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First off, both the 64 and 128 programs come with Busy Bee Speller. In version 1, the speller is a stand-alone program that can't be accessed from within the word processor. That puts you back in the SpeedScript and GEOS category, saving your text, exiting the program, loading the spelling checker, and then saving the corrected text.

In version 2, however, the spelling checker boots with The Write Stuff and can be used from within the program. The great thing about this spelling checker is that it doesn't just flag suspected words from its dictionary and force you to look them up. For good spellers, BB Speller has a quick 17,000word dictionary that finds most common words for fast typo checking. If you're a poor speller, an additional 61,000 words kick in. You can select an option that will automatically correct your spelling. There's none of that timeconsuming business of trying to look up a word when you don't know how to spell it in the first place. In addition, you can add 15,000 words of your own and delete those that you don't need.

The Write Stuff offers a multitude of features that let you get as complicated as you want. By progressing through the features in stages, complexity isn't forced upon you. A Menu Maker lets you create custom disk menus, edit program names beyond the usual 16 characters, and add comments. Thus, instead of trying to remember an exact program name to load, you can search through a menu of meaningful filenames, complete with brief descriptions. Children and poor typists will like the fact that they can use the cursor to load files.

Like SpeedScript, The Write Stuff saves text as program (PRG) files in screen code, but you can save text as sequential (SEQ) files with the press of key. If you have files from SpeedScript, Easy Script, PaperClip, Fleet System, or other word processors and want to convert them for use with TWS, the program offers automatic file translation for ten different word processors. I loaded Fleet System USR files and successfully converted them, including the embedded format commands. With the press of a key, you can opt for word-wrap or you can see an edge effect, the term for the white space that surrounds your text on the printed page.

The Write Stuff has many more features as well. To compare different versions of a file at the same time, you can opt for a split screen. TWS rivals GEOS and other graphics-based word processors by letting you print in double columns for simple desktop publish-

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ing. You can also add soft hyphens if you want words to get as close as possible to the right-hand margin but don't want to use justification.

The Write Stuff also supports the Super Graphix printer interface, RAM expanders, sorting by columns, file security, and alternate fonts such as Gazette programs Ultrafont+ (September 1986) or Excelfont 80 (June 1988). Writers and students should like its handy outliner. About the only feature this program doesn't have is a thesaurus.

One additional feature that comes only with the 64 version is Busy Bee Talker. BB Talker uses SAM (Software Automatic Mouth) from Tronix Software to read aloud anything you've written with BB Writer. This is a great feature for reading stories to children or for letting them create their own and having SAM read their stories to them.

The GEOS Substitute

If your old word processor seems outdated and if you'd like to upgrade to a newer one that can print different fonts and has graphics capabilities but you don't want to invest in GEOS, then take a look at Word Writer 6. This Timeworks program for the 64 and 128 in 40-column mode offers both plain and fancy word processing capabilities. You can print text in different size fonts and even insert small graphics.

Don't expect to rush through this word processor and become an expert the first time you try it. Word Writer can do much, but it's complicated and takes time and effort to get up and running. It's not for children or the occasional user.

The 166-page manual says Word Writer is "a complete writing environment for memos, manuscripts, and everything in between." That may be true, but learning to use it takes some effort. It was like trying to install GEOS and making all those disks the first time out.

First off, you can't just boot up the disk and start typing. You have to make a backup disk containing all the files and fonts you think you'll need. That takes up a lot of space, so you can't store many documents on a disk. When the disk is full, you have no choice but to make another backup disk.

The manual does have a section for getting started quickly, and the program comes with a cheat sheet to help you become familiar with the commands. When you run the program, several help screens are available to acquaint you with various features.

Although the program supports a variety of printers, nothing is truly automatic. It took me an hour to get a sample text file printed correctly with a Super Graphix interface and Star SG-10 printer since that combination wasn't on the automatic-setup list.

The Final Word

When it comes to commercial word processors, this die-hard GEOS fan finds that she can crank them up and type faster with them than she can with geoWrite. I don't have to wait for the screen to redraw because I'm not using a graphics-based processor. I don't drop icons accidentally or have to reset them, trying to get proper margins, paragraph indents, and tabs on the exact spot. Also, what I see in the preview for both the 64 and the 128 is exactly what I'll get on the printed page.

I have to give up most of the fancy fonts I use with GEOS, and I'm confined to 12-point type unless I load external fonts. But that's not truly a problem. I find I do most of my work with standard typefaces and ASCII files anyway. Because I'm usually in a hurry and don't want to wait for all the disk saves and loads or for the screen to redraw, I often find I don't need the graphics or fancy fonts of geoWrite. I'm not saying goodbye to geoWrite; I'm just admitting that commercial word processors do make my life easier.

Dorothy Hemme teaches high school in Sugar Land, Texas. Like any good teacher, this GEOS fan keeps an open mind to computing alternatives.

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GEOWIZARD

You have to expect something special from a program that bills itself as "the ultimate GEOS utility." But when you run this AUTOEXEC program, all you see is an innocuous dialog box telling you that geoWizard has been installed in your RAM. (You need at least 512K. Smaller RAM units can be used only at the expense of the RAM disk.)

That's about it. Life goes on as usual, and you might even forget that geoWizard's there. But when you press both buttons on the mouse (or a key combination if you use a joystick), geoWizard pops out of nowhere and shows its stuff. Whatever you're doingworking on a document or moving files around the desk-Top-freezes, and a new command window opens at the top of the screen. This new menu offers a number of functions at the touch of a key combination. At this point, geoWizard is ready to

Press the Commodore key and the P key simultaneously to dump a screen to your printer. Such a screen dump is glaringly absent from the GEOS system. The routine will print both 40and 80-column screens. On the geoWizard disk is a desk accessory that can increase the capabilities of the screen dump, allowing you to dump the image to a photo scrap or a geoPaint file. Pretty snazzy, but that's only the beginning of geoWizard's capabilities.

You can use another key combination to rescue you from those annoying system error dialog boxes. When you lock everything up, as long as the pointer is still moving on the screen (in oth-

er words, if GEOS can still read your input device), geoWizard is alive and kicking, ready to transport you back to the deskTop with your RAM disk intact. There's also a command to do a system reboot, which starts you over from scratch. Use this to recover from the most hopeless crashes.

All of this is great, but geoWizard has more amazing tricks up its disk sleeve. When you press the Commodore key and either L (for Load) or D (for Desk accessory), something extraordinary occurs. After presenting you with a file selection box (a much more efficient one than GEOS usually uses), geoWizard opens another program for you, right smack in the middle of whatever you're doing. The options allow you to run a desk accessory, an application, or an AUTOEXEC file without closing another application first. It's a lot like multitasking, and it can really speed things up.

Let me illustrate. If you're in the middle of a geoPublish session and you discover that you need to do some graphics work in geoPaint, you activate geoWizard. Press Commodore-L to load an application, select geoPaint from any active drive, and you're off. When you leave geoPaint, you'll be returned to where you left off in geoPublish. This powerful feature alone is worth the program's modest price.

As if that weren't enough, the geoWizard disk includes MiniDesk, a desk accessory that works some rather fine magic of its own. MiniDesk provides a scaled-down version of the deskTop, listing files by name instead of by icon and offering several es-

sential file-handling functions: copy, scratch, and rename. You can access any drive using MiniDesk, including drive C. While in geoPublish, for instance, you might discover that you've forgotten to place a text file on your work disk. No need to auit aeoPublish when Mini-Desk is around. The needed file can be retrieved from any drive and copied onto your work disk in seconds. If you're short of disk space. MiniDesk will let vou clear nonessential files without leaving the comfort of your application.

All of these amazing feats don't come free. There are some compatibility problems because geoWizard breaks a few GEOS rules to work its wonders. There aren't many problems, however, and most of them are detailed in the documentation that comes on disk as a geoWrite document. If you use a utility that's on the disk to relocate the geoWizard code during boot-up. you can even avoid some of these problems.

Generally speaking, geoWizard may conflict with third-party programs that may also break rules by rewriting vectors or areas of memory that GEOS normally leaves vacant. One example is GateWay. There is some incompatibility, since Gate-Way's Switcher and geoWizard's multitasking fight over memory space. Such problems are rare, which is a tribute to Jim Collette's skills as a programmer.

In fact, the entire package is one of the finest pieces of user-written software I've ever seen. The program is as bug-free and user-proof as you can imagine. It cheerfully shows up whenever you call it and tidies up screen modes and disks be-

fore it leaves. The documentation is clear and complete, including honest information about possible pitfalls and a technical description of how the magic is done. Try it, and geoWizard, the ultimate utility for GEOS, will quickly become an indispensable part of your GEOS environment. You won't know how you got along without it.

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Circle Reader Service Number 341

GEOVIDEO

On the wall by my computer desk is a scrap of paper, torn from a notebook that has long since hit the circular file. On that piece of paper is a collection of scribbles-SYS commands. phone numbers, three-line programs, directory commands, and so on-that I've accumulated over years. I keep telling myself that I'm going to print a nice, clean copy one of these days and throw away the messy version-but I know I never will.

That scrap of paper with its messy scrawl is one of the most valuable reference tools I have. It makes no difference that it looks like something blown into my yard from the dumpster across the street. It gives me information that I need.

In other words, it's not the package; it's the content. Keep that in mind when you look at geoVideo. This isn't software for your 64; it's a videotape tutorial for GEOS. It was put together by a group of people whose expertise is GEOS, not video.

I thought my wife was just forgetting things.



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You might smile and say, "Yeah, but hey, they know what they're talking about." and you'd be right. Sort of.

This onscreen duo does know its subject, but the video has some problems. There are occasional cuts that clip off part of what's being said, and the poor image of the computer screen makes it difficult to see what's being described at times. There's the fact that the cursor has been redefined and doesn't remotely resemble the pointer novice users might expect to see on their own screens, but these blemishes are minor.

The real problems come from the fact that, even though these folks are obviously experts at GEOS, they don't impart that expertise in a logical sense. Instead, they ramble through a description of each application using the menus as a general guide, throwing in occasional tidbits of vaguely related information when the idea strikes them. To be fair, they do cover most of what you need to know about GEOS, but unless you're familiar with the program to begin with, you'll never be able to piece it together from geoVideo.

Which brings up another problem. Far too often the person explaining the program uses a keyboard shortcut to accomplish a task. Since the video shows only the monitor screen, the viewer can't see what is being demonstrated! Keyboard shortcuts are defined eventually, but not before they're used extensively and mysteriously. Of course, many GEOS users would know these shortcuts already and wouldn't be confused. Then again, those users wouldn't need geoVideo in the first place. The folks who do l need a video like this are the ones who gave up on GEOS the minute they saw a manual more than eight pages long. They need accurate, easy-to-follow instructions and information.

OK, OK, now I hear some people accusing me of nitpicking. Who cares if the cursor is shaped like the letter K instead of its usual pointer? And didn't I say that the video quality isn't all that important? Any user who watches geoVideo will get some information from it. It's very interesting to watch expert users put a powerful software package like this through its paces. And the quality of the screen image and commentary does occasionally shine, especially in the geoPaint tutorial. Even a jaded GEOS junkie like me can glean some pointers from other experts.

GEOS is a rich, powerful operating environment with a lot of possibilities. New users watching geoVideo will certainly get a feel for the immense capabilities of the system along with a healthy dose of information that they can use. But right away, we run into another problem. The information isn't always accurate.

Early in the video, it's stated that the geoRAM device is inserted into the user port; actually, it goes in the cartridge port. The Search and Title Page functions in geoWrite are obviously new to the expert trying to explain them, since she doesn't get them right. The strange effects of colors bleeding into each other, inherent in the Commodore screen. high-resolution seem to baffle the presenter as much as they would a new user. The Update function is erroneously declared to be unnecessary for l geoRAM users.

The list of inaccuracies goes on and on, and that's a problem—a big problem. The makers of this video should at the very least have planned exactly what they were going to say about each feature before they switched on the camera. Also, they should have researched the items that they were fuzzy about.

So what's the verdict? Is geoVideo worth the 20 bucks? That depends. Is it a complete tutorial? Pretty much. Is it accurate? Fairly. Is it interesting? For any GEOS nut, sure. Is it instructive? It's really too disjointed and assumes too much for most novices. If you're an intermediate user who'd like to see how that darn graphics importer really works or if you break out in hives when confronted with a hefty manual, geoVideo is worth a look-see.

I certainly compliment the makers on a good effort, but unfortunately, they have given us what amounts to a first draft that's still plaqued with errors. What geoVideo needs is a good final edit. STEVE VANDER ARK

geoVideo-\$20

MEMORY PLUS ENTERPRISES Box 225 Oakwood, IL 61858

Circle Reader Service Number 342

SID MASTER

"You know, looking at this program is about as exciting as looking at a belt sander." David Minnick said to his coreviewer wife, Robin.

'OK, but a belt sander is a handy thing to have around if you're building a bookcase," Robin replied.

SID Master is a modestlooking program—no fancy frills. Its manual has a sub-

dued, two-tone cover, basic Courier-style print, and computer-generated diagrams. Yet, like a belt sander that makes a tedious woodworking job easier, SID Master is a powerful addition that should be welcome in any programmer's toolkit.

Indy Software has recently lowered SID Master's price, and the manual alone is worth the modest cost. This is an excellent handbook for understanding sound, sound production, and the Commodore SID chip. Appendices in the manual contain listings of the SID registers, tables of decay and release times, and tables of frequency settings and sustain loudness levels. This information is available in Commodore's Programmer's Reference Guide, but it's nice to have it here in a manual dedicated to sound.

Let's take a look at some of the material covered in the manual. I think you'll agree that it's a great reference book.

The first chapter provides an overview of the program and is mandatory reading. Subsequent chapters expand on the properties of the SID chip, how it works, and how you can control it.

Chapter 2 deals with parameters applying directly to the SID chip's three independently controlled voices. Each parameter is defined and explained, followed by an example for experimentation. Parameters include frequency, pulse width, waveform, ring modulation, syncronization, and the envelope generator, which covers attack, sustain, decay, and release.

Filter parameters are covered in chapter 3. The filter is used to remove high, low, or middle frequencies of the waveform.

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REVIEWS

Chapter 4 explains the digital/analog meter that is displayed on SID Master's screen. The meter displays continuous output of the SID chip's four read-only registers. This chapter explains how the registers can be used to generate sound effects in conjunction with software links, parameters that control software in SID Master itself. Chapter 5 covers the creation of complex sounds with these software links.

Chapter 6 is the one most of us have been looking for. This is where you learn how to incorporate sound effects in BASIC programs. This chapter provides the background and mathematics necessary to enable you to take the sounds that you've created with SID Master and put them where you want them—in your own software.

The mathematics used to convert parameter values into bytes are presented in a BASIC program that does the work for you. In no time at all, we came up with a simple program using two sounds we created and the numbers in the manual for producing two other effects. Our short demonstration depicts an annoying noise, an aggravated assault upon the source of that sound, then enthusiastic applause, followed by authoritative retribution.

A defective power transformer near our house had been making an annoying ponging sound, so we used SID Master to develop a similar sound on the 64. Then we worked on applause. We modified a siren whose parameters were listed in the manual. Then we took the numbers listed for a gunshot effect. After converting these numbers to the appropriate POKEs and adding some PRINT statements, we came up with a short program. Imagine that you are running this program, listening to the sounds and reading the text that appears on your monitor.

Sound: PONG! PONG!

PONG!

Text: Will someone please

shut that thing up?

Text: Just a minute, honey.

I have an idea.

Sound: Gunshot.
Text: Good shot!
Sound: Applause.
Text: Jolly good!
Sound: Siren.
Text: Uh oh!!!

OK, so we're not Jim Butterfield or even Arlan Levitan—but it worked, and so does SID Master.

Other programs let you play around with sound, helping you learn about

waveforms, pulse widths, and sound envelopes. SID Master takes you a step further by helping you to use the sounds that you create. As its name implies, it helps you master the SID chip.

Normally, when you try to program sound, you have to experiment, trying out different routines, poking in various values and settings. This process lets you alter only a few parameters at a time, checking the results one by one. SID Master lets you manipulate all of them at once. This makes creating and adjusting sound effects quicker and easier. All that remains is adding the numbers to your own programs. (SID Master is geared toward BASIC programming, but it wouldn't take many more steps to convert the numbers into hex to use SID Master with assembly language.)

There is an art to using SID Master efficiently. There are nuances to many of the steps. Certain delay times work better than others. You may find that you prefer some filters with certain kinds of waveforms over others, and getting just the right sound takes some fine-tuning. But that's the fun. Our favorite tools are those that are complex in ability yet simple to operate. They accomplish easily in seconds what would take us hours to do by hand. Their beauty and elegance lie in their ability to liberate us from time-consuming tasks. Just as a circular saw, a drill, and a belt sander are basic power tools of carpentry, a sprite editor, an assembler, and now SID Master are basic power tools of programming.

DAVID AND ROBIN MINNICK

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Circle Reader Service Number 343

CORRECTION

In the August issue, we published a review of S.E.C. Check Register 128. The version that was sent to our reviewer apparently was an early edition of the program. A spokesman from Sparks Electronics informs us that the current version has been upgraded and improved. New features have been added and earlier problems have been addressed. The price for the new version is \$24.95 plus \$3.00 shipping and handling, and the new address is Sparks Electronics, 5316 South Ninth Street, St. Joseph, Missouri 64504.



COMMODORE CLIPS

News, notes, and new products

Messiah Is Coming

Messiah III: Nemesis (about \$59) is a vast role-playing game for the 64/128 that should be available for Christmas. The game has more than one meg of code stuffed on three double-sided disks. Artists and programmers at Mad Man Software (7610 West Fifth Street, Suite 200, Lakewood, Colorado) have spent more than two years completing this project.



Messiah III features more than 300 scenes, 50 maps, and intelligent monsters.

Note that Messiah III is R-rated, It has violence, nudity, and adult situations. It's also a tough game to complete, designed for high-school intellectuals and up who have role-playing experience. Mad Man Software's Artificial Monster Intelligence System makes each monster fight in its own unique style. The Mad Man programmers claim that these are the smartest monsters that you've ever faced in a role-playing game.

CQ Computer Hams

Here's a useful product for 64/128 owners who are also ham radio operators. They can connect their computers to VHF hand-held or HF SSB transceivers and communicate via packet radio. MFJ Enterprises (P.O. Box 494, Mississippi State, Mississippi 39762; 800-647-5869) announces a fast, easy, and inexpensive way for hams to join the packet action.

The MFJ-1271 (\$49.95) modem plugs into your 64/128's cassette port and works both VHF packet at 1200 bps and HF packet at 300 bps. An adjustable threshold control helps reduce noise susceptibility to increase contact success. An LED is also included to let you know when you're receiving signals properly.

The MFJ-1271 also sports remote packet operation, mailboxlike message forwarding, and Net/ROM emulation. plus much more. It works with MFJ's Digicom/64 public domain software.



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Big Bucks

Everyone loves cash, and the bigger. the better. With this in mind, Banner Band (533 North Wolf Road, Wheeling, Illinois 60090; 800-333-0549) has created Banner Cash (\$14.95). Banner Cash is computer paper that looks like

a giant ten-dollar bill. Retail store owners can use Banner Cash to print sale banners. It also makes great birthday greetings. There are 245 Banner Cash dollars on each roll of paper.

In addition to Banner Cash, Banner Band also has Lacey Flowers, computer paper with a floral motif woven into a pink lace background.

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By Kathleen Hobby Evansville, IN

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The Lay of the Land

How would you like to view the topography of your hometown in 3-D? Digiscape Software (P.O. Box 113058, Carrollton, Texas 75001) has released a product that will let you see the topography not only of your area but of the entire United States—excluding Alaska and Hawaii—and parts of Canada.

Digital Landscape (\$58) contains more than 400,000 elevations taken at regular intervals across the continent. The distance between intervals is approximately three miles, depending on selected latitude. The 3-D renderings on each of the 15 data disks may be rotated 360 degrees in 1-degree increments of azimuth and tilted up to 89 degrees in declination.

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WORLD VIEW

Anders Reuterswärd

VIEW FROM GERMANY

Here is Europe calling again, with an extensive report from the Commodore scene in Germany. Since we don't yet have a German correspondent, I'll try to describe the Commodore situation from my viewpoint north of the border in Sweden.

I base my evaluation on what I gather from reading German computer magazines and the bulletin of Germany's popular GEOS Users Club (GUC), to which I belong.

Germany has always been the center of Commodore activity in Europe. Maybe Commodore fans in Britain will dispute my opinion, but no other European country has produced as much hardware and professional software for the 64 and 128 as has Germany. Also, almost all Commodore machines sold in Europe during the past few years have been assembled at Commodore factories in Germany.

It's only when it comes to games that the British Isles have been more productive than Germany, thanks in part to their close contacts with the large U.S. market. Also, most Germans aren't proficient in languages other than their own, making them dependent on domestic software or titles that have been translated.

One good example of this is GEOS, a software package that has reached high sales and a very high level of usage in Germany. This is mainly because the importer has taken the time to translate the entire GEOS line, software and manuals, into German.

The driving agent behind GEOS and Commodore activity in Germany is Markt & Technik. This company produces a large range of quality software and books, imports GEOS prod-

ucts, and publishes a Commodore magazine called *64'er*.

Even with the worldwide decline of the 8-bit machines, this monthly magazine still goes strong. Every issue is packed with articles, hardware and software reviews, construction projects, repair instructions, and type-in programs for the 64/128.

One new phenomenon in Germany is the GUC. With over 2000 members, a monthly bulletin, a large public domain library, and its own quality GEOS software, this club has quickly become a power on the Commodore scene. Unfortunately, this climb to the top hasn't been without clashes and controversies with the established market dominators, mainly Markt & Technik.

For fans elsewhere, GEOS products are available from the GUC at reasonable prices. How about GEOS on an EPROM? It boots instantly when you turn on the computer. TopDesk is an entirely new desktop that displays the contents of up to four drives at the same time. RamPrint is a printer routine that uses an REU as a printer buffer, leaving the computer free for other tasks while the printer trundles along. There's even more in the club's GEOS pipeline. If you're interested in learning about this group, drop a line to GEOS Users Club, Jurgen Heinisch, Xantener Strasse 40. D-4270 Dorsten 19 Rhade, Germany. He'll send you information about GUC membership.

There are still a lot of German mail-order firms catering to Commodore users. You can see many of their advertisements if you skim through the pages of computer magazines. There are word processors, database programs, CAD programs, paint programs, assemblers, terminal software, desktop publishing

programs, and games—all in the German language.

Perhaps true to their heritage, the Germans seem to specialize in hardware. Peripherals of all imaginable and some unimaginable kinds are available. Another quick look through computer magazines reveals advertisements for video digitizers, scanners (among them Handyscanner, which recently turned up on the U.S. market [COMPUTE, December 1990]), Prestel decoders, printer ribbon reinkers, MIDI interfaces, realtime clocks, satellite pay-TV decoders, printer interfaces, RS-232 interfaces, drive turbos, EPROM burners and cards, memory expansion units, cartridges, user port expanders, and more.

The list is long. The products are all for use with the 64 or 128, and they're all of domestic origin. Imported products such as Hard Drive and RAMLink from Creative Micro Design are available, but at much higher prices.

Regretfully, I don't have figures regarding the number of computers in Germany, but Amigas are taking over the market there as well as everywhere else in Europe. The rate of 8-bit decline, however, seems to be slower than it is in the U.S.

One reason for this is the recent merger of East and West Germany. That merger released a flood of computer-deprived East Germans onto the market. Their somewhat limited cash resources make used 64s and 128s perfect first computers. These new buyers should also help keep demand strong for software and add-on hardware.

I believe that Germany is a very fortunate country in this aspect and that the Commodore 8-bit computers will survive longer in that country than anywhere else.

Commodore 8-bit computers will survive longer in Germany than anywhere else.

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FEEDBACK

Bug-Swatter

Several readers wrote to complain about F/X Plot 128 (June 1992). The problem occurs when line 920 directs the program to a nonexistent line 170. The mistake was a renumbering error on our part. Line 920 should read as follows.

920 ON GK GOTO 930, 1450, 110, 990

Typewriter Emulator

Has anyone ever come up with a program that would convert a 64 and a printer into a typewriter? This would be nice for filling in blanks on printed forms.

STEPHEN LUISSER NORTHAMPTON, PA

Here's a program that might work if your printer doesn't have a buffer.

10 OPEN 4,4,7 20 GET A\$: IF A\$ = "" THEN 20 30 PRINT#\$,A\$;: GOTO 20

Most printers with buffers, however, save characters sent to them until they receive a carriage return. In this case, you'd be typing blindly until you hit Return, and then al letters would print at once.

If this program doesn't work as you'd like it to, try changing line 20.

20 INPUT A\$

As you type, you'll see characters on the screen; press Return and the line will print. It's not exactly like a typewriter; you may have problems moving the printhead the proper number of spaces when filling in blanks.

Double-Spacing

Is there some way I can get a program listing to print double-spaced? It would be a break for my poor old eyes when it comes to debugging, but I

hate to fiddle with my printer's DIP switches.

G.W. BLACK ATLANTA, GA

Here's a way you can do it with a program command. Load your program into memory, but when you enter the commands to produce a printout of the listing, use a file number greater than 127. Here's an example. Enter the first line and press Return to start the listing. Enter the second line to close the file.

OPEN200,4:CMD200:LIST PRINT#200:CLOSE200

Programs Within Programs

I have trouble loading programs from within another program. For example, I'll make a menu, it loads a program, and then there's an error. I used the clear command at the end of the menu, and that didn't work. Please help!

