A Report From The 1987 Winter Consumer Electronics Show

COMPUTE!

$3.00
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1987
Issue 83
Vol. 9, No. 4
$4.25 Canada
02193
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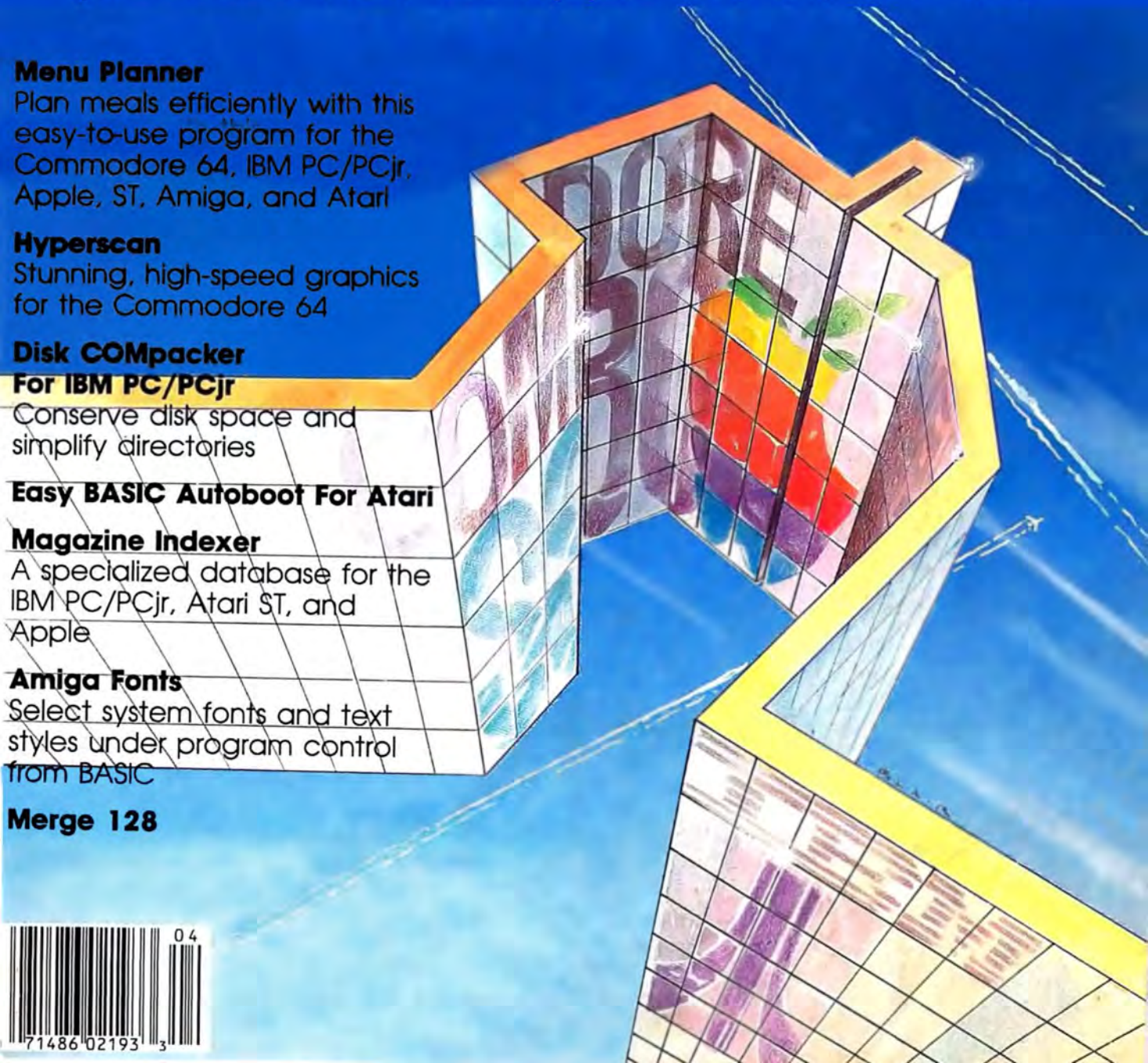
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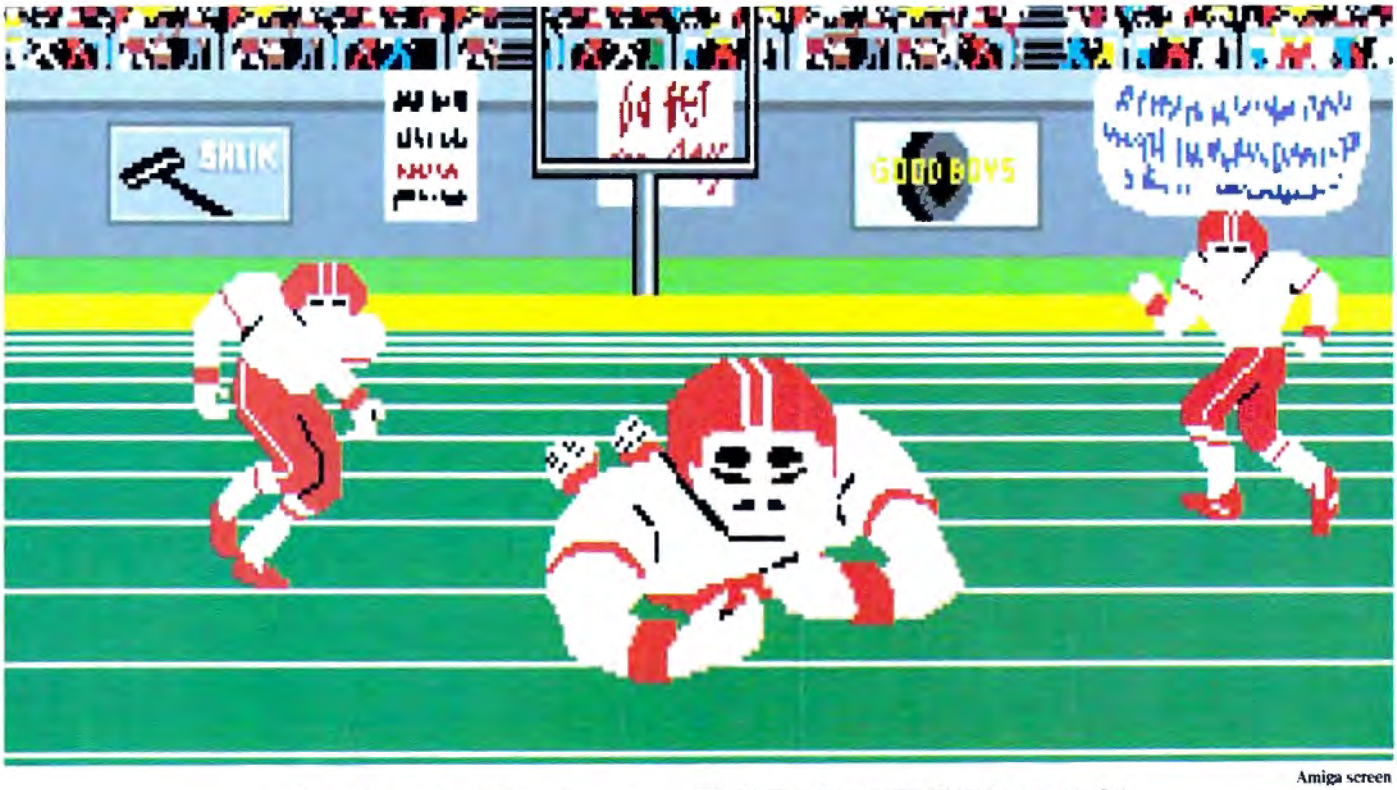
Magazine Indexer
A specialized database for the IBM PC/PCjr, Atari ST, and Apple

