs. local sales tax, you may only really save if you are placing a large order. Radio Shack has a sale on its X-10 equipment a few times a year. During the sale, their prices are about as good as you will find through mail order. One thing you should definitely *not* buy at Radio Shack is the CP290 Computer Interface. They only sell the IBM version, and you can get it for a lot less (around $44) from Dyers Electric. ■

SOURCES

Dyers Electric Supply
7350 Varna Ave.
N. Hollywood, CA
818-983-0371

Ask for Jim Wilson. He knows his stuff and his prices are very good. Buy your CP290 here.

Home Automation Labs
5500 Highlands Parkway Suite 450
Smyrna, GA 30082-5141
1-800-HOME-LAB

A bit pricey but a great selection of X-10 and other stuff. Get this catalog. If you already have a CP290 but lack the proper cable for the IIGS serial port, HAL sells a Mac replacement cable for $15.

Home Control Concepts
9520 Padgett St. Suite 108
San Diego, CA 92126
1-800-CONTROL

A good selection of X-10 hardware.

Radio Shack (Plug 'n Power brand)

Just around the corner from you. A modest selection of hardware but handy when you are having an appliance module emergency.

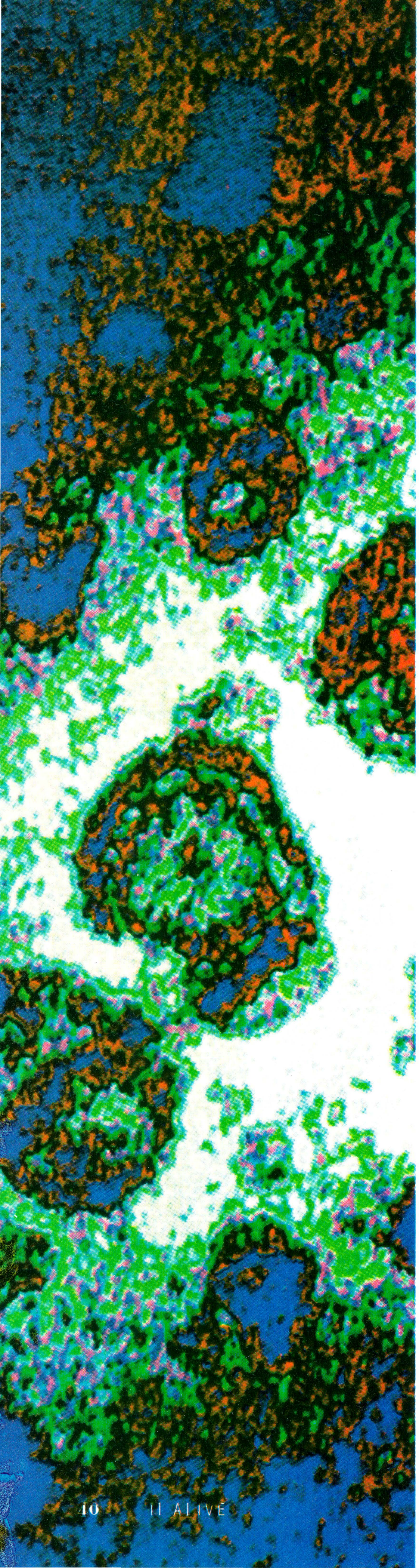
A GREAT SOURCE FOR X-10 HELP:

GEnie
Consumer Electronics Bulletin Board
Category 8 Topics 4-6, 8, 16 and 19 deal specifically with X-10. Type M346;1 at any GEnie prompt.

Apple II Bulletin Board
Category 6 Topic 10
Type m645;1 at any GEnie prompt.

I can be found lurking in both areas. My GEnie address is A.COUGHLIN.

I recommend that you pick up some catalogs to see the full range of hardware available for an X-10 system. While I've covered the basics, there is more exotic (and expensive) hardware to interface with an X-10 system.



INFECTED!

A Guide to the Early Diagnosis and Cure of Apple II Viruses
Part II: Detection & Treatment

by Doug Cuff

In the first installment of this article, we discussed the known Apple II viruses. In this installment, we'll talk about what you can do to protect yourself from infection, and what you should do if you suspect a virus has already attacked your system.

Virus Detection Software

It's been some time since anyone reported seeing CyberAIDS or any of the other known viruses on their system. Even in 1988 and 1989, viruses were never widespread—thank goodness—and even then there were many more reports of virus *detection* than of damage caused by the viruses.

Still, you might feel better if you got some software to check for the viruses that the Apple II community has already encountered. I was unable to find any software to combat DOS 3.3 viruses, but for ProDOS and GS/OS, there are essentially three commercial programs that battle known viruses: *Apple.Rx, Salvation-Exorciser,* and *Virus MD.* There are also several public-domain programs that will search for specific viruses. Neil Parker's *VIRUS.KILLER,* for instance, looks exclusively for the Load Runner virus.

Glen Bredon's *Apple.Rx* is a shareware program available on many commercial online services, BBSs, and user groups. It guards against all viruses, known and unknown, through its checksum routines. (More about that in the next section.) *Apple.Rx* also features a command to search for known viruses. When you first receive it, *Apple.Rx* will search only for CyberAIDS; send Bredon full payment for the program and he'll tell you how to "unlock" it to search for Festering Hate and BURP. *Apple.Rx* will also check the boot blocks of any ProDOS volume, which is helpful for fighting Load Runner and Screen Blanker. If the boot block is not Apple-normal, *Apple.Rx* will offer to fix it for you. The latest version (3.4) of *Apple.Rx* will run only on a IIGS; an earlier version (2.7) will also run on an Apple IIe or IIc that has had its 65C02 chip replaced with a 65802.

Glen Bredon is also the author of *ProSel-16,* a program launcher and collection of disk utilities. *ProSel-16* also includes some virus detection (and perhaps even protection) functions built in, though Bredon wisely refuses to explain the exact details, as that would help would-be virus creators circumvent his precautions. Bredon does note that *ProSel-16* provides protection against all five known ProDOS viruses.

Salvation-Exorciser from Vitesse is another program that searches for known Apple II viruses. It is unique in that it can add detection modules for any new viruses that appear. Tony Ward, file librarian for the A2 RoundTables on GEnie, reports that he uses it to check the files uploaded to the A2 libraries. America Online staff are also said to use *Exorciser.*

Morgan Davis's Virus MD comes in a version for the IIGS and one for the IIe and IIc. The commercial IIGS version is capable of detecting and fixing CyberAIDS, Festering Hate, and Load Runner. The IIe/IIc version is public domain; it's a short BASIC program that will search for and fix CyberAIDS and Festering Hate. The public domain version was originally distributed as WOPFOG, taking its name from the two abbreviations mentioned in the top line of the Festering Hate "good news/bad news" text screen.

Fighting Unknown Viruses

CyberAIDS and Festering Hate are "typical" viruses, in that they attack a computer system at its weakest point: the human operator. When these viruses attack a SYS file, they make it between 3 and 4K larger, and change the file's modification date. If you check your free space both carefully and regularly, you'll notice there's less and less—a sign that something may be wrong. This is particularly dramatic in the case of the BURP virus, as it will attack and enlarge every SYS file it can find, which will make this reduction in free disk space more obvious. Another symptom that's equally evident is a program that, at startup, accesses disk volumes other than the active one. CyberAIDS and Festering Hate try to infect SYS files on any available volume, which should sound some alarm bells. (Some programs, however, have legitimate code to "scan" all available viruses, so a program that does this is not necessarily infected.)

Viruses go undetected, however, because the human brain doesn't normally operate at this level of scrutiny. To pick a person at random: do I check the free space on my hard drive regularly? Of course not! Not only am I trusting, but I'm also terminally lazy. Besides which, I'm adding new programs and data regularly, so the amount of free space fluctuates wildly anyway.

I'm not so lazy, however, that I don't keep an eye on changes to my hard drive. Doesn't it make sense to have a list of your SYS files, their lengths, and when they were most recently modified? Of course, that won't do much good unless you check the list periodically, which makes the human the weak link again.

Programs such as Glen Bredon's *Apple.Rx* (shareware) and Joe Jaworski's *Vaccine II* (freeware) will help you do the work of keeping track of your files by generating checksums for them. With *Vaccine II,* you can create a checksum file that stores vital information about a SYS (or any type) program, including its length. If you suspect that a program is being altered, just use Vaccine II to examine the checksum file for that program. Of course, some SYS files do alter themselves legitimately—*AppleWorks'* APLWORKS.SYSTEM, for instance, keeps updating itself with the current date—so there's no need to panic just because a file is altered. Just stay alert.

Since *Vaccine II* creates checksum files one at a time, it's best used when you suspect a particular file. If you want to use your computer to generate a list of SYS files and their lengths, *Apple.Rx* will help. It will compile a list of checksums for every SYS and S16 program it can find. (You can add other file types once you've paid the shareware fee, but it's sensible to expect viruses to only attach themselves to executable files. Even though *Apple.Rx* checks S16 programs, no known virus actually uses them to spread.) Later, you can ask *Apple.Rx* to compare the checksum file to the programs on disk, and *Apple.Rx* will warn you if any files have been changed.

The checksum solution still relies on the user to some extent—you must take the trouble to run the "check" mode occasionally. You must also generate new checksum files when you add new programs to your hard drive. If you operate *Apple.Rx* in conjunction with *ProSel-16,* you can automate the checking procedure, but the generating and checking procedures are both quite simple and painless, so you should be safe as long as you remember to run them regularly.

There's another method for detecting unknown viruses. Both *Vaccine II* and *Salvation-Exorciser* can analyze programs for questionable code, such as Format calls, block-level reads and writes, illegal IIGS toolbox calls, and so forth. An arcade game, for instance, probably shouldn't be trying to format a disk. The problem is that many programs use these calls quite legitimately. Many factory-fresh ProDOS 8 programs, including AppleWorks and Talk is Cheap, fail some of Vaccine II's checks—yet harbor no viruses. As Dennis Doms noted, a code-checking program "could be used to intercept MLI calls and report attempted 'writes,' but you'd probably spend most of your time arguing with it"—that is, trying to determine which "questionable" calls are legitimate. Unless you're knowledgeable about machine code, you're unlikely to find such a program useful.

If you do know your machine code, however, such an approach can be helpful. I asked Tony Ward, file librarian for GEnie's A2 RoundTables, how he began checking uploaded files for possible viruses. He replied: "I run all S16 and SYS files through *Salvation-Exorciser* to determine if there are any 'questionable' disk access or battery RAM calls. If I find such a call, I scan through the offending program using ORCA/Disassembler to see if the calls are appropriate. If I can't determine the validity of a disk access call, I turn off my hard drive and boot from a floppy to test it. If the program doesn't seem to do anything nasty, I run it from the hard drive to make sure it works."

Other Protection Strategies

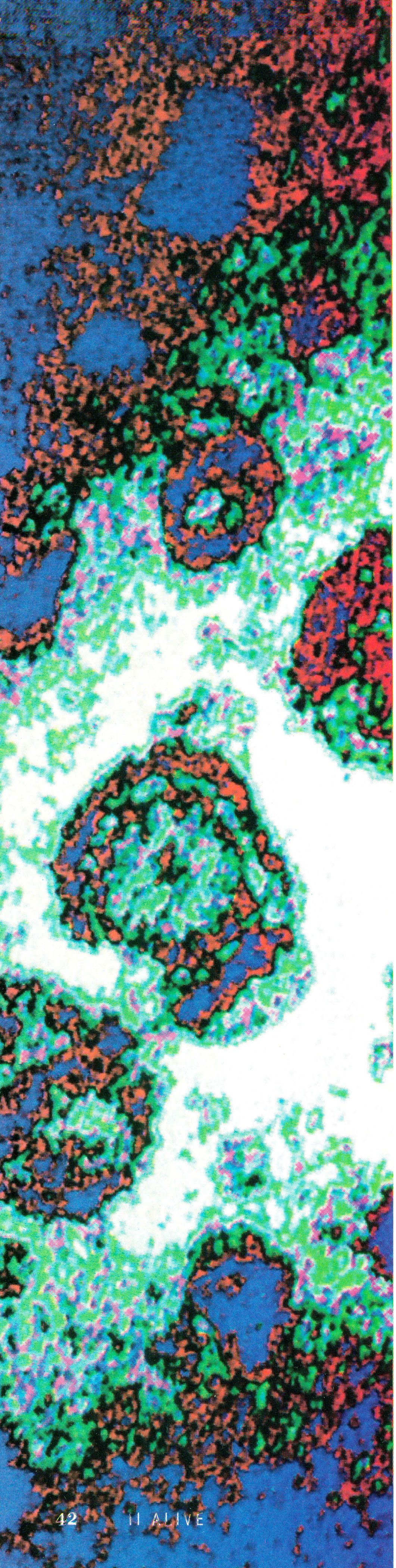
As Tony Ward notes, GEnie checks its uploads for viruses pretty thoroughly. So do other commercial services with Apple II areas, such as America Online and CompuServe. If you obtain your freeware and shareware by downloading from such well-known commercial services, you'll minimize your risks of catching a virus.