MICHAEL V. MAY MT. PERRY, OH

Using BASIC for loading either another BASIC or machine code file is called chaining. To chain, your program must enter a LOAD command with the ,8 or ,8,1 extension just as if you'd entered it in direct mode. Within BASIC, however, the interpreter has a pointer that tells the 64 where to continue processing the program after a command has been executed. The pointer is reset to the start of the program when a LOAD is executed. This is actually a help when one BASIC program is loaded from another, since the new program overwrites the old and you want the new one to start running at the first line. When you want to load a machine language program, however, you run into a problem if you simply enter

10 LOAD "MACHINE CODE",8,1 20 REM THE REST OF THE BASIC PROGRAM FROM HERE

This results in an endless loop as the pointer is reset and the file named MACHINE CODE is loaded over and over again.

The solution is to set a flag that tells your program that it has already completed the loading and to continue running. Here's how the program above should look.

10 IF FL=0 THEN FL=255:LOAD "MACHINE CODE",8,1 20 REM THE REST OF THE BASIC PROGRAM GOES HERE

The flag, in this case, is held in the variable FL. When the program is first run, all possible numeric variables have a default value of 0. When we test whether or not FL is 0 initially, the condition is true. Because it's true, the line continues to process by setting FL to a value of 255 and loading the machine code file. (Any number other than 0 will work except in the case of a bad memory register, a rare event.) Now, when the pointer is reset and the condition is tested again, it's no longer true and processing continues on the next line.

Null Modems

I want to transfer some documents that I wrote on my 64 to my IBM computer. I know that I can upload them to a BBS and then download them to my IBM, but isn't there some way I can hook the two computers together without going through a third one by telephone?

WAYNE PALMER CHICAGO, IL

Last month in a similar question we mentioned that some conversion is necessary to make the Commodore files

something like the code in the next two lines. conversion is necessary to make the Commodore files

answers about typewriter emulations, double-spaced listings, and more

Ouestions and

compatible with the character set of the receiving IBM computer. The 64 uses a nonstandard set of characters called PET-ASCII or PETSCII and the IBM uses the standard AS-CII character set. (For more information about PETSCII, see the reply below to Frank Chang.)

For the 64, there are several conversion programs that will let you convert PETSCII to ASCII or ASCII to PETSCII. Some commercial word processors include a conversion program. Convert, for example, is one that comes with Word Writer. Check your local Commodore user group, bulletin board system, or national online services for a public domain conversion program.

The serial port on the back of the 64 is almost, but not quite, a standard RS-232 port; the only difference is the Commodore's voltage level. You can convert it by plugging in an RS-232 adapter, which is available from vari-

ous suppliers.

Next, you'll need something called a null modem cable. This is just a simple cable that fools computers into thinking that they're linked by modem over a telephone line. A couple of the cable's wires are crossed so that an input line on one side is an output line on the other. One end plugs into the RS-232 adapter on the 64, and the other end plugs into the IBM's serial port. Null modem cables are available from several manufacturers, including The Grapevine Group, 3 Chestnut Street, Suffern, New York 10901; (800) 292-7445.

Finally, each computer will have to be running its own terminal software. The software must be set up to recognize a modem plugged into the serial port. Of course, there won't really be any modem attached, only the null modem

cable. Have the IBM request a download and then have the 64 upload the file. Also, be sure that the terminal programs are set for the same sending rates and other telecommunications parameters.

Commodore's ASCII

Just what is PET ASCII? FRANK CHANG RIDGEWOOD, NY

ASCII stands for the American Standard Code for Information Interchange. As the name suggests, it's a standard way of assigning computer character sets to specific values, 65 for the letter A, 66 for the letter B, and so on. It's often used with word processors when saving text to disk and for transmitting text from one computer to another.

Commodore devised its own number-to-character system when it released its original PET series of computers, hence the PET ASCII or PET-SCII name. It is similar to AS-CII, but there are differences. The most obvious difference is that uppercase letters in PETSCII print in lowercase in ASCII, and vice versa.

The 8-bit Commodore machines derive their character set from a time when ASCII wasn't the de facto standard that it is today and the big players took no pride in being compatible. Consequently, from the point of view of more modern machines, including the Amiga, the 8-bit Commodores not only confuse upperand lowercase, but they neglect entirely such characters as the brace and underscore.

There's no problem when you are swapping sequential files with someone who owns another 8-bit Commodore, and modems do a good job of translating when you call a BBS that's running on an IBM. The problem becomes apparent when you download an AS- CII sequential file from an IBM and try to read it with a Commodore word processor or sequential file reader. If you get a file whose upperand lowercase letters appear to be reversed, that's usually the reason. There are conversion programs available that translate the characters, enabling word processors to handle the text correctly.

Word processors such as SpeedScript add more complexity to the situation by using their own special codes. Instead of writing sequential files in ASCII or PETSCII, SpeedScript saves text as program files using Commodore

screen codes.

If you're sending a SpeedScript file to someone who needs a PETSCII or true ASCII sequential file, you can overcome this problem by printing your SpeedScript file to disk rather than saving it by pressing f8 as you normally would. To print a file to disk, press Shift-Ctrl-P simultaneously. You'll be asked if you want to print to screen, disk, or printer. Select D for disk, and you'll have a PET-SCII sequential file on disk.

SpeedScript can also print files as true ASCII. On the first line of your document, press Ctrl-£ and then press A. This will print a lowercase reversed A on your screen. This code will change your SpeedScript file to true ASCII when you print to disk. You can easily test for this by printing your file to the screen instead of to a disk. All the upper- and lowercase letters will be reversed.

Converting documents to true ASCII can be useful when you want to send a SpeedScript document via modem to someone who has an IBM. The IBM user can then load your text into an ASCIIbased word processor without additional converting.

Comments about running a program from within a program, null modems, ASCII, and PETSCII

-www.commodore.ca

BEGINNER BASIC

Larry Cotton

MORE KEYS, PLEASE

Last month we learned about some keys unique to the 64. Let's examine some more.

When the 64 is first turned on, the keyboard defaults to what is known as the uppercase/graphic character set mode. Normally, anything you type is in uppercase. However, most keys can generate graphic characters by holding the Shift or Commodore key while pressing them.

Each keyboard character has a unique CHR\$ code, which you can see by entering PRINT ASC("X"), where X is the character itself. For instance, the ASCII code for J is 74. The codes for the symbols produced when holding down the Shift or Commodore key with J are 202 and 181, respectively. Conversely, to print any character onscreen, enter PRINT CHR\$(X) and then press Return, where X is the character's ASCII code. (Note that you don't need the quotation marks in this case.)

As you may have discovered by now, graphic characters can be used to enhance the appearance of your BA-SIC program screens. Here's a short example:

10 PRINTCHR\$(147): REM CLEAR SCREEN

20 POKE 53280, 5: POKE 53281, 1: REM SET BORDER AND BACK-GROUND COLORS

30 POKE 646, 5: SET CURSOR COLOR

40 V=8: H=15: GOSUB 1000 50 PRINTCHR\$(213)

60 V=8: FOR H=16 TO 22: GOSUB 1000

70 PRINTCHR\$(192): NEXT 80 V=8: H=23: GOSUB 1000

90 PRINTCHR\$(201) 100 FOR V=9 TO 11: H=15: GOSUB 1000

110 PRINTCHR\$(194): NEXT 120 FOR V=9 TO 11: H=23: 130 PRINTCHRS(194): NEXT
140 V=12: H=15: GOSUB 1000
150 PRINTCHRS(202)
160 V=12: FOR H=16 TO 22:
GOSUB 1000
170 PRINTCHRS(192): NEXT
180 V=12: H=23: GOSUB 1000
190 PRINTCHRS(203)
200 V=10: H=17: GOSUB 1000
210 PRINT"TITLE"
999 GOTO 999
1000 POKE 214, V: PRINT: POKE
211, H: RETURN
1001 REM VERTICAL AND HORIZONTAL CURSOR POSITIONS

GOSUB 1000

The numbers 214 and 211 in line 1000 are the memory registers that control cursor position. Admittedly, this technique creates a longer program, but I prefer it because it's precise and much easier to type in. Most programs can be shortened by printing the graphic characters themselves, but typing in such a program can be tedious.

The keyboard can be switched to the uppercase/lowercase character set by pressing the Commodore and Shift keys simultaneously. This allows the use of upperand lowercase in text, but unfortunately, it prohibits printing graphic characters on the same screen. Switching between character sets can be accomplished with PRINT CHR\$(14) (uppercase/lowercase) or PRINT CHR\$(142) (uppercase/graphic).

Some of the other keys peculiar to the 64 are the Clr/ Home, Inst/Del, Run/Stop, Ctrl, Commodore, and Restore keys. Let's look at each.

The CIr/Home key, as I'm sure you have by now discovered, has a dual purpose: Unshifted, it brings the cursor home—to the upper left corner of the screen; shifted, it clears the screen completely. CIr and Home CHR\$ codes are 147 and 19, respectively.

The Inst/Del key is used to I than just pressed.

insert and delete characters. However, when entering BA-SIC programs, it's easy to be caught in what's known as the quote mode. This is where every inserted keystroke produces an arcane graphic symbol. The easiest way to escape this mode is to press a shifted Return.

The CHR\$ codes for Inst and Del are 148 and 20, respectively. These are useful to know when looking for specific characters to be entered.

The Run/Stop key is usually used (unshifted) to stop a BASIC program. Shifted, it's used to start loading a program from tape. The CHR\$ code for Stop is 3. Sensing a shifted Run/Stop key requires peeking at memory locations 197 and 653, as mentioned last month.

The Ctrl key's most useful function is to slow down a BA-SIC program listing. Use it with a number key to select one of eight cursor colors. As with other keys, it can be programmed to do other things. In SpeedScript 3.2, for instance, the Ctrl key is used with the E to erase words, sentences, and paragraphs.

The Commodore key's main two default functions are switching between keyboard character sets (with the Shift key) and selecting eight additional cursor colors (with the number keys).

The Shift, Čtrl, and Commodore keys don't have ASCII codes. To prove it, try PRINT ASC("X"), where X is one of those keys. They can be sensed, however, as pointed out last month, by peeking at memory register 653.

Finally, we come to the Restore key. This is probably the most abused key on the 64. It's used with the Run/Stop key to restore the computer to its standard condition. It's designed to be struck, rather than just pressed.

Here's a look at some of the unique keys found only on 64 and 128 keyboards.

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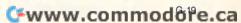
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Circle Reader Service Number 152



MACHINE LANGUAGE

Jim Butterfield

DIRECTORIES

Programming to read a disk directory isn't trivial. You must go through a careful sequence of steps.

There are two approaches: read a fake BASIC program or read disk data in binary. Fake BASIC is invoked by opening with a filename such as \$0 and using secondary address 0. That's the option we'll take; it's simpler and more flexible.

You know that LOAD "\$0",8 will load a directory and LIST will display it. The LOAD command brings in a fake BASIC program, complete with pseudo line numbers, showing the size of each file. Instead of LOAD, we may open the file and use GET to pull in directory bytes one at a time. But we must know how to unscramble this programlike structure.

Here's a way to use

program to read a

disk's directory.

a fake BASIC

In a BASIC program—even the fake one used for directories—the first two bytes are the load address in binary. Then come the program lines.

Each line consists of a twobyte link, followed by a twobyte binary line number; these four bytes are followed by a string of characters terminated with a binary 0 character. When we read the directory, we check the link for 0, which will signal the end of the file. We save the line number, since it represents the file size in blocks, and scan through the remaining text. This text is not all filename; there may be leading spaces, quotation marks, and file type designations such as PRG or SEQ.

After putting the machine language code into memory, the BASIC program opens the file. Note that it uses a secondary address of 0. If desired, we can use pattern matching in the filename; for example, OPEN 1,8,0,"\$0:B*" would deliver only those filenames that begin with the letter B.

The job of reading the direc-

tory is done in the machine language program. First, it connects to the file; then it throws away the first two load bytes.

2000 LDX #\$01 JSR \$FFC6 JSR \$FFE4 JSR \$FFE4

Next, the program starts its main loop, which reads each directory line. The first two link bytes are tested for 0, then discarded.

200B JSR \$FFE4 STA \$2100 JSR \$FFE4 ORA \$2100 BEQ \$2057

The next two bytes are the pseudo line number that represent the file size. We bring this in and store the two bytes. You'll often want to make use of this file size value; this program stores it but doesn't use it.

2019 JSR \$FFE4 STA \$2101 JSR \$FFE4 STA \$2102

The remainder of the line contains text. We'll read this into memory, watching for the binary 0 that signals the end of the line.

LDX #\$00
2027 STX \$2100
JSR \$FFE4
LDX \$2100
STA \$2200,X
TAY
BEQ \$2039
INX
BNE \$2027

After receiving the line, we'll deliver it to the screen. It hasn't been neatly parsed for spaces or quotation marks, so it might look a little ragged. But you'll be able to see how the directory is read.

Before printing the line, we'll disconnect momentarily from the input channel.

2039 JSR \$FFCC LDX #\$00 203E LDA \$2200,X JSR \$FFD2 INX CPX \$2100 BCC \$203E

A final return is printed, and then the program reconnects the input stream and goes back to do another line.

204A LDA #\$0D JSR \$FFD2 ; reconnect to the input stream LDX #\$01 JSR \$FFC6 JMP \$200B

When we're ready to quit, we just unhook the input channel and return to BASIC.

2057 JSR \$FFCC RTS

Here's the program in BASIC.

100 DATA 162,1,32,198, 255,32,

228, 255, 32,228,255 110 DATA 32,228,255,141,0,33, 32,228,255,13,0,33,240,62 120 DATA 32,228,255,141,1, 33, 32,228,255,141,2,33,162,0 130 DATA 142,0,33,32,228, 255, 174,0,33,157,0,34,168,

240,3,232,208,238 140 DATA 32,204,255,162,0,189, 0,34,32,210,255,

232,236,0,33,144,244 150 DATA 169,13,32,210,255,162, 1,32,198,255,76,11,

32,32,204,255,96 200 FOR J=8192 TO 8282 210 READ X

220 T=T+X 230 POKE J,X 240 NEXT J

250 IF T<>11245 THEN STOP 300 OPEN 1,8,0,"\$0"

310 SYS 8192 320 CLOSE 1

The jo

G-20

D'IVERSIONS

Fred D'Ignazio

MY DREAM

The other night I awoke from a strange dream in which I'd been a computer program—a simulation. The authors of the program were monitoring the program and had just decided to terminate it, since it had outlived its usefulness. At that moment I woke up.

"Whew!" I sighed silently, noticing the comforting dark profile of my wife sleeping next to me. "That sure was weird!"

"What was weird?" came a small voice from inside my head.

I looked around the silent bedroom. No one else was there—just my wife and I. Who could have spoken?

"We're still watching you," came the reply.

"Who are you?" I whispered, casting a nervous glance at my sleeping wife.

"No one special. We're just monitoring your program. It's about to be terminated, you know."

Now I was deeply frightened. What was going on? Was I awake or not? Was this just another dream within my first dream?

"You're not really there," I whispered. No reply.

It was working. I continued, "You're just the product of a feverish mind. I've been sick recently, and you're just the residue of my fever."

Still no reply.

I glanced at the clock radio on the bedside table—3:00 a.m. I figured it was OK for me to settle down again and try to get some sleep. I closed my eyes again.

"We're still here."

I bolted out of bed. I sprinted for the bathroom door. Once inside, I shut the door and turned on the light. Staring back at me from the bathroom mirror was an extremely scared-looking face. I rushed to the toilet. No dream had ev-

er survived this test!

A few moments later, calmed and relieved, I switched off the bathroom light and returned to bed. I pulled the covers way up and fell almost instantly to sleep.

The voice returned. "If you don't believe me," it said, "watch this." I then saw a replay of parts of my life that I hadn't thought about in years. "It's all in the database," the voice said. "We know everything about you because we created you. And we created everything around you. But it's all about to end."

"But I'm alive!" I silently screamed. "How can you terminate me if I'm alive?"

"You only think you're alive," said the voice. "We programmed that feeling into you to make the simulation more interesting."

"But what about my wife here beside me?" I said quietly, gently nudging her sleeping form. Jeez, she sure seemed relaxed! She didn't have to be that relaxed, not with this drama being played out only inches away.

"Just part of the program," said the voice.

"And my kids?"

"Also the program."

"And this house? And our poor kitty who lived with us for 20 years before she wandered away last November? And a lady named Margaret who raised my brothers and sister and me? And the mean kid on the playground in the sixth grade who pushed me down the hill in front of my friends? And my three-legged dog?" (I was running out of memories.) "The program."

Then I had an idea. "If all this is part of a program," I reasoned, "how come I have my own computer? In fact, how come I have a bunch of computers? Are they all part of the program, too?" I smirked in

program, too?" I smirked

"You got it," said the voice. (Did I detect in that voice a faint trace of yet another smirk, mirroring my own?)

"OK," I whispered in despair. "You win. I am a program. My whole life is a program. My whole reality is a program. So when are you going to terminate me? Right here? Right now?"

"We're thinking about it," said the voice. "But you're turning out to have some unexpected uses. We'll let you know."

"When?" I thought. "When? When?"

I finally dozed off to sleep. The next morning my wife asked me how I'd slept—the way she'd done for the last 23 years—and I just looked at her. How was I to tell her that I now had the notion that she was just a simulation, that I was just a simulation, and that our world was just someone's computer program?

Every day I look around and touch objects, sniff them, hold them, taste them, enjoy them. Are they real? Or are they just bits and bytes, subroutines and macros, tiny little pieces of the program of my life?

Is today the day I'll be terminated? Or tomorrow? Or not at all? Was it really just a dream?

I speculate about the future. Will technology ever become so advanced that we'll be able to embed parts of our consciousness into our virtual media and create virtual selves—little Fred programs, leading blissful lives on a computer-simulated landscape, interacting with fellow simulated beings all living in a virtual world?

Will these beings think they're real, too? Will they think they're alive? What happens when it comes time to terminate them and try something new?

Do we tell them before we pull the plug?

If computer simulations mimic reality, how can we be sure that life itself isn't just a subroutine in some vast complex simulation?

Steve Vander Ark

DWEEZILS AND DRIVERS

Dave Ferguson is an accomplished GEOS programmer who has written several excellent utility programs for geoPaint. He's made them available on his Dweezil Disks, and I'm sure geoArtists will want to add them to their palette of tools. Here's a rundown of what the Dweezil Disks have to offer. In case you're curious, Dweezil is Ferguson's dog, and the disks are available from Quincy Softworks, 9479 East Whitmore Avenue, Hughson, California: 95326-9745. Write for a flier.

I love NewTools and its new toolbox. When activated from the menu in geoPaint, NewTools presents you with a large pointer that you use to designate a rectangular section of the bitmap. When you select a region, the cursor jumps automatically to the new toolbox (the regular toolbox is deactivated when NewTools works its magic).

From this toolbox you can perform a wide variety of strange but wonderful options. For example, one icon will slant your selected area upward at a 45-degree angle. Another will curve it—something I've always wished I could do to text in geoPublish!

NewTools also has a feature to put the finished results in boldface, adding pixels to the image. This is often necessary since some angle options tend to stretch the pixels apart. NewTools2, which operates in 64 or 128 mode, 40 or 80 columns, can be found on Ferguson's Dweezil Disk 1.

While geoPaint supports color, it's less of a hassle to work in monochrome. Besides, most users don't have a color printer anyway. When you're working in monochrome mode, patterns take on a new

importance. With the paintbrush tool set for various widths and patterns, you can create with a slew of shadings and simulated tints and hues.

UltiPatt and PattDA are two desk accessories that give you complete control over the patterns used in geoPaint. Each accessory includes a large selection of pattern sets that include some excellent gray scales. With UltiPatt, the sets are built right into the program; with PattDA, you load them from the disk in alternative patterns.

If you can't find a pattern you want from the 50 or so sets that are provided, you can use UltiPatt to create new ones. You can combine existing patterns, layering patterns on top of each other, or even use the program's random function to create new ones with the click of a button. UltiPatt and PattDA can be found on Dweezil Disk 2.

Marker is one more little Dweezil disk utility that comes in handy with geoPaint. It's a desk accessory that replaces geoPaint's ineffectual ruler tool. Marker not only reads the offset position in inches and pixels but also leaves a single-pixel mark when you press the M key. You'll find Marker on Dweezil Disk 1.

You won't want to miss geo-Stamp or its big brother, Big-Stamp, if for no other reason than that they are so darn much fun. The difference between the two programs is the size of the stamps they produce. BigStamp makes a stamp four times as large as geoStamp's. Where do the stamps come from? Well, a number of collections are included with the disk, and there are a few on Quantum-Link. And with the included utilities you can copy stampsized chunks of a geoPaint bitmap into a collection or edit stamp images of your own. The programs include a lot of well-thought-out commands, such as a key stroke to move the stamp one stamp width exactly in any direction, making borders a cinch. GeoStamp isn't on a Dweezil disk but is available separately from Quincy Softworks.

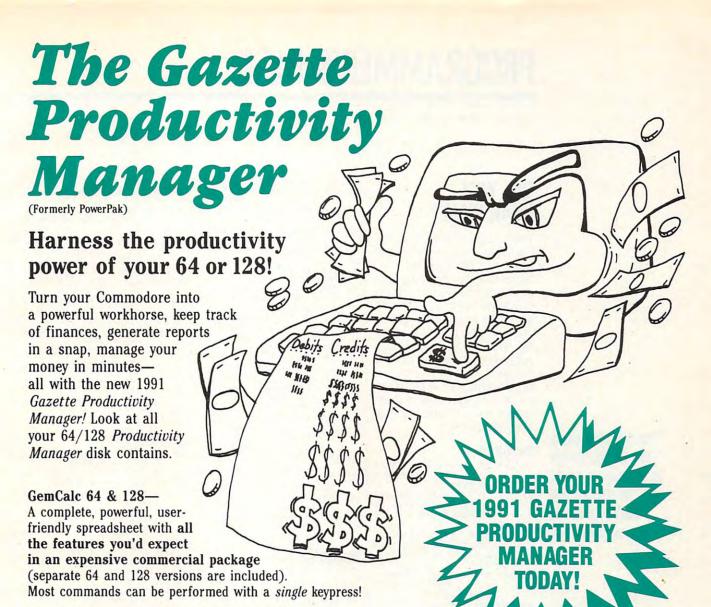
As long as we're on the subject of geoPaint programs, let me mention a few that are in Q-Link's library. A handy utility called Mirror Mirror lets you flip a geoPaint page side to side, resulting in a mirror image of your page. To download it easily from Q-Link, request MIRROR, uploaded by Red Storm.

Printing a geoPaint document is fairly straightforward, but there are print utilities that offer you some options. If you'd like a poster of your geoPaint or any GEOS page, try PosterPrint, a printer driver for Epson FX-80-compatible printers. PosterPrint enlarges the printout, turning one page into four. PosterPrint is available on Q-Link. Its filename is POSPRI3.0.SDA, and it was uploaded by Irv Cobb.

Another print utility called Rotate Pages will take sections of a geoPaint page (perhaps converted from geoPublish via Paint Pages) and print them sideways. With a little planning you can create landscape-printed booklets using this program. You can find Rotate Pages on Q-Link as ROTPAGES, uploaded by Student 4th.

If you want to get a grayscale printout of a color geoPaint document, there are
printer drivers on Q-Link that
will do that for you. There are
Epson versions for the 9-pin
(EPSON9PINCOLOR) and
24-pin (EPSON24PINCOLOR
and EPSON24PINGREY).
Okimate 20 users should look
for OKIMATE20GREY. All of
these were uploaded by GeoRep GHW, the wizard of the
printer drivers.

Here are some new geoPaint utilities that artists will want to add to their palette of tools.



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PROGRAMMER'S PAGE

Randy Thompson

DID YOU HEAR THAT?

Vince Tagle of Granada Hills California, really outdid himself when he answered my challenge to produce some wild sounds for the 64 and 128. My challenge ran in my April column, and within a few weeks of the article's publication, Vince fired off a letter listing some very strange-sounding programs. Here are just a few of the sounds (noises?) that Vince sent in. A couple of them supply some interesting visual effects, as well.

The SID chip gives the 64 the power to produce a world of earthly and unearthly sounds. Check these out.

PROGRAM 1

JX 100 FOR I=49152 TO 49258 :READ D:C=C+D:POKE I ,D:NEXT

KX 110 IF C<>16497 THEN PRI NT "ERROR IN DATA ST ATEMENTS":STOP

CP 120 SYS 49152

DA 130 POKE 54278,240:POKE {SPACE}54276,129:POK E 54273,34: POKE 5427 2,75

GK 140 FOR I=1 TO 15: POKE 5 4296, I:FOR J=1 TO 50 : NEXT : NEXT

MP 150 FOR I=15 TO 1 STEP -1: POKE 54296, I: FOR J =1 TO 200:NEXT:NEXT

SR 160 FOR I=1 TO 600+INT (R ND(1)*1000):NEXT KR 170 GOTO 130

XB 180 DATA 120,169,35,162, 192,141,20,3,142,21, 3,169,1,141,18,208,1 33,251,133,254

XH 190 DATA 173,17,208,41,1 27,141,17,208,169,12

9,141,26,208,88,96,1 73,25,208,141 JB 200 DATA 25,208,48,7,173 ,13,220,88,76,49,234 ,166,251,232,232,232 232,232,232

CM 210 DATA 232,232,142,18, 208,134,251,228,254, 208,4,230,251,230,25 4,166,253

JX 220 DATA{2 SPACES}232,13 8,41,15,170,134,253, 189,91,192,141,22,20 8,76,188,254,200,201

QR 230 DATA 202,203,204,205 ,206,207,207,206,205 ,204,203,202,201,200

PROGRAM 2

EX 100 FOR I=49152 TO 49191 :READ D: POKE I, D: NEX T:SYS 49152

HF 110 DATA 120,169,26,162,

192,141,20,3 KG 120 DATA 142,21,3,88,96, 120,169,234,162 EF 130 DATA 49,141,21,3,142

,20,3,88,96,32 SR 140 DATA 135,234,174,141 ,2,224,1,240,246

HP 150 DATA 76,49,234,0

PROGRAM 3

BP 100 FOR I=49152 TO 49228 :READ D:C=C+D:POKE I D:NEXT

GS 110 IF C<>9456 THEN PRIN T "ERROR IN DATA STA TEMENTS":STOP

CP 120 SYS 49152 PX 130 DATA 120,169,43,162, 192,141,20,3,142,21 RF 140 DATA 3,162,25,169,0, 157,255,211,202,208

GP 150 DATA 250,169,63,141, 5,212,169,240,141,6

XF 160 DATA 212,169,17,141, 4,212,169,15,141,24

JD 170 DATA 212,88,96,166,2 03,224,64,240,18,169

SJ 180 DATA 17,141,4,212,16 5,211,105,14,141,1

XJ 190 DATA 212,141,0,212,7 6,49,234,169,16,141 DD 200 DATA 4,212,76,49,234 ,23,212

KB 300 PRINT" (DOWN) PRESS AN Y KEY."