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Select system fonts and text styles under program control from BASIC

Merge 128



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Amiga screen

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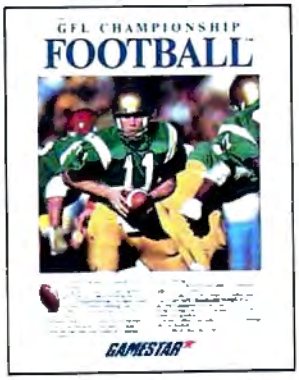
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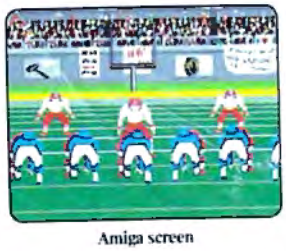
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Amiga screen



Commodore 64-128 screen



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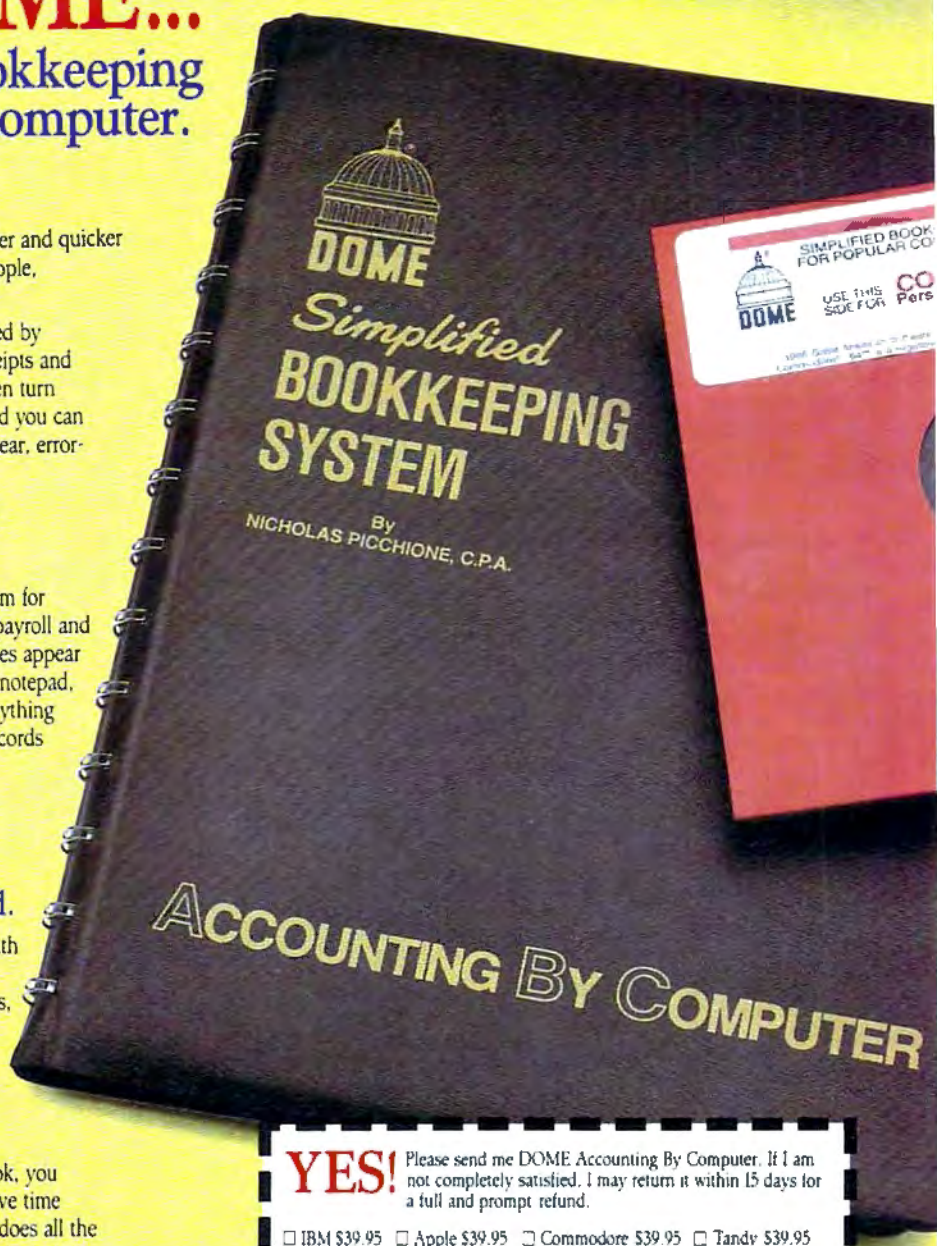
Commodore 64-128 screen