However, it's been so long since any viruses swept the Apple II community that you don't need to stick exclusively to these services. Calling a local BBS is probably okay, as long as the people running it seem to take themselves and their users seriously. Calling "pirate" BBSs (which illegally distribute commercial software) is a sure way to end up in trouble of one kind or another—on MS-DOS machines, viruses have been known to turn up in pirated copies of commercial games like *Leisure Suit Larry.* (There are continual rumors that these infected commercial programs may have been "injected" into the pirate community by the software publishers themselves, as a form of punishment for illegal distribution of the games. However, no such allegations have ever been proven.)

Even if you don't have a modem, you should know that much Apple II software was originally obtained from an online service, be it a commercial service or a free local BBS. If you don't know where your local user group gets its programs, ask. You might make a point of asking them what virus-detection software and procedures they use, too, if they don't get it directly from a reliable source.

When you acquire a new program from a less-than-reliable source, test it in an environ-

CyberAIDS and Festering Hate are "typical" viruses, in that they attack a computer system at its weakest point: the human operator. When these viruses attack a SYS file, they make it between 3 and 4K larger, and change the file's modification date.



ment that will limit the damage if a virus should turn up. Put the program on a 5.25" or 3.5" disk along with a couple of SYS files as "bait," and remove other disks from drives. Turn off your hard drive. Run the program a few times, and see if anything odd happens, like the size of the SYS files on the same disk increasing.

If you don't have a hard drive, all you really need to do is make sure that every disk drive but one is empty, and be sure that you make backups. I know you've heard this before, but that doesn't make it any less true: backups are your friends. You'll be glad to have them once disaster strikes, whether that disaster is a virus, a hard drive crash, or a relative who has just said "oops." (Someday, someone will write a program that makes backing up your data a positive joy; users will look for excuses to run it.)

If you're using a hard drive and can't face making a fresh backup every time you download a new file, perhaps you should consider waiting for that one day a week when you do have the time to make a backup before running any of the files you've downloaded that week.

If you're using a hard drive and can't face making a fresh backup every time you download a new file, perhaps you should consider waiting for that one day a week when you *do* have the time to make a backup before running any of the files you've downloaded that week.

If you should happen to discover a virus before it does any real damage, your first step should be to make a backup, and—if you have or can afford spare backup tapes or disks—don't overwrite your previous backup in doing so. Your previous backup might predate the infection, and allow you to restore data that might otherwise be lost.

Recovering from a Virus Attack

Once a virus has struck, it's too late to wish you had made a recent backup. Can anything be done?

Much depends on what virus has infected you and on what recovery software you own, or can acquire quickly. If CyberAIDS or BURP have erased the main directory, software such as *Bag of Tricks 2, ProSel,* or *Salvation-Deliverance* may be able to restore it. If Festering Hate has wiped out the entire disk, that's more serious, but you may be able to recover some, if not all, of your data. Viruses such as Load Runner and Blackout are more easily dealt with, since they only damage the boot block, and only do that on 3.5" disks. It's not hard to repair the boot block, especially with virus software such as *Apple.Rx, Deliverance, Exorciser,* or *Virus MD.*

It's worth repeating that viruses were never widespread in the Apple II community, and are even more scarce now. It seems likely that all the programming wizards with no moral sense have fled to other platforms in order to be able to harass and annoy the maximum number of users with the minimum effort. It makes sense to take a few precautions and to give your disks and hard drive a blood test every once in a while, but don't keep yourself awake at night wondering when the killer virus will find you. ■

VENDOR INFORMATION

Apple.Rx
Glen Bredon
58188 Trails End Road
North Fork, CA 93643

ProSel 8, ProSel-16
Charlie's Appleseeds
9081 Hadley Place
San Diego, CA 92126-1523
phone 619-566-1297

Salvation—Deliverance& Salvation—Exorciser
Vitesse, Inc.
P.O. Box 929
La Puente, CA 91747-0929
phone 1-800-777-7344

Virus MD
Morgan Davis Group
10079 Nuerto Lane
Rancho San Diego, CA 91977-7132
phone 619-670-0563

MEDIA À LA MODE

Making Your Own MOD Files

by Tony Morales

One of the most exciting events in the history of IIGS music was the introduction of programs (such as NoiseTracker, ModZap, and SoniqTracker) to play Amiga-compatible MOD files. (MOD, short for module, files include both samples—short snippets of sound—and a "sequence" which describes which samples should be used to play which musical notes, and when.)

The great thing about MOD files is that many computers can play them. You can download an Amiga MOD, play it on your IIGS, and then take it to work and play it on your Mac or PC. No other computer music format is quite as universal as MOD files are. Best of all, there are thousands of MOD files available, so your listening pleasure can go on and on.

But unless you happen to have an Amiga or PC sitting next to your IIGS, you've been just a spectator. You've had no way to create your own MODs and become a part of the MOD-mania which is sweeping the the world. But with a small amount of effort—and some technical knowledge—MOD files can be assembled by hand. This article describes the MOD format, and includes step-by-step commands for creating your own MODs using the IIGS Monitor.

BEFORE BEGINNING

Before a carpenter builds a house, he must be equipped with the proper tools. The same thing is true for designing MODs. The first thing you'll need is a copy of AudioZap. You can get it from any online service or your local user group. AudioZap is the only IIGS sound editor which can save 8-bit digitized sound samples in Amiga format. (Remember, MOD files are an Amiga format; the sounds will be converted back to IIGS format internally when they are played on a IIGS MOD player.)

The second thing you need is a utility which can take several small files and combine them into one large file. I currently know of only one program which can do this: Davex. Davex is a ProDOS 8 shell utility which sports a user interface similar to the MOD shell. Davex comes with several external commands, including a utility to combine files together. Davex is also available from online services and user groups. (You can also combine the files manually using BASIC.System's BLOAD and BSAVE commands, using the B (byte) parameter, but this is considerably more work and is something we won't get into here.)

ABOUT MOD FILES

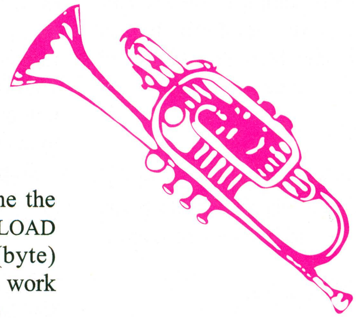
Let's start with an overview of the MOD file format. MOD files have 3 basic parts: a header, blocks of notes, and sound samples. The header consists of the title of the MOD, the instrument definitions, and the order in which to play the blocks of notes the MOD contains. (The latter provision allows you to extend the song easily by repeating parts of it, instead of having to copy each note to a new section.)

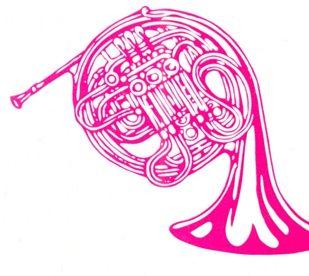
PREPARING THE SAMPLES

MODs can have up to 31 instruments. Naturally, you don't *need* this many—any number of instruments will work. First, decide on which samples to use for your MOD. Assuming that they are musical tones (and not non-musical samples, like drums and sound effects) they should all play on the same note. They will be pitch-shifted when they are played. Next, save the samples as raw binary files, with no extraneous information in the file (such as AIFF chunks).

All of the samples must have an *even* number of bytes in them. For example, a sample that uses 32000 bytes is fine, while a sample that uses 21847 bytes is not. Also, many MOD designers round the sample lengths to a multiple of 100 to make the MOD easier to assemble. (Add extra bytes with a value of 128 to the end of the sound to "pad" it out, if necessary.) When you have prepared your samples, make a note of the length of each. You will need this information when defining the instruments.

Next, combine all the samples into one large file, which we will call a wavebank, using Davex. When this is done, load the wavebank into AudioZap. If you were to play this file, you would hear all your samples, one right after the other. (Try it!) Save the wavebank in Amiga format, using the file name INST (short for instruments).




For the technically curious, the Amiga method of encoding the bytes in a sound sample is to exclusively OR each byte with $80. 8-bit sound samples consist of volume intensities in the range $00 to $FF (0 to 255 decimal). The exclusive-OR operation adds 128 to all the bytes that are less than 128, and subtracts 128 from all the bytes that are 128 or greater.

THE MOD HEADER

Now it's time to define the instruments which correspond to the samples. For the following examples, you need to be in BASIC.System and in the Monitor. To get to the Monitor from BASIC, type:

CALL -151

We'll build our MOD's header starting at memory location $1000. The header is 1084 bytes long, so start by zeroing 1084 bytes of memory. Type:

00<1000.143BZ

The first 20 bytes of every MOD contain the MOD's title. If you can't think of a title for your MOD right now, skip this step. To title your song, first clear bit 7 of the MOD filter mask (all MOD ASCII strings must have their high-order bit off). Do this by typing:

7F=F

Now let's enter the name. We'll use the example "My First MOD." Type:

1000:"My first MOD"

DEFINING AN INSTRUMENT

Each instrument definition takes 30 bytes. All 31 definitions come directly after the MOD's title. The first definition starts at offset 20, the next at 50, and so on. In hex, that means that our first instrument definition (instrument zero) begins at $1014; the next at $1032, and so forth (adding $1E to each offset).

The first 22 bytes of an instrument definition hold the instrument name. Some MOD composers like to use these titles to make a message (since many MOD players display the names of the instruments while playing the MOD). Some simply title the instruments with a description of the instrument. Of course, you can also skip titling your instruments if you wish.

If you choose to title any or all of the 31 instruments, repeat the processes discussed above for titling the MOD. Be sure to use the correct addresses. This example would title instrument #1:

1032:"Instrument 1"

After the title comes the length of the instrument *in words.* (A word is two bytes, so divide the length in bytes by two to get the length in words. This is why the sounds need to be an even length.) There's a twist, though: almost every other microprocessor (besides the 6502 family) stores byte pairs (words) in memory with the high-order byte first, followed by the low-order byte. The 65xxx stores the low-order byte first, followed by the high-order byte.

Suppose your first instrument was 32000 bytes long. Divide this in half to get 16000. Convert this to hex to get $3E80. Normally, if you were entering this number as a two-byte value, you would flip them around and enter $80 3E. However, in this case, you *don't* flip them:

1048:3E 80

The next byte is the semitone for that instrument. Allowable values here range from $00 to $0F. I've never seen a MOD that uses anything other than $00, so you might wish to stick with this value.

104A: 00

The next byte is the volume level for the instrument. Range is $00 to $40. Most instruments use $40, but you can use lower values if you want to. (You can change the volume of the sample within the MOD's sequence portion.)

104B: 40

The next word is the loop offset for the instrument, again in words. Looping allows part of the sound to be played over and over to make a sustaining tone. The sample is played all the way through once, then the portion of the sample beginning at the loop offset (with a length determined by the loop length, below) would be played repeatedly. For our 32,000-byte instrument, if we wanted to start the loop at offset 12,000, we would divide the 12,000 by two (6,000) and convert to hex ($1770). Remember, you don't "flip" the bytes.

104C:17 70

The last word in an instrument definition is the loop length—in words, of course. This value is the number of bytes to repeat following the loop offset. To loop 20000 bytes over and over starting with offset 12000, you would enter $2710 (the hexadecimal equivalent of 10,000, which is half of 20,000). If the instrument isn't looping, enter $0001. Note that you cannot loop past the end of the sample.

104E:27 10

By the way, it can be very difficult to get good-sounding loops. I suggest that you don't bother with it for your first MOD.

To define the first instrument with all of the above information, you could enter the following:

1032:"Instrument 1"
1048:3E 80 00 40 17 70 27 10

COMPLETING THE HEADER

Before we move on, two more fields must be added to the MOD header. The first of these is at offset 951 ($3B7). This byte should be set to $7F. This is for some old MOD players, which use this byte as the number of patterns to scan when loading. Setting this byte to $7F tells the players (those which care) to scan all patterns. This will enter the correct value:

13B7:7F

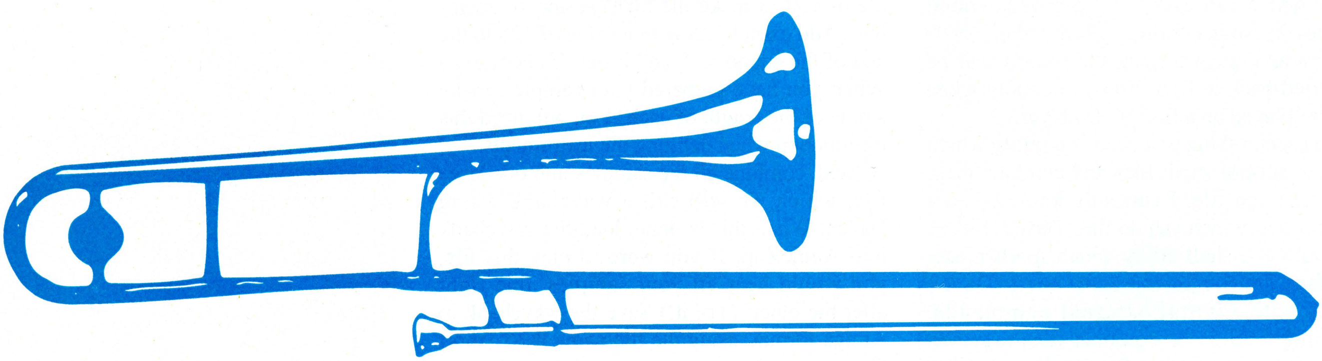
The last thing that needs to be added is the Protracker signature. This signature tells MOD players that they are dealing with a Protracker-compatible MOD file. The Protracker signature is made up of 4 ASCII characters. The following will enter the signature, which begins at offset 1080 ($438):

1438:"M.K."