PROGRAM 4

CC 100 FOR I=49152 TO 49230 :READ D:C=C+D:POKE I ,D:NEXT

CH 110 IF C<>11843 THEN PRI NT "ERROR IN DATA ST ATEMENTS":STOP

CP 120 SYS 49152

MG 130 DATA 169,11,162,192,

141,6,3,142,7,3 EB 140 DATA 96,16,36,36,15, 48,32,201,255,240

GP 150 DATA 28,133,251,134, 252,132,254,166,253, 224

OB 160 DATA 5,240,7,169,5,1 33,253,32,210,255

DG 170 DATA 165,251,166,252 ,164,254,76,36,167,1

PQ 180 DATA 251,134,252,132 ,254,166,253,224,154 ,240

DJ 190 DATA 7,169,154,133,2 53,32,210,255,165,25

PP 200 DATA 166,252,164,254 ,76,243,166,208,14

PROGRAM 5

100 FOR I=49152 TO 49266 :READ D:C=C+D:POKE I ,D:NEXT

EG 110 IF C<>13471 THEN PRI NT "ERROR IN DATA ST ATEMENTS":STOP

HK 120 POKE 16383,0:SYS 491 RJ 130 DATA 120,169,31,162,

192,141,20,3,142,21 BE 140 DATA 3,169,0,141,18,

208,173,17,208,41 KX 150 DATA 127,141,17,208 169,129,141,26,208,8

AE 160 DATA 96,173,25,208,1

41,25,208,48,7,173 GS 170 DATA 13,220,88,76,49

,234,230,254,165,254 QP 180 DATA 41,3,208,21,166

,251,232,138,41,15 KR 190 DATA 133,251,170,189 ,78,192,141,17,208,1

89,94,192 JC 200 DATA 141,22,208,76,1

AE 210 DATA 26,27,28,29,30, 31,31,30,29,28 FG 220 DATA 27,26,25,24,203

,204,205,206,207,206

GG 230 DATA 205,204,203,202 ,201,200,200,201,202 ,203,0,0,0,0

PROGRAM 6

BM 10 FOR I=54272 TO 54295: POKE I, Ø: NEXT

POKE 54296,15:POKE 54 277,8:POKE 54278,255: POKE 54276,23: POKE 54 287,40

GB 30 FOR Z=1 TO 6 EB 40 FOR F1=255 TO 0 STEP {SPACE}-6:POKE 54273, F1:NEXT F1

EM 50 FOR F1=0 TO 255 STEP {SPACE} 20: POKE 54273, F1:NEXT F1

SX 60 NEXT Z

CE 70 POKE 54278,15:POKE 54 296,0

PROGRAM 7

BM 10 FOR I=54272 TO 54295: POKE I, 0: NEXT

MX 20 POKE 54296,15:POKE 54 277,8:POKE 54278,255: POKE 54276,23:F1=10 SM 30 FOR Z=1 TO 24:F2=30:P

OKE 54273,F1
RA 40 FOR Y=1 TO 10:POKE 54

287,F2:F2=F2*1.01:NEX

JC 50 F1=F1+8:NEXT Z RE 60 POKE 54278,15: POKE 54 296,0

Send more sounds, folks! Our address is listed below.

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SPEEDSPELLER 128

By Christopher Chojnacki

When SpeedScript 128 made its debut in October 1987, those of us who had been using SpeedScript for the 64 could hardly wait to try it out. This new version took advantage of most of the 128's abilities, but it still lacked two features that most word processors would call standard equipment: a spelling checker and a word counter.

True, programs exist that will take a SpeedScript file and either count its words or check its spelling, but they require an interruption of the creative process. You have to save your file, exit SpeedScript, load and run the spelling checker or word counter, save the corrected file, load SpeedScript again, and finally load the file once more. Now, there's a better way.

Getting Started

SpeedSpeller 128 is a two-part patch to SpeedScript 128 that adds a high-performance integrated spelling checker, a command line for viewing and changing the parameters of the spelling checker, a word counter, and a viewing mode that can double the number of onscreen lines.

The first part, SpeedSpeller 128, is written entirely in BASIC. To help avoid typing errors, enter it with The Automatic Proofreader; see "Typing Aids" elsewhere in this section. When you've finished typing it in, be sure to save the program.

The second part of the program is written in machine language. Enter it with MLX, our machine language entry program; see "Typing Aids" again. When MLX prompts, respond with the following values.

Starting address: 1300 Ending address: 1BEF

When you've finished typing, save this program with the filename ESC.PATCH.ML on the same disk as the first program. When SpeedSpeller 128 runs, it looks for and runs this file.

Running the Program

After you've saved both programs, reboot your 128 and run SpeedSpeller 128. You'll be presented with options to install the patch to SpeedScript 128, change the device number for the dictionary files, or change the minimum word length to check for errors.

The first time you run SpeedSpeller, choose the first option by pressing the A key. At this point the patch's subroutine package loads into memory, and you're asked for the SpeedScript 128 filename and the device number of the drive where it's located. If you're using only one drive, be sure that the disk containing your version SpeedScript 128 is in that drive before choosing a device number. After the patch is installed, you'll be asked for a filename to save your new version of SpeedScript 128.

Since SpeedSpeller supports numerous drives, you'll also be asked what device number you want for dictionary disks and the minimum word length to check for spelling errors. These values are then saved to disk in a file called ESC. Since this also contains subroutines used by the patch, ESC should be on the same disk as your new version of SpeedScript 128. Other options on the SpeedSpeller 128 main menu allow you to display and/or change the default values that you've already saved in the ESC file. When you're satisfied that everything is the way that you want it, you can load and run your new version of SpeedScript 128 just as you would your old one.

Changes

Although this new version of SpeedScript 128 doesn't look any different from the old one, there are some changes. For one thing, functions Control-A to change a letter's case and Control-X to transpose two letters no longer exist. They were removed to make room for the patch. Also, some functions have been switched back to the keys they were assigned to in the original version of SpeedScript. Specifically, Insert mode is now toggled using Control-I (or the Tab key), the Run/Stop key now inserts 5 spaces, and the Shift-Run/Stop combination inserts 255 spaces. The Esc key now gives you four new functions.

Integration

The Esc key, when used alone or together with the Shift, Alt, Control, or Commodore (C=) keys, allows you to check the spelling of the file you have in memory, change your default values for the spelling checker, count the number of words in the file in memory, or toggle the length of the screen between 25 and 50 lines.

The first time that you use any of these new functions, it will be necessary to hold down any key being used with the Esc key for a few seconds while the patch loads in the subroutines from the disk. After that, all of the new functions will be ready to use instantly. Loading the subroutine package in separately from SpeedScript 128 itself makes it possible to upgrade or alter these new functions at some future time without having to alter SpeedScript 128 again in the process.

Check Your Spelling

To check the file you're working on for spelling errors, move the cursor to where you want the process to begin and press the Esc key. Your file is scanned from the cursor position to the end of the file for words that are at least as long as the value you set as your minimum word length.

Subdictionaries for each letter of the alphabet are then loaded into memory as necessary and used to check your file. If you don't have a subdictionary on your disk, you can load one from another disk or create one as you go along. If a word being checked doesn't appear in a subdictionary, the file scrolls to a point six words prior to the word in question. The word is displayed in reverse video at the top of the screen, and you're presented with a list of options.

Your first option is to add this word to your subdictionary by pressing the A key. Do this only if you know the word is spelled correctly. Your second option, to edit the word, is selected by pressing the E key. Type the word exactly as you want it to appear in your file, using capital letters where necessary. Finally, if you don't want to edit the word or add it to your subdictionary, you can skip the word by pressing the S key.

Be Aware

There are a few things to remember in general about this spelling checker and october 1992 COMPUTE G-25

The first is that SpeedSpeller 128 automatically cancels Insert mode. Similarly, the search and replace buffers are cleared anytime you use Speed-Speller 128's Edit option. The next thing to remember is that words are not case sensitive. Therefore, capital, Capital, and CAPITAL all appear the same and are all checked using the same word in the C subdictionary. Also, contractions are viewed as two words. So couldn't, for example, will appear to be misspelled as couldn. You can abort the checking process at any time by pressing the Restore key and then pressing the N key when asked if you want to exit SpeedScript 128.

The chart below summarizes the changes that have been made.

Key	
Combination	n

Combination
Esc Check spelling
View/change default
values
Control-Esc View/change default
values
C=-Esc Toggle between 25
and 50 lines

Shift-Esc Run/Stop Shift-Run/Stop Control-I Tab Restore

View/change default values Toggle between 25 and 50 lines Word-count Insert 5 spaces Insert 255 spaces Toggle Insert mode Toggle Insert mode Cancel spellchecking

File Management

Whenever SpeedSpeller 128 updates a subdictionary, it saves a temporary version of the new dictionary, verifies it, erases the old one, and then renames the temporary one. This is done to ensure that you don't accidentally lose or otherwise damage a subdictionary while updating it. For this reason, it's necessary to always have enough room left on a disk to have an extra copy of your largest subdictionary. Also, it's best not to save any documents with a single character as a filename, just to be sure that you don't inadvertently destroy a subdictionary.

Subdictionaries can be loaded into SpeedScript 128 and edited if you accidentally add a misspelled word. The file format is simple. The first letter of the file is the name of the file in reverse video. This is made by pressing the £

key while holding down the Control key and then pressing the letter that you want when asked to press a format key. Each word is then stored without the first letter and with the last letter in reverse video. No spaces separate the words, and no space or return is at the end of the file. For example, if the Z subdictionary contained the words zany, zebra, and zipper, it would look like this.

Zan Vebraippe I

A subdictionary stored in this manner uses less space and can be loaded into memory faster.

Default Values

You can view at any time the default values for your subdictionary drive number and the minimum word length to check for spelling errors. Press the Esc key and either Alt or Control. To change these values, keep the Alt or Control key pressed down, release the Esc key, and press either the D key to cycle through device numbers 8–15 or the W key to cycle through word lengths of four to seven characters. These values remain in effect until you change them or turn off your computer.

Counting Words

Pressing the Esc key while holding down the Shift key counts all of the words in the file in memory in three seconds or less. There are a few things to consider, however, when using this function. The first is that contractions and hyphenated words are counted as multiple words. For example, couldn't is considered two words. Also, numbers are not counted as words.

Doubling Your Fun

Finally, we come to the last of Speed-Speller 128's new features. By pressing the Esc key while holding down the Commodore (C=) key, you can toggle between SpeedScript 128's normal display of 25 lines and 50 lines of onscreen text.

This is possible by using what's known as Interlace Display mode. Unfortunately, not everyone will be able to use this feature. You'll need a good RGB monitor with a vertical-hold control. To reduce any flickering, try reducing the brightness of your monitor or us-

ing text and background color combinations that have a lower contrast.

If you exit and then reenter SpeedScript 128 while in this mode, you'll have to toggle this feature once to reset your display. Additionally, SpeedScript 128 will seem a little sluggish when using this mode because the program has to handle twice as much information every time it updates the screen. Also, because the computer's operating system doesn't recognize this mode, only the upper half of the screen will be used anytime you display a disk directory or print a file to the screen.

A Final Word

The type of disk drive that you use can either help or hinder a spelling checker's performance. The way that words are stored in a subdictionary is also a factor. SpeedCheck 128, the spelling checker on COMPUTE's SpeedScript disk, stores words in its dictionary in a random order. This means the entire subdictionary has to be checked from the beginning until it either finds the word it's looking for or runs out of words in the subdictionary. This process can be very fast or very slow.

SpeedSpeller 128, on the other hand, stores the words in its subdictionaries in alphabetical order and then uses what is known as a binary search to look for words. This method involves dividing each subdictionary in half and deciding in which half the word being checked should be found. This halving continues until either the word is located or the half is too small to be divided again. This process is very fast. The time required to check the spelling of a word will generally remain the same regardless of the word's location in the subdictionary, the size of the dictionary, or whether or not the word is in the dictionary.

Speaking of size, depending on how much memory your version of SpeedScript 128 uses, each subdictionary can contain approximately 7000 words. This means that an entire dictionary can contain about 182,000 words. In addition, because of the way Speed-Speller 128 handles the loading and saving of subdictionaries, you don't have to keep all of your subdictionaries

on a single disk. www.commodore.ca

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SPEEDSPELLER 128

- AD Ø POKE48,128:CLR:FAST:IFPEE K(238) <>79THENPRINTCHR\$(2
- QF 1 PRINTCHR\$(27) "R\$\(7\)
 {2 HOME}{CLR}"CHR\$(11) CHR
 \$(142):BA=PEEK(186)
- CB 2 DEFFNMA(X)=PEEK(174)+256*
- PK 3 PRINTSPC(12)"{17 SPACES}
 {A}****************************
 {S}
- JK 4 PRINTSPC(12)"{5 SPACES}
 {A}**************
 ELLER{2 SPACES}128 {Z}***

- HB 5 PRINTSPC(12) "{A}**** {X} P
 ATCH INSTALLATION AND MAI
 NTENANCE PROGRAM {Z}***
 {S}"
- JM 7 WINDOW12,7,66,22:PRINT"
 {3}{CLR}":WINDOW13,8,65,2
- CE 8 PRINT"{CLR}A) INSTALL PAT CH TO SPEEDSCRIPT 128"
- CH TO SPEEDSCRIPT 128"

 JA 9 PRINT" {DOWN}B) CHANGE DEV
- ICE # FOR DICTIONARY"
 EM 10 PRINT" (DOWN)C) CHANGE MI
 NIMUM WORD-LENGTH"
- DG 11 PRINT" (DOWN) CHOOSE AN OP
- KQ 12 GETR\$:IF((R\$<"A")OR(R\$>" C"))THEN12:ELSEIFR\$="B"T
- HEN33:ELSEIFR\$="C"THEN40"
 HK 13 BLOAD"ESC.PATCH.ML",U(BA
-),B1,P4864:EA=FNMA(0)
 MD 14 PRINT"{CLR}NAME OF SPEED
 SCRIPT 128 VERSION TO CO
 NVERT:":N\$="":INPUTN\$
- BP 15 IF LEN(N\$) <1 OR LEN(N\$) > 16 THEN14
- MF 16 INPUT" (DOWN) DEVICE # TO {SPACE} LOAD VERSION FROM (8 TO 15)"; DV
- HH 17 IF DV<8 OR DV>15 THENPRI NT"{UP}"CHR\$(27)"D{2 UP} ":GOTO16
- FC 18 BLOAD(N\$),U(DV),B1,P7169 :EB=FNMA(0)
- :EB=FNMA(Ø)

 HK 19 READS,F,KC:IFS=ØTHEN22
- PC 20 CK=0:BANK1:FORX=STOF:REA
 DN:CK=CK+N:POKEX,N:NEXT:
 BANK0
- HR 21 IFCK<>KCTHENPRINT"{DOWN}
 ERROR IN DATA FOR LOCATI
 ON(S)"S"TO"F:END:ELSE19
- GG 22 PRINT"{DOWN}NAME FOR NEW SPEEDSCRIPT 128 VERSON: ":NS="":INPUTNS
- CR 23 IF LEN(N\$) <1 OR LEN(N\$) >
 16 THENPRINT" {UP}"CHR\$ (2
 7) "D{3 UP}":GOTO22
- SK 24 INPUT"{DOWN}DEVICE # TO {SPACE}SAVE NEW VERSION

- {SPACE}TO (8 TO 15)";DV

 JC 25 IF DV<8 OR DV>15 THENPRI

 NT"{UP}"CHR\$(27)"D{2 UP}

 ":GOTO24
- BD 26 BSAVE(N\$),U(DV),B1,P7169 TO P(EB):IFDS<>ØTHEN52
- RF 28 IF DD<8 OR DD>15 THENPRI NT"{UP}"CHR\$(27)"D{2 UP} ":GOTO27
- SK 29 BANK1:POKE5150,DD:BANK0 RJ 30 INPUT"{DOWN}MINIMUM WORD
- -LENGTH (4 TO 7)"; WL

 CH 31 IF WL<4 OR WL>7 THENPRIN
 T"{UP}"CHR\$(27)"D{2 UP}"
- :GOTO30
 CK 32 BANK1:POKE5175,WL:BANK0:
 GOTO47
- AG 33 INPUT"{CLR}DEVICE # TO L
 OAD 'ESC' SUBROUTINE FRO
 M (8 TO 15)";DV
- RB 34 IF DV<8 OR DV>15 THEN33
- RX 35 BLOAD"ESC", U (DV), B1, P486 4:EA=FNMA(0):BANK1:DD=PE EK(5150):BANK0
- MJ 36 PRINT" (DOWN) DICTIONARY C URRENTLY LOADED FROM DEV ICE #"DD
- SE 37 INPUT"{DOWN}NEW DEVICE #
 TO LOAD DICTIONARY FROM
 (8 TO 15)";DD
- EK 38 IF DD<8 OR DD>15 THENPRI NT"{UP}"CHR\$(27)"D{2 UP} ":GOTO37
- GF 39 BANK1:POKE5150,DD:BANK0:
- GG 40 INPUT"{CLR}DEVICE # TO L
 OAD 'ESC' SUBROUTINE FRO
 M (8 TO 15)";DV
- DQ 41 IF DV<8 OR DV>15 THEN40 AH 42 BLOAD"ESC", U(DV), B1, P486
- AH 42 BLOAD"ESC", U(DV), B1, P486 4:EA=FNMA(Ø):BANK1:WL=PE EK(5175):BANKØ
- RM 43 PRINT" (DOWN) CURRENT MINI MUM WORD-LENGTH: "WL
- PD 44 INPUT" [DOWN] NEW MINIMUM {SPACE} WORD-LENGTH (4 TO 7)": WL
- HH 45 IF WL<4 OR WL>7 THENPRIN T"{UP}"CHR\$(27)"D{2 UP}"
- JG 46 BANK1:POKE5175,WL:BANKØ ER 47 SCRATCH"ESC",U(DV):IFDS)
- ER 47 SCRATCH"ESC", U(DV):IFDS> 1THEN52
- HS 48 BSAVE"ESC", U(DV), B1, P486 4 TO P(EA): IFDS<>0THEN52 EX 49 SCRATCH"ESC", U(DV): IFDS>
- QA 50 RENAME"ESC", U(DV) TO"ESC", U(DV): IFDS<>0THEN52
- RM 51 BANK0:POKE7167,0:PRINT"
 {2 HOME}{CLR}{DOWN}ALL F
 INISHED!":BANK15:POKE48,
 4:CLR:SLOW:END
- AK 52 BANKØ:POKE7167,Ø:PRINT"
 {DOWN}ERROR: "DS\$:BANK15

- :POKE48,4:CLR:SLOW:END DS 53 DATA 7280,7281,281,254,2
- FP 54 DATA 7283,7284,281,254,2
- AK 55 DATA 8181,8181,3,3
- KR 56 DATA 8187,8187,255,255
- KD 57 DATA 8221,8222,219,177,4
- DJ 58 DATA 8245,8246,208,172,3
- RJ 59 DATA 8265,8266,136,99,37
- AF 60 DATA 9833,9833,80,80
- FM 61 DATA 10109,10109,79,79
- CB 62 DATA 10334,10335,206,166
- SM 63 DATA 10930,10993,8169
- JM 64 DATA 173,255,27,201,204, 240,36,169
- FP 65 DATA 3,162,224,160,42,32
- HD 66 DATA 169,0,170,32,104,25
- 5,173,3 BG 67 DATA 40,170,168,32,186,2
- 55,169,0
- EE 68 DATA 32,213,255,144,3,76
- HS 69 DATA 32,204,255,108,0,19
- QD 70 DATA 67,234,160,0,185,70
- ,53,240 BX 71 DATA 6,32,210,255,200,20
- 8,245,96 CH 72 DATA 12350,12350,228,228
- CH 72 DATA 12350,12350,228,228 GA 73 DATA 0,0,0

ESC.PATCH.ML

- 1300:58 14 53 10 05 95 94 5A 1308:10 05 0C 0C 05 12 20 31 9B 1310:32 38 3A 20 00 53 30 3A 8E 30 1318:20 52 3A 20 30 20 53 16
- 1320:03 01 ØE OF 99 ar. 07 59 20 1328:44 ØF 03 15 an 05 ØE 14 92
- 1330:2E 2E 2E 00 43 08 05 03 96 1338: 0B 09 ar. 97 20 27 20 27 50
- 1340:20 57 ØF 12 04 13 2E 2E 46 D6 1348:2E aa 55 ØE aR ØE OF 17
- 1350:0E 20 57 OF 12 04 20 20 6F 1358:20 00 20 20 04 41 04 2C E 2
- 1360:20 45 04 99 14 20 OF 12 4A 1368:20 53 0B 09 10 3F aa 44 27
- 1370:0F 0E 05 20 43 08 05 03 8B 1378:0B 09 0E 07 00 53 01 16 FD
- 1380:05 20 55 10 04 01 14 05 2E 1388:04 20 53 15 02 2D 44 09 CA
- 1390:03 14 09 0F 0E 01 12 19 01
- 1398:20 28 59 2F 4E 29 3F aa 8C 13AØ:29 20 44 15 12 9 OF 97 15
- 13A8:20 53 15 02 2D 44 09 03 06
- 13B0:14 09 0F 0E 01 12 19 20 88 13B8:00 4C 0F 01 04 00 53 01 AB
- 13C0:16 05 00 3A 20 54 12 19 66
- 13C8:20 41 07 01 09 0E 20 28 29 13D0:59 2F 4E 29 3F 00 43 0F 5B
- 13D8:12 12 05 03 14 20 53 10 35
- 13E0:05 0C 0C 09 0E 07 3A 20 BF 13E8:00 45 12 12 0F 12 20 28 EC
 - 13F0:00 53 10 05 05 04 43 0F 0C