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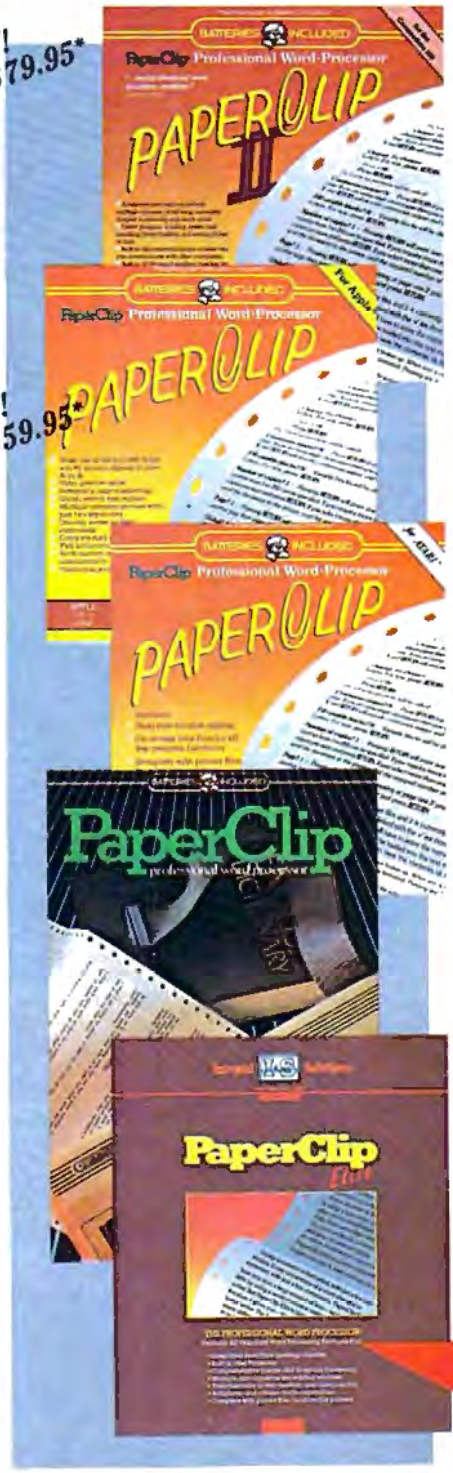
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APRIL 1987
VOLUME 9
NUMBER 4
ISSUE 83

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AP Apple, **Mac** Macintosh, **AT** Atari, **ST,** Atari ST, **64** Commodore 64, **128** Commodore 128, **P** PET/CBM, **PC** IBM PC, **PCjr** IBM PCjr, **AM** Amiga, *General interest.

COMPUTE! Publications, Inc.
Part of ABC Consumer Magazines, Inc.
One of the ABC Publishing Companies
ABC Publishing, President, Robert G. Burton
1330 Avenue of the Americas, New York, New York 10019

COMPUTE! The Journal for Progressive Computing (USPS: 537250) is published monthly by COMPUTE! Publications, Inc., 825 7th Ave., New York, NY 10019 USA. Phone: (212) 265-8360. Editorial Offices are located at 324 West Wendover Avenue, Greensboro, NC 27408. Domestic Subscriptions: 12 issues, $24. POSTMASTER: Send address changes to: **COMPUTE!** Magazine, P.O. Box 10955, Des Moines, IA 50950. Second class postage paid at Greensboro, NC 27403 and additional mailing offices. Entire contents copyright ©1987 by COMPUTE! Publications, Inc. All rights reserved. ISSN 0194-357X.

Editor's Notes

Computerization, like industrialization and other great cultural shifts, is permeating all facets of society. Few aspects of modern life will remain untouched. Here at COMPUTE! the change has been both swift and dramatic.

When COMPUTE! started six years ago, we were doing most of our writing on typewriters and had only one, early-microcomputer word processor. But within two years we had moved almost exclusively to word processing.

We were among the many journalists who abandoned the traditional typewriter in the first half of this decade. Still, because our articles pass through many hands—general, technical, copy editing, typesetting, and so on—we didn't pass disks around with the articles on them. Instead, an article was printed out and the *paper* copy was then edited by the several editors.

After the pen-and-paper editing phase, the article was then typeset. This meant that it had to be retyped into a machine which could produce magazine-quality print. It also meant an extra opportunity for errors to creep in, so the copy had to be proofread after it came out of the typesetting machine.