That's all there is to it. Now, save the header for future reference:

BSAVE HDR,A$1000,L1084

In the second half of this article, we'll show you how to put together the patterns—the sequences which tell the MOD player which samples to play. It is this which will turn your MOD from a collection of dead sound samples into a living, breathing piece of music. Stay tuned! ■



ProDOS Building Blocks: Part One

ProDOS has been the standard Apple II disk operating system since 1983. It's responsible for creating, deleting, reading, and writing files; managing the free space on your disks; and a few other tasks (such as handling interrupts).

Normally, you don't need to be aware of the low-level details of how ProDOS stores information on your disks, since ProDOS has proven rather reliable. However, if you want to learn more about how your computer *really* works, you could do worse than to snoop around on ProDOS disks. Not only is it reasonably fascinating, it also lets you do all sorts of "impossible" things—such as changing a file's type, or rescuing data from a disk with a blown main directory.

Tool of the Trade

Included with this article is Blockhead, a program (written in BASIC and machine language) which allows you to inspect and change your disks at the lowest possible level—the block level. Blockhead works on any Apple IIe, IIc, or IIGS model.

The Blockhead program, actually, is a work-in-progress. Right now, it has many of the features you need to snoop around on your disks, and to change the information you find there. What it doesn't have yet is the ability to "follow" a file and read the individual blocks that make up the file. This feature, which will make it simple to "patch" bytes within a file, will be added in a future version of the program, to be published with another installment of this series.

Because this program allows you to modify your disks directly, it is *imperative* that you be very, very careful when typing it in. Check and double-check every line of Blockhead before running it for the first time. (This is especially important for the machine-language portion.) The BASIC program includes a routine that checks to make sure the machine-language portion is intact before allowing the program to run, just as an extra safety check. Also, be sure to use only backup copies of your important disks until you are certain your copy of Blockhead is reliable.

If you would rather not spend the time typing and testing all those lines of BASIC and machine language, you can order a disk containing Blockhead from the Shareware Spy (see this issue's Shareware Spy column for ordering details). As a bonus, you will get the assembly source code for the machine language portion, which we're not printing here. (Of course, it's even harder to follow than the BASIC listing, so maybe we're not really doing you any favors by providing it!) Or, you can just try to follow along with the text until the final Blockhead program is ready, so you don't have to type it in (or buy it) twice.

Technical Knowledge Required!

Be very sure you know what you're doing before you modify your disks using Blockhead. Make backups of important files and disks. We repeat: *Make backups!*

To use Blockhead effectively, you will need to know the hexadecimal (base 16) numbering system, the ASCII character code, and have a thorough familiarity with ProDOS disk structure. You should know what blocks are and, in a general way, how ProDOS stores files on disks. (If you don't know these things yet, don't worry; we'll cover them in future installments of this series.)

We also recommend having on hand a good ProDOS reference book, such as Apple's ProDOS technical manual or *Beneath Apple ProDOS.* (The best place to buy these and other Apple II books is from Resource Central. See this issue's News & Rumors column for a special offer on *Beneath Apple ProDOS* from Resource Central.)

Inspecting Blocks

To start up Blockhead, simply type RUN BLOCKHEAD at the ProDOS BASIC prompt. To exit Blockhead, press the Escape key.

When you run Blockhead, the first thing it does is display block 0 of the disk you ran it from. (This is the disk's boot block.) The leftmost column of numbers tells you the starting byte number of each line. Since there are eight bytes in each line, the address column is incremented by eights. The middle section of the screen displays the numeric contents of the byte in hexadecimal, eight bytes per line. The rightmost column displays the same bytes, but in character (ASCII) form instead of numeric form.

Use the Apple's arrow keys to move the flashing cursor through the displayed block data. Notice the address counter at the bottom of the screen changes to reflect the number of the byte the cursor is on. Since each block contains 512 bytes, numbered between 0 and 511, the cursor can't move beyond byte $1FF (the hex equivalent of 511). If you are still looking at Block 0, you will probably recognize the message "Unable to Load ProDOS" in the rightmost column as you scroll through the block. (Much of the rest of the time the text column will look like gibberish.)

You can read other blocks on the disk by pressing the + key to read the next block, or the - key to read the previous block. (You do not need to use the Shift key to read the next block if you're using the main keyboard—the program also accepts the = key to move to the next block.)

To read a specific block directly, press Control-R. The cursor will jump down to the block number at the bottom of the screen. Press Control-X (or Clear) to clear the existing block number, then enter the new one (in hexadeci-

B Y J E R R Y K I N D A L L

mal, of course). (You can also use the up and down arrow keys to select the next and previous block from the previous block number.) Press Return when the desired block number has been entered, or Escape to cancel.

As an exercise, you may want to explore your disks to see what's on them. It's easy—just hit the + key to move to the next block, use the arrow keys to look through it, and then proceed to the next block. And, as long as you never change any data, it's also perfectly safe. You might want to jot down the numbers of blocks that seem to contain "interesting" data, so you can return to them later.

If you do change some data in a block (we'll tell you how later), Blockhead will ask you if you want to write the changed block to disk before reading the new one, to prevent you from forgetting to save the changes you've made. Unless you are sure you have made a change you want to keep, press the N key, for No, and Blockhead will forget your changes.

Display Modes

Everything inside your Apple is stored as numbers—and, furthermore, the same numbers can mean different things depending on what program is looking at them. For example, the series of hexadecimal bytes 8D 41 42 might be an assembly language instruction (STA $4241), a number (4,342,157 in decimal), or text (a carriage return, followed by the letters A and B). Part of understanding what really goes on inside your computer, and on your disks, involves cultivating a "feel" for which bytes might have which meanings, based solely on context.

The ASCII display can be particularly confusing. The Apple uses different numeric codes for inverse, flashing, and "normal" letters. Normally, these codes are "filtered" out (that is, removed) so that you can more easily see the text hidden within the blocks (and to avoid frying your eyeballs—flashing text gets really annoying to look at). Control characters are shown as "." in the ASCII listing. However, sometimes you will want or need to look at the text without this filtering. Press Control-F to deactivate the filter. Control-F is a "toggle switch"—hitting it once will turn off the filter, and hitting it again will turn the filter back on.

All Apples since the introduction of the IIc (including the enhanced IIe and the IIGS) have two character sets. One contains flashing and inverse characters in addition to the "normal" text we're used to looking at. However, there are not enough ASCII codes to include lowercase letters in the flashing and inverse sets, so there is also an "alternate" set which includes only inverse and normal characters (no flashing text), with a full complement of upper and lower case letters in both sets. The alternate set also contains the "MouseText" graphic characters. Normally, the alternate character set is used only when the 80-column firmware is activated.

Blockhead can display ASCII codes in either the alternate or main character sets (the main set is the default). To switch to the alternate set, press Control-A (for Alternate). Like Fil-

Listing 1: Blockhead BASIC Code

Launch BASIC.System, get to the "]" prompt, and enter this program a line at a time. (Indented lines in the listing below are continuations of the previous line. Do not press Return until the end of the actual BASIC program line.) Be careful of typing mistakes—double-check each line before pressing Return. When you are finished, save the program to disk with the command SAVE BLOCKHEAD.

```
10  GOTO 21
11 H = H + 3:O = O + 1: IF O < 8 THEN 50
12 O = 0:H = 7
13  IF B = 8696 THEN O = 7:H = 28: GOTO 50
14 B = B + 8: IF V = 22 THEN T = T + 8: CALL 2048,T: GOTO 50
15 V = V + 1: GOTO 50
16 H = H - 3:O = O - 1: IF O >  = 0 THEN 50
17 O = 7:H = 28
18  IF B = 8192 THEN O = 0:H = 7: GOTO 50
19 B = B - 8: IF V = 3 THEN T = T - 8: CALL 2048,T: GOTO 50
20 V = V - 1: GOTO 50
21  IF  PEEK (104) = 8 THEN  POKE 103,1: POKE 104,9: POKE 2304,0: PRINT  CHR$(4)"-
      BLOCKHEAD"
22  PRINT  CHR$ (4)"BLOAD BLOCKHEAD.ML"
23  LOMEM: 24576
24 Q = 0: FOR X = 1 TO 246:Q = Q + X *  PEEK (2047 + X): NEXT : IF Q <  > 3439013
      THEN  PRINT "BLOCKHEAD.ML file is faulty.": STOP
25  PRINT  CHR$ (21);: TEXT : SPEED= 255: NOTRACE : HOME : INVERSE
29  PRINT " BLOCKHEAD V1.0          BY JERRY KINDALL ": NORMAL
30  POKE 1,21: POKE 2,0: POKE 3,128:T = 8192:B = T:V = 3:H = 7:O = 0:K = 0:R = 0:M =
      0:A = 0:Y = T: CALL 2057,K
31 B0 =  - 16287:B1 =  - 16286
39  GOSUB 700
40  CALL 2048,T: CALL 2054,K: POKE 49166 + A,0
50  CALL 2051,B + O: VTAB V: HTAB H: IF R THEN  HTAB 33 + O
51  GET X$:X =  ASC (X$)
52  IF  PEEK (B0) > 127 THEN  POKE B + O,X:R = 1: GOTO 200
53  IF  PEEK (B1) > 127 THEN  POKE B + O,X + 128:R = 1: GOTO 200
60  ON X GOTO 140,50,300,115,50,110,50,16,150,13,18,50,50,50,50,125,50,101,50,50,11,
      50,104,50,50,160,100
64  IF X > 95 THEN X = X - 32
70  IF (X$ = "=" OR X$ = "+") AND K < 65535 THEN K0 = K:K = K + 1: GOSUB 600: GOTO 40
71  IF (X$ = "-" OR X$ = "_") AND K > 0 THEN K0 = K:K = K - 1: GOSUB 600: GOTO 40
72  IF X$ = "," OR X$ = "<" THEN O = 0:H = 7: GOTO 50
73  IF X$ = "." OR X$ = ">" THEN O = 7:H = 28: GOTO 50
74  IF X$ = "[" OR X$ = "{" THEN T = 8192:B = 8192:O = 0:V = 3:H = 7: GOTO 40
75  IF X$ = "]" OR X$ = "}" THEN T = 8544:B = 8696:V = 22:H = 28:O = 7: GOTO 40
76  IF (X > 47 AND X < 58) OR (X > 64 AND X < 71) THEN 950
99  GOTO 51
100  GOSUB 800: VTAB 24: HTAB 1: CALL  - 868: VTAB 23: END
101  GOSUB 800: GOSUB 470: GOSUB 605: GOTO 40
104  GOSUB 480: GOSUB 650: GOTO 50
110  POKE 3,128 -  PEEK (3):A = 0: GOTO 40
115  POKE 34,23: HOME : PRINT "Decimal value (" PEEK (B + O)")? ";: INPUT "";X$:
      TEXT : GOSUB 700:X =  VAL (X$): IF X$ <  > "" AND X >  = 0 AND X <  = 255 THEN
      POKE B + O, VAL (X$): GOTO 200
116  GOTO 50
125  POKE 34,22: HOME : INPUT "Pstring? ";X$: HOME : TEXT : GOSUB 700: IF X$ <  > ""
      THEN  POKE B + O, LEN (X$): FOR Q = 1 TO  LEN (X$): POKE B + O + Q, ASC ( MID$
      (X$,Q,1)): NEXT :M = 1: GOTO 40
126  GOTO 50
140 A =  NOT A: POKE 3,0: GOTO 40
150 R =  NOT R: GOTO 50
160  VTAB 24: HTAB 1: PRINT "Filling block data...";
161  IF B + O <  > Y THEN  FOR X = B + O TO Y STEP  SGN (Y - B - O): POKE X, PEEK
      (Y): NEXT :M = 1: GOTO 39
162  FOR X = 8192 TO 8703: POKE X, PEEK (Y): NEXT :M = 1: GOTO 39
200  CALL 2048,T:X = 21:M = 1:Y = B + O: GOTO 11
300  GOSUB 800:F0$ = F$: IF F$ <  > "" THEN F$ = "": GOSUB 700
304  VTAB 24: HTAB 11
305  GET X$:X =  ASC (X$): IF X = 27 THEN F$ = F0$: GOTO 39
306  IF X$ > "0" AND X$ < "8" THEN S =  VAL (X$): PRINT S;: GOTO 310
307  IF X = 10 AND S > 1 THEN S = S - 1: PRINT S; CHR$ (8);: GOTO 305
308  IF X = 11 AND S < 7 THEN S = S + 1: PRINT S; CHR$ (8);: GOTO 305
309  IF X <  > 13 AND X <  > 9 AND X <  > 21 THEN 305
310  HTAB 20
311  GET X$:X =  ASC (X$): IF X = 27 THEN F$ = F0$: GOTO 39
312  IF X$ = "1" OR X$ = "2" THEN D =  VAL (X$): PRINT D;: GOTO 320
313  IF X = 10 AND D = 2 THEN D = 1: PRINT D; CHR$ (8);: GOTO 311
314  IF X = 11 AND D = 1 THEN D = 2: PRINT D; CHR$ (8);: GOTO 311
315  IF X = 8 THEN 304
316  IF X = 32 THEN D = 3 - D: PRINT D; CHR$ (8);: GOTO 311
317  IF X <  > 13 THEN 311
320  POKE 48944,S * 16 + (D - 1) * 128: GOTO 39
470  VTAB 24: HTAB 33: INVERSE : PRINT "READ";: GOTO 490
480  VTAB 24: HTAB 33: INVERSE : PRINT "WRITE";
490 K0 = K: NORMAL : CALL  - 868
```

```
500  CALL 2054,K: HTAB 31
510  GOSUB 900
515  IF X = 24 THEN K = 0: GOTO 500
516  IF X = 10 AND K > 0 THEN K = K - 1: GOTO 500
517  IF X = 11 AND K < 65535 THEN K = K + 1: GOTO 500
520  IF X = 27 THEN K = K0: POP : GOTO 39
525  IF X = 8 THEN K =  INT (K / 16): GOTO 500
530  IF X = 13 THEN  GOTO 700
540  IF X < 48 THEN 510
560 K = K * 16 + N:K = K -  INT (K / 65536) * 65536
570  GOTO 500
600  GOSUB 800
605  CALL 2057,K: IF  PEEK (0) > 0 THEN K = K0: PRINT  CHR$ (7);: RETURN
610 M = 0:T = 8192:B = T:V = 3:H = 7:O = 0:Y = T: RETURN
650  CALL 2060,K: IF  PEEK (0) > 0 THEN  PRINT  CHR$ (7): RETURN
660 M = 0: RETURN
700 S =  INT ( PEEK (48944) / 16):D = 1: IF S > 7 THEN S = S - 8:D = 2
705  VTAB 24: HTAB 1: IF F$ <  > "" THEN  PRINT "File=" LEFT$ (F$ + "         ",15);
710  IF F$ = "" THEN  PRINT "Disk=Slot "S", Drive "D;
720  PRINT "  Blk=      Adr=";: CALL 2054,K: CALL 2051,B + O: RETURN
800  IF  NOT M THEN  RETURN
801  VTAB 24: HTAB 1: PRINT "Changes not written!";: HTAB 33: INVERSE : PRINT
      "WRITE?";: NORMAL : CALL  - 868
802  GET X$: IF X$ = "Y" OR X$ = "y" THEN  CALL 2060,K0
803  IF X$ =  CHR$ (27) THEN  GOSUB 700:K = K0: POP : GOTO 40
804  GOTO 700
900  GET X$:X =  ASC (X$): IF X = 127 THEN X = 8
905  IF X > 95 THEN X = X - 32
910  IF X = 95 OR X < 48 THEN  RETURN
920 N = X - 48: IF N > 9 AND N < 17 THEN 900
930  IF N > 16 THEN N = N - 7: IF N > 15 THEN 900
940  RETURN
950  HTAB H: GOSUB 910: PRINT  CHR$ (X);:N0 = N: GOSUB 900
955  IF X = 13 OR X = 32 OR X = 21 THEN N = N0:N0 = 0:X = 48
960  IF X > 47 THEN  POKE B + O,N0 * 16 + N:R = 0: GOTO 200
970  GOTO 40
62999 :
63000  REM BlockHead v1.0
63001  REM by Jerry Kindall
63002  REM for II Alive
63003  REM Public-domain
```