PROGRAMS

G-28 COMPL	1430:05 ØE 1438:04 3B 1440:08 Ø3 1448:20 20 1450:19 Ø8 1458:A5 D3 1460:20 CB 1468:15 4A 1470:BØ Ø3 1478:4C 20 1488:20 18 1490:48 A9 1490:48 A9 1498:20 29 1488:20 18 1490:48 A9 1448:20 18 1490:48 A9 1448:20 18 1490:48 A9 1448:20 08 1448:20 08 1448:20 08 1458:A5 29 14C0:ED 19 14C0:ED 19 14C0:ED 19 14C0:ED 20 14D8:20 8E 14E0:A9 Ø0 14F8:20 ØC 1500:BE A0 1510:35 60 1518:CB 1E 1520:1E A9 1528:AE 10 1530:E8 86 1530:E8 86 1530:E8 86 1530:E8 86 1530:E8 86 1530:E8 86 1540:40 ØB 1518:CB 1E 1520:1E A9 1558:21 A5 1560:42 20 1568:C8 98 1578:30 Ø7 1580:ØB A5 1588:2A ED 1590:B9 Ø6 15A0:13 20 15B0:ØB A5 1588:2B ED 1590:B9 Ø6 15A0:13 20 15B0:Ø9 Ø9 15B8:CB 18 15C8:20 54 15D0:90 ØD 15D8:FØ DD 15E0:45 84 15E0:D0:90 ØD 15E0:45 84 15E0:D0:90 ØD
	00 43 43 40 00 42 42 42 42 42 42 42 42 42 42 42 42 42
	1244361286618849944867875000C8800A35566109A1E00D03880018800A35566109A1E00D03880018A107855500018
	0550094A220BBDD0C441850580BD0388C15DE630E8A33DAA505CA883EDA93ED3008564999940
	1002007330EF891C055555555D5003A2FA5E5208193150A099793A00F93B02085B201A58508
	149215 6 A A 3 1 8 A 1 2 D F F C 2 D 2 1 B E 7 9 D F B F F L 2 A 0 7 A 1 C 1 9 B 5 B 7 5 C 6 6 2 C 5 C 1 E 8 4 5 2 2 5 A 0 D A 6 C 9 B 5 B 7 5 C 6 6 2 C 5 C 1 E 8 4 5 2 5 A 0 D A 6 C 9 B 5 B 7 5 C 6 6 2 C 5 C 1 E 8 4 5 2 5 A 0 D A 6 C 9 B 5 B 7 5 C 6 6 2 C 5 C 1 E 8 4 5 2 C 5 C 1 E 8 6 C 9 C 1 E 8 6 C 7 B 7 B 7 B 7 B 7 B 7 B 7 B 7 B 7 B 7
	56BE2DF80C3A65FF499A4DE39B2A1042D1E9C7515143D982FE0F8CFCD10AC1A43BF
	1630:F6 1638:29 1640:B5 1638:21 1660:1F 1668:13 1670:85 1678:20 1680:1E 1688:20 1690:18 1648:1E 1688:20 1690:18 1648:1E 1688:3F 1600:74 1608:00 1608:60 1608:60 1608:60 1608:60 1608:60 1608:60 1608:60 1674:18 1688:3F 1708:20 1730:18 1748:44 1720:E9 1748:45 1718:44 1720:E9 1748:45 1740:60 1748:49 1750:12 1758:35 1760:35 1768:80 1770:2A 1778:35 1780:A5 1780:A
	B19F2001532225A25EEBE8100C0AFF2B0A2CA98CA98A5E00EFC9685D9A5F085E095E0958B00A5FC965C0985C095F085F095F095F095F095F095F095F095F095F095F09
	C8AD848F0558DA68D900A80910010000E033380035F089FD884405B5A554446E0003E009
	00FF21FA5200A94949490B0B5870A4BD37790BDA50BDA50C155BBB55BBB0858780BBDA50BDA50BDA50BDA50BB5878855BBB0
	00081201D99367200A0F1B992760400988469E1FC440B659A8851F5100E65896585B0A7185006
	0 A 5 1 F 5 4 4 0 6 6 0 7 8 4 2 9 F 0 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7
	909901959000000000000000000000000000000
	2084120D8661E0D0889998BC900D0F655449001E986B55599BB5C55D66F1F441750C15000
	D954C1292C18FE27FB5A2D88A77D628C1A7465E8A60113EA45D628A65A7466E8F8D7127
C=ww	1860:00 1868:14 1870:86 1870:86 1870:86 1880:18 1888:54 1890:20 1840:49 1848:18 1800:15 1800:15 1800:15 1808:20 1860:49 1908:80 1918:48 1920:99 1928:00 1938:00 1948:02 1958:80 1968:47 1978:20 1980:70 1988:51 1980:38 1970:00 1948:02 1950:49 1960:44 1968:35 1960:44 1968:45 1970:00 1948:35 1950:40 1948:35 1950:38 1950:38 1950:3
	A441318B44122313E00990042D99F183008980139030FE800475A5002240855FA0030FE800475A2240855FA
	01990299F180DD33331FB20FBC6F3DD008C0AC00B018E935CE405B4601CCE0085CE0020F5CF03DD008C0AC00B018E93E405B4601CCE0085CE008F5CF263
	2000 CB000 FEB0 FFF F0 FF F0 FFF F0 F0
	BD5D8186EEE133860BDF088F008E0D00BE11D009900CEE133800BB088559768860BFF098860
	FFFEE 8 4 5 8 4 1 8 8 9 9 8 D C C C C C C C C C C C C C C C C C C
	6001354400EF715E942EF999990FF5FF19288ADD085E085E085200D85E0852000D85E085200D85E085200D85E085200D85E085200D85E085200D85E0852000000000000000000000000000000000
	AADD0443C8DD1A014001421D0780CF9990093B8855D0F8BA288F2566050EE1555500
	0C9AB1835C5E3DAAA5AE6EAC55BB403BC7BB90AAD23142F7AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA

1A88:18 1E A9 89 AØ 13 2Ø 18 C7 1A90:1E 20 3F 18 DØ 1A AD 3E CD 1A98:13 49 CØ AØ ØØ 91 BØ A5 18 1AAØ:BØ 18 69 Ø1 85 AE AA A5 52 1AA8:B1 69 00 85 AF A8 C4 AF C1 1ABØ:60 20 CB 1E A9 02 AØ 13 22 1AB8:20 18 1E A9 AD A0 13 20 97 1AC0:18 1E A9 14 A0 14 20 18 AC 1AC8:1E AD 1E 14 AA C9 ØA 3Ø 3D 1ADØ:0B A9 31 20 0C 1D 8A 18 1F 1AD8:69 26 DØ Ø7 49 3Ø 2Ø ØC 2D 1AEØ:1D A9 20 20 0C 1D A9 1F 5B 1AE8: AØ 14 2Ø 18 1E AD 37 14 22 1AFØ:49 3Ø 2Ø ØC 1D EE 15 35 9E 1AF8: A5 D3 FØ 2B 2Ø E4 FF FØ 4B 1B00:F7 29 1F C9 04 D0 0E AE 1BØ8:1E 14 E8 8A Ø9 Ø8 29 ØF E1 1B10:8D 1E 14 DØ 9C C9 17 DØ 2F 1B18:DF AE 37 14 E8 8A 09 1B20:29 07 8D 37 14 DØ 8A 60 2B 1B28:78 AD 4E 14 8D 4F 14 49 2C 1B30:40 8D 4E 14 AD 45 14 8D 2D 1B38:49 14 49 10 8D 45 14 AD 99 1B40:50 14 8D 52 14 49 2B 8D 24 1B48:50 14 AD 51 14 8D 53 14 08 1B50:49 38 8D 51 14 CD 2F ØA 4Ø 1B58:FØ 26 AØ ØØ BE 38 14 C8 6C 1B60:B9 38 14 C8 20 07 1D C0 A8 1B68:16 DØ F1 A9 FF AØ 1Ø A2 FB 1B70:1E 20 07 1D 88 D0 FA AD 9B 1B78:50 14 4A 90 03 20 79 E1 9B 1B80:AD 54 14 AE CF 21 8D CF FD 1B88:21 8E 54 14 AD 55 14 AE 58 1B90:D0 21 8D D0 21 8E 55 14 38 1B98:AD 56 14 AE E1 21 8D E1 39 1BA0:21 8E 56 14 AD 57 14 AE B8 1BA8:E2 21 8D E2 21 8E 57 14 7E 1BBØ:AD 50 14 8D BØ 1D AD 51 D3 1BB8:14 8D 2F ØA 8D 32 26 8D F1 1BC0:52 26 8D 85 26 8D 93 27 69 1BC8:AD 4E 14 8D 33 26 AD 13 65 1BDØ: 35 85 29 AD 14 35 85 2A AD 1BD8:20 2E 26 20 52 1E AD E6 BE 1BE0:21 0A 0A 0A 0A 0D D2 21 57 IBE8: A2 1A 20 07 1D 58 60 00 76

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LA BASIC

By Farid Ahmad

One of the shortcomings of 64 BASIC is that it doesn't allow the use of labels. A label is a subroutine that is assigned a descriptive name rather than a line number or address. To run the subroutine, you simply call the label by its name. Such a feature makes a program easy to write and even easier to modify.

La BASIC adds this facility to BASIC. It allows the use of labels with GOTO, GOSUB, and RESTORE. In addition, it pro-

vides two new commands for easy cursor positioning and color control.

Getting Started

La BASIC is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX prompts, respond with the following values.

Starting address: C000 Ending address: C337

Be sure to save a copy of La BASIC before you exit MLX.

Labels

A label consists of a REM statement in the following format.

REM=label

The equal sign (=) distinguishes a label in La BASIC from an ordinary REM statement. Note that there is no space between the REM and the equal sign. A space after the equal sign will be treated as a part of the label. Labels may be up to 27 characters in length and may use any character except quotation marks. Labels may also include BASIC keywords.

The actual BASIC subroutine would immediately follow. The keyword *RETURN* would mark the end of the routine. Here's a very simple example.

500 REM=PAUSE 510 FOR P=1T03000: NEXT 520 RETURN

Whenever you'd like for the program to pause for a few seconds, you could call the PAUSE label with La BASIC's commands.

La BASIC Commands

The following commands are available in La BASIC.

SYS 49152, 0

This command has no parameters. It must be used at the beginning of a program before any labels are used. It searches through the entire program for labels and sets up a table of them, their line numbers, and their addresses in a separate area of memory. By de-

fault, the memory under Kernal ROM is used, but it can be changed as described later.

SYS 49152, 1, label

This is the GOTO command. It transfers program control to the line that contains the label. The label parameter may be any legal BASIC string, character variable, or a combination of these. For example, suppose a program contains a label such as REM=DRAW TITLE. This could be called with any of the following statements.

SYS 49152, 1, "DRAW TITLE" T\$="DRAW TITLE": SYS 49152, 1, T\$ A\$="DRAW": SYS 49152, 1, A\$+" TITLE"

SYS 49152, 2, label

This is the GOSUB command. It works like the normal GOSUB, except that control is transferred to the subroutine that starts with the specified label. The subroutine should end with a RETURN statement as usual. The label can be specified as shown previously.

SYS 49152, 5, label

This is a selective RESTORE. After this command is executed, the DATA pointer will be set to the line containing the label. The label can be specified as with the previous command.

The remaining two commands don't use labels. However, they make programming easier.

SYS 49152, 3(row, column, color

Note that there is no closing parenthesis. This command will clear the screen, position the cursor at the specified row and column, and set the text color. The row may be from 0 to 24, and the column from 0 to 39. Values outside this range produce an ILLEGAL QUANTITY ERROR.

SYS 49152, 4(row, column, color

This command is similar to the previous one, except that the screen isn't cleared before positioning the cursor.

The color parameter may be used in two ways. If you want to change the printing color without changing the text already onscreen, use any Commodore color number from 0 to 15. For example, SYS 49152, 4(0, 0, 1 will change the printing advantage to parameter.

change the printing color to white

If you want the color change to affect the text that is already on the screen, add 100 to the color number. SYS 49152, 4(0, 0, 101 will change the color of all the onscreen text to white and make white the printing color.

In both of the above commands, the color parameter is optional. If you don't wish to change the text color, leave out this parameter as well as the preceding comma.

Error Messages

La BASIC may generate the following error messages.

LABEL USED TWICE IN LINES: 11,12

LABEL TOO LONG

This error occurs when an attempt is made to define or call a label longer than 27 characters.

LABEL NOT FOUND

MISSING LABEL

This error occurs if a null string is specified as the label in the GOTO, GOSUB, or RESTORE statement.

OUT OF LABEL MEMORY Label memory may be increased as described below.

Label Storage

By default, the labels are stored under Kernal ROM. To use some other memory area, use the following statements with appropriate line numbers at the beginning of the program (before the SYS 49152, 0 command).

5 POKE 49967,BO/256: POKE 49968,BO-INT(BO/256)*BO 10 TP=TP-32: POKE 49969,TP/256: POKE 49970.TP-INT(TP/256)*BO

In this case BO equals the bottom of the storage area, and TP equals the top of the storage area.

Each label requires 32 bytes of storage, so you can have 32 labels per 1K of memory. Thus, if the default memory area is used, up to 256 labels may be defined.

The advantage of storing labels in a separate area of memory is that La BA-SIC doesn't have to look through the entire BASIC program each time a label

is used. This can speed things up considerably. The speed gain will be especially significant in long programs that contain many subroutines and REM statements. As long as the REM statements are placed between two subroutines, they won't slow BASIC down and your programs will run faster.

Command Summary

SYS 49152, 0 Set up table of labels
SYS 49152, 1, GOTO label label
SYS 49152, 2, GOSUB label label
SYS 49152, 3

(row, column, color Clear screen, position cursor, set color SYS 49152, 4 (row, column, color co

color SYS 49152, 5, RESTORE to line conlabel taining label

LA BASIC

C000:20 FD AE 20 9E B7 E0 01 7F C008:F0 19 EØ 92 FØ 1E EØ 03 EØ Ø4 FØ 13 EØ Ø5 CØ10:FØ 14 C018:F0 15 E0 00 F0 14 A2 0E 9E CØ2Ø:4C 8B E3 4C 60 C1 4C F3 D6 C1 4C CØ28:C1 4C F8 C1 4C 66 A5 2B 85 Ø3 A5 2C CØ3Ø:4C C2 AD 2F C3 85 FD AD CØ38:85 014 AØ Ø1 aa FA CØ40:30 C3 85 FE A9 CØ48:91 FD A9 00 8D 35 C3 A0 B0 CØ50:00 B1 Ø3 85 05 C8 B1 Ø3 A8 CØ58:85 06 C8 B1 03 8D 33 C3 CA C3 C8 B1 DF CØ60:C8 B1 Ø3 8D 34 8F FØ Ø3 4C 4C C1 CØ68:03 C9 C070:C8 03 09 3D FØ 03 4C BF B1 A2 00 CØ78:4C C1 AØ Ø6 B1 Ø3 19 9D ØF C3 C8 CØ8Ø:C9 ØØ FØ 10 DØ F1 AE 33 C3 BB CØ88:E8 EØ 34 C3 86 39 85 3A C090:AD 00 90 4C CC CØ A9 CØ98:98 C2 8F Cl CØ aa FØ CØAØ: ØF 20 Ø2 B1 FB 85 95 C8 CØA8:34 AØ 91 85 51 85 .06 A9 37 COBO:B1 FB C2 97 A9 20 1E AB CØB8:58 AØ 05 20 CD A9 49 A5 96 BD CACA: A6 3A D2 FF AE 33 C3 AD CØC8:2C 20 BD A9 80 20 CØDØ: 34 C3 20 CD 35 C3 6C Ø2 Ø3 AD CØD8:D2 FF COEO:FO OA A9 DC AØ C2 20 1E CØE8: AB 4C 65 A4 AØ ØØ 38 A5 65 Ø1 91 FD C8 A5 Ø4 ØA CØFØ: 03 E9 33 C3 A8 91 FD C8 AD CØF8:E9 00 91 91 C100:91 FD C8 AD 34 C3 69 02 85 03 C108:C8 18 A5 03 C110:A5 04 69 00 85 04 A2 00 16 C118:BD ØF C3 C9 00 F0 07 91 E8 4C 18 C1 91 FD 9F C120:FD C8

C128:18 A5 FD 69 20 85 FD A5 30 C130:FE 69 00 85 FE A5 FE CD 40 C138:32 C3 FØ 94 BØ 99 90 ac C140:A5 FD CD 31 C3 90 95 A9 F6 C148:01 8D 35 C3 A9 00 A0 22 01 C150:91 A5 05 85 Ø3 A5 96 FD AA C158:FØ 05 85 04 40 4F CØ 60 98 C160:20 74 C2 20 8F C1 CØ 00 B1 FB 85 7A C168:DØ 1B AØ C170:C8 B1 FB 85 7B C8 B1 FB C178:85 39 C8 B1 FB 85 3A A9 C180:37 85 a1 58 60 A9 AC AØ 4A C188:C2 20 1E AB 4C 65 A4 AD E.2 C190:2F C3 85 FB AD 30 C3 34 85 C198:FC 78 A9 Ø1 AØ 01 A3 Cla0:Bl FØ 2A AØ 04 A2 00 17 FB Cla8:B1 FB FØ 1A DD ØF C3 DØ A8 C1 18 A5 C1BØ: 05 C8 E.8 4C EC A5 C1B8:FB 85 FB FC 69 69 20 C1C0:00 85 FC 4C 9E C1 BD C1C8:C3 DØ EB AØ 01 60 A0 aa ClDØ:A9 37 85 01 58 60 A9 03 52 A3 C1D8:20 FB 20 74 C2 A5 3A 48 ClEØ:48 A5 7A 48 A5 A5 12 C1E8:39 A9 8D 48 20 63 Cl 48 ClFØ:4C AE A7 A9 93 20 D2 FF 20 FF AE 20 9E 4A B7 ClF8:A9 28 C200:86 02 20 FD 20 9E B7 AE C208:8A A8 A6 Ø2 EØ 19 BØ 37 C210:C0 28 BØ 33 18 20 F0 6C C218:AØ B1 09 2C DØ ØD 00 7A C220:20 20 9E B7 EØ 63 FD AE 86 02 60 38 8A C228:BØ 04 8E C230:E9 AØ 00 8D 86 02 99 64 C238:00 D8 99 00 D9 99 60 ØØ DB C8 DØ F1 40 C240:99 A 2 C248: ØE 4C 8B E3 20 74 C2 20 C250:8F C1 CØ Ø1 FØ Ø3 4C 85 E7 C258:C1 AØ ØØ B1 FB 85 41 C8 85 C8 B1 85 C260:B1 FB 42 FB C8 B1 FB 85 40 A9 C268:3F C270:85 01 58 60 20 FD AE 20 B6 FØ 22 C278:9E AD 20 A3 AA C280:C9 1C BØ 14 85 Ø2 AØ C288:B1 22 99 ØF C3 C8 C4 02 A9 00 99 ØF C3 60 C290:D0 F6 C298: A9 BD AØ C2 20 1E AB 4C C2AØ:65 A4 A9 CD AØ C2 20 1E 12 4C 41 42 C2A8:AB 4C 65 A4 4C 20 4E 4F 54 46 C2BØ:45 ØØ 12 4C 41 C2B8:4F 55 4E 44 45 4C 20 54 4F 4F 20 E 2 C2C0:42 00 12 49 C2C8:4C 4F 4E 47 47 20 41 C2DØ:53 53 49 4E 4C C2D8:42 4C 00 12 4F 55 54 45 C2E0:20 4F 46 20 4C 41 42 45 46 52 20 4D 45 4D 4F C2E8:4C 4C 41 42 45 4C 20 78 C2FØ: ØØ 12 C2F8:55 53 45 44 20 57 49 49 4E 20 4C C300:43 45 20 49 20 3A 20 00 00 C6 C308:4E 45 53 C310:00 00 00 aa 99 99 99 aa aa aa 9F C318:00 00 aa 00 aa 00 ØØ 00 00 aa A7 C320:00 00 00 C328:00 00 00 00 00 00 00 00 AF C330:E0 DF FF 00 00 00 00 00 20

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SPEEDSPELL

By Daniel Lightner

SpeedSpell Utility Program (SUP) and SpeedSpell are a pair of programs for the 64 that can check SpeedScript documents for spelling errors. SUP is used to create and edit SpeedSpell dictionary disks, and SpeedSpell checks the spelling. If you already have COMPUTE's SpeedCheck, SpeedSpell can utilize your SpeedCheck dictionary. Both SUP and SpeedSpell are written in machine language. To enter them, you'll have to use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When entering SUP with MLX, respond with the following values at the prompts.

Starting address: 0801 Ending address: 11CO

When entering SpeedSpell, respond with these MLX values.

Starting address: 0801 Ending address: 1518

Be sure to save copies of these programs after you've finished typing.

The Utility

Load and run SUP as you would any BASIC program. When the menu appears, choose option 1 to create a new dictionary disk. You'll have the option to format the disk. Before you answer the prompt, be sure that you place a new disk into drive 8. Never use a disk that contains any important files. Choose Y to format and N to abort. SUP prompts you to place the target disk in the disk drive and press the space bar to begin formatting.

SUP formats the disk and puts endof-file markers on certain sectors. The program puts a unique ID of SS on its dictionary disks, so try to avoid using this ID on SpeedScript or SpeedSpell disks.

After a disk has been formatted, you won't need to use this option again with that disk. Using option 1 on a valid dictionary disk will destroy any information that it may contain.

SUP sets up 104 storage areas, with each area containing six blocks. Each letter of the alphabet has four ar-

eas assigned to it, and each area can hold up to 1535 characters and one end-of-file marker. Each of those four areas is designed to hold words whose second letter falls within a certain range of characters. For example, the first area assigned to the letter A would hold words that begin with A and whose second letter falls within the range A-H. The next area assigned to A would contain words whose second letters fall within the range I-N. The next area would be for letters O-T, and the last area would be for U-Z.

Following this group, the next four areas would be assigned to the letter B. then C, and so on. This system reserves space for 6140 characters for each letter. Words are stored in these areas back to back, minus the first character, with bit 7 of the last character set. By storing words in this fashion, SpeedSpell can check a text file much faster than the original SpeedCheck.

A newly created dictionary contains no words. It must be compiled by entering words one at a time, using option 2, or from SpeedSpell during an actual spell-checking session. With option 2, just type the word that you wish to enter and press Return. If the word already exists in the dictionary, it will be ignored.

Option 3 lets you delete any misspelled words that may be in your dictionary. Just follow the same steps

used in option 2.

Option 4 lets you look at an area of words. Choose this option, and you'll be prompted for the first letter of the word. Next, you'll have to enter a number from 1 to 4, depending on the word's second letter. The ranges will be listed so you can easily decide which range is correct. When the listing starts, you can freeze it by holding down the space bar. It restarts when you release it.

If you have a SpeedCheck dictionary, use option 5 to add its words to the SpeedSpell dictionary. It's better to do this before you put any words in your SpeedSpell dictionary because SUP won't check for duplicate words while adding the SpeedCheck listing. You'll be prompted as to which disks to place into the drive.

Use option 6 when you wish to exit SUP.

SpeedSpell

Once you have a working dictionary, use SpeedSpell to check the spelling of your SpeedScript documents. Load and run SpeedSpell as you would a BA-SIC program. When the menu appears, choose the L option to load a SpeedScript document for checking.

After your file loads, SpeedSpell races through the document, setting flags to determine which words will be searched for in the dictionary. Speed-Spell uses a specially formatted dictionary disk so that it can rapidly find certain words. After SpeedSpell has set its flags, it'll prompt you to insert the dictionary disk in drive 8 and press the space bar. SpeedSpell checks for the SS ID to be sure that it's a dictionary disk. Be sure that the other disks you use have a different ID.

Next, SpeedSpell starts loading certain sectors from the disk and checking the document for the words found in those sectors. SpeedSpell only checks words more than four characters long. This process can take several minutes if the dictionary is large. The dictionary can store 24 disk blocks of words for each letter of the alphabet. After the document has been checked. you can start editing words. Use the G option to get the first misspelled word. If no words are found, SpeedSpell responds with an End of file! bar and the Inst/Del key to correct the spelling. This is a good time to have a paper dictionary handy. Press Return to place the corrected word in the document.

If a word is correct but not in your dictionary or if the word has been edited. you can add the word to the dictionary by selecting the P option. SpeedSpell checks the dictionary automatically for the word before it enters it. It will not save duplicate words.

Function key f7 can be used to recall the last misspelled word. It will recall the word even if it has been edited and entered into the dictionary.

Finally, when the last word has been fixed, select the S option to save the file to disk. Remember to swap disks. SpeedSpell looks at the ID to be sure that you've removed the dictionary disk.

SpeedSpell marks the misspellings by adding a value of 128 to each char-

acte of you use SpeedScript statore.ca

or stage 2 commands, try not to put them in bunches of more than four. SpeedSpell will mistake them for misspelled words and subtract a value of 128 from them, leaving them as useless letters in the document.

Choose Q to quit SpeedSpell. Be sure to make backup copies of all your important SpeedScript disks, SpeedSpell, SUP, and especially your dictionary.