Now, however, the days of paper editing are long gone for us and many other publications. Today, most articles are edited entirely on our networked word processing system. Most authors send in a paper (or disk) copy of their submission. If the article is selected for publication, it is then typed (or uploaded) into our system, where it moves from screen to screen around the building until it is finally ready to be sent to the printer.

Our editing system is similar to ordinary word processors, but includes additional features which make it easy for articles or memos to be transmitted from one editor to another. There are built-in safeguards against crashes, power outages, and accidental deletions. We haven't lost any copy in the three years we've been using the system, which is more a testament to the computer system than to our collective caution.

Since it must serve a variety of purposes, the "editing processor" keyboard has 134 keys instead of the usual 60 on a typewriter or computer keyboard. If, for example, you press the H&J (Hyphenate & Justify) key by accident, your article will suddenly seize up and reformat into a single, magazine-size, column. (Fortunately, you can un-H&J quickly.) Also, there are dedicated keys to define blocks, sentences, words, and characters, and keys to move, copy, or delete these units as well. A first look at the huge keyboard is daunting. You suspect you'll never master it. There are actually far more than 134 keys, since each key can be shifted, supershifted, and even supershift-shifted. Thus, each of the 134 keys can perform as many as four different functions.

Fortunately, most of the writing and editing is accomplished in the same way it would be on a less formidable word processor. Nested in the center of the huge keyboard are the familiar typewriter keys. And, after a little practice, we've all learned to reach for the supershift key when necessary.

And the advantages of the system are considerable. Some of our authors and columnists send copy directly to our system memory via modem. When visiting computer shows in Chicago or California, our feature writers type late-breaking stories into lap portables, call us from their hotel phones, and their copy—sounding like a high-pitched scream—enters the terminals here at the office in North Carolina. These are crack feature writers, so a story sometimes flows, largely unchanged, onto the printed page where, for the first time, it becomes paper and ink.

Since from start to finish our articles are in electronic mass memory, the possibilities of introducing various kinds of typographical and transcription errors is greatly reduced. Even something as simple as passing an article around is now far more efficient.

Our book division, too, has welcomed the new system because an entire book can be online at once and even copied to more than one editor simultaneously. There's also a feature which shows what changes have been made to the copy so that the original can be compared to the edited version. If necessary, editing can be selectively removed.

Also, we're currently experimenting with digitizing drawings, photos, and charts. This will result in more flexibility and more options with the graphics in our publications. Even program listings will soon be electronically reproduced instead of photographed from paper printouts as they are now. Ultimately, every page of a magazine will be edited, composed, and produced—from the original story idea to the final layout—entirely on video screens with computer assistance.

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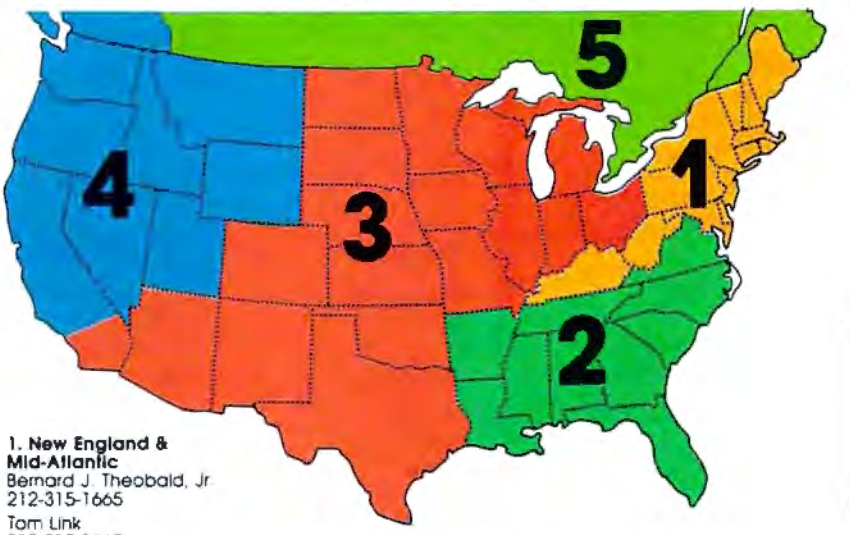
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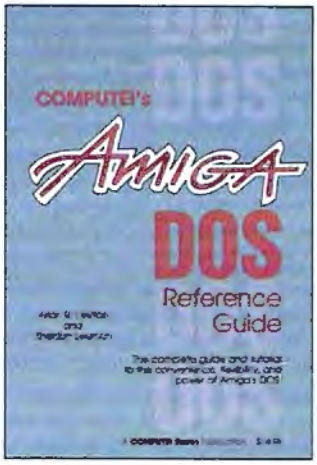
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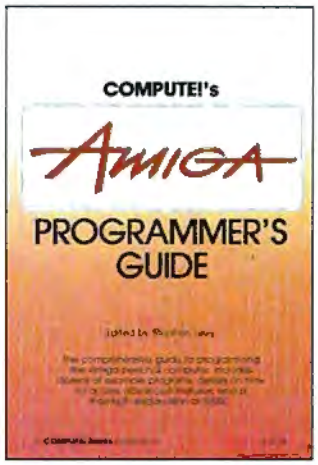