Listing 2: Blockhead Machine Language Code

Be sure to save any BASIC program in memory, since this procedure will erase it. Enter the command CALL-151 to display the * prompt. Enter each line below at the * prompt. Be especially careful of typing errors when entering this part of the program. (Note: All round things are zeroes, not letter "O"s.) When finished, return to BASIC with the command 0G, then save the program to disk with BSAVE BLOCKHEAD.ML,A2048,L246.

```
0067: 01 09
00AF: 04 09
0900: 00 00 00 00
0800: 4C 44 08 4C AA 08 4C A0
0808: 08 4C 1A 08 20 26 08 20
0810: 00 BF 81 3E 08 90 02 85
0818: 00 60 20 26 08 20 00 BF
0820: 80 3E 08 4C 15 08 20 D3
0828: 08 A5 50 8D 42 08 A5 51
0830: 8D 43 08 AD 30 BF 8D 3F
0838: 08 A9 00 85 00 60 03 40
0840: 00 20 00 00 20 D3 08 A9
0848: 01 20 E1 08 20 8E FD 18
0850: A5 28 69 20 8D 87 08 A5
0858: 29 8D 88 08 A5 50 8D 74
0860: 08 A5 51 8D 75 08 A0 00
0868: 20 AF 08 A9 BA 91 28 C8
0870: C8 A2 00 BD F8 21 48 20
0878: BC 08 C8 68 05 03 10 06
0880: C9 A0 B0 02 A9 AE 9D F0
0888: 06 E8 E0 08 90 E5 18 A5
0890: 50 69 08 85 50 90 02 E6
0898: 51 A5 25 C5 01 90 AD 60
08A0: 20 DC 08 A0 1A A5 51 4C
08A8: B7 08 20 DC 08 A0 24 A5
08B0: 51 38 E9 20 18 65 02 20
08B8: BC 08 A5 50 48 4A 4A 4A
08C0: 4A 20 C7 08 68 29 0F 86
08C8: FF AA BD E6 08 A6 FF 91
08D0: 28 C8 60 20 BE DE 20 67
08D8: DD 4C 52 E7 20 D3 08 A9
08E0: 17 85 25 4C 22 FC B0 B1
08E8: B2 B3 B4 B5 B6 B7 B8 B9
08F0: C1 C2 C3 C4 C5 C6
```

tering, this is a toggle—to go back to the main set, press Control-A again.

The Control-F and Control-A commands are interlinked. If the filter is turned on when you press Control-A, it will be turned off, since you can't see the effects of the alternate character set with filtering on. Similarly, activating the filter automatically selects the main character set.

Remember, neither Control-F nor Control-A change the displayed data in any way. They only change how it appears on the screen.

Selecting Another Drive

Blockhead always defaults to reading the disk it was run from. (More precisely, it defaults to looking at the last disk accessed before the program was run, which is usually the disk it was run from, unless you load and run the program as two separate steps.)

To switch to a different drive, press Control-C (for Change disk). The flashing cursor will hop to the bottom of the screen. You can enter the slot and drive number of the desired disk by typing the slot and drive number (no Returns are needed).

You can also use the up and down arrow keys to alter the slot or drive number one by one. Press Return, Tab, or right arrow to accept the slot number and change only the drive number. Press the Space Bar when the cursor is on the drive number to switch to the other drive. Press the left arrow key to move back to the slot number. Press Escape to exit the drive selection process without changing the drive.

Changing the drive number does not automatically read a block from the new disk. This is to facilitate copying blocks from one disk to another. (To perform this feat, simply read the desired block from the original disk, switch to the destination disk, and write the block with Control-W, then Return.) So, if you want to read a block after changing the disk, simply press Control-R, then Return.

Changing the Data

There are several ways to change the data in a block. The simplest way, if you know hexadecimal, is to simply move the cursor to the desired byte and begin typing hexadecimal data. As soon as you have entered two hexadecimal digits, the cursor will move to the next byte, and you can type the next byte without any intervening spaces.

If you want to enter a decimal number, move the cursor to the byte you wish to change and press Control-D. A prompt will appear at the bottom of the screen, showing you the current value of the byte in decimal. Enter the new value (between 0 and 255) and press Return. (If you just want to *see* the byte's decimal value, just press Return when asked for the new value, and the byte will not be changed.)

Entering text is just as easy. To enter low-ASCII text (text with ASCII codes less than 128), hold down the Command or Open-Apple key as you type the desired text. To enter high-ASCII text (text with ASCII codes greater than

(Continued on page 54)

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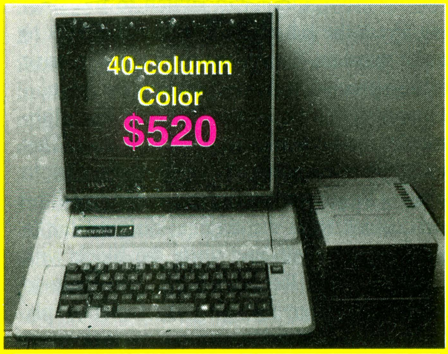

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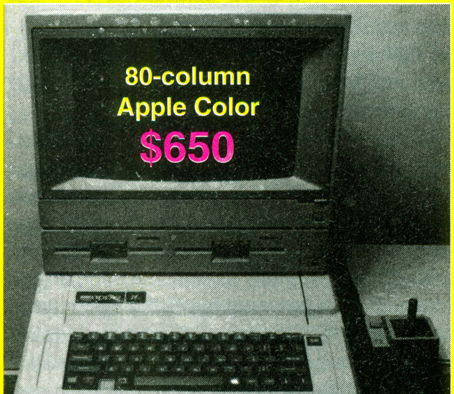

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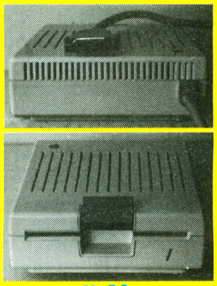

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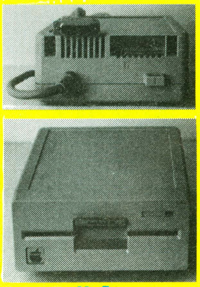

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Major League Drag

by Mike Westerfield

PEANUTS AND POPCORN AND PHYSICS

As I write this article, baseball season is starting. Like most of you, when I think of baseball, I think back to those long-ago years in, well, physics class.

What? Baseball doesn't remind *you* of physics?

Back in high school physics class, one of the first problems we learned to solve was how far something would go. Let's say we're talking about a fast ball thrown by a good pitcher at about 90 miles per hour. Chunking through the numbers, I found that a ball thrown at a 45° angle would travel about 540 feet. That's about twice the length of a football field. It's also about twice as far as the baseball will really go.

Oops. The problem, of course, is that beginning physics classes neglect a few unimportant things to make the problems easier. In this case, the unimportant little detail we ignored was *drag*. Get rid of the air, and even a decent Little League hitter can knock the ball out of Yankee Stadium.

So why not add drag? Well, with pencil and paper, which is what they made me use back in high school, it's pretty tough to deal with drag, since it varies with the speed of the ball. But with a computer, it's pretty easy. In this issue we'll write a program that follows the path of a baseball so we can see how far, how fast, and how high it will *really* go.

THE MATH

The easiest way to solve the problem with the computer is a little different than the easiest way to solve the problem with a pencil and paper, even if we ignore drag. If you are doing it with pencil and paper, you will probably use certain equations to determine the end position of the ball directly, without calculating any of its intermediary steps. On the computer, it's conceptually simpler to follow the path of the baseball a different way.

To follow the baseball on the computer, we start with the velocity and position of the baseball, and follow it along over small increments of time. We have to take the force of gravity into effect, and the easiest way to do that is to split the velocity into two components, just like we use two numbers to keep track of the position of the baseball. One component will keep track of the baseball's horizontal velocity, and the other will keep track of its vertical velocity. Since gravity applies only to the vertical component of the baseball's velocity, this split will make our calculation that much simpler.

As the baseball starts, then, we set up four variables:

```
{set the starting position}
x := 0.0;
y := 0.0;

{set the starting horizontal (vx)
and vertical (vy) velocities}
vx := v*cos(angle);
vy := v*sin(angle);
```

The two inputs are the starting speed of the baseball, `v`, and the flight angle between the starting path of the ball and the ground, `angle`. The `cos` and `sin` functions are used to convert the velocity (which is actually a mathematical construct called a *vector,* with both a value and a direction) to its horizontal and vertical components.

To follow the path of the baseball, we'll pick a short time interval, and stuff it in a variable called `dt`. The distance the ball travels over any particular time interval is the velocity times the time, so we update the position like this:

```
x := x + vx * dt;
y := y + vy * dt;
```

If the velocity stayed the same, that would be the end of the story. Gravity changes the velocity in the vertical direction, though, eventually pulling the ball back to the ground. We'll use `g` for the acceleration of gravity, updating `vy` each step with the line:

```
vy := vy - g*dt;
```

The other thing that affects the velocity of the baseball is drag. Drag always pushes against the direction of the ball. The simplest equation for drag leaves out a few details, but it works a lot better than ignoring drag completely. In air, over the range of speeds normally traveled by a baseball, the force of drag can be approximated by the following formula:

$$D = C_d \rho V^2 S / 2$$

Symbol	Variable	What it Means
D		Force of drag.
C_d	`Cd`	Coefficient of drag. For a baseball in air, this is about 0.2. The coefficient of drag tells how efficient a shape is at slipping through the air. A streamlined shape, like a trout, has a coefficient of drag of about 0.1. A flat plate held up to the wind (think of a sail on a boat) has a coefficient of drag around 1.2.
r	`da`	The density of air. This value can vary quite a bit, but at sea level on a dry day, which is what people usually work with, the value is 1.2250140 kilograms per cubic meter (kg/m^3).
S	`A`	The frontal area of the baseball. This is the area of the baseball as the wind sees it, as if it were a disk. A baseball has a circumference of 9 inches. Sticking with the metric (meters-kilograms-seconds) units of measurement used in physics, this gives an area of 0.0041585563 square meters.
V	`vx, vy`	The velocity of the baseball.
m	`m`	Mass of the baseball. This isn't in the drag equation, but we'll need the value in a moment to convert the force of drag into an acceleration. A baseball weighs 5 ounces, or 0.15551743 kilograms.