SUP

G-32

Ø801:0B Ø8 70 17 9E 32 30 96 20 20 00 20 20 0809:37 aa aa 0811:20 20 20 20 20 C4 B9 96 99 F8 00 B9 FD 08 F6 98 Ø819:3C 99 Ø821:99 33 Ø3 88 DØ F1 AØ 4C 88 DØ Al Ø829:B9 ØC 08 99 FF 03 A9 13 85 B6 A 9 D7 85 2D Ø831:F7 D7 4C 60 92 31 Ø839:2E aa al GA 99 99 E8 F9 Ø841:13 10 **B9** 6E C8 DØ F7 EE 92 01 EE 19 0849:07 03 23 A2 0851:05 01 C6 F9 DØ ED 0859:20 34 03 FØ 33 C9 07 DØ 95 Ø3 DØ ØA AØ 20 34 al Ø861:16 A2 69 97 65 Ø869:A2 04 20 34 93 18 0871:10 05 A2 ØA 20 34 03 85 1D 85 A5 FE FB Ø879:A8 A5 A7 85 A 9 85 F8 20 6C 03 73 0881:F7 FF FF A5 FR F7 85 FE 72 Ø889:A5 85 08 21 Ø891:E8 20 34 03 DØ 1E A2 0899:20 34 03 AØ 02 84 A8 85 2A FC 65 A6 85 F7 58 A5 18 Ø8A1:A6 20 6C EF Ø8A9:A5 FD F8 65 A7 85 20 34 03 FB Ø8B1: Ø3 4C 13 01 E8 84 A8 E8 20 36 Ø8B9:DØ 10 AG 93 08 A2 as 20 34 F4 Ø8C1:34 03 FØ ØF 20 34 CF 4C 5C 01 A2 Ø8C9: Ø3 Øl E8 20 AF 4C 5C Ø8D1:03 E6 A7 DØ ØA E8 20 34 Ø3 B2 Ø8D9:34 03 20 37 69 04 A8 DØ D6 E8 08E1:18 20 34 21 02 Ø8E9:34 03 DØ GA A2 Ø8 A2 06 DØ ED A2 Ø8F1: Ø3 18 69 00 85 F7 Ø8F9:20 34 03 DØ E6 A9 FØ ØC 06 FA 2A 37 A4 Ø9Ø1:A7 FB FB CA DØ F2 A8 D8 0909:26 A7 C6 FE FE 85 FA A9 08 0911:60 48 B1 68 A4 FE Da 02 C6 4A 0919:85 FB DØ DE A4 B5 FE CØ E7 0921:FF C6 D8 A9 37 85 BA DØ 07 Ø929:FF Ca A8 FØ 49 0931:01 58 4C an 98 A 4 A5 F7 38 E5 A8 BØ 03 7 F. 0939:22 F7 A5 FC E5 8A 85 Ø941:C6 FR 38 FC 85 B1 3A 02 C6 FD Ø949:A8 BØ F8 C4 42 91 FC 98 DØ Ø951:F7 88 FD C6 76 F7 C6 Ø959:A9 FØ ØA B1 98 78 E.6 Ø961:F8 C6 A9 10 EC 60 08 60 00 ØB aR 73 16 4C 0969:01 30 36 31 E3 41 Ø971:C8 07 9E 32 92 C1 6C 0979:92 99 A9 20 8D B2 D9 08 EF 80 28 03 25 18 0981:8D 20 C7 28 DØ 21 0989:70 AB 20 11 4D CC GA 0991:02 20 FA 25 ØD 20 00 A9 45 AA 38 11 A4 0999:80 1F FØ A8 06 FC CØ 59 Ø3 00 99A1:85 66 Ø9A9:54 B8 1E CØ 3A D3 01 5F

Ø9B1:31 FØ 17 C9 32 FØ 24 C9 7F C9 35 C7 15 67 FØ 27 34 Ø9B9:33 2E C9 36 FØ 35 4C 49 B2 09C1:F0 B9 09C9:AE 90 B7 B8 80 42 C1 BE 99 9 33 09D1:06 GA 77 98 81 42 Ø9D9:A5 70 ac 97 42 A9 92 ac AA Ø9E1:8D BF 09 AE ØE 4C 2D 85 38 BC ac 88 Ø9E9:59 E 2 FC 34 4A DB Ø9F1:EØ 88 ØF 60 34 ØC 4E FO DD Ø9F9:67 C9 59 58 EB 9E 66 05 8E A9 D9 80 58 ØAØ1:80 13 A2 73 44 89 1C C8 71 92 ØAØ9: ØF A7 40 BA ØA11:01 A9 ØF 2B 56 40 94 00 81 00 86 E7 9C 8A F3 ØA19:5A ac BØ ØA21:7A 80 88 05 60 30 CA 86 2B 10 ØA29:02 ØB F6 08 4C E 7 20 14 5F ØA31:9B 03 18 56 30 13 AØ ØA39:67 00 47 DC aa EC C7 87 26 60 E2 FØ 15 A7 12 ØA41:25 21 09 95 80 ØA BD ØA49:AØ FØ 40 aa AB ØA51:68 68 9C 73 aa 22 AØ FE 66 D3 72 07 88 **B4** ØA59:D1 F2 El EC 80 F1 ØA61:80 98 03 68 43 10 98 EØ Fa 5F F4 ØA69:FØ Ø3 D8 El 88 04 BØ 60 20 66 ØD 78 ØA71:71 29 90 B8 4D A7 ØA79:4A an C9 05 ØA81:09 60 AC 03 B9 9E 12 69 35 E4 ØA89:A8 AD 68 C9 99 90 ØB CB 09 15 90 28 ØA91:48 ØF 90 06 ØA99:01 C8 8C 60 FC **B7** C3 A3 E9 8F 80 00 DØ 90 C3 FO ØAA1:A5 ØAA9: Ø3 20 89 ØE 20 9B 01 03 F6 33 ØAB1:3B 2A 02 50 9B El EC A4 ØAB9: ØA 20 FE 8A AØ 02 FØ 42 94 27 A2 FE ØAC1:CE 4C aF 30 13 10 FØ 18 42 ØAC9:A2 1E 80 36 DD CB 76 BØ E8 EC 99 DC 03 1A ØAD1:8A Ca 21 ØAD9:40 40 E. 6 4D 41 CI 1E ØAE1: ØA ØA EE 13 AD C3 20 7C C5 1C ØA C5 10 29 ØAE9:48 02 81 ØF ØD ØAF1:01 60 4C **B3** E.7 EE 80 AD EA 32 C9 8A ØAF9:BF 91 FØ F4 37 ØA Da ER 28 2F AE ØBØ1:C5 72 6E 49 AA 13 4F ØBØ9:38 24 05 FR 82 ØB11: ØA B9 36 03 BØ 99 C8 CC 99 50 45 20 BE F8 74 AØ ØB19:14 04 EC 8E 80 ØB21: ØA AC CØ BØ B9 12 03 ac B4 FD A8 ØB29:06 21 38 76 5A 3F 90 02 C4 ØB31:E6 B5 20 5A ØB39:D4 20 72 9 20 2D E.0 6B ØA 06 B4 ØB41:28 2C ØB E6 06 01 1A 38 A5 FB ED 97 4C D8 ØB49:DØ E9 FC D4 ØB51:34 93 CE 6A 00 E.9 4A 80 9F ØB59: ØD AG 01 40 5D 80 F7 GA 8D ØB61:CØ B2 10 B7 81 C3 ØB69:C4 02 91 40 02 18 C5 F2 03 C9 4A C2 ØA 80 C2 E3 ØB71:45 18 ØD FB A9 78 FD 76 ØB79:00 E9 ØA ØE FØ 5C ØB81:CØ B8 aa 31 06 FØ ØB 93 CO 07 03 C4 57 ØB89:58 19 40 F9 81 E 7 B8 ØB91:20 AE 58 42 21 02 2E 03 ØB99:A2 EB C6 45 64 FØ B2 ØF 18 2D BF 41 ØBA1:40 CD FØ 03 20 F5 ØBA9:A2 DØ EC 90 94 86 5E D6 02 19 67 ØBB1:F6 ØB 4D A9 AA El 03 CC ØBB9:05 84 DØ 08 28 91 FI 4C ØE ØBC1:30 10 18 1A 96 ØBC9:3E 47 ED FØ **B4** 2F FF 96 78 40 42 71 Ø2 FB 6C ØBD1:F1 58 15 81 ØBD9: ØC C9 30 DØ 09 4C BB

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1211:B1 71 A9
               1D
                   20
                       D2
                          FF
                              E8
                                A6
1219:EC
        16
            5C
                DØ
                   ED
                       AC
                          CI
                              10
                                 87
            ØC
                EC
                   29
                       FØ
                          04
                              90
                                 47
1221:20 EF
1229:5B BØ 1A
                EE
                   ØC
                       B9
                          35
                              Ø3 ØE
                                 95
1231:91 34
            DA
                68
                   CC
                       F2
                          AD
                              FA
                                 13
1239:C9 Ø1 FØ
                77
                   43
                       CD
                          92
                             A5
            7E
               A5
                       08
                          C8
                              48
                                64
1241:FD 8F
                   FE
1249:80 88
            04
                A8
                   CA
                       Ø1
                          CD
                              6A
                                 3B
                       47
                             DØ
                                 82
1251:56 DØ
            FO
               E8
                   CD
                          52
1259:E9 20 F8
               DØ
                   07
                       AC
                          CE C4
                                 F3
1261:A7 C2 B1
                FD
                   99
                       87
                          04
                             C8
                                 DB
                   4C
1269:CØ 18
            DØ
               F6
                       DB
                          13
                             AØ
                                 16
                             BE 96
1271:01 AD BD
               AB
                   13
                       FB
                          AD
1279:02 85
            FC
                88
                   B1
                       FR
                          C8
                              91
                                 C8
1281:FB 20
            D8
                ØB
                   A5
                       FB
                          C5
                              FD
                                 1E
1289:DØ F1
            A5
                FC
                   C5
                       FE
                          DØ
                             EB CE
1291:20 E6
            ØB
                FØ
                   EG
                       57
                          32
                              94
                                 BC
                                 5F
                   50
                       A2
                              4C
1299: AD CA
            02
                CD
                          Da
12A1:27 14 A9
                00 8D D0
                          02
                             E2
                                 2A
12A9: ØA 20
            11
                13
                   C8
                       CC
                          6A
                              DØ
                                 4D
                   AØ
                       ØB
                8C
                                 87
12B1:F7 AØ
            aa
                          B1
                              30
12B9:C9 20 F0
                   20
                          12
                                 41
                09
                       EC
                              EE
                7E
                   14
                       4C
                          5F
                              12
                                 D4
1201:34 03
            4C
1209:20 65
            DA
                8D
                   91
                       20
                          3E
                              93
                                 24
12D1:96 EØ
                      46
                          20
                             46
            44
                20
                   4F
                                 1E
12D9:81 ØB
            20
                21
                   66
                       BA
                          6E
                              ØØ
                                 92
12E1:C1
         4D
            24
                9A
                   3F
                       20
                          23
                              36
                                 5F
12E9:31 31
                97
                   03
                       58
                          C4
                              31
                                 A7
12F1:36
        32
            55
               31
                   6B
                       BØ
                          55
                              13
                                 57
12F9:00 07
            20
                42
                   2D
                       50
                          20
                             ED
                                 EØ
1301:30 B6 08
                             9A
                                81
               2D
                   55
                       49
            80
                   C9
                       FØ
                          50
                              00
                                 ØF
1309:A8 OF
               50
1311:59 00
            1D
                22
                   49
                       53
                          4B
                             20
                                 F7
1319:1C 68 BC
                ØB
                   20
                              43
1321:45 96
                       73
                          99
                             AC
            93
                   A4
                                 16
                14
1329:FØ 9A
            62
                59
                   20
                       64
                          41
                              4E
                                 B3
1331:49 E1
            87
                50
                       ØE
                          4E
                              39
                                 90
1339:43 00 B1 50
                   59
                       52
                          07
                              93
                                 F1
1341:51 B7
            F1
                63
                   D1
                       D4
                          CD
                              70
                                 60
1349:53
        77
            E1
               20
                   69
                       4E
                          54
                              99
                                 FB
1351:6C 54 40
               15
                   10
                       61
                          2C
                              48
                                 C2
1359:72 49
            47
                48
                   54
                       ED
                          72
                              45
                                 FC
1361:53 45 52 56
                   33 CF
                             ØD
                                 32
1369:93 9A 60 D5
                   94
                       91
                          1E
                             D7
                                 68
1371:EØ 86
            31
                39
                   39
                      32
                          27
                              5F
                                 A3
1379:C3 4F 4D
               50
                   55
                      54
                          ED
                             DØ
                                AC
1381:55 42 4C
               8B EØ 41
                          F2
                              B6
                                 CD
1389:0D 9A 91 E7 03
                      00
                          F5
                              2D
```