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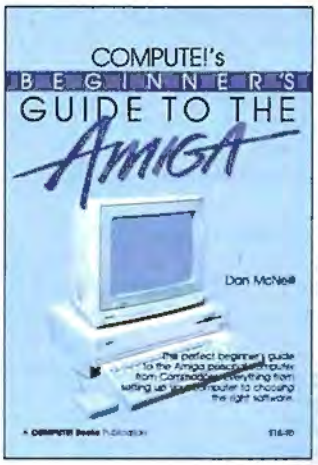


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Readers Feedback

The Editors and Readers of COMPUTE!

If you have any questions, comments, or suggestions you would like to see addressed in this column, write to "Readers' Feedback," COMPUTE!, P.O. Box 5406, Greensboro, NC 27403. Due to the volume of mail we receive, we regret that we cannot provide personal answers to technical questions.

Computer Laryngitis

I own an older model of Atari, the 1200XL. As advertised when I bought it, the computer was said to have a voice synthesizer. However, I have not been able to use it. Do I have to use some special software or can I get voice synthesis from BASIC? Also, can the synthesizer sing?

Chris Macy

The 1200XL was the first of the XL line of Atari computers. Although it featured a few new innovations over the Atari 800, it did not meet with wide consumer acceptance and was discontinued within a year of its introduction. The 800XL and 600XL became the new high- and low-end machines, respectively. For a while, Atari planned to introduce computers called the 1400XL and the 1450XLD. Both of these models were supposed to offer easy-to-use speech synthesis. Before the 1450XLD was finally canceled, the designers were planning to route the speech through the AMY sound chip (which now may show up as an enhancement for the ST line), allowing the computer to "sing." Unfortunately, the 1450XLD (and the 65XEM, another computer designed to use the AMY chip) never made it to the store shelves.

At present, the Amiga is the only home computer which includes built-in speech synthesis. Although speech is not built into your computer, hardware and software speech synthesizers are sold for the Atari computer line and other machines, as well. We've even seen a limited but functional public domain speech synthesizer for the Atari ST.

As a technical matter, it's actually somewhat easier to make a computer sing than it is to make it talk: It is simpler to create a steady musical tone than is to produce the extremely complex sounds that make up human speech. Some electronic music synthesizers can generate a passable imitation of a human voice tone, but none of them can talk.

As a practical matter, speech-specific voice synthesizers don't sing very well. Just for fun, one of our programmers spent some time trying to make the Amiga's built-in speech synthesizer sing "Happy Birthday," using the synthesizer's pitch controls to change from one note to another in Amiga BASIC. The results were amusing, but not very satisfactory. Spoken words require sounds (known as phonemes*) that change in complicated ways over very short time periods. Since speech phonemes aren't designed for music, they don't sound convincing in a song, even if you change the pitch to produce different notes. It's possible, of course, to have a voice synthesizer that handles both speech and music, but that capability would have to be built into the program.*

Keyboard Polling In ST BASIC

Is there a way to make the Atari ST respond to a string input immediately in ST BASIC? I know how to use INP, but the computer waits for the input before going to the next line. I would like the program to continue whether or not a key was pressed. What command or PEEK should I use?

Jamieson Schulte

This is one of those happy occasions where a question from one reader is answered by another reader. If you experiment with the PEEK mentioned by Mr. Honzik below, you'll discover that when no key is pressed, a negative value is returned (the number varies, but it's always negative, unless the mouse is moved). Positive