From Newton's second law (F = m a), we can convert the drag force to an acceleration, and from the acceleration, we can adjust the velocity. The only trick is making sure the change in velocity always works against the direction of travel. For that, I used a subroutine called `Sign`, which returns -1, 0 or 1, depending on the sign of the input. By passing the velocity and multiplying the result by the force of drag, the force of drag always has the same sign as velocity. Putting all of this together, here's the two lines that take drag into account:

```
vx = vx -
dt*Sign(vx)*sqr(vx)*Cd*da*A/(2.0*m);
vy = vy -
dt*Sign(vy)*sqr(vy)*Cd*da*A/(2.0*m);
```

Listing 1 shows a program that puts all of these ideas to work. In this country, we generally talk about speeds in miles per hour, distances on a baseball field in feet or yards, and angles in degrees. All of the units need to be the same to follow the motion of the baseball, and the angle needs to be in radians to get the sine and cosine in Pascal. The program takes all of this into account. You give the speed of the baseball in miles per hour, the angle in degrees, and the program gives back the distance traveled in feet.

SOME PRACTICAL TIPS

One of the things I didn't talk much about was the size of the time step, dt. If this value is too big or too small, the program just doesn't work well. Good values for dt are about 0.1 to 0.001. With a value of 0.1, the results are off by a few percent, but the program runs pretty quickly. With a value of 0.001 for dt, the program takes a long time, but the answer you get is only off by a few hundredths of a percent.

I've kept things very simple for this article. There are better ways to write this program. By using better numerical methods, you can get the same accuracy this program does a lot faster. So why didn't I do it the better way? Basically, this way works fine for what we're trying to do, and anyone who knows algebra and Newton's laws of motion can follow what the program does.

PLAY BALL!

Now that we can follow the path of a baseball fairly well, let's answer some questions.

Back in physics class, we solved another problem. If you're going for distance, and drag isn't a factor, you should launch the ball at a 45°angle. Anything more or less, and the ball doesn't go as far. When drag is added, though, the "best" angle isn't the same. So what is it?

One way to find out is to try a few angles. Here's a slightly modified version of the main part of the program. With it, we find that the best launch angle for a 90 mile per hour fast ball is about 43°. Is it the same speed for balls traveling at different speeds? Good question. Try it for, say, 175 miles per hour to see.

```
angle := 45.0;
while angle >= 30.0 do begin
   d := metersToFeet * Flight(v *
mphTomps, angle * dTor, 0.01);
   writeln(angle:12:1, d:12:5);
   angle := angle - 1.0;
   end; {while}
```

Anyone who's watched a baseball game knows how fast pitchers throw the ball. A good fast ball goes about 90 miles per hour. How fast does the ball go when a batter hits it, though? Another simple change can tell us.

LISTING 1

```
{----------------------------------------------------------------}
{                                                                }
{ Simulation of a baseball in flight, including drag.            }
{                                                                }
{ Mike Westerfield                                               }
{ April 1994                                                     }
{                                                                }
{----------------------------------------------------------------}

{$keep 'BaseBall'}
{$optimize 1}

program BaseBall (output);

const
   metersToFeet = 3.2808399;        {convert meters to feet}
   mphTomps = 0.44704;              {convert miles/hour to meters/second}
   dTor = 0.017453292;              {convert degrees to radians}

var
   v: real;                         {starting velocity (miles/hour)}
   angle: real;                     {launch angle (degrees)}
   d: real;                         {distance traveled (feet)}


   function Flight (v, angle, dt: real): real;

   { Determine how far a baseball will fly                      }
   {                                                            }
   { parameters:                                                }
   {    v - starting speed (meters/second)                      }
   {    angle - starting angle (radians)                        }
   {    dt - time increment                                     }
   {                                                            }
   { Returns: Distance traveled (meters)                        }
   {                                                            }
   { Note: inside this subroutine, all units are in the mks     }
   {    system (meters-kilograms-seconds)                       }

   const
      A = 0.004158556;              {frontal area of a baseball}
      Cd = 0.2;                     {coefficient of drag for a sphere}
      da = 1.2250140;               {density of the atmosphere}
      g = 9.8;                      {acceleration of gravity}
      m = 0.15551743;               {mass (weight) of the baseball}

   var
      x, y: real;                   {current position of the baseball}
      vx, vy: real;                 {current velocity of the baseball}


      function Sign (x: real): real;

      { Return the sign of a number                             }
      {                                                         }
      { parameters:                                             }
      {    x - number for which to return the sign              }
      {                                                         }
      { Returns:                                                }
      {    -1.0 if x < 0.0                                      }
      {     0.0 if x = 0.0                                      }
      {     1.0 if x > 0.0                                      }

      begin {Sign}
      if x < 0.0 then
         Sign := -1.0
      else if x = 0.0 then
         Sign := 0.0
      else
         Sign := 1.0;
      end; {Sign}


   begin {Flight}
   {set the starting position}
   x := 0.0;
```

```
    y := 0.0;

    {set the starting horizontal (vx) and vertical (vy) velocities}
    vx := v*cos(angle);
    vy := v*sin(angle);

    {follow the flight until the ball hits the ground}
    while y >= 0.0 do begin

       {update the position of the ball}
       x := x + vx*dt;
       y := y + vy*dt;

       {update the velocity, ignoring drag}
       vy := vy - g*dt;

       {take drag into effect}
       vx := vx - dt*Sign(vx)*sqr(vx)*Cd*da*A/(2.0*m);
       vy := vy - dt*Sign(vy)*sqr(vy)*Cd*da*A/(2.0*m);

      {writeln(x:12:5, y:12:5, vx:12:5, vy:12:5);}
       end; {while}

    {return the result}
    Flight := x;
    end; {Flight}


begin
v := 90.0;
angle := 40.0;

d := metersToFeet * Flight(v * mphTomps, angle * dTor, 0.01);

writeln('With a starting speed of ', v:1:1, ' miles per hour, launched from
');
writeln('an angle of ', angle:1:1, ' degrees, a baseball will travel about ');
writeln(d:1:5, ' feet.');
end.


Applesoft BASIC Version of Listing 1

10 V = 90:AN = 40:DT = 0.01: REM  Starting speed, angle, time slice
20 MF = 3.2808399: REM  meters to feet factor
30 HS = 0.44704: REM  miles per hour to meters per second factor
40 DR = 0.017453292: REM  degrees to radians factor
50 A = 0.004158556: REM  frontal area of baseball (square meters)
60 CD = 0.2: REM  coefficient of drag for a sphere
70 DA = 1.2250140: REM  density of the atmosphere
80 G = 9.8: REM  acceleration due to gravity (meters/second/second)
90 M = 0.15551743: REM  mass of baseball (kilograms)
95 :
100 V0 = V * HS:A0 = AN * DR: REM  convert units
110 X = 0:Y = 0: REM  set starting position
120 VX = V0 *  COS (A0):VY = V0 *  SIN (A0): REM  convert velocity
130 X = X + VX * DT:Y = Y + VY * DT: REM  adjust position of ball
140 VY = VY - G * DT: REM  update for gravity
150 VX = VX - DT *  SGN (VX) *  SQR (VX) * CD * DA * A / (2.0 * M): REM  drag x
160 VY = VY - DT *  SGN (VY) *  SQR ( ABS (VY)) * CD * DA * A / (2.0 * M): REM drag y
170 REM N = X: GOSUB 230:N = Y: GOSUB 230:N = VX: GOSUB 230:N = VY: GOSUB 230: PRINT
171  IF Y > 0 THEN 130
175 :
179  PRINT
180  PRINT "With a starting speed of "V" MPH,"
190  PRINT "launched from an angle of "AN "
200  PRINT "degrees, a baseball will travel about"
210  PRINT  INT (X * MF + .5)" feet."
220  END
225 :
226  REM  Print N with 5 decimal places, in 12 spaces total
227 :
230 N$ =  STR$ (N): IF N =  INT (N) THEN N$ = N$ + "."
235  IF  LEFT$ (N$,1) = "." THEN N$ = "0" + N$
236  IF  LEFT$ (N$,2) = "-." THEN N$ = "-0." +  MID$ (N$,3)
240 N$ = N$ + "00000"
250  IF  ASC ( RIGHT$ (N$,6)) <  > 46 THEN N$ =  LEFT$ (N$, LEN (N$) - 1): GOTO 250
260  PRINT  RIGHT$ ("      " + N$,12);: RETURN
```

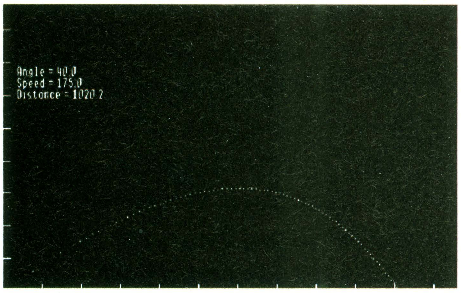

Figure 1: Flight of a baseball with position plotted every 0.1 seconds.

The fence on a baseball field is about 320 to 380 yards from the batter, or roughly 1000 feet. Starting with a velocity of, say, 100 miles per hour, and incrementing the speed by 5 miles per hour, you can find the speed you need to hit the ball to carry it over the fence. With a little work, you can even take wind speed into account.

In fact, this short program can answer all sorts of questions. Figure 1 shows the path of a baseball hit at 175 miles per hour and an angle of 40°. As you can see, the ball is coming almost straight down near the end. You can figure out how fast the ball is going when it crosses the plate, how high it will go, and how fast it is going when the nut in the stands tries to catch it with his bare hands. (Here's a hint: use a hat!) You can also decide if it's faster to throw the ball at a steep angle, and throw it 400 feet in a single throw, or to throw it low and hard, relaying the ball to another player. The same basic ideas work for other things, too, like model rockets, motion of the planets, and golf balls.

FURTHER READING

In most of these articles, I've given the names of some specific books to look for if you want to learn more. This time, I'm not going to get specific. There are lots of good books, written at so many different levels that recommending one or two would be silly. My favorite books are also out of print, and some are hard to find at even a well-stocked library, so you probably couldn't find the ones I would list anyway.

For general information about Newton's laws, look in a high school physics book. All of the ideas I've discussed here except drag are covered in any decent textbook.

The best place to look for information about drag is books about airplanes, especially those written before 1940. That's back in the propeller airplane days, when planes went about as fast as baseballs. Things change a lot when you get close to the speed of sound.

For more detailed information about drag, check the card catalog at your library for fluid dynamics. There are a lot of books, dealing with all sorts of topics. Some will even tell you how to model the actual flow of air past the baseball.

Finally, if you want to make the program run a lot faster, giving more accurate answers in less time, you'll need to look in the computer science section for books about numerical analysis. ■

(Continued from page 30)

		MakinCopies, Mailman,No.2, Music Files (Color My World, Beethoven, William Tell, Best of My Love, Smoke on the Water), rsounds (Yumm, Do Dat Again, I'll Be Back, Yeah)
7C	3.5	Print Shop GS graphics (cub scouts, school, logos, pixels, states, scouts, scout ranks, sports, characters, misc)
7D	3.5	Brickout, Fenced In, Super Tic Tac Toe, Mastermind, New Print Shop
7E	5.25	Brickout, Fenced In, Super Tic Tac Toe, Mastermind, New Print Shop

January/February 1994

6A	3.5 GS	All Except Front, Cleaner Cleaner Up, Columnist, DeskTracker, DOS 3.3 Launcher, FinderSounder, FinderView, FolderJump, IR, IRnda, Double Solitaire
6B	3.5 GS	MODZap, NoiseTracker, OverSampler, PowerPlay, Universal Sound Edit (USE)
6C	5.25	Columnist, DOS 3.3 Launcher
6D	3.5	Columnist, DOS 3.3 Launcher

November/December 1993

5A	3.5 GS	Plunder, One-Arm Battle
5B	3.5 GS	Milestones 2000

September/October 1993

4A	3.5 GS	FixFontMgr, JumboDesk, Winflate, Mac Sound Grabber
4B	3.5	Sound Editor
4C	5.25	Sound Editor

July/August 1993

3A	3.5 GS	ProBoot, SANE Fix, Quadronome, ShadowWrite, SoniqTracker
3B	3.5 GS	Bulla (FTA)
3C	3.5 GS	Bille Art (Brutal Deluxe)

May/June 1993

2A	3.5 GS	DuelTris, Spy Hunter GS, FloorTiles, Ant Wars
2B	3.5	SoftDAC, Magic File Cabinet
2C	5.25	SoftDAC, Magic File Cabinet

March/April 1993

1A	3.5 GS	Keyboard Extender, BRAM Checker, Scrapbook NDA, X-10 GS, GUIMaster, rSounder
1B	3.5	AppleWriter II, Electric Duet, GraForth
1C	5.25	AppleWriter II
1D	5.25	Electric Duet
1E	5.25	GraFORTH

PRODOS BUILDING BLOCKS

(Continued from page 47)

127), hold down the Option or Solid-Apple key instead. Remember, while the Apple or Option key is held down, anything you type (even Tab, Return, and the arrow keys) will be entered as text. There is no separate "text entry" mode.