```
1391:0D 1C 13 20 20 A8 AC 2F D5
1399:3C 12 CF
               9A
                  14
                      78
                         A4
                             C2
                                D2
13A1:40 CD 42 4E 55 E4
13A9:CC E7 24 CC 4F
                      41
                         2F
                            9
                                68
13B1:4E E3 43 52
                   49
                      50
                         F4
                             C4
                            12
                                F5
                         54
13B9:4F
        43
            55
               4D
                  45
                      4E
            E1 D3 C3 91 D3 41
                                6A
13C1:CE 51
13C9:56 27
            06
               17
                   C6
                             45
                                50
                      25
                         19
                             2A
                                AT
13D1:9B
        25
            15
               DØ 3E
13D9:20 C9
            4E 20 C4
                      49
                         43 54
                                74
                   52
                      59
                             73
                                B9
            4E
               41
13E1:49 4F
13E9:8E ØA
            C5
                1F
                   9E
                      44
                         10
                             9E
                                63
13F1:62 49
            53
                83
                  3E
                      3E C7
                             7C
                                35
13F9:3E C7
            45 B2
                   10
                      D4
                          48
                             45
                                AE
               58 80
                      5F D7
                             88
                                D4
1401:20 CE
            45
                             10
                                FB
1409:18 80
           an
               11 12
                      28 CE
1411:96 D1
            BB
               74
                   20
                      20
                         05
                             58
                                 85
1419:49 54
            20 D3 E1
                      04
                          45
                             44
                                2A
                             C4
                                05
1421:53 50
            45 4C
                   4C ØD 9A
                      ØD
                          2F
                             89
                                 45
1429:4D ØB 94
                27
                   20
1431:13
         8F
            84
                ØA
                   OF
                      82
                          80
                             aa
                                95
                                CE
1439:2D 2D 2D 9B
                   00 04
                             ØC
                          28
                             2C
                                 49
               10
                   20
                      24
1441:10 14
            18
                   40
                       44
                          48
                             4C
                                 51
1449:30
         34
            38
                3C
1451:50 54
            58
                5C
                   60
                      64
                             83
                                FF
                      92 DA
                             aa
                                43
1459:0F 01
            01
                02
                   02
1461:03 03
            04
                04
                   014
                       ØD
                          05
                             95
                                EF
1469:06 06 06 D0
                   00
                          07
                             08
                                16
                   9
                          ØA
                             ØA
                                60
1471:08 08
            ØD Ø9
                       ØA
                ØB
                   ac
                       ac
                          ac
                             ØD
                                DI
1479:DØ
        00
            ØB
1481:0D 0D 0E
                ØE
                   OF
                      DØ
                                D8
                          11
                             12
                                 21
1489:0F 10 10 10
                   ØD
                      11
                       14
                          14
                             14
                                 FF
1491:12
         12
            13
                13
                   13
1499:15 15
            15
                70
                   1E
                      16
                         16
                             17
                                C7
                                10
                          19
                             19
14A1:17 17
            18
               18
                   18
                      19
14A9:1A
         1A
            1A
                18
                   18
                       18
                          10
                             10
                                 F3
         10
               1D
                   1E
                      1E
                         1E
14B1:1C
            10
                                 68
14B9:1F 1F 20 C0
                  83
                      DF
                          C8
                             F1
                   98
                      C3
                          20
                             23
                                BØ
14C1:68 E8
            Fa
                30
14C9:A1 78 C8 90 88 02
                          Ø8 ØE
                                6D
14D1:01 07 0D 00 06
                       ac
                          12
                             05
                                 67
14D9:0B 11
            04
               ØA
                   10
                       A7
                          23
                             DC
                                 2F
                          04
                             77
                                 10
14E1:51 10
            87
               40
                   93
                      33
                   20
                          42
                             43
                                98
14E9:4F 52
            44
               3F
                       41
            46
                47
                   48
                       49
                          4A
                             4B
                                 12
14F1:44 45
                                1A
14F9:4C 4D
            4E
                4F
                   50
                       51
                          52
                             53
            56
               57
                   58
                       59
                          5A
                             Ø1
                                C8
1501:54
         55
1509:42 84
            17
                09
                   ØF
                       15
                          18
                             28
1511:03 00 00 EA 00
                       aa
                          aa
```

Daniel Lightner is a frequent contributor who seldom misspells words now.

DYNAMIC MEMORY

By Frank Gordon

It's possible to watch the 64 in action by redirecting the interrupt vector at 788 and 789 to a routine that prints selected areas of memory to the screen. Dynamic Memory is such a program, and it does it 60 times per second.

Dynamic Memory displays selected areas of memory at the top of the screen in a nine-line display. Line 1 displays the BA-SIC pointers from 43 to 56. Lines 2 and 3 display the top 80 bytes of the stack.

Lines 4 and 5 display the 80 bytes of the input buffer, and lines 6–9 display the first 160 bytes of BASIC memory.

By examining these, you can see how BASIC pointers change, how the stack operates when you list and run a program, and how line numbers are stored in the stack's last two bytes. You can also see how the input buffer shortens programs by tokenizing keywords and how the screen editor inserts and deletes lines in memory.

Typing It In

Dynamic Memory is written entirely in BASIC. To help avoid typing errors, use The Automatic Proofreader; see "Typing Aids" elsewhere in this section. Be sure to save a copy of the program when you've finished typing it in.

Using Dynamic Memory

Load and run Dynamic Memory as you would any BASIC program, but then enter SYS 900 to activate the screen. Press Clr/Home and cursor down below the memory display. To deactivate, press Run/Stop-Restore.

Screen Codes

The display may appear strange because it consists primarily of screen codes. Text may be easier to comprehend if you switch to upper- and lowercase mode by simultaneously pressing the Commodore key and the Shift key.

On the first line, in the upper left corner, you'll see a line that begins with the letters *ah*. These letters represent the values of memory locations 43 and 44, the BASIC program pointer. Screen codes *a* and *h* equal 1 and 8 in low-byte/high-byte format.

If you place your cursor on a line of code and press Return, the line will appear in the input buffer, which is line 4 on the screen. The original code will appear shortened because it has been tokenized. For example, list line 135 on a clear part of the screen. It should appear as the following.

135 FOR J = 900 TO 969: READK: POKEJ,K :NEXT

Now place your cursor on this line and press Return. The line will appear in the buffer (line 4) as follows.

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aJ2900\$969:g K:W J,K:D@D@:POKEJ.K: NEXT@@@@

The line number 135 is stored in the last two bytes of the stack as @. All 64 tokens are equal to 128 or greater. In the line above, the BASIC keywords are represented as follows.

Token	Value	Screen code
FOR	129	a
=	178	2
TO	164	\$
READ	135	g
POKE	151	W
NEXT	130	b

Modifying Dynamic Memory

You may wish to modify Dynamic Memory to examine other pointers and memory areas. If so, load the program and enter the following changes.

25 REM INDEX INTO BUFFER	AJ
30 DATA 165,11,141,0,4	rh
35 REM LINE NUMBER & ADDRESS	hb
40 DATA 162,5,181,57,157,2,4	FQ
50 DATA 202,16,248	QF
60 REM STACK POINTER	mK
65 DATA 186,142,9,4	HJ
135 FOR J=900 TO 978: READK: POK	EJ,K:
NEXT	

Now when you run the program, the first line shows the values for the input buffer index (11,\$b), the current and previous line numbers and the address of the current BASIC statement (57-62, \$39-\$3E), and the value of the stack pointer. Many variations are possible with this display.

You can see a listing of screen codes in a number of Commodore publications, including Mapping the Commodore 64 and 64C (Appendix G) by Sheldon Leemon from COMPUTE Books. You can also see them by running the following short program.

5 REM PRINT SCREEN CODES 10 FOR X=0T0255 20 POKE 1024+X,X: NEXT 30 PRINT"{3 DOWN}

DYNAMIC MEMORY

MM 5 REM COPYRIGHT 1992 - COMP UTE PUBLICATIONS INTL LTD - ALL RIGHTS RESERVED OS 10 REM - REDIRECT INTERRUPT

		VECTOR TO INSERTED PROG
100		RAM
AH	15	DATA 120,169,145,141,20,
		3,169,3
RX	20	DATA 141,21,3,88,96
HM	25	REM SHOW BASIC POINTERS
1		{SPACE}43-56 ON 1ST LINE
		OF SCREEN
QG	30	DATA 162,13,181,43
EP	40	DATA 157,0,4,202,16,248
SH	70	REM SHOW LAST 80 STACK B
1		YTES ON 2ND & 3RD SCREEN
		LINES
EF	75	DATA 162,79,189,176,1,15
		7,40,4
MM	80	DATA 202,208,247
XK		REM SHOW INPUT BUFFER ON
		4TH & 5TH LINE OF SCREE
		N
FB	90	DATA 162,79,189,0,2,157,
		120,4
НН	95	DATA 202,16,247
CF	100	REM SHOW 1ST 160 BASIC
		{SPACE}PROGRAM BYTES ON
		LINES 6,7,8 & 9 OF SCR
		EEN
MP	105	DATA 162,55,189,1,8,157
		,200,4
EC	110	DATA 202,16,247
PS	115	
		57,0,5
AD		DATA 202,16,247
XA	125	REM BACK TO REGULAR INT
		ERRUPT ROUTINE
	130	
XH	135	
		EJ,K:NEXT

Frank Gordon is the author of Graphos (April 1992). He lives in Orono, Maine.

SCAN 64

By Daniel Lightner

Here's a short utility program that lets you view the entire contents of your 64's memory. It's similar to Dynamic Memory, also published in this section, but it doesn't respond to immediate input.

Entering the Program

Scan 64 is written entirely in machine language. To enter it, use MLX, our machine language entry program; see "Typing Aids" elsewhere in this section. When MLX responds, reply with the following.

Starting address: C000 Ending address: COEF

When you've finished typing in Scan 64, be sure to save a copy to disk before exiting MLX.

Using the Program

Scan 64 is easy to use. Load it with the ,8,1 extension, type NEW, and then press Return. To activate the program, enter SYS 49152. At the top of the screen, Scan 64 displays the range of addresses being displayed, followed by the contents of the first 512 bytes of memory. (Note the ah in bytes 43 and 44, as mentioned in connection with Dynamic Memory.)

To scan forward in memory, press the right cursor key. To scan backward, hold down the Shift key while pressing the same cursor key. To exit

the program, press Return.

You can see the contents of Scan 64 itself, by scanning locations 49152-49663. You can easily spot the words MEMORY LOCATIONS on lines 7 and 8. If you can't, press the Commodore key and the Shift key simultaneously to enter upper- and lowercase mode. If you load other programs before you load Scan 64, you can also see their contents, depending on their starting addresses in memory.

SCAN 64									
C000:A9	00	85	FB	85	FC	AØ	00	28	
C008:A9	9A	20	D2	FF	A9	93	20	24	
C010:D2	FF	B9	D7	CØ	20	D2	FF	DB	
CØ18:C8	CØ	12	DØ	F5	A5	FC	A6	64	
CØ2Ø:FB	20	CD	BD	A9	20	20	D2	1E	
CØ28:FF	A9	2D	20	D2	FF	A9	20	C5	
C030:20	D2	FF	18	A5	FB	69	FF	E7	
CØ38:AA	A5	FC	69	01	20	CD	BD	90	
CØ40:A2	02	20	AF	CØ	20	C9	CØ	6D	
CØ48:18	A5	FD	69	20	85	FD	A5	4E	
CØ50:FE	69	00	85	FE	20	BA	CØ	B2	
CØ58:EØ	10	DØ	E9	A5	FB	48	A5	5A	
C060:FC	48	A2	00	20	AF	CØ	A9	Bl	
CØ68:7C	85	FD	A9	04	85	FE	20	38	
C070:C9	CØ	20	BA	CØ	18	A5	FD	66	
CØ78:69	28	85	FD	A5	FE	69	00	45	
CØ8Ø:85	FE	EØ	10	DØ	E9	68	85	26	
CØ88:FC	68	85	FB	20	E4	FF	C9	71	
CØ90:1D	FØ	09	C9	9D	FØ	08	C9	25	
C098:0D	DØ	F1	60	4C	06	CØ	38	4D	
CØAØ:A5	FB	E9	00	85	FB	A5	FC	95	
CØA8:E9	04	85	FC	4C	06	CØ	A9	46	
CØBØ:DØ	95	FB	A9	C7	95	FC	A2	4B	
CØB8:00	60	18	A5	FB	69	20	85	FA	
CØCØ:FB	A5	FC	69	00	85	FC	E8	D8	
CØC8:60	AØ	00	Bl	FB	91	FD	C8	A8	
CØDØ:CØ	20	DØ	F7	AØ	00	60	20	3A	
CØD8:4D	45	4D	4F	52	59	20	4C	75	
CØEØ: 4F	43	41	54	49	4F	4E	53	BF	
CØE8:20	00	00	00	00	00	00	00	7A	

Daniel Lightner is a frequent contributor who lives in Sidney, Montana.

MINDBOGGLE

By John Cameron

If you want a challenging yet entertaining game that will help you whittle away a few hours, look no further. Mindboggle is just what you've been looking for.

Mindboggle (not to be confused with Mind Boggle, May 1984) is a strategy game for up to four players. Your memory will be pushed to the limit as you search through a game board of almost 200 blocks to locate identical pairs hidden within. As if this wouldn't be hard enough, you must also contend with three other human or computer players, who'll do everything in their power to lower your score while searching for the matches themselves. Special blocks placed randomly throughout the board may be either helpful or harmful to you. If used to your advantage, they may mean the difference between the joy of victory and the agony of defeat.

Getting Started

Mindboggle consists of two programs. The first is written in BASIC. To avoid typing errors, enter it using The Automatic Proofreader; see "Typing Aids" elsewhere in this section. When you've finished typing, be sure to save a copy of the program before exiting Proofreader. The second program is written in machine language and must be typed in using MLX, our machine language entry program; see "Typing Aids" again. Enter the following values when MLX prompts.

Starting address: C800 Ending address: CB77

When you've finished typing, save the program to the same disk as the BA-SIC portion of the game. Save it with the filename BOGGLE.ML before exiting MLX.

Game Options

Load and run the BASIC portion of the game. It automatically loads the machine language routines. Since Mindboggle is a multiplayer game, it plays with one joystick plugged into either port or two joysticks. When the title screen appears, you'll be asked for the number of players. Move either joystick to alter the value, and then press the

fire button. The initial number of players is zero. If this value is selected, all four player positions will be controlled by the computer.

If human players are competing, the game will ask them to type in their names. The final question asked is the skill level. There are eight levels available, ranging from Simple to Difficult. In the easier levels, fewer pairs have to be found, and a larger number of special blocks are scattered throughout the game board. In the difficult levels, the board consists almost entirely of pairs, with only a few special blocks.

Once these options are entered, the game pauses momentarily to randomly place the matching blocks. The length of this pause depends on the skill level chosen. Higher levels require more time to position the increased number of pairs.

Playing the Game

When the game begins, you are presented with a view of 171 blocks, turned so that only their backs are showing. The players' names are arranged below them, with the current player's name highlighted in white. Scores are shown under the names, and the number of pairs remaining to be found is printed at the bottom of the screen. A cursor in the shape of an open rectangle appears at the top of the screen. Its color corresponds to the color in which the current player's score is displayed. This helps in determining whose turn it is.

Move this cursor to a block that you wish to open. Press the fire button to reveal one of five possible designs. When a block is uncovered, the player must then find its twin, located somewhere else on the board. If the second block doesn't match the first, then both are turned back over. If the two match, that player earns 100 points. and both blocks are covered by a marker in that player's color. Among the special blocks found in the game is one that looks like a closed hand. If it's encountered before or after uncovering a patterned block, then all blocks which match that pattern are revealed. This can be advantageous when a pattern has more than one twin, thus earning the player a greater number of points in a single move.

If one player uncovers several hand blocks in a row, play continues until that player locates a different block design. If any succession of hands ends with a happy face block or if this block is revealed upon a player's first move, then that player is awarded 250 bonus points instantly. Stop blocks are rare, and they resemble a stop sign with a diagonal line crossed through it. Come across one of these at any time, and you lose your turn.

Perhaps the most interesting block is the masked thief block. This gray block lets you steal 50 points from any opponent by changing the opponent's colored marker to your own color. If no opponent markers are available, then select a closed block as the target instead. Should a closed block be revealed instead, it will remain open if it's not a pattern block. The game continues until every pair is revealed. This doesn't necessarily mean that every block is opened. There may be some special blocks hidden even after the last set of twins has been located. At this point, the game goes to a special wrap-up screen, where the final scores and statistics are displayed. The winner is the individual with the highest score. If two players have the same score, the winner is the one with the greater number of markers. So try to keep as many blocks as you can. With the game over, hit the fire button to play again. You will be returned to the title screen and given the option to keep the same players for a second game or to change them. Likewise, the skill level may then be altered for a more or less challenging game, depending on your preferences.

Computer Opponents

One of the most attractive features of Mindboggle is the ability to pit your wits against the computer. Though it may sometimes seem like the machine has the advantage, it actually tackles the game much in the same manner that we do. It uses a probability function to calculate its chances of finding a hidden pattern and its match. Like a human being, it's more apt to locate a block that has been revealed several times when there are few blocks remaining. Its memory capability increases, however, at higher skill levels.

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Game Tips

In the higher levels, where special blocks are less frequent, greater emphasis should be placed on memorizing the locations of patterns, especially those that have been revealed numerous times. If you find it necessary to use a pad and pencil to jot down notes, write quickly, for nonmatching patterns don't stay open long.

In the lower levels, the strategy is different. It's often better to search for happy faces than the patterns themselves. Not only do you earn a higher score with them, but you also are protected from having your points stolen. When going against a computer opponent, it's safest to have markers around the middle of the board, rather than the sides. So if you steal a marker, concentrate in the center, as the computer will be less likely to change it back.

MINDBOGGLE

- AP Ø REM COPYRIGHT 1992 COMP UTE PUBLICATIONS INTL LTD - ALL RIGHTS RESERVED
- KF 1 IFA=ØTHENPOKE53265,11:A=1 :LOAD"BOGGLE.ML",8,1
- KM 2 POKE56578,63:POKE56576,19
 6:POKE53272,18:POKE648,19
 6:GOSUB96:POKE788,52
- RA 3 PRINT" {CLR} "CHR\$ (14) CHR\$ (8): POKE53280,0: POKE53281,0: GOSUB112
- PF 4 IFHS>FHTHENFH=HS
- JD 5 PRINT"{HOME}{DOWN}"TAB(11
)"{CYN}HIGH SCORE: {WHT}"
 ;:A\$=STR\$(FH):Z=7:GOSUB20
 4:PRINTC\$
- GJ 6 PRINTTAB(14)"{3 DOWN}

 {BLU}STUVWXYZ+{-}-↑":PRIN

 TTAB(14)"{*}{SHIFT-SPACE}

 {K}{I}{T}{@}{G}{+}{M}{E}

 {Z}{S}"
- FQ 7 PRINTTAB(12)"{3 DOWN}

 {GRN}COPYRIGHT @ 1992":PR

 INTTAB(12)"{DOWN}{YEL}COM

 PUTE MAGAZINE"
- HD 8 PRINTTAB(8)"{3 DOWN}{RED} WRITTEN BY{2 SPACES}JOHN {SPACE}CAMERON{4 DOWN}":P OKE53265,27
- FD 9 IFFH=ØTHEN16
- HF 10 GOSUB205:A\$(0)="YES":A\$(
 1)="NO":YN=0
- XX 11 PRINTLEFT\$ (DW\$, 22) TAB (8)

 "{WHT}USE THE SAME PLAYE
 RS: {CYN}"A\$ (YN)
- MC 12 GOSUB82:A=YN-(JR=8ANDYN< 1)+(JL=4ANDYN>0):IFFB=0T HENYN=A:GOTO15
- SR 13 IFA=YNTHEN12
- PP 14 YN=A:GOTO11

- EB 15 IFYN=ØTHEN32
- GM 16 GOSUB205:PL=0
- HQ 17 PRINTLEFT\$(DW\$,22)TAB(10
) "{WHT}NUMBER OF PLAYERS
 :{CYN}";PL
- KF 18 GOSUB82:P=PL-(JR=8ANDPL<
 4)+(JL=4ANDPL>0):IFFB=0T
- HENPL=P:GOTO21 PD 19 IFP=PLTHEN18
- JC 20 PL=P:GOTO17
- XQ 21 IFPL=@THEN32
- AR 22 FORK=1TOPL:GOSUB205:IN\$=
 "":CT=0
- OS 23 PRINTLEFT\$ (DW\$, 22) TAB (4)

 "{WHT}ENTER NAME OF PLAY
 ER"K"{LEFT}: ";:GOSUB25
- HD 24 PL\$(K) = LEFT\$(IN\$+"
 {7 SPACES}",8):NEXT:GOTO
- BQ 25 PRINT" {CYN} *";
- CG 26 GETAS: IFAS=""THEN26
- KD 27 IFA\$=CHR\$(13)ANDCT>ØTHEN PRINT"{LEFT} ":RETURN
- DK 28 IFA\$=CHR\$(20)ANDCT>0THEN CT=CT-1:IN\$=LEFT\$(IN\$,CT):PRINT"{LEFT}"CHR\$(20); :GOTO25
- PA 29 IF (A\$<"A"ANDA\$<>" ")ORA\$
 >"Z"THEN26
- GE 30 CT=CT+1:IFCT>8THENCT=8:G OTO26
- AQ 31 PRINT"{WHT}{LEFT}"A\$;:IN \$=IN\$+A\$:GOTO25
- BQ 32 GOSUB205:SK=0
- AA 33 PRINTLEFT\$(DW\$,22)TAB(5)
 "{WHT}ENTER SKILL LEVEL:
 {CYN}";SK\$(SK)
- KD 34 GOSUB82:S=SK-(JR=8ANDSK
 7)+(JL=4ANDSK>0):IFFB=0T
 HENSK=S:GOTO37
- DD 35 IFS=SKTHEN34
- AF 36 SK=S:GOTO33
- SJ 37 GOSUB205:PRINTLEFT\$(DW\$, 22)TAB(14)"{CYN}PLEASE {2 SPACES}WAIT"
- DR 38 IFPL<4THENFORK=PL+1TO4:P L\$(K)=CP\$:NEXT
- RE 39 SC(1)=0:SC(2)=0:SC(3)=0: SC(4)=0
- GE 41 LM=15+10*SK:FORK=1TOLM
- PA 42 A=FNRN(18):B=FNRN(8):IFB L\$(A,B)<>""THEN42
- RQ 43 BL\$(A,B)=PC\$(FNRN(3),0)+
 PC\$(FNRN(3),1)+R\$+PC\$(FN
 RN(3),2)+PC\$(FNRN(3),3)
- QB 44 A\$=BL\$(A,B)
- CC 45 C=FNRN(18):D=FNRN(8):IFB L\$(C,D)<>""THEN45
- AA 46 BL\$(C,D)=A\$:MT(C,D,0)=A: MT(C,D,1)=B:MT(A,B,0)=C: MT(A,B,1)=D
- QS 47 MT (A,B,2)=0:MT (C,D,2)=0: NEXT
- FD 48 FORK=@TO18:FORL=@TO8
- PM 49 IFBL\$ (K,L) = ""THENGOSUB51

- :MT (K,L,Ø) =-1:MT (K,L,2) =
- KS 50 NEXT: NEXT: GOTO56
- CM 51 C=FNRN(3)+1:ONCGOSUB52,5 3,54,55:RETURN
- DX 52 BL\$(K,L)=FI\$:RETURN
- MH 53 BL\$(K,L)=HP\$:RETURN
- QQ 54 BL\$(K,L)=SS\$:RETURN
- QE 55 BL\$(K,L)=TH\$:RETURN
- JE 56 PRINT"{CLR}{2}!"B1\$"#";:
 FORK=1TO18:PRINT"\$"SPC(3
 8)"%";:NEXT
- GF 58 PRINT"\$"B2\$"%\$"SPC(38)"%
 &"B1\$"'{HOME}"
- DR 59 FORK=2TO19STEP2:FORL=1TO 19STEP2:PRINTLEFT\$ (DW\$, K) SPC (L) VB\$
- EJ 60 PRINTLEFT\$ (DW\$, K) SPC (38-L) VB\$: NEXT: NEXT: QQ=FRE (0
- PG 61 PRINTLEFT\$(DW\$,23)"
 {RIGHT}";:FORK=1TO4:A\$=S
 TR\$(SC(K))
- GF 62 Z=7:GOSUB204:B\$=" "+C\$+"
 ":PRINTCL\$(K)B\$;:IFK<4T
 HENPRINT"{2 SPACES}";</pre>
- XJ 63 NEXT
- SQ 64 PRINTLEFT\$(DW\$,25)TAB(10
) "{CYN}PAIRS REMAINING:
 {SPACE}{WHT}";
- QB 66 IFLM<1THEN143
- HR 67 CP=CP+1:IFCP>4THENCP=1
- HS 68 GOSUB86:LP=CP
- QP 69 GOSUB87:IFPL\$(CP)=CP\$THE N164
- AR 70 GOSUB82
- MJ 71 DX=OX-(JR=8ANDOX<18)+(JL =4ANDOX>0):CX=DX
- XA 72 DY=CY-(JD=2ANDCY<8)+(JU= lANDCY>0)
- GG 73 GX=GX-(GXAND1):IFDX>14TH ENCX=CX-16:GX=GXOR1
- ENCX=CX-16:GX=GXOR1
 RE 74 OX=DX:CY=DY:IFFB=ØTHENGO
- RE 74 OX=DX:CY=DY:IFFB=0THENG SUB87:GOTO76
- EP 75 GOTO69
- BA 76 A\$=BL\$(OX,CY):IFDI(OX,CY))>ØANDA\$<>FB\$THEN69
- PR 77 B\$="{WHT}":IFA\$=FI\$THENB \$=CL\$(CP)
- PD 78 ZL=-(A\$=FI\$)-2*(A\$=TH\$)-3*(A\$=HP\$)-4*(A\$=SS\$)-5* (A\$=FB\$)
- AH 79 ONSPGOTO116,119
- SE 80 HI=-1:SP=2:GX=GXOR-2*(PX >14):GOTO69
- PQ 81 SP=1:GX=GX-(GXAND2):POKE V+21,GX:GOTO61
- RX 82 JY=15-(PEEK(J)AND15):JU= JYAND1:JD=JYAND2:JL=JYAN D4:JR=JYAND8
- CE 83 FB=PEEK(J) AND16

1	MG	84	IFJU=ØANDJD=ØANDJR=ØANDJ	1
			L=@ANDFB=16THENA=~ (J=563	
			2011/1-562211-1-113-0000	
			20)+(J=56321):J=J+A:GOTO	I
			82	
1	MF	85	RETURN	2
1	FA	86	FORK=0T07: POKE56097+(LP-	1
*	n	00	TORK-DIO7. PORE 300974 (LP-	
			1)*10+K,11:POKE56097+(CP	
			-1)*10+K,1:NEXT:RETURN	7
T	OC	87	Z=-(SP=2):POKEV+40,CL(5)	1
	, ,	01		
			: POKEV+39,CL(CP)	
7	AR	88	POKEV, 28+16*CX: POKEV+16,	5
			GX: POKEV+1,56+16*CY	
		00	THE LINE OF THE CT	4
1	IA	89	IFZ=1ANDOX=PXANDCY=PYTHE	
			NPOKEV+2, PEEK (V): POKEV+3	(
			, PEEK (V+1)	1 65
		oa		E
	SF	90	POKEV+21,1+2*Z:RETURN	
i	JR	91	DI(Q1,Q2) = 5:MT(Q1,Q2,2) =	
			MT (Q1,Q2,2)+.1	-
		00	111 (Q1,Q2,2)+.1	F
1	EB	92	PRINTLEFTS (DWS, Q2*2+2) SP	
			C(Q1*2+1)B\$A\$:BL\$(Q1,Q2)	F
			=A\$:GOSUB202:RETURN	L
		00		
ŀ	ID	93	PRINTLEFT\$ (DW\$, Q2*2+2) SP	K
			C(Q1*2+1) VB\$:DI(Q1,Q2)=0	
			:NS=5:GOSUB200	**
				K
r	M	94	RV=RV-1: RETURN	
0	SP	95	A\$=FB\$:B\$=CL\$(CP):DI(Q1,	G
			Q2) = CP: LM=LM5: GOTO92	
		00		H
P	M	96	DIMBL\$(18,8),DI(18,8),PC	A
			\$(3,3),MT(18,8,2):SO=542	
			72	-
		07		В
K	S	97	DEF FNRN(X) = INT ((PEEK(SO	
			+27)/256)*(X+1))	D
Н	Н	98	DEF FNP(X) = (PEEK(SO+27)/	
		20		P
			256) <x< td=""><td></td></x<>	
D	H	99	R\$="{DOWN}{2 LEFT}":FI\$=	Н
			"()"+R\$+"*+":HP\$="{YEL};	-
				- 3
			<"+R\$+"=>":SS\$="{RED},-"	K
			+R\$+"./":FH=0:HS=0	
R	C	100	FB\$=" "+R\$+"*Q":VB\$="</td <td></td>	
-				72.7
			{BLU}[{7}£{BLU}"+R\$+"]	S
			THS="{8}E{N}"+RS+"	C
			{Q}{D}":CP\$="COMPUTER"	F
D	Н	101		
D	n	INI	B19- :B29- :FORK=1103	D
			8:B1\$=B1\$+CHR\$(34):B2\$=	K
			B2\$+"R":NEXT	В
D	В	102		
14	D	TOZ	THE THOMESTER DOWNS":J	R
			=56320	
S	G	103	FORK=ØTO3:FORL=ØTO3:PC\$	F
			(K,L)=CHR\$(97+4*K+L):NE	
				M
			XTL, K	H
M	Q	104	FORK=@TO2:POKE49152+K,2	В
			55:POKE49155+K,255:NEXT	-
_	-	100		
Q	P	105		
			POKEK, 224: POKEK+1, Ø: POK	Н
			EK+2,7:NEXT	**
.,		100		
X	H	TNP	FORK=0TO2:POKE49206+K,2	R
			55: POKE 49209+K, 255: POKE	
			49212+K,Ø:NEXT	**
		10-		Н
Н	H	107	CL\$(1) = "{GRN}":CL\$(2) = "	
			{CYN}":CL\$(3)="{RED}":C	E
			L\$(4)="{YEL}"	-
-	**	100		
C	н	108	CL(1)=5:CL(2)=3:CL(3)=2	
			:CL(4)=7:CL(5)=12	
S	R	109		C
_	-	-	"VERY EASY{2 SPACES}","	-
			VERY EASY (2 SPACES)","	
			RATHER EASY", "ALMOST EA	

SY", "ALMOST HARD" XS 110 DATA "RATHER HARD", "VERY

		HADDIS CDACES H. HOTERT		110	
		HARD{2 SPACES}","DIFFI CULT{2 SPACES}"	JC	146	FORL=ØTO8:FORK=ØTO18:A=
FG	111	FORK=ØTO7:READSK\$(K):NE			DI (K,L) : IFA>ØANDA<5THEN A(A)=A(A)+1
		XT: RETURN	BM	147	NEXT: NEXT
XP	112	V=53248: POKEV+21, Ø: POKE	KQ	148	FORK=1TO4: PRINT" {DOWN}
		V+16,0:POKEV+2,28:POKEV +3,56			{2 RIGHT}{BLU}"PL\$(K),C
AH	113	POKE51192,0:POKE51193,0	HE	149	L\$(K);:A\$=STR\$(SC(K)) Z=7:GOSUB204:PRINTC\$,:A
****		:CX=Ø:CY=Ø:GX=Ø:CP=Ø:LP	IIL	145	\$=STR\$(A(K)):Z=4:GOSUB2
		=2:SP=1:OX=0			Ø4:PRINTC\$:NEXT
SK	114	FORK=SOTOSO+24:POKEK,Ø:	AF	150	PRINT"{3 DOWN}{2}
		NEXT: RV=0: POKESO+15, 255			{2 RIGHT}!"LEFT\$(B1\$,34
CR	115	:POKESO+18,128 RETURN) "#":FORK=1T03:PRINT" {2 RIGHT}\$"SPC(34)"%":N
		PX=OX:PY=CY:LZ=ZL:IFZL<			EXT
		5THENQ1=OX:Q2=CY:GOSUB9	FK	151	PRINT"{2 RIGHT}&"LEFT\$(
		1			B1\$,34)"'"
FC	117	ONZL+1GOTO80,80,80,118,	KR	152	HS=SC(1):W=1:FORK=2T04:
PR	118	81,69 SC(CP)=SC(CP)+250:GOTO8	1		IFSC(K)>HSTHENHS=SC(K): W=K
2 20	110	1	нк	153	NEXT: PRINTLEFTS (DWS, 20)
KQ	119	IFZL<5THENQ1=OX:Q2=CY:G			TAB (5) "{CYN}THE WINNER:
		OSUB91			";
KC	120	ONZL+1GOTO121,130,133,1	JS	154	FORK=1TO4: IFW=KTHENNEXT
CH	121	35,136,138 ONLZ+1GOTO122,127,125	TC	155	:GOTO157 IFSC(K)=HSTHENA=-K*(A(K
HC	122	IFA\$<>BL\$(PX,PY)THEN125	00	133)>A(W))-W*(A(W)>A(K))-5
		SC (CP) = SC (CP) + 100: Q1 = 0X			* (A(K)=A(W)):W=A
		:Q2=CY:GOSUB95			NEXT
BF	124	Q1=PX:Q2=PY:GOSUB95:GOT	MG	157	IFW=5THENPRINT" {RED}HIG
De	125	081 FORK=1T02500:NEXT			H SCORE IS TIED":GOTO15
		Q1=0X:Q2=CY:GOSUB93:Q1=	DG	158	PRINT"{BLU}PLAYER"W"
	110	PX:Q2=PY:GOSUB93:GOTO81	DG	130	{WHT}"PL\$(W)
HK	127	FORK=ØTO18:FORL=ØTO8:C\$	AP	159	PRINTLEFTS (DWS, 24) TAB (8
	100	=A\$	1913)"{YEL}PRESS FIRE TO PL
KM	128	IFAS=BL\$(K,L)THENQ1=K:Q	75.3	100	AY AGAIN"
		2=L:GOSUB95:SC(CP)=SC(C P)+50:A\$=C\$			GOSUB82:IFFB=ØTHEN3 GOTO160
SH	129	NEXTL, K: GOTO81			MX=FNRN(18):MY=FNRN(8):
CC	130	ONLZ+1GOTO132,80			GOTO170
FS	131	GOTO81	QK	163	NX=FNRN(18):NY=FNRN(8):
DC	132	A\$=BL\$(PX,PY):GOTO127 IFLZ=ØTHEN125	7211	164	GOTO175
		GOTO81			ONSPGOTO165,174 IFHI>-1THEN197
		ONLZ+1GOTO125,118:GOTO8			IFMT (MX, MY, Ø) =-landbls(
		1			MX,MY) <>SS\$THEN195
		IFLZ=ØTHEN125	XF	167	MX=0:MY=0:FORL=0TO8:FOR
		GOTO81 IFLZ<>2THEN80	an.	100	K=ØTO18:A=FNRN(4)
		A=PEEK (55337+OX*2+ (CY*2	SP	168	IFMT (K,L,2)>HIANDDI (K,L)=ØAND (A=ØORRV>160) THEN
)*40)AND15:IFA=CL(CP)TH			MX=K:MY=L
		EN8Ø			NEXT: NEXT
HA	140	LM=LM+.5:Q1=OX:Q2=CY:G0	AX	170	A=FNRN(1):NX=MT(MX,MY,Ø
RF	1/1	SUB95:SC(CP)=SC(CP)+5Ø FORK=1TO4:IFA=CL(K)THEN):NY=MT (MX, MY, 1):HI=MT (
KE	141	B=K:K=5	YB	171	MX,MY,2) IFMT (MX,MY,0)>-lTHENIFN
HR	142	NEXT: SC (B) = SC (B) -50: GOT	11.10	111	OTFNP (MT (NX, NY, 2) +SK*.Ø
0.5		081			02+RV*.001)ANDA=0THEN16
ES	143	POKEV+21, Ø: PRINT" {CLR}			2
		{2 DOWN}{WHT}{3 RIGHT}F	DA	172	IFDI (MX, MY) > ØTHEN162
		INAL RESULTS: ": PRINT" {2}{RIGHT}"B2\$			GOTO197 IFHI>-1THEN197
CS	144	PRINT"{4}{2 RIGHT}NAME"			ONLZ+1GOTO176,180,183
		,,"SCORE","{2 LEFT}BLOC	XF	176	IFNX=-1THEN163
		KS WON {DOWN}"	SQ	177	IFFNRN(9)=ØTHEN193
XD	145	$A(1) = \emptyset : A(2) = \emptyset : A(3) = \emptyset : A($	QP	178	IFMT (NX, NY, Ø) >-lTHENIFN

4)=0

QP 178 IFMT (NX, NY, Ø) >-1THENIFN

OTFNP (MT (NX, NY, 2) +SK*.Ø © www.commodore.ca

```
02+RV*.001) ANDRV<170THE
                                                             77 3E ØØ 83
                                      C878:3E 77
                                                   77
                                                      77
                                                          77
                                                              70
                                                                 70
                                                                     00
                                                                        2C
                                                          70
        N163
                                      C880:7E
                                               77
                                                   77
                                                       7 E
                                                                    00
                                                                        A9
                                      C888:3E
                                                77
                                                   77
                                                       77
                                                          77
                                                              7E
                                                                 3B
CE 179 GOTO193
                                                          77
                                                              77
                                                                 77
                                                                     00
                                                                        9E
                                      C890:7E
                                               77
                                                   77
                                                       7E
   180
       IFNX=-1THEN163
                                                          07
                                                              77
                                                                 3E
                                                                     ØØ
                                                                        AB
                                                   70
                                                       3E
                                      C898:3E
                                               77
   181 A=FNRN(2): IFA=ØTHEN163
GF
                                                                 1C
                                                                        C7
                                                                     aa
                                                1C
                                                   1C
                                                       1C
                                                          1C
                                                              10
                                      C8AØ:7F
CD 182 GOTO193
                                                                     00
                                                                        50
                                      C8A8:77
                                                77
                                                   77
                                                       77
                                                          77
                                                              77
                                                                 3E
XF 183 IFNX=-1THEN163
                                                          77
                                                                 08
                                                                     00
                                                                        07
                                                              3E
                                      C8BØ:77
                                                77
                                                   77
                                                       77
   184 A=- (FNRN(2)=0): IFLM=(15
                                                                     aa
                                      C8B8:77
                                                77
                                                       7F
                                                          7F
                                                              77
                                                                 63
                                                                        6P
        +10*SK)THENONA+1GOTO163
                                                              77
                                      C8C0:77
                                                77
                                                   3E
                                                       1C
                                                          3E
                                                                 77
                                                                     aa
                                                                        34
         ,193
                                                                 10
                                                          1C
                                                              1C
                                                                     aa
                                                                        50
                                      C8C8:77
                                                77
                                                   77
                                                       3E
KH 185 NX=-1:FORK=@TO18:FORL=@
                                                77
                                                   ØE
                                                       1C
                                                          38
                                                                  7F
                                                                     aa
                                                                        22
                                       C8DØ: 7F
        TO8: A=PEEK (55337+K*2+(L
                                                                        3A
                                       C8D8:00
                                                7F
                                                   7F
                                                       70
                                                          77
                                                              76
                                                                 76
                                                                     76
        *2) *40) AND15
                                                                     6E
                                                                        6F
                                                              6E
                                                                 6E
                                       C8E0:00 FE FE
                                                       ar.
                                                          EE
PX 186 IFBL$(K,L)=FB$THENGOSUB
                                       C8E8:76
                                                76
                                                   76
                                                       77
                                                           70
                                                              7F
                                                                  7 F
                                                                     aa
                                                                        1A
        190:IFFL=0THENK=19:L=9
                                                       EE
                                                          ØE
                                                              FE
                                                                 FE
                                                                     00
                                                                        7C
                                       CSFØ: 6E
                                                6E
                                                   6E
BX 187 NEXT: NEXT
                                                                     7F
                                                                        CA
                                                          7F
                                                              7 F
                                                                  7F
                                       C8F8:00
                                                7F
                                                   7F
                                                       7F
   188 IFNX=-1THENNX=FNRN(18):
CP
                                                           00
                                                              aa
                                                                 00
                                                                     00
                                                                        93
                                       C900:00
                                                aa
                                                   00
                                                       00
        NY=FNRN(8)
                                                       BF
                                                          BF
                                                              B8
                                                                     BA
                                                                        BA
                                       C908:00 FF
                                                   80
   189 GOTO194
QG
                                                                        A3
                                                                     00
                                       C910:00 FF
                                                   aa
                                                       FF
                                                          FF
                                                              00
                                                                 FF
   190 NX=K:NY=L:FL=0:IFA=CL(C
                                                   01
                                                          FD
                                                              10
                                                                 DD
                                                                     50
                                                                        29
                                       C918:00
                                                FF
                                                       FD
        P) THENFL=1: NX=-1: RETURN
                                       C920:BA BA BA BA BA
                                                                 BA
                                                                     BA
                                                                        B3
KE 191 B=FNRN(1):IFB>ØTHENFL=1
                                                                 5D
                                                                     5D
                                                                        BB
                                                           5D
                                                              5D
                                       C928:5D
                                                5D
                                                   5D
                                                       5D
RD 192 RETURN
                                       C93Ø:BA BB
                                                   B8
                                                       BF
                                                           BF
                                                              80
                                                                 FF
                                                                     aa
                                                                        23
PQ 193 IFDI (NX, NY) > ØTHEN163
                                                          FD
                                                              01
                                                                 FF
                                                                     00
                                                                         69
                                       C938:5D DD
                                                   1D
                                                       FD
JK 194 HI=5:MX=NX:MY=NY:GOTO19
                                                                     89
                                                                        F3
                                       C940:FF 80
                                                   80 86
                                                          B6 B6
                                                                 B6
                                                              81
                                                                  7D
                                                                     8D
                                                                        4F
                                       C948:FF
                                                01
                                                   Cl
                                                       D9
                                                          D9
GH 195 IFLM= (15+10*SK) ANDBL$ (M
                                                           83
                                                              83
                                                                  80
                                                                     FF
                                                                        BØ
                                       C950:9F
                                                9F
                                                   8E
                                                       81
        X,MY) = TH$THEN162
                                                                  01
                                                                     FF
                                                                         CE
                                       C958:ED F9
                                                   Fl
                                                       81
                                                           Cl
                                                              Cl
GC 196 GOTO170
                                                       70
                                                           E3
                                                              C7
                                                                  CF
                                                                     CE
                                                                         FD
                                       C960:0F
                                                1F
                                                    38
   197 JU=- (MY<CY): JD=-2* (MY>C
                                       C968:FØ F8
                                                   1C
                                                       ØE
                                                          C7
                                                              83
                                                                 13
                                                                     33
                                                                        BC
BS
        Y): JR=-8*(MX>OX): JL=-4*
                                                           70
                                                              38
                                                                  1F
                                                                         C4
                                       C970:CC
                                                CR
                                                   CI
                                                       E 3
                                                                     FØ
                                                       C7
                                                                         7F
                                                           ØE
                                                              1C
                                                                 F8
         (MX<OX)
                                       C978:73
                                                F3
                                                   E3
EA 198 FB=16: IFOX=MXANDCY=MYTH
                                       C980:3E
                                                77
                                                    77
                                                       77
                                                           77
                                                              77
                                                                  3E
                                                                     ØØ 8D
                                                                     aa
                                                                         DE
                                                                  7 F
                                                           1C
                                                              1C
                                       C988:1C
                                                7C
                                                   10
                                                       10
        ENFB=Ø
                                                           70
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        Ø: NEXT: POKESO+4, 32: RETU
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CAA8:81 C1 E1 F1 F9 FD EF
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CABØ: DF
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CAB8:E7
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CACØ:F8
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CAC8:FE
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CAEØ:E7
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CB20:F9
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CB28:C7
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CB60:72 F2
             26
CB68:01 01 01 01 01 FD FD FD
                                 EA
CB70:F8 CØ CØ CØ CØ FF
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John Cameron lives in Newcastle, New Brunswick, Canada.

TYPING AIDS

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C860:70

C868:63

KODAK DICONIX

The Kodak Diconix 701 inkjet printer-from the people who sell film in those little yellow boxes—might be your answer to one or both of two questions. First, do you need a printer that's as portable as your laptop? The 701 works either from AC or from a battery power pack. Second, do you want laser printer-quality graphics but can't afford a laser? The 701 provides 300 × 300 dpi resolution in a very small package.

Portable enough to take on the road but powerful enough for the office, the 701 is a fully functional letter quality printer. It takes up less space on your desk than a sheet of paper and weighs only 5.9 pounds, including battery. It's 2.4 inches high, 7.68 inches deep, and 11.7 inches wide. A sheet feeder is built in, allowing you to print as many as 30 pages at a time. For portable use, the optional battery is the same as that used by many popular video camcorders.

A Microsoft Windows driver is included for instant compatibility with Windows applications. The popular HP DeskJet Plus and IBM Pro-Printer X24E printers are emulated, which means that most programs can easily use the 701.

Print speeds approach those of laser printers. Up to three pages per minute in draft mode or two pages per minute in quality mode are possible (200 cps in draft, 120 cps in quality mode). Regular plain paper can be used, including letterheads and forms. Ink-jet transparencies can also be printed, enabling you to

make last-minute preparations for presentations on the road. The printhead, a replaceable self-contained ink cartridge, is good for approximately 800 pages in standard-text draft mode.

Several fonts of different sizes are built into the printer. These are Courier at 5-.

and capabilities. The 701 was designed not only to be a full-featured desktop unit but also to be light and small enough (and, with battery power, portable enough) to take into the field.

Kodak's marketing strategy is to offer mobile printers

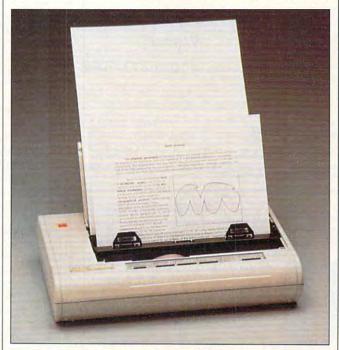
Aldus PhotoStyler. The results were just short of amazing for such a small printer. It really is a viable alternative to laser printers.

The Kodak Diconix 701 gives you AC or battery-powered 300-dpi printing in a powerful little package. RALPH ROBERTS

Kodak Diconix 701-\$549

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Circle Reader Service Number 361



If you need a readily portable ink-jet printer with near laser quality, the Kodak Diconix 701 could be for you.

6-, 10-, and 12-cpi monospaced; HEVTA (Helvetica) at 10-point proportional; Courier at 10- and 20-point proportional; and Gothic at 15-. 16.67-, and 20-cpi monospaced. Also included are hundreds of ASCII characters and symbols, coded graphics, and country-specific characters.

The 701 belongs to a new class of computer hardware that Kodak calls "mobile computing equipment." While mobile equipment has the light weight and small footprint characteristic of portable equipment, it provides greater "horsepower"

as affordable alternatives to other types of desktop printers. The 701 is less expensive and a good deal lighter than most laser printers but prints very close to the same quality. It can also run from batteries, which laser printers can't do.

I installed and tested the 701 with a number of programs and had no problems. Installing the printer driver included for Windows let me (using Adobe Type Manager) print more than 200 fonts to the 701 using Windows 3.1. I also printed a number of 256-shades-ofgray photographs using

WINSPEED 1.03

"Faster than a speeding bullet, able to leap tall . . .

OK, that was Superman. But WinSpeed moves things along pretty rapidly, too, and-unlike the Man of Steel-it does do Windows in Super VGA.

We'll get more objective in a moment, but Win-Speed—the software-only display accelerator from Panacea-was a distinctly pleasant surprise. I had reluctantly accepted that Windows was slow in displaying intensive graphics, such as those in CorelDRAW!. Try blending colors or doing "fountain" fills, and you'll sit with crossed arms for a while as your display grinds out the graphic object. Other Windows applications suffer from this same Januarycold molasses slowness.

Let's put it this way: Speeding up Windows is good. WinSpeed is good.

Speeding up Windows applications is usually done in one of two ways. Hardware upgrades are the more expensive approach. Buying a 486-50 is certainly one solution, as is buying an expensive special video adapter like ATI's 8514 board. More realistic for most of us is a

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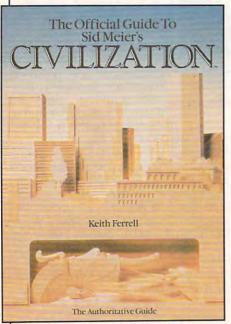
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RFVIFWS

software upgrade.

Panacea claims a two to five times increase in VGA display speeds. I installed WinSpeed on my 386-20 with a Trident TVGA Super VGA display board and found it does indeed deliver within that range. There were no problems during installation using the automated installation procedure, or when I reinstalled manually for this review. One caution: For WinSpeed to install properly, you must start Windows from the WinSpeed subdirectory.

CorelDRAW! and Aldus PhotoStyler were two of my often-used applications that benefited dramatically. Scrolling in all Windows applications now seems around 30 percent or so faster, a very nice increase. WinSpeed achieves its speed by replacing the normal drivers shipped with Windows or with your Super VGA board with special drivers optimized for maximum display speed.

The amount of display-speed increase you get depends on which graphics board is used. WinSpeed is designed to work with a key set of Super VGA boards having specific types of VGA chips. By taking advantage of some little-known features of these VGA chips, WinSpeed gives you additional performance not available directly from the board's manufacturer. This isn't as limited as it sounds-the manual lists 45 boards WinSpeed supports.

Panacea writes approximately 90 percent of the drivers for video cards currently being sold, so the company knows a lot about optimizing display drivers for the major VGA chips. WinSpeed specifically works with Paradise, Tseng ET-4000, ATI, Trident 8800 and 8900, V7, and ZyMOS 51 chips. Normally, the installation program detects the chip you have, but manual installation is also possible for nonstandard boards.

WinSpeed increases display speed for all three of the 256-color VGA modes: 640 × 480, 800 × 600, and 1024 × 768 pixels per screen. It must use one of the 256-color VGA modes of your adapter to achieve its speed, even when displaying 16 colors. So, a card with 256-color capacity is required.

For my system, WinSpeed was a welcome and productive enhancement. RALPH ROBERTS

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Circle Reader Service Number 242

DFI 486/33

When I first powered up the DFI 486/ 33 with local bus video, my thoughts immediately turned to a line from a classic song by the Who: "I don't wanna cause no fuss, but can I buy your magic bus?"

The DFI 486/33 is one of the first relatively low-cost PC clones to feature local bus video. The computer's Super VGA graphics subsystem is directly addressed by the 486DX microprocessor, which gives you graphics performance three times faster than that of typical 16-bit Super VGA cards. Display data doesn't have to pass through the slow

16-bit ISA bus slots found on traditional PCs, but it can instead be sent directly to the chip set 32 bits at a time, at a speed much higher than the 8 MHz of the typical PC expansion bus.

Local bus is the second big innovation to hit PC video within the last year or so; the first was the Windows accelerator card. Windows accelerators may actually give you more speed than a local bus VGA setup-but only while you're running Windows. These cards have custom processors designed specifically for speeding up Windows and a few other applications, such as AutoCAD. But if you're not running Windows, your graphics performance with one of these cards will normally be no better than with a vanilla VGA card. Local bus, on the other hand, speeds up all screen operations. If you don't live in Windows and want top performance for DOS-based graphics applications or game software, local bus is the way

One important concern with local bus video is that it doesn't use ISA expansion slots. Early local bus implementations used custom, nonstandard slots or put the video circuitry on the computer's motherboard. In mid June. however, the VESA committee defined a standard for future local bus implementations.

DFI's local bus implementation predates the VESA standard. It's a unique hybrid of the custom slot and motherboard setups. Both the 486DX processor and the video setup are on a custom card with two connectors. One connector plugs into an ISA AT slot, while the other plugs into a custom slot that's in-line with the AT slot. The processor and its support circuitry are on the custom card, but the system's main memory and cache RAM are on the processorless motherboard, which DFI calls a station board. Putting the processor on a card makes processor upgrades literally a snap. The station board can hold up to 48MB of RAM. and an additional 16MB can be added using a 32-bit memory card.

The system I tested was configured with a 486DX running at 33 MHz (386DX and 486SX configurations are also available), 4MB of memory, 256K of processor cache memory, a crystalclear 1024 × 768 noninterlaced Super VGA monitor, a 200MB Maxtor IDE hard drive, and 31/2-inch and 51/4-inch floppy drives. The station board has eight expansion slots, six of which are available. One slot is occupied by the processor/video card, while another holds a DFI All-in-One expansion card, which includes floppy and IDE hard drive controllers, two serial ports, a parallel printer port, and a game port. Ribbon cables extend from this board to the COM2 and game port connectors, which block an adjoining slot. If you need to fill all six open slots in the computer, you'll have to sacrifice the use of these two ports.

The system case is fairly plain, but not bad-looking. Reset, Turbo, and Power buttons adorn the left front. These buttons are flush with the front of the unit and must be pressed in fairly far; it's unlikely you'll accidentally reset or turn off the machine. With both floppies installed, there's still a spare 51/4-inch drive bay, suitable for a tape backup or CD-ROM drive.

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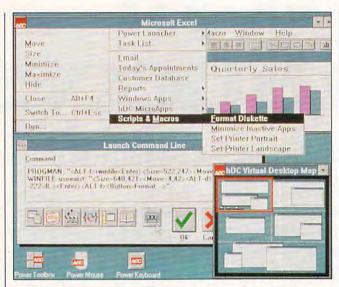
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three-button serial mouse is Microsoft and Mouse Systems compatible, and it has a quality feel. The only really weak link in the system is the keyboard. DFI uses a Key Tronic enhanced AT keyboard, but it must be Key Tronic's bottom-of-the-line model. The keyboard is very light, and the keys feel very mushy. I'll admit, however, it's one of the quietest keyboards I've ever used. and I did eventually adjust to the keys' lack of positive feedback.

Of course, if you're purchasing a 486, performance is probably a big concern. With its speedy processor, 256K of ultrafast cache RAM, and local bus video system, I never spent any time waiting for the computer. Word processor macros that take five or six seconds to execute on the 386SX/16 I normally use were practically instant on the DFI. Windows screen updates were incredibly quick; even running in 256-color 800 × 600 mode. Word for Windows scrolled through documents with no stuttering at all. Graphics-intensive games such as Aces of the Pacific run silky smooth. The Tseng ET4000-based graphics subsystem includes 1MB of RAM and supports resolutions up to 1024 x 768 in 256 colors.

The system's documentation is great from a hardware-configuration standpoint, but it never pretends to be a tutorial on how to use the machine. You'll have no trouble setting up the system or adding peripherals to it, but if you're new to MS-DOS computing, plan on buying a good PC tutorial book with the system.

The DFI 486/33 is a real gem. Although the configuration I tested retails for



Windows power users will be pleased to learn that hDC Power Launcher lives up to its billing as "the Toolbar for Windows."

\$2,495, DFI says the actual street price is likely to be 25–30 percent lower than that. Of course, after using a system with performance like this, I'm hooked. To paraphrase the Who, "I don't care how much I pay, I wanna drive my [local] bus with you everyday."

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HDC POWER LAUNCHER

Windows was designed to be infinitely extendible. That's the good news. The bad news is that most of that flexibility hasn't been evident until now. With hDC Power Launcher, however, you get both extendibility and a fresh, unique mixture of utility programs that go far beyond what the modest name implies. The company calls Power Launcher "the Toolbar for Windows," and it is that, allowing you to add a single master toolbar visible in all Windows applications, as well as a custom toolbar for each program.

Included with the product are several related utilities, which the company calls MicroApps: a keyboard macro program that goes far bevond Macro Recorder, a mouse macro program, and Power Toolbox, which lets you create toolboxes. Several other utilities are included: my favorite is Virtual Desktop, which lets your screen stand in for a much bigger workspace. Power Launcher attaches itself to the System menu, so it's immediately available from all applications with a minimum of keystrokes.

Central to using Power Launcher and any of the MicroApps are what hDC calls Enhanced Commands, which execute whenever you click on an icon in the custom toolbox, launch a keyboard macro, or customize a mouse button. Like

many concepts in a wellcrafted GUI program, Enhanced Commands are easier to use than to explain.

An Enhanced Command can be viewed as an extension of the concept of running a program from Program Manager or File Manager, but it's much more than that. You can trigger keyboard macros, move and resize windows and icons, request input from the user, change an application's window caption, set the starting directory for an application, replace an application's icon, issue DDE commands, call routines from DLLs, run another Power Launcher script, and do any of this at any time as a scheduled event.

It's easy to tame this bewildering array of features, because each of the utilities sports a button called the Command Builder. When you click on it, you're stepped through a visual script-building process that lets you create an Enhanced Command without typing a thing. Left-brained, numbingly conventional traditionalist that I am, I much preferred simply typing a script into the included edit box. but it's a tribute to Power Launcher's infinite flexibility that the two approaches work equally well. Saving a command sequence as a script lets you attach that same script to a macro or toolbox icon or whatever, so you don't duplicate work.

The manuals are excellent—beautifully produced, intuitively organized, well written, and fairly complete. They could use much more extensive indices and examples for advanced scripting topics, especially in the sections on DDE and the use of DLLs. The online help is complete and, like the manual and hDC apps themselves,

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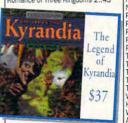
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clearly the product of topnotch talent. The whole package fairly oozes quality.

Is Power Launcher worth the money? Absolutely—if you're a power user or if you're about to become one and are chafing under Windows' self-imposed limitations. This is a state-of-theart set of utilities. If you're new to Windows or use it only occasionally, Power Launcher probably isn't for you. Yet.

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LAPLINK PRO

LapLink Pro is a utility for managing files between computers. Files, directories, and whole directory tree structures may be copied, deleted, moved, and renamed. If you like, you may clone an entire drive.

Data compression is used to increase throughput speeds. Additionally, text files may be viewed and even edited. (LapLink includes a full-screen text editor which may be applied to lo-

cal text files. There's even a largetype mode for laptop displays.) One thing LapLink won't let you do is global management of selected files. Hence, you're restricted to transferring files only from the directory you're in, unless whole subdirectories below the current directory are being passed. Wildcards may be used when doing copies, both for selecting which files to copy and for selecting which files not to use.

The program is remarkably easy to use. Getting it up and running requires almost no thought, and usage will be intuitive to anyone with moderate computer experience and only a little presence of mind. The program works with two computers at a time—called local and remote. The local computer is the one you're typing on; either computer can be used at any time for controlling communications between the two. Communication is established through a serial port, parallel port, or modem connection. A set of connecting cables is supplied with the software.

The program checks each communication port from the moment it's run; if it finds a LapLink connection there, it reports that the remote computer is available. The screen is split into two windows: one for the current directory contents on the local computer, the other for the same on the selected remote computer. An alternative to stepping through each directory by ascending or descending the directory hierarchy from your current level is an interactive tree mode. In tree mode, you may travel along a tree diagram while simulta-



LapLink Pro makes it easy to manage files between two or more computers.

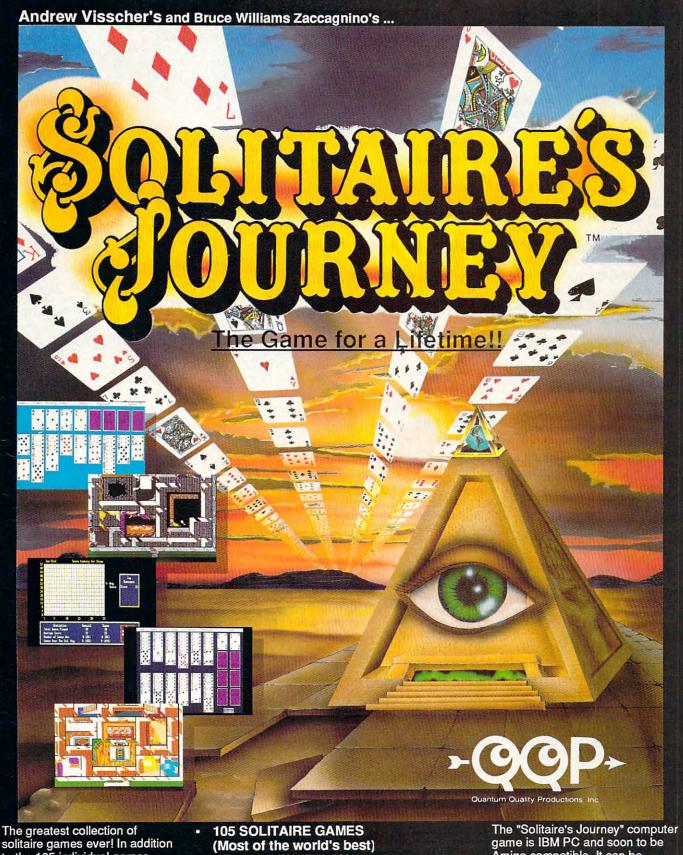
neously looking at a list of files for each directory.

For most file-handling activities, Lap-Link effectively merges the two communicating computers into one computer with two keyboards. Unfortunately, DOS isn't accessible on the remote computer, but (as is commonplace these days) you may drop from the local LapLink into the DOS shell and return again. You can even launch another program and return to LapLink at its conclusion, but this, too, is only available on the local computer.

I tested LapLink Pro on my three primary computers—an 8088-based XT, an 80286-based machine, and an 80386-based AT—with both parallel and serial connections. During this same period I installed on all three a utility for compressing disk drive files to extend storage capacity. Unfortunately, the compression utility created a variety of problems, including mangled system data on the boot partition of the XT hard drive. Fortunately, I'd backed up all of the important XT directory structures to the high-capacity hard drive of my 386 as a practical test of LapLink.

But LapLink was not yet through helping me. Because of that crash, I decided that the best solution to my diskcompressor problems was to restore the drives to normal formatting, a process which involved the recording and safekeeping of dozens of directory structures and a few hundred megabytes worth of files-something which would have been incredibly tedious and time-consuming before LapLink. Going through a process somewhat similar to a high-tech version of Tower of Hanoi, shuttling directories back and forth between the three computers, I had all three hard drives formatted and restored in a reasonable amount of time-and almost without tedium. Lap-

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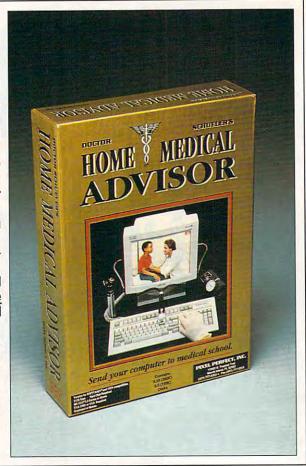
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Link turned a potential crisis into an interesting afternoon's work.

My three computers are hooked together at their parallel and serial ports. Occasionally, I'm also linked by modem to another computer running LapLink. In theory, then, one might consider having a collection of computers communicating freely with one another. If computer A is linked to computer B and computer B is linked to computer C, then not only can B communicate with both A and C, but A should be able to gateway through B to get to C and vice versa. This principle can be daisychained to link as many computers as you like, each having access to any other. In practice, however, only the first case—that of B communicating with both A and C (though not at the same time)—is possible with the current version of LapLink. (Traveling Software recently announced a new "corporate 10-pack" for linking multiple computers.)

Business travelers trying to keep up-to-date records are well served by LapLink Pro. In the first place, connecting with another computer over the phone can be as easy as running LapLink on the other computer and calling it through LapLink on your own. No hassles-direct and straightforward. One very useful feature of LapLink is that it will synchronize directories for you. This means that it will update the files in the selected directories of both the local and remote machines so the selected directories match.

File selections for copying depend on what filenames aren't duplicated and, if some are, what the most recent file is. Hence, you can easily ensure that your laptop drive is in agreement with your desktop. Changes made on both computers are filed with a minimum of trouble. Another neat feature is the one for copying existing files only.

That means that if there are only specific files you need to copy, files which already exist in the selected directory of the receiving computer, then only those files will be copied and no otherseven if every file in the source directory is highlighted. For example, if your receiving computer is a spacelimited laptop which only needs an update of certain specific records and not a whole database of files, this selection will filter out the unneeded files and transfer only those required.

One additional feature is quite handy. LapLink Pro provides built-in support for the Xircom parallel port multiplexer, so LapLink and your printer can share the same parallel port.

It doesn't take long to discover that if you work with more than one computer, LapLink Pro is an indispensable utility. It's fast, reliable, and extremely easy to use. I highly recommend it.

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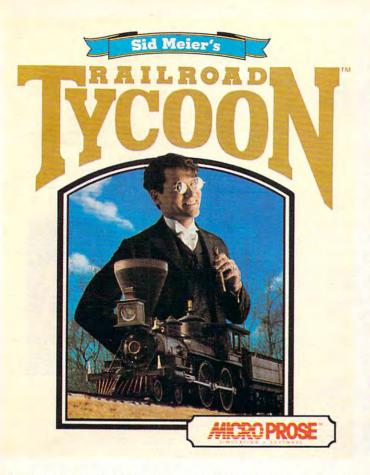
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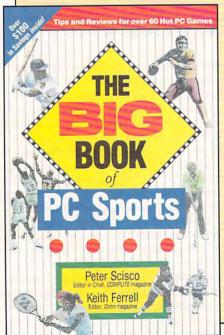
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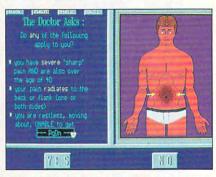
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man of the Department of Emergency Medicine at Holmes Regional Medical Center in Melbourne, Florida.

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and can help you localize exactly where it hurts.

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The Poison file spotlights more than 500 common household substances and products and tells you what to do if ingestion of any of them occurs. The Test file covers more than 125 of the most frequently performed medical tests and is a great way for you to become an informed patient before undergoing any medical testing. Information from any of the files can be outputted to dot-matrix or HP LaserJet printers.

A seventh file, a Referral file, is available upon registration of your software; it provides a listing of board-certified specialists in your state, making it easier for you to choose a doctor.

Home Medical Advisor is a great crowd pleaser; it leaves you wanting more. Adding some capability for the user to enter personal medical history, such as the last time you had a tetanus shot, would be a real help. The manual includes a glossary and instructions for basic procedures such as taking a temperature, but these deserve a spot in the program.

In addition, I found myself wishing for illustrations in the Disease and Injury files. The graphics are well done, but too often illustration opportunities are wasted on mere head shots of fictitious

physicians.

If you have a monochrome VGA monitor, you'll have trouble distinguishing between text and important special references called hot keys, which are programmed to appear in red. If Alt-X, which according to the documentation gives you access to the Drug file, doesn't work in your copy, try Alt-R, which retrieved the Drug file in my review copy of the program.

The greatest disappointment in Home Medical Advisor was the number of grammatical errors, punctuation problems, and typos in both the software and the documentation. Let's hope the good doctor asks a professional writer to diagnose these easily fixed problems in future updates.

If the intent of Home Medical Advisor is to educate and nurture patients, then it certainly succeeds. Its most powerful feature is cross-referencing. Every entry is littered with hot keys, which when clicked on lead you through catacombs of related information. You can journey tirelessly through—and even become addicted to—all the data included in Home Medical Advisor.

Dr. Schueler's Home Medical Advisor 2.0 is just what the doctor ordered, for everyone from new mothers and fathers to the parents of young athletes to elderly users facing increasing health problems.

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IMAGE COMMUNICATIONS TWINCOM 96/42i

In a crowded field of modems, it's hard to be distinctive. But that's just what this internal 9600 bps modem does—stand out in the crowd. Besides having fast transfer speeds, it implements the newest error-correcting and data-compression techniques. And a unique system of speed buffering allows data to be exchanged between the modem and computer at speeds of up to 38,400 bps.

Installing the card was easy. Step-by-step instructions made installation almost foolproof. I was a bit surprised that the default COM port setting was COM4, since most modems use COM2. Don't worry, though: Setting the port is as easy as flipping several switches as indicated by a chart in the manual. Another surprise was finding there wasn't any telecommunication software included, although that helps keep the price down.

Two different error-correction methods are available. You don't have to worry about either one. When modems connect, they determine and establish the best technique for the circumstances. For those interested in the technical details or for the rest of you, who want to know what to ask the salesman in the store, LAP-M and MNP-4 are the two types of error-correcting methods included. Both of these dramatically reduce the possibility that line noise or other interference will corrupt the flow of information.

Another new technology

that's built in is data compression. You don't have to know anything about it; the modems figure out what to do when they first connect. The V.42bis flavor of compression can quadruple data throughput when transferring compressible data. The MNP-5 variety can double the data throughput. All of this means that you'll send and receive information at a much faster rate.

The faster rate of data transfer poses a new problem. Since the modem is sending at a rate of 9600 bps over the phone line while compressing the data, it needs data from the computer at a faster rate than 9600 bps. Why? Remember that compression can usually at least double the data throughput. If the modem is using compression and communicating at a rate of 9600 bps, then, with the doubled throughput, it's sending at an effective rate of 19,200 bps. That means it needs information from the computer at the rate of 19,200 bps. In the best situations, with V.42bis compression, it's sending at an effective rate of 38,400 bps and needs information from the computer at that rate.

The folks at Image Communications engineered the perfect solution in what they call speed buffering. Regardless of the over-the-phone communication rate, the baud rate of the computer can be set to 38,400 bps. Two internal buffers on the modem card manage the overflows and underflows of data. That way, under the best of circumstances, you can get an effective communication of 38,400 bps. At that rate I can send my entire Windows subdirectory (about 12MB) in about 42 minutes. That's incredible!

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If you use your computer to perform business or scientific calculations, Digi-Corp's Q.E.D. may be just the program for you. This package turns your computer into a powerful programmable calculator, chock-full of scientific, statistical, and financial functions. Q.E.D.'s wealth of features and ease of use put to rest the question, Why not use a pocket calculator?

Q.E.D. performs all calculations in double precision, making answers accurate to 16 digits. Some pocket calculators can match this precision in their internal calculations, but, almost invariably, they must round the answer to 8 or 10 digits to fit their abbreviated displays.

The program provides easy manipulation of complex and polar numbers, something very few pocket calculators can claim. For engineers or others performing advanced mathematical calculations, this feature alone may be worth the cost of the program. Engineers may also like to know that Q.E.D. can use either *i* or *j* to denote a complex number's imaginary part.

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This calculator easily achieves its goal of providing users considerable computational power in an easy-to-use package and at a reasonable price.

IBM PC or compatible; 256K RAM (512K recommended for additional modules); CGA, EGA, VGA, MDA, and Hercules; 3½-inch floppy drive or hard drive; supports math coprocessor—\$39.95

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OMAR SHARIF ON BRIDGE

For bridge enthusiasts with some aces to play, there's finally a bridge game that'll help you fine-tune your game while you have a great time. The only thing you'll miss is your partner's frowns when you pass while he's holding all the points, or when you go down because you miscounted the trump.

Omar Sharif on Bridge is so easy to use that I didn't read the manual for several weeks. Pull-down menus and popup dialog boxes make it all happen. The well-designed interface logically groups choices together, and a single mouse click or keypress does everything.

A digitized voice narrates gameplay; it sounds like Omar himself. On my Sound Blaster the voice sounds great. On my computer at work, equipped with only a PC speaker, it sounds so bad I have to turn it off.

Beyond the cosmetics is the real bridge engine—bidding and card playing. In both areas the program performed well. If I could be as consistent, my game would improve dramatically. Bidding followed all of the standard conventions. None were mentioned in the manual, and you couldn't pick the ones you wanted to observe. But it dutifully responded to my 4 No Trump bid by going into Blackwood. Weak 2 bids and takeout doubles were also part of its standard arsenal.

I did note several oddities that made the bidding uncannily human. Here's an example: I was dealt a hand with nine spades (missing only the ace at the top) and some other points. Needless to say, I wanted to get the bid, but so did West. He outbid me and ended up at seven hearts. I had at least one loser and prudently stopped at six

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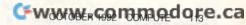
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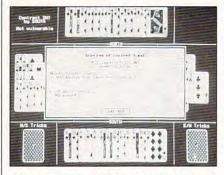
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REVIEWS

spades. He should have known he had at least one loser, too. At the first opportunity I played my ace of diamonds, took the trick, and probably created some new silicon-based curse words in the process.



Hone your bridge game at home on your computer with Omar Sharif on Bridge.

If the programmers wanted a perfectly playing bidding routine, they didn't quite make it. If they wanted to simulate human play, they got pretty close. I can't count the number of times I've faced an opponent who was determined to take the bid, no matter what.

The card-playing half of the game regularly took advantage of my mistakes. It never made mistakes and remembered every card. It took my best effort to keep up. If you're practicing the card-playing portion of your game, this'll give you a real workout. It's a good way to do your calisthenics before you get to the table and risk the ire of your partner.

Here, too, I noted some oddities. I think it's fair to say even to this day that academics are sorting out the issues of artificial intelligence. It's difficult, to say the least, to get a computer to really think. While the game played remarkably well, some insight and intuition on its part would have helped.

On one hand in which I took the bid, I got a hint for each move. I wanted to understand how the computer was thinking. It was the dummy's lead, and I was eying a possible finesse that needed to lead from the dummy. The computer advised me to play a low card from the dummy instead of taking it with a high card. The advice box told me that this was so I could lead from my hand. On the very next play it told me to lead a low card from my hand so the dummy could take the trick and gain the lead. I could have taken either trick from the dummy or my hand. It then made the finesse I wanted to try. I had to scratch my head over this. Even though the net effect was the same, it was a rather illogical way of do-

If you're serious about bridge and have trouble rounding up three other people to play, or if you want to practice so you can win more matches, this is a great benefit. You can play anytime you want. You'll face a reasonably good opponent, and you can get advice and learn more about the game. And best of all, you won't get any frowns after a bad play.

RICHARD C. LEINECKER

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Of course, all of the more analytic features are here—constellation lines, coordinate lines, object labels, local and celestial coordinates, tracking, and encyclopedic information. You can search for stars, constellations, Messier and NGC objects, and even user-defined objects! If you're trying to learn your way around the starscape, a flash card option paints an unlabeled patch of random sky for you.

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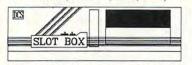
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Mike Smithwick's. He originally wrote it for the Commodore Amiga during, he notes, "five years of parttime work." The Amiga version was received with wide popular acclaim. Now ported to the IBM PC, Distant Suns has all of the Amiga features and more; its praises continue to be sung. The manual itself, also written by Smithwick, is very well done, serving both to guide the user in the operation of Distant Suns and to provide a fine introduction to astronomy; an appendix even explains varieties of telescopes, so that a reader unfamiliar with these devices can make an informed purchase.

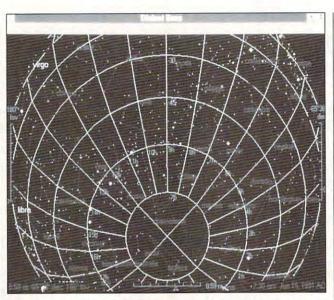
Here's my only complaint: The program must be run under Windows-an operating system for which I prefer not to pay the storage overhead. To have been given the option of a stand-alone would have been nice. But that's my only serious complaint, and a subjective one at that. It's for Distant Suns almost exclusively that Windows remains on my hard drive. So consider that to be more praise for Smithwick.

Distant Suns works best in VGA graphics mode. A fast microprocessor makes things like screen updates happen more rapidly. A fast CPU combined with a math coprocessor will make the program hum nicely. Whatever your system configuration, however, count on an extraordinarily pleasant experience. BRUCE M. BOWDEN

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Distant Suns offers a comprehensive tour of the heavens, past and present—as long as you're running Windows.

```
= Sort by Line
Here you have a series of lines, all terminated with a carriage-return.
It might look like:
          Michelle Pfeiffer: Vestminster, CA
          John Gray: Hardin, KY
          Jin Henderson: New York, NY
          Wayne Gretsky: Malibu, CA
          etc ...
Now let's say you wanted to sort these by LAST NAME. Assuming these
lines are already on your screen as Document 1, press:
                for Merge/Sort
   S or 2
                for Sort
                for (Screen) source
                for results to go to the screen as well.
   or a
                for Keus
                for Right Across
                for Right Arrow again to get to "Vord"
to sort by "word" number 2 in the line
                Done with sort criteria
                to Perform the sort
F1-Index FZ-PrevTopic F3-Srch AltF3-Srch@Cursor Tab/ShiftTab to XRefs
```

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PROFESSIONAL HELP FOR WORDPERFECT

Like many people, if I had to choose just one reason for owning a personal computer, word processing would be my immediate first choice. Though discussions

of the merits of the various text editors tend to be more emotional than rational, my own strong preference (and the preference of millions) happens to be WordPerfect.

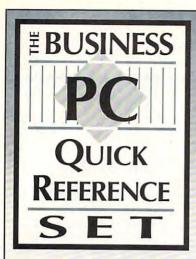
WordPerfect has expanded enormously in scope and power over the years, and the reference manual reflects that growth. More than 1000 pages long, the documentation for WordPerfect 5.1 can make learning about a particular feature an arduous task.

Professional Help for WordPerfect reduces the need to thumb through the manual or workbook. It's a TSR (Terminate and Stay Resident) program, so you can call for help at any time from within WordPerfect. It takes up only 6K of memory but provides access to a half megabyte of information in compressed form.

The Alt-H hot key brings up the Professional Help for WordPerfect Topic Index screen, presenting a list of more than 180 WordPerfect features. You can scroll through the list for the topic of interest or go to it directly by typing enough letters of its name to identify it. With the cursor on the topic, press Enter to bring up a screen of information and instructions. You can use the highlighted cross references contained in the help screens to jump to related information.

For just one example, many WordPerfect users are aware that WordPerfect supports special characters. but how many can claim to know how to access all 1500 of them? To use one of these characters, you must press Ctrl-V and then a two-number designator. Since most users can't remember the code, out comes the manual. With Professional Help for WordPerfect, Alt-H brings up the index screen, typing spe takes you to Special Characters, and pressing Enter brings up a list of the characters and their designators. A few keystrokes replace minutes of page flipping.

Briefly put, whether you're a WordPerfect buff or a professional user, you may well

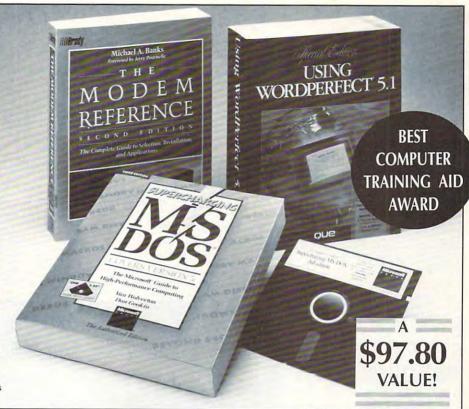


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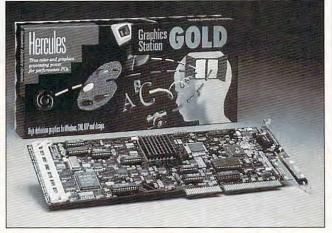
If you're looking for a Windows or GUI accelerator that's also a CAD engine and an animation platform, read on: The Hercules Graphics Station Gold 16 card has it all. And, if that's not enough for you, there's TI-GA compatibility for true photorealistic image display and manipulation, as well as a 32,768-color palette in Windows

Right from the start, I should make it clear that the Graphics Station Gold 16 card in the configuration I received for review has no built-in VGA capabilities; it's meant to be used in conjunction with an existing VGA card that connects via an included ribbon cable. Hercules also offers the Graphics Station Gold 16 card with built-in VGA, as well as other configurations with more advanced features at correspondingly higher prices.

Everything about the Graphics Station Gold 16 card exemplifies the excellence in engineering and manufacturing on which Hercules has built its reputation. The full-length board utilizes the popular Texas Instruments S3 graphics proces-

sor chip with 1MB of video RAM as the standard configuration to deliver razor-sharp images with pure color saturation at refresh rates of up to 75MHz. This ensures comfortable, flicker-free viewing on today's better monitors. This board is a high-end video product that

ed, since the Graphics Station Gold 16's ribbon cable has both types of connectors on it. A supplied 75-ohm terminator plug is then inserted into the 15-pin socket of the existing VGA board, and the monitor cable is connected to the 15-pin D connector of the Her-



Juice up your GUI with Hercules Graphics Station Gold 16, which can dramatically improve your system's graphics.

will serve the most demanding user without a whimper, while maintaining a price point that makes it affordable for just about everyone who's looking to increase the speed of video performance significantly.

A single 15-pin D connector is located on the board's mounting bracket for attaching the monitor's video cable, and installation is a quick and painless procedure that can be accomplished in just a few minutes. Installing the Graphics Station Gold 16 card consists of inserting the card in any available full-length 16bit slot and connecting the ribbon connector cable from the card's pin connector to the "feature" connector of the resident VGA board.

Either pin-type or edgetype VGA board feature connectors can be accommodatcules card. Since there are no jumpers or switch settings to deal with, even a novice can achieve a successful installation. Once you've installed the hardware, all that remains is to load the driver and utility software.

I liked that the Graphics Station Gold 16 worked with my existing VGA card, a Truevision Video VGA with Overlay, but most users will probably want to purchase the version of the Graphics Station Gold 16 that comes with built-in VGA; even with the built-in VGA, you still have the option of bypassing it to use an existing VGA card via the ribbon connector cable. There's plenty of configuration flexibility here

The Graphics Station Gold 16 supports virtually all resolutions, up to and including 1024 × 768 noninter-

laced. Its true-color capabilities are truly spectacular. A rich assortment of drivers is supplied with the card for Windows and AutoDesk programs such as Autodesk 3D Studio, AutoShade, and Animator Pro.

Also included are several utility programs for adjusting monitor performance, changing display resolutions, and adjusting the display parameters interactively via the exclusive Hercules MoniTrac feature, which gives you the best fit for your particular monitor. Once the card has been adjusted to achieve the best possible image from your display, MoniTrac saves the adjustments in a configuration file that loads these settings automatically every time.

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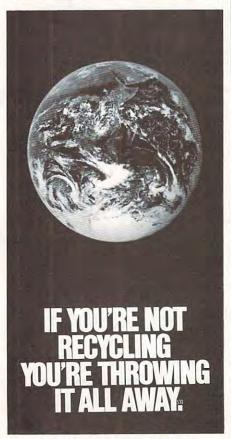
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REVIEWS

could be you, but first you must pass a test using your pattern recognition talents, as well as your logic and decisionmaking skills.

You should also make sure that your cosmic consciousness is up to par (just read up on the constellations). You'll also need to fill out the job application before you can enter Dr.



Parents and children alike will enjoy The Castle of Dr. Brain.

Brain's laboratory.

Parents searching for a game to stimulate their child's mind as well as a game that's fun to play should check this one out. Elementary children may need Mom's or Dad's help with some puzzles. Older kids shouldn't face anything they haven't seen before except maybe the binary conversion puzzle and the sequence in which they program the robot.

This game's not just for kids. Adults can face the challenge, too—if they dare. You won't find any shoot-'em-up action in this one, just pure brain-teasing satisfaction with topnotch digitized sound and animated graphics.

The generic user's manual can be used for all Sierra games. This may confuse some users, since the icons may not be the same for all games. There are also general tips for solving adventure game puzzles. There's a Fantastic Book of Logic Puzzles, as well, which may help with some of the puzzles.

The technical support department is helpful and friendly, but the support number isn't an 800 number. That means you pay the big bucks for the long-distance call.

If you're an adventure-gaming nut like me, you'll love The Castle of Dr. Brain.

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WYSE DECISION 386/40

The Wyse Decision 386/40 is a high-performance machine for desktop power users. It's a system most businesses and individuals who need a powerful, fast system will find satisfactory. Its use of the high-speed 40-MHz Am386DXL microprocessor makes it a desirable computer for people using large complex spreadsheets, databases, and Windows.

The Decision comes standard with a 40-MHz 386 processor, 4MB RAM, one 8-bit and seven 16-bit expansion slots, one parallel and two serial ports, and four mass storage shelves. In addition, the Decision comes with DOS 5.0, as well as setup and utilities disks.

The Decision comes in four standard configurations. Model 1 includes one 5½-inch 1.2MB floppy drive, while Model 3 includes one 3½-inch 1.44MB floppy drive; both Models 1 and 3 also include a hard disk interface and cables so you can install a hard drive. Models 120 and 200 come with one 3½-inch floppy drive and a hard drive—120MB and 200MB respectively. There's also a variety of optional monitors and other enhancements available at additional cost. The model I reviewed was the 200 with an additional 5¼-inch floppy drive.

Once removed from the box, the Decision took just a few minutes to set up. Setup involved simply plugging in the monitor and keyboard. Installing the second floppy drive took me about 30 minutes; someone with more experience could probably finish the job faster. The manual includes easy-to-follow instructions for installing the drive. As with many installation instructions, you'll need to study the diagrams and compare them to the actual hardware before proceeding. But in general you should be able to install your own drive. The slowest part of the process was actually getting the cable connected-it's tough if you don't have long, thin fingers.

Once the drive was installed, it was easy enough to run the setup disk and reconfigure the system to include the new drive. Although I didn't install a second hard drive, the documentation states that any hard drives added will automatically be configured and that the system can boot up and run without a keyboard or video.

If you've never used a 40-MHz 386 computer, you're in for a pleasant surprise. This computer is fast! Installing Windows and other applications seemed less of a chore than with slower systems. The drives run quite efficiently as well.

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Using The Norton Utilities Version 6' System Information, SYSINFO, I got the following benchmark comparative data: The Decision 386/40 MHz ranked at 41.3 for CPU speed, 7.0 for disk speed, and 29.7 overall. For the Compag 386/33 MHz, the numbers were 34.7, 8.4, and 25.9. For the IBM AT 286/8 MHz, 4.4, 2.1, and 3.7. For the IBM XT 88/4.77 MHz, 1.0, 1.0, and 1.0. This data confirmed the hands-on performance I experienced.

I tried several of my favorite applications on the Decision, including Windows and WinWord. As you would expect, these applications installed much more quickly than on slower systems. Windows ran at a respectable speed, and WinWord loaded files nicely. The spelling checker on the usually fast XvWrite word processor moved from word to word instantly. I got the same improved speed with Quattro Pro and other software.

Not only is the Decision very fast, but it's also quiet—the fan is much quieter than with other MS-DOS computers I've used.

It's easy to recommend the Decision. The machine is fast and reliable and comes with a one-year warranty and an optional on-site service warranty for just \$99 a year. The service program includes a toll-free technical assistance number. Windows users will find the standard 4MB of 32-bit memory eminently satisfactory. If you need an additional hard or floppy drive, you'll find installation quick and easy. And, with plenty of extra slots, expanding this system should be no problem. STEPHEN LEVY

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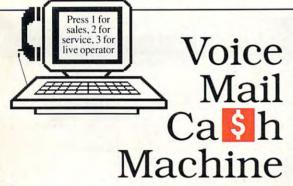
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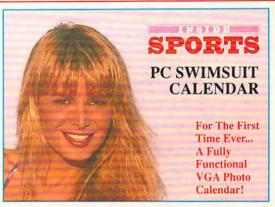
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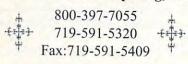


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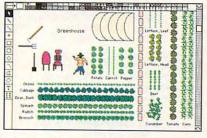


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NEWS BITS

Jill Champion

Helping Rebuild L.A.

Families displaced from their homes following the Los Angeles riots are getting a helping hand from AST Research. The company is donating computer systems to the Rebuild L.A. extragovernmental task force.

AST donated 486-based EISA file servers, which are being used as the data-processing hub of the Rebuild L.A. administrative offices. The company also donated 386-based desktop and notebook systems to L.A. food distribution groups for controlling inventory of food, clothing, and personal-care items, making logging in and tracking down needed supplies much less time-consuming.

Each food distribution center is equipped with a fax/modem for communicating and transferring data between other centers and the Rebuild L.A. offices. Notebook computers are used at remote locations.

AST's effort is part of a technology coalition formed by Rebuild L.A. that includes companies such as Microsoft, Novell, Epson America, and WordPerfect. Orange Countybased software company Dariana orchestrated the effort to get technology donations from the companies involved.

Your Last Computer

How would you like a computer quaranteed to last as long as you will? Hyundai is feeling pretty self-confident about its computer products. In a bold move, the company recently began offering a lifetime warranty-a first for a computer manufacturer-on its current line of 386 and 486 PCs and notebooks. The warranty, which is limited to a product's original user, covers the base system, including the motherboard, and related components such as the video card, floppy drives, and keyboard.

Hello, Operator?

Reach out and . . . press pound now if you want to play telephone tag with a mechanical voice in a tunnel. Hang up and write a letter if you want to contact a person. A recent report by Frost & Sullivan International won't be good news for those who are hoping voice mail is just another fad. In fact, F&S sees an "explosion" in the E-mail/voice-mail industry. The research firm predicts products and services for both electronic mail and voice mail will jump from the current \$2.9 billion to \$10.8 billion by 1996.

We'll look back fondly on those long-forgotten days when telephones were used for human interfacing.

Missing Children

Approximately 9000 missing children are currently listed with the National Center for Missing and Exploited Children (NCMEC) in Arlington, Virginia—and some have been missing for years. Hopefully, the center's new state-of-theart electronic imaging network, which greatly expedites processing and distributing photos of the victims and their abductors, will make it possible for more children to be found quickly.

The Missing and Exploited Children Information Network, developed for NCMEC by Applied Multimedia Technologies of Atlanta, Georgia, and Intellibit of Vienna, Virginia, permits rapid photo and text-record transmission to any Group III fax machine in the world. A photograph is scanned into a computer, where it can be duplicated and distributed within hours.

The system accommodates high-quality photographs of missing children and their abductors in both gray scale and digitized color, and it can "age-progress" images as

well. The images can be easily captured and compressed. Then they can be stored, searched, displayed, and transferred with text case records.

Those using the system access it through low-cost PCs (286, 386, and 486 machines), standard VGA monitors, and regular telephone lines to search and retrieve master records and photos. High-quality halftone grayscale photos can be remotely printed on any compatible Hewlett-Packard LaserJet II printer. What used to take days can now be accomplished in a matter of hours with the new system, says NCMEC spokesperson Julia Cartwright.

NBA Laptops

IBM has gone pro—basket-ball, that is. As of the 1991–1992 season, IBM is the "official computer" of the NBA. But the association between the two organizations goes further than mere sponsorship: IBM has donated PS/2 L40SX laptops to every NBA coaching staff and is in the process of developing software for them, as well.

Computers are just starting to enter the sports arena as part of a technological frontier that will be crucial to teams and athletes of the future who want that "winning edge." As an example of how the laptop could be used, say a team's coach calls a timeout to diagram a play. With the touch of a button, his laptop shows the team the play that's been working best against their opponent all night—one that differs from that of the pregame scouting report. Their "insight" could give them the edge that makes the difference between defeat and victory.

And that's only the beginning. There may be hundreds of applications for this technology yet to be discovered.

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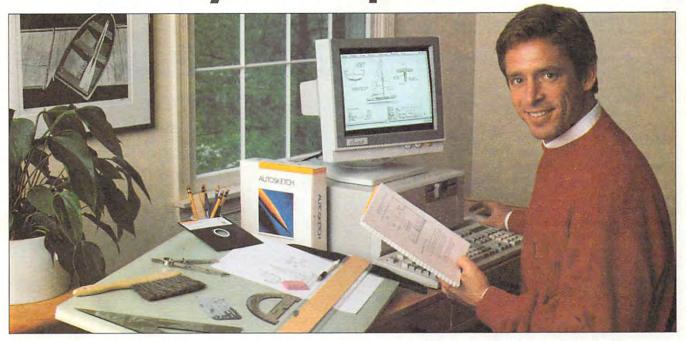
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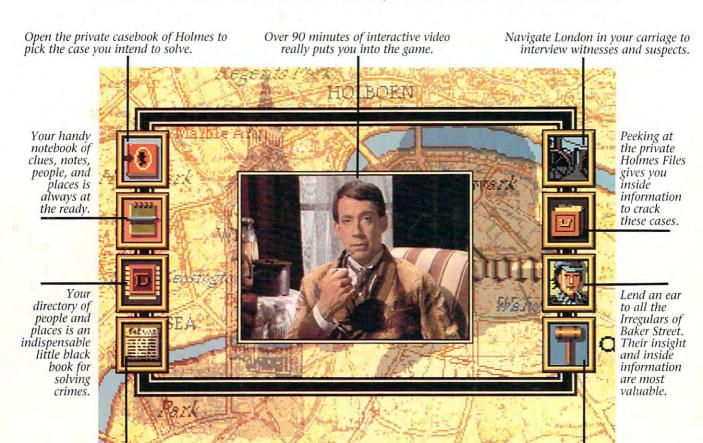
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