When you are entering text, it can be hard to figure out where the cursor is in relation to the text you want to change, because the cursor is in the hexadecimal display, while the text to be changed is in the ASCII display in the right column. The Tab key can be used to move the cursor to the ASCII display, so you can tell which byte you would be changing. Press the Tab key again to move the cursor back to the hexadecimal display.

It is important to recognize that moving the cursor to the text area with the Tab key does not enter an "ASCII entry mode" of any sort. You must still hold down the Apple (Open-Apple) or Option (Solid-Apple) key to enter ASCII text. (Doing so, you may have noticed, automatically moves the cursor to the ASCII column if it's not already there.) Similarly, if you begin typing while the cursor is in the ASCII column, the program will expect you to be typing hex digits and move the cursor back over to the hexadecimal column.

Sometimes, you'll need to enter a ProDOS string, also known as a Pascal string. This is a low-ASCII string with a length byte at the beginning which tells the computer how many characters of text are in the string. (For example, a ProDOS string of the word "Apple" would begin with the number 5, followed by the ASCII codes for each character of the word.) To enter such a string, place the cursor where you want the length byte to be placed (the text will follow) and press Control-P (for Pascal/ProDOS string). You will be prompted at the bottom of the screen for the text; enter it and press Return, and Blockhead will place the ASCII codes and the correct length byte into the block.

Blockhead also has a powerful feature for changing a range of bytes to the same value (say, zero). To do this, move the cursor to the first position and enter the desired byte value. (You can enter the value in any of the ways described above, except as a ProDOS string.) Then move the cursor to the last position and press Control-Z (for Zap). Blockhead will fill in all the bytes between the last byte you entered and the current cursor position with the value of the last byte entered.

To fill an entire block with a value, enter the desired value in any byte using any of the above methods, then press the left arrow key to move the cursor back onto the original byte. Then press Control-Z. Blockhead will fill the entire block with the byte you specified.

Writing Your Changes

To write your changes to disk, press Control-W and press Return. (You can also change to a different block number before writing—use the up or down arrow keys to change the block number, or press Control-X or Clear and enter a new block number in hexadecimal, before pressing Return.)

Blockhead will also remind you to save your changes if you modify a block in any way, and then tell the program to read another block, change to another drive, or exit. If you answer Y to the "Write?" prompt, your changes will be saved to the original block number. If you answer N, your changes will not be saved before the requested action is performed. If you press Escape, the requested action (read another block, etc.) will be aborted, and you will have another chance to write the block—to a different block number, if desired—using the Control-W command.

Error Handling

Blockhead's error handling is, well, raw. When the program detects an error, it beeps. So, if you hear a beep, chances are good that Blockhead had trouble reading from, or writing to, the disk. No other error messages are provided, since it should be obvious what caused the error—if you just told Blockhead to write a block, and it beeps, you need to check the obvious things: is the disk set to a valid slot and drive? Is there a disk in the drive? Is the disk formatted? Have you tried to read a block number higher than the number of blocks on the volume?

If you made any typing errors while entering the Blockhead program, you may encounter an error message of some sort. Such crashes will usually display the number of the line which contains the error. Use the LIST command to look at this line and compare it with the printed listing, then retype it. ■

computer clubs

To get more information about the Apple User Group nearest you,

If you want your computer club to be mentioned in II Alive, send a letter describing your club to:

Quality Computers
c/o Bob DeMaggio
P.O. Box 349
St. Clair Shores, MI 48080

ALASKA

Anchorage Apple Users Group
P.O. Box 110753
Anchorage, AK 99511-0753
Contact: Timothy Odell 373-7459

Apple Mousse User Group
P.O. Box 80176
Fairbanks, AK 99708
Contact: Jesse Atencio (907) 456-1333
$15 per year

ARIZONA

Apple-Res
9052 E. Sahuaro Dr.
Scottsdale, AZ 85260
$25 per year

Tucson Apple Core
P.O. Box 43176
Tucson, AZ 85733-3176
Contact: Clay Evitts (602) 296-5491 days
$20 per year
BBS: (602) 882-2945

ARKANSAS

Apple Tree of the Ozarks
HC 62 Box 540
Flippen, AR 76234
$20 per year; $15 initiation

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Apple Corp of San Diego
P.O. Box 87964
San Diego, CA 92138-7964
Contact: Tom Kasner (619) 484-0695 Ext. 6

Appleholics Anonymous Apple II User Group
3875 Telegraph Rd. Suite A202
Ventura, CA 93003
Contact: Tony Pizza (805) 482-3453
$12 per year

AppleJacks of Inland Empire
Contact: Larry (909) 864-2309
BBS: (909) 369-6637

Apple Sac
P.O. Box 254645
Sacramento, CA 95825
Contact: Heidi Bylsma (916) 486-8326
New $30, Renewal $25
BBS: Future Vision (Metal) 481-1096

Fresno Apple II Computer Users Group
P.O. Box 16155
Fresno, CA 93755

GravenStein Apple IIGS Users Group
P.O. Box 964
Petaluma, CA 94953-0964
$25 per year per family
BBS: (707) 794-9333

Newton's Fruit Users Group
14639 Cashew St.
Hesperia, CA 92345-2702
BBS: (619) 956-2631

Orange Apple Computer Club
25422 Trabuco Rd., Bldg 105, Ste-251
El Toro, CA 92630
(714) 770-1865
$25 per year

Original Apple Corps
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Los Angeles, CA 90009
Contact: Fred Duffy (310) 450-3336
BBS: (310) 454-4660

Peninsula Apple User Group
Redwood City, CA
Contact: Roger Lakner 367-8657

P.I.E. (Programming & Interfacing Enthusiasts, Inc.)
P.O. Box 2185
Santa Clara, CA 95055
Contact: Dean Nichols (408) 241-2185
$20 per year
BBS: (408) 733-4670

Stockton Apple Users Grou
6333 Pacific Ave., Suite 186
Stockton, CA 95207

Tri-City Apple User Group
P.O. Box 93123
Pasadena, CA 91109
(213) 258-0281
$20 per year
BBS: (818) 288-5640

Tri Valley Apple II User Group (TVAIIUG)
P.O. Box 2096
Dublin, CA 94568
Contact: Jerry Carleton (510) 828-0959

Valley Apple Computer Club
12978 Crowley St.
Arleta, CA 91331
Contact: William Trent (818) 988-1752
$24
BBS: (818) 504-9750

COLORADO

Computer C.A.C.H.E. (Colorado Apple & Compatable Home Enthusiasts)
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BBS: (303) 280-9453

Denver Apple Pi
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Lakewood, CO 80228-0668
$18 plus $7 new member application fee
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Hamden, CT 06517

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Greens Farms, CT 06436
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Hartford User Group Exchange (H.U.G.E.)
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East Hartford, CT 06138-0027
Contact: Edward Sposito (203) 635-0557
$24
BBS: Bit Bucket (203) 257-9588

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Plainville, CT 06062-2608
Contact: Linda Frechette (203) 747-2036

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Wilmington, DE 19808-0956
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Apple Computer Enjoyment Society (A.C.E.S.)
P.O. Box 291557
Fort Lauderdale, FL 33329-1557
1-800-924-4709 & (305) 584-5923
$30 1st year; $25 renewal

Fort Lauderdale Chapter (A.C.E.S.)
see above
BBS: (305) 431-5189

South Broward Chapter (A.C.E.S.)
see above
BBS: (305) 431-5189

West Palm Beach Chapter (A.C.E.S.)
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BBS: (407) 483-8426

Apple Tree of Central Florida
2810 Nela Ave.
Orlando, FL 32809
$35 annually
BBS: 366-0156

Spring Hill Apple Computer Enthusiasts (SPACE)
11418 Long Hill Court
Spring Hill, FL 34609
$20
(904) 686-7069

SunCoast Apple Club
3300 Duncan Ave.
Sarasota, FL 34239
Contact: Shirley Cook (813) 922-1351
$20 per year, $10 for students

SunCoast Apple Tree
P.O. Box 7488
Clearwater, FL 34618
$25 per year
BBS: (813) 347-5104

SWACKS Apple Computer Club
c/o L.E. McLaughlin
384 Lancaster Ave.
Port Charlotte, FL 33952
$20 per year; $12 for Newsletter only

GEORGIA

Computer User Group (Any Type)
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Rockmart, GA 30153
Contact: Donald Sullivan
(404) 684-5909
$15 per year

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Honolulu, HI 96820-1954
Contact: Eugene Villaluz (808) 735-3750
$24 per year

IDAHO

Apple Boise User Group (ABUG)
934 River Park Lane
Boise, ID 83706
Contact: George Nummy (208) 344-9506
$12 per year

ILLINOIS

Apple Tree Computer Club
P.O. Box 823
Homewood, IL 60430-0823
Contact: Mary Ann Trzyna
(815) 469-1961
$28 family, $14 auxiliary per year
BBS: (708) 481-2211

Aurora Area Apple Corps
P.O. Box 2901
Aurora, IL 60507-2901
Contact: Howard Katz (708) 357-0759
$20

DAUG (Dupage Apple Users Group)
P.O. Box 294
Downers Grove, IL 60515

Lincolnwood Apple Users Group
2926 Leanne Court
Northbrook, IL 60062
(708) 480-8812

Northern Illinois Computer Society
P.O. Box 547
Arlington Heights, IL 60006
New $30, Renewal $24,
includes entire family
BBS: (312) 351-4374

Northshore Apple Users Group
c/o Babette Simon
5331 Carol
Skokie, IL 60077
Contact: Babette Simon (708) 967-7483
Family $20 per year

INDIANA

Apple Pickers
P.O. Box 20136
Indianapolis, IN 46220
Contact: Vincent Roth (317) 357-6207 after 5
New $25, $30 per family per year;
Renewal $20
BBS: (317) 897-1989

Apple Users Group of Michiana
P.O. Box 11398
South Bend, IN 46634-1398
$15 per year

Fort Wayne
Apple Computer Users' Group
P.O. Box 10004
Ft. Wayne, IN 46850-0004
$15 per year

Northwest Indiana Apple Users Group
7526 Independence St.
Merrillville, IN 46410
Contact: Nate Gaglilardi 762-6818
$14 per year

IOWA

Applebyter Computer Club
P.O. Box 2092
Davenport, IA 52809
Contact: Shawn Beattie
BBS: 788-0314

Green Apple User Group
P.O. Box 171
Waterloo, IA 50701
Contact: Virgil Berg (319) 232-1842
$15 per year

Metro Apple Computer Hobbyists
P.O. Box 176
Crescent, IA 51526-0176
$20 per year

Roland Story Apple User's Group
P.O. Box 407
Roland, IA 50236-0407
Contact: Dave Graham (515) 388-4700
$10 per year

KANSAS

Apple Bits Users Group (ABUG)
P.O. Box 368
Shawnee Mission, KS 66201
Contact: Sandy Brockman
(816) 523-1007
$30 first year; $25 renewal

Apple Tree User Group, Inc.
306 West 5th Street
Larned, KS 67550
Contact: Shane Blanchett
$15 Initiation Fee; $20 Individual, $25 Family

Parsons Apple Users Group
P.O. Box 1081
Parsons, KS 67357
Contact: Randall Swearengin (316) 421-6953
Family $12 per yr, Full-time students $6 per yr
BBS: (316) 421-2027

Plane Apple User's Group
P.O. Box 47396
Wichita, KS 67201
Contact: Duston James (316) 685-2174;
Steve Specht (316) 265-5539
$24 per year
OMEGA PRO (316) 721-7735

Topeka Area Apple Group
5419 SW 28th St.
Topeka, KS 66614-1713
Contact: Ron Hurd (913) 272-5033
$15 family

KENTUCKY

Louisville Computer Society
P.O. Box 9021
Louisville, KY 40209-9021
$26

MAINE

Northwoods IIGS User Group
P.O. Box 550
Milford, ME 04461-0550
$15 per year

MARYLAND

Maryland Apple Corp.
Contact: Dave Smythe (410) 882-9234

Washington Apple Pi, Ltd.
7910 Woodmont Ave., Suite 910
Bethesda, MD 20814
(301) 654-8060

MASSACHUSETTS

Cape Cod Apple Users Group
P.O. Box 48
South Dennis, MA 02660
Contact: Ron Church (508) 540-2517
$20 per year

MICHIGAN

Apple P.I.E.
P.O. Box 5055
Warren, MI 48090-5055
$25 per year

Apples for the Teachers
161 Cass Ave.
Mt. Clemens, MI 48043
Contact: Jim Wenzloff (313) 469-7206

groups specializing in a certain subject, or how to start a new group, call Apple Computer 1-800-538-9696, ext. 500. or write to: The Apple User Group Connection • Apple Computer, Inc. • 20525 Mariani Ave., M/S 36AA • Cupertino, CA 95014

Flint Apple Club
P.O. Box 460
Flint MI 48501
$20 per year
BBS: (313) 230-7754

Grand Rapids Apple II Users Group
P.O. Box 1811
Grand Rapids, MI 49501

Lansing Users Group
P.O. Box 27144
Lansing, MI 48909-7144
$18

Michigan Apple Computer User Group
P.O. Box 567
Warren, MI 48090-0567
$25 to start, $20 renewal per year

Midland Apple Club
1710 West St. Andrews
Midland, MI 48640

MINNESOTA

Lake Superior Apple Users Group
Duluth, MN
Contact: Don Jacobson (218) 723-4349

Minnesota Apple Computer Users Group
P.O. Box 796
Hopkins, MN 55343
Contact: Rand Sibet (612) 566-8571
$25 per year, $15 student

MISSOURI

American Public Domain Club
5821 Kerth Rd.
St. Louis, MO 63128
Contact: Michael Young
$12

Apple Squires of the Ozarks
P.O. Box 3986
Springfield, MO 65808-3986
Contact: Doug Kahler 833-4362
$15 initiation fee; $20 individual

Monsanto Apple Users Group
2 Pem Road
St. Louis, MO 63146-5407
Contact: John B. Wilson (314) 694-2447
(Leave voice mail)
GEnie E-Mail Address: JBWILSON
$10 per year–Monthly Newsletter

MONTANA

Billings Apple Users Group
P.O. Box 23005
Billings, MT 59104-3005
Students $15, Individual $20,
Family $25, Corp $50
BBS: 256-3454

NEBRASKA

Apple-Link
P.O. Box 22246
Lincoln, NE 68542
$10 per year

NEVADA

Southern Nevada Apple Family User Group
P.O. Box 12715
Las Vegas, NV 89112-1715
Contact: George Lewis (702) 364-9093
BBS: Apples Only (702) 646-7007

NEW JERSEY

Bergen Apple Special Interest Club (B.A.S.I.C.)
The BASIC FACTS; 8-11 Creek Ct.
Fair Lawn, NJ 07410
Contact: Philip Smallen 791-3355
$15 per year
SSA-BBS: 472-8312

North Jersey Mac Apple User Group
P.O. Box 215 (WOB)
West Orange, NJ 07052-0215
Contact: Pete Crosta (201) 667-6369
$25 per year

Ocean County Apple Users Group
25 Long Road
Freehold, NJ 07728
Contact: Matt Weiss (908) 431-2339
$15 per year

Ocean/Monmouth Apple Users Group
55 Meadowbrook Road
Brick, NJ 08723-7848
Contact: Bill Scratchley (908) 920-3833
$15 per year

Princeton Apple II Users Group
100 Sixth Ave.
Trenton, NJ 08619-3223
$12 per year

South Jersey Apple User's Group
P.O. Box 4273
Cherry Hill, NJ 08003-4273
Contact: Jack Bullion 767-4913
$20 single/family, $10 student
SJAUG APPLELINE 424-1382

NEW MEXICO

Applequerque Computer Club
P.O. Box 35508
Albuquerque, NM 87176-5508

NEW YORK

BAUG (Big Apple Users Group)
P.O. Box 1822
Old Chelsea Station
New York, NY 10113-0945
(212) 603-9007

CRAB-Apple (County of Rockland Apple Branch)
P.O. Box 268
W. Nyack, NY 10994-0268
$10 per year,
free 1/2 year membership for new members

GAB'er (Guilderland Apple Byters)
Roger C. Mazula, Editor
28 Hay Path
Watervliet, NY 12189
Contact: John Buckley (518) 371-3624
$10 per year, $5 initiation fee
BBS: Pro Vanilla (518) 462-5953

Mixed Burnt Hills Apple Group
171 Birch Lane
Scotia, NY 12302
$8 per year
BBS: Plain Vanilla 462-5953

Putnam Valley
Educators Apple Users Group
142 Peekskill Hollow Rd.
Putnam Valley, NY 10579
Contact: Frank Reale (914) 528-8101

SACC Apple Computer Club
147 Deforest Rd.
Dix Hills, NY 11746
Contact: Gregory Dib (516) 499-7681
$10 per year

NORTH CAROLINA

Carolina Apple Core
P.O. Box 31424
Raleigh, NC 27622
$18 per year
CAC 783-9010; NIEHS 541-0041

Charlotte Apple Computer Club
P.O. Box 221913
Charlotte, NC 28222
BBS: 563-6233

Eamon Adventurer's Guild
7625 Hawkhaven Dr.
Clemmons, NC 27012
Contact: Tom Zuchowski (919) 766-7490
$7 per year
T.ZUCHOWSKI on GEnie

Triad Apple Core
c/o GTCC Small Business ASST. Center
2007 Yancyville St., Suite 220
Greensboro, NC 27405

OHIO

Apple-Dayton, Inc.
P.O. Box 3240
Dayton, OH 45401-3240
$25 per year

Apple GS Columbus
P.O. Box 27072
Columbus, OH 43227-0072
Contact: John Ledford (614) 855-0937
BBS: (614) 475-9791

AppleSiders of Cincinnati
P.O. Box 14277
Cincinnati, OH 45250-0277
Contact: Ralph Kitts (513) 829-1161
$25 per year
BBS: (606) 572-5375 or (606) 572-5685

COACH (Central Ohio Apple Computer Hobbyists)
P.O. Box 09028
Bexley, OH 43209
Contact: Mike Goodrich (614) 866-4860
BBS: (614) 262-4946

NEO Apple Corps
c/o Nancy Abbott
1935 Mattingly Rd.
Hinckley, OH 44233

OREGON

Appleeugene
907 River Road #289
Eugene, OR 97404
Contact: Larry Badten 895-2605
$15 per year

Portland Apple II User Group
P.O. Box 1608
Beaverton, OR 97075-1608
$20 1st year; $15 thereafter

Willamette Apple Connection
P.O. Box 18435
Salem, OR 97305
Contact: Neal Layton (503) 370-9527
$15 per year
WAC BBS (503) 363-0861

PENNSYLVANIA

Apple Butler Users Group
P.O. Box 39 Meridian Station
Butler, PA 16001-0039
$20 Single, $25 family

Columbia Apple Pi
c/o L.A. Winski, M.D.
P.O. Box 710
Millville, PA 17846
$6 per year

Delaware Valley Apple Branch
132 Eaton Dr.
Wayne, PA 19087
Contact: Curt Wilson (215) 473-6199
$15 annually

Erie Apple Crunchers, Inc.
P.O. Box 1575
Erie, PA 16507
$5 initiation fee; $25 per year
E.A.C. Express (814) 838-8510

Hershey Apple Core
P.O. Box 634
Hershey, PA 17033
HAC Hotline: (717) 531-1300
The Library BBS: (717) 566-1699

Keystone Apple Core
c/o William C. Miller, President
1789 Braggtown Road
East Berlin, PA 17316
$10 annually

Philadelphia Area Computer Society SIG
P.O. Box 312
LaSalle University
Philadelphia, PA 19141
Contact: Martin Friedman (215) 353-2753
AOL: Meesh1 BBS: (215) 842-9600
$30 per year

RHODE ISLAND

Rhode Island Apple Group
P.O. Box 4726
Rumford, RI 02916-4726
$10 initiation; $20 annual dues

SOUTH CAROLINA

CSRA Apple Users Group
1342 Moultrie Drive
Aiken, SC 29803
$15 year

Greenville Apple Users Group
P.O. Box 4937
Greenville, SC 29608
Contact: Doug Durkee (803) 244-7396
$20 per year

TENNESSEE

AppleCore of Memphis
P.O. Box 241002
Memphis, TN 38124-1002
$20 per year

Music City Apple Core
c/o Gerald Dooley
1085 Woodcock Hollow Road
Kingston Springs, TN 37082
Contact: Gerald Dooley 952-2367; George Emge 833-1508; Everett Hertenstein 262-4778

TEXAS

Apple Valley Computer Club
Tony Rodriguez, Pres. 5900 N. 28th Lane
McAllen, TX 78504
Contact: Tony Rodriguez 682-9625
$10 per year

Coastal Bend Users Group (CBUG)
P.O. Box 8391
Corpus Christi, TX 78468-8391
$12 per year per household
STIX (512) 992-4855

San Antonio Appleseed
P.O. Box 290028
San Antonio, TX 78280-1428
New Membership $15, Renewal $10

Tarrant Apple Group (TAG)
912 West Broadway Ave.
Fort Worth, TX 76104
Contact: Bob Baggott (817) 332-3341
$15 per year

VIRGINIA

Northern Virginia Apple Users Group
P.O. Box 8211
Falls Church, VA 22041
PRO-NOVA BBS: (703) 671-0416

TideWater AppleWorms
P.O. Box 68097
Virginia Beach, VA 23455
Contact: Kevin Mitchell (804) 468-9914

WEST VIRGINIA

Apple Users Group of Charleston
2105 Weberwood Drive
South Charleston, WV 25303
Contact: John Howell 343-6422, or
Chas. Szasz 965-6965
$10 per year

Club Apple User Group
125 North Pinch Rd.
Elkview, WV 25071
$10

WISCONSIN

Milwaukee Apple Users Symposium
9818 W. Sheridan Ave.
Milwaukee, WI 53225
Contact: Helmut Wittbecker

Racine Area Users Group
P.O. Box 085152
Racine, WI 53408
$10/Family per year

Wisconsin Apple Users Club, Inc.
P.O. Box 20998
Milwaukee, WI 53220-0998
Contact: Bruce Kosbab (414) 771-6086

AUSTRALIA

Apple Users Society of Melbourne (A.U.S.O.M.)
P.O. Box 1071 Narre Warren MDA
Narre Warren, VIC 3805
Ph: (613) 796-7553

Tazmanian Apple User Group
P.O. Box 188
N. Hubart, Tasmania 7002 AUSTRALIA
10021 485200
Contact: Jim Fraser

CANADA

Apple SAUCE
Box 480 RPO, University
Saskatoon, Sask., Canada S7N 4J8
Contact: Brock Chatson (306) 374-0095
$20 per year
BBS: SAUCE (306) 955-8828

Apples Victoria Users Group
9184 Cresswell Rd.
RR 2, Sidney, B.C. V8L 3S1
Contact: Shirley Demeriez
(604) 656-2845 6-9PM
$24 per year, $30 family

Apples B.C. Computing Society
P.O. Box 80569
Burnaby, B.C. V5H 3X9
$35 per year, $30 renewal

Calgary Apple Corps Computer Club
Box 8, Station 'T'
Calgary, Alberta, Canada T2H 2G7
C Renzo Costa (403) 251-0525
$30 per year for individuals or families

Kelowna Apple Users Group
1622 West Kelowna Rd.
Kelowna, B.C., Canada V1Z 3B7
Contact: Robert Ashton
(604) 769-3140 6 to 9 pm
$2 per month

London Apple Corps
1555 Glenora Dr., Suite 103
London, Ontario, Canada N5X NV7

Winnipeg Apple Users' Group
P.O. Box 1798
Winnipeg, MB R3C 3R1
Contact: Don Soutter 256-0095
$20 indiv, $25 family; $5 initiation fee
Applebox BBS: 224-0683

ENGLAND

Cambridge Apple User Group
22 High Street
Cambridge CB4 1NG
England (U.K.)
Contact: Ian Archibald

The British IIGS Club
41 High Street
Great Shelford
Cambridge CB2 5EH
England (U.K.)
Contact: Peter Stark
(Produces bimonthly 'members' disks)

FRANCE

GS Club
6, impasse La Croix-Pommier,
94120 Fontenay-sous-Bois.
Téléphone: (1) 48.77.11.32
AppleLink: GS.CLUB

GERMANY

Kaiserslautern Apple Users Group
PSC 1 Box 8851
APO AE 09012

Ramstein Apple Club
PSC 2 Box 18
APO AE 09012

Rhein-Neckar Apple Users Group (RNAUG)
P.O. Box 525,
APO New York, NY 09063
Contact: James Clark
$10 per year

ITALY

Apple II Survivor Club Italy
Via Dal Fabbro 4
37122 Verona Italy
Contact: Manuel Turtula

Apple ABCs

by Barry McDonald

Recently, I decided to make an inventory of my electronic equipment for insurance purposes. As I began compiling a list of stereo and computer equipment, I realized the inventory consisted entirely of abbreviations. In my living room I have an RCA TV, a CD player made by JVC, a VHS VCR, and an AM/FM radio. In my office you'll find a IIe, a IIGS, and a Macintosh IIci. (I am not into IBM PCs.) In my car is a CB. You don't need a high IQ or a Ph.D. to see that when it comes to electronic devices, we rely heavily on abbreviations.

Trying to talk about your Apple computer without using abbreviations is like trying to collect an IOU in the ICU. The true sign of a power user is the ability to toss initials around. A study of some common and not so common computer abbreviations reveals a lot about computer culture, history, and psychology. So here, FYI, is an abbreviated look at what we might call the Apple ABCs.

HARDWARE HANDLES

You may think your computer system is an amazing collection of nuts and bolts, but it's actually an amazing collection of vowels and consonants. Your CPU (Central Processing Unit) contains ROM (Read-Only Memory) and RAM (Random-Access Memory), both measured in K or MB (Kilobytes or Megabytes). The chips that dot your computer's motherboard sport monograms such as PAL (Programmed Array Logic), MMU (Memory Management Unit), and IOU (Input Output Unit). You type on a QWERTY keyboard (so named for the first six letters on the keyboard) which connects to your IIGS via the ADB (Apple Desktop Bus). You may own a SCSI (Small Computer System Interface) hard drive or a floppy drive that uses DS DD (Double-Sided Double-Density) or HD (High-Density) disks. To backup your data, you can use one of the newer DAT (Digital Audio Tape) machines. A CD-ROM (Compact Disk Read-Only Memory), which is a WORM (Write Once Read Many) device, is another storage option.

From the DIP (Dual Inline Package) switches on your SSC (Super Serial Card) to the pixels (picture elements) displayed on the CRT (Cathode Ray Tube) of your RGB (Red-Green-Blue) monitor—that may be spewing ELF (Extremely Low Frequency) radiation if it's not up to FCC (Federal Communications Commission) standards—any discussion of Apple hardware begins and ends with abbreviations.

The names of the first Apple computers contained numbers—Apple I, Apple II—and the first upgrade of the venerable II was the II Plus, but all subsequent models have sported initials: IIe, IIc, IIGS. The consensus among Apple gurus is that the letter *e* stands for *expanded*, the *c* stands for *compact*, and the *GS* for *graphics* and *sound*. Apple must have been especially proud of the IIGS because it's the only Apple II to rate capital letters!

I/O ERRORS

Abbreviations should make life easier, but they sometimes cause confusion. Have you ever tried to explain to a novice why the shortcut for Copy is Command–C but the shortcut for Paste is Command–V? The power switches of many computer devices contain two of the most misunderstood symbols of the computer world. They look like this: o |. If you've ever pondered whether the o stands for *Off* or *On*, you lose on both counts. The two symbols represent the binary digits zero (0) and one (1). At its most basic level, a computer reads electrical current, and current can either be flowing (On–represented by a one), or not flowing (Off–represented by a zero). These digital hieroglyphs have replaced the simple words *On* and *Off* on the power switches of the IIGS and most modern peripherals. To confuse matters more, these symbols, which make some sense on a digital device, now have found grace universally on non-digital electronic devices such as overhead projectors and camcorders.

By the way, all of this has nothing to do with the commonly used abbreviation I/O, which stands for Input/Output, used in phrases such as I/O error, I/O cable, or I/O port.

SOFTWARE SHORTHAND

The frequent use of abbreviations in Apple software gives new meaning to the phrase "initialize the disk." DOS (Disk Operating System), ProDOS (PROfessional Disk Operating System) and BASIC (Beginners All-purpose Symbolic Instruction Code) were the mainstays of early Apple computing, though other operating systems such as CP/M (Control Program for Microprocessors) and other languages such as PILOT (Programmed Inquiry, Learning, Or Teaching) soon became available. GS/OS (GS Operating System) has given Apple IIGS users access to the GUI (Graphical User Interface) that dominates the Macintosh world, introducing abbreviations such as CDev (Control Panel Device) and DA (Desk Accessory). In fact, the IIGS makes matters worse because it has two kinds of desk accessories: Classic (CDA) and New (NDA).

We use abbreviations to refer to types of software such as CAD (Computer-Aided Design), DTP (Desktop Publishing), and OCR (Optical Character Recognition), file formats such as DIF (Data Interchange Format), DHR (Double High Resolution), and SHR (Super High Resolution), software companies such as MECC (Minnesota Educational Computing Consortium), and user groups such as NAUG (National AppleWorks Users Group).

Although we use abbreviations to save time and space, we often lose sight of the actual words that the letters stand for, and this ironically leads to redundancy. For example, to attach a musical keyboard to your Apple, you'll need a MIDI interface, but MIDI stands for Musical Instrument Digital Interface, so you end up buying an interface interface. You'll see articles on telecommunication that discuss BBS systems; guess what the *S* stands for? Similar repetition occurs in phrases like GUI interface, ProDOS operating system, and BASIC code, not to mention LCD display.

SAY IT LIKE IT IS

Though we pronounce many abbreviations letter by letter—CPU and CRT, for example—others like RAM and QWERTY are acronyms, abbreviations pronounced as words. Acronyms are easier to say and easier to remember than standard abbreviations, and they're also more fun.

Acronyms are the caviar of abbreviations. Rumor has it that one of the prerequisites for obtaining a job as a hardware or software developer is the ability to create clever acronyms. Three-letter acronyms like DIP, CAD, and GUI (pronounced *gooey*) are common and simple to create. DOS (Disk Operating System) is an often mispronounced acronym. You'll hear people pronounce it as the word *dose,* but properly pronounced, it rhymes with *boss.* (Toss the DOS to Ross, boss.)

Computer acronyms of four to six letters are not uncommon. ASCII (American Standard Code for Information Interchange), pronounced *ASK-ee*, is the format used to create text files. SIMMs (Single Inline Memory Modules), most commonly used in Macintoshes, can also be installed on some IIGS memory cards.

We seem to favor acronyms over standard abbreviations, yet sometimes a quite pronounceable abbreviation is spoken letter by letter. For example, the name of the tiny lights that tell you your disk drive or printer is on is L-E-Ds (Light Emitting Diodes), not *leds*. Perhaps the inventors of this term were concerned about unflattering comparisons to zeppelins.

On the other hand, the human mind is capable of making the most unpronounceable collections of letters into acronyms. SCSI (Small Computer System Interface) is *scuzzy*. An IBM character code (which fills the same purpose as ASCII, but is different), called EBCDIC (Extended Binary-Coded Decimal Interchange Code), is *EB-si-dik*, which is certainly a creative phonetic interpretation. The all-time winner in this category and one of the longest computer acronyms is WYSIWYG (What you see is what you get), pronounced *WIZ-ee-wig*. It means that the appearance of a document on screen will match what comes out on paper.

An acronym's resemblance to an actual word is usually ignored. We don't associate CAD programs with ungentlemanly conduct or DIP switches with sour cream. The ultimate accomplishment in acronym design, however, is to have the letters form a word that reflects the meaning of the abbreviation. Note the clever harmony between form and meaning in the terms BASIC (Beginners All-purpose Symbolic Instruction Code) and PILOT (Programmed Inquiry, Learning, Or Teaching). At Apple Computer, the division that created the Newton is known as PIE (Personal Interactive Electronics), perhaps to bring to mind the phrase "easy as pie." Many user groups have devised clever acronyms. For example, the Hartford User Group Exchange goes by the title of HUGE, with the probable intent to suggest its size and importance.

CONTRACTIONS AND COMBINATIONS

Many common computer words are abbreviations in disguise. For example, the word *modem* comes from a combination of the words *modulate* and *demodulate*. The term *bit*, which refers to those individual zeros and ones that we discussed earlier, is a blending of the words *binary* and *digit*. Technically, these words are contractions rather than abbreviations, but like acronyms, words of this type make long technical terms easier to say and remember. So we say *pixel* instead of *picture element* and prefer the sound of *FORTRAN* over the full name of this computer language, *Formula Translator*.

To complicate matters, many terms combine standard abbreviations with acronyms or contractions. For example, ProDOS comes from the combination of an abbreviation (*Pro*fessional) and an acronym (DOS). CD-ROM is a combination of a standard abbreviation and an acronym.

Such is our preoccupation with brevity that we sometimes abbreviate abbreviations! With the arrival of GS/OS, the file once known as ProDOS was renamed P8. The *B* in the term BPS (bits per second) stands for *bit*, which, as we've seen, is already a contraction of the words *binary digit*.

ABBREVIATED LONGEVITY

History has shown that electronic devices and media not associated with abbreviations do not last. Phonograph records were LPs and they reigned for many years before being replaced by CDs, but veterans of the late 1960s may recall a now defunct technology known as the 8-track tape. How could the 8-track last—no abbreviation! In the VCR wars of the 1980s, the VHS (Video Home System) won out over the Beta format because Beta, though it is the Greek version of the letter B, is not a true abbreviation. It is inevitable that the standard audio cassette tape—for which there is no abbreviation—will soon be supplanted by DAT (Digital Audio Tape). (Well, I guess that hasn't happened, but maybe DCC, the Digital Compact Cassette, will finish the job.) In the cafe of consumer electronics, alphabet soup is the preferred dish.

In the world of Apple computing, the same holds true. All we can say about models like the Apple III Plus and the short-lived Lisa is RIP (Rest In Peace), while models like the IIe and IIGS may be around to help us initialize a new century.

TEST YOUR IQ (INITIAL QUOTIENT)

How many of these common abbreviations do you know? To give you a little help, the terms have been divided into several categories. Answers appear below.

Telecommunications & Networking

SYSOP
BBS
AOL
SIG
FTP
MNP
LAN
WAN

Machines & Memory

TTL
IC
MHz
ms
RISC
DMA
CAS
RAS
EPROM
PDA
LCD

Standards & Measurements

ANSI
IEEE
NTSC
CPI
NLQ
LPI
DPI

Classics:

GIGO
WIMPY

ANSWERS

Telecommunications & Networking: A SYSOP (System Operator) is a person who supervises a BBS (Bulletin Board System) or online service such as AOL (America Online), where you can join SIGs (Special Interest Groups). FTP (File Transfer Protocol) is a method of retrieving files on the Internet, while MNP (Microcom Network Protocol) is an error-checking feature used by modems. LANs (Local Area Networks) and WANs (Wide Area Networks) allow computers and peripherals to communicate with one another.

Machines & Memory: TTL (Transistor-Transistor Logic) monitors are better known as monochrome monitors. The speed of ICs (Integrated Circuits) is measured in MHz (megahertz,) or millions of cycles per second. One ms (millisecond) is a thousandth of a second, which is an eternity to the new RISC (Reduced Instruction Set Computer) chips that are replacing slower integrated circuits. DMA (Direct Memory Access) allows interface cards to communicate directly with a computer's memory, bypassing the microprocessor, for more speed. The CAS (Column Address Strobe) and RAS (Row Address Strobe) are signals used to communicate with memory chips. EPROM (Erasable Programmable Read-Only Memory) is a type of ROM that can be reprogrammed. The screens of PDAs (Personal Digital Assistants) like Apple's Newton consist of LCDs (Liquid-Crystal Displays).

Standards & Measurements: ANSI (the American National Standards Institute) and IEEE (the Institute of Electrical and Electronic Engineers) set standards for computers and other electronic devices, while NTSC (the National Television Standards Committee) creates video and broadcast standards for North America. The size of non-proportional type is measured in CPI (Characters Per Inch), and NLQ (Near Letter Quality) describes the best print quality on a 9-pin dot-matrix printer such as the ImageWriter. There are two measurements called LPI (Lines Per Inch): one describes the number of lines of text that fit into one vertical inch on a page, while the other refers to the frequency of the halftone screen used to print gray-scale images on a laser printer. The resolution of printers and monitors is measured in DPI (Dots Per Inch).

Classics: GIGO (Garbage In, Garbage Out) is a programmer's motto that means if you enter incorrect data, you will get incorrect results. WIMP (Windows, Icons, Mouse, and Pull-down menus) is a less formal and usually pejorative alternative to the term GUI (Graphical User Interface). Computers that use these features are called WIMPy by those who believe that "real" computer users type their commands on a keyboard.

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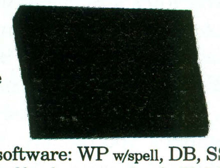

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(Continued from page 12)

write and edit your historical pieces and footnotes without leaving the program.

To help you truly master the way the pros do it, Quinsept includes a comprehensive loose-leaf manual. Thick (and, at first glance, a bit intimidating), the manual does take some getting into, but the payoff is well worth the effort. For starters, you quickly discover that using the program's initial default settings wastes the program's power. The lesson is clear: to get the most from *Family Roots,* you need to know about and *use* its features.

The *Family Roots* byword is Flexibility. A plethora of options lets you make your notes, charts, and record keeping as detailed as you like. For example, Individual Information offers the usual date of birth, death, and marriage data slots along with *nine* extra categories of your choosing. In fact, practically every function, from Forms to Searches, can be customized to look and work just the way you like it!

A major attraction of specialized genealogy software is convenience. For instance *Family Roots* can be set to automatically complement related data. So, if you add "Uncle Bob, married to Aunt Fanny," "Uncle Bob" would also be added into Aunt Fanny's file as "husband."

I especially like the function keys. With this feature, you don't have to continually retype surnames, place names, and so on. Just program a function key, and every time you punch it, the appropriate text will be entered in the records.

With *Family Roots* there's no shortage of printouts, and, again, you can tailor the forms to your liking. The program prints all types of charts from Blank Standard, Descendant, and Ancestor, to special pedigree forms called Ahnentafels. Group Sheets take two forms: Custom, and the format developed by the Church of the Latter Day Saints (favored by many expert researchers). Naturally, Person Sheets and Lists also come in several different flavors.

Family Roots has long been a mainstay in genealogy software. Small wonder! This full-featured package makes it a snap to record, organize, and process genealogical data. Quinsept's ad advises, "Put up your Dukes!" When you're ready to get serious about the dukes, heroes, saints, and scoundrels in your family tree, check out *Family Roots.* ■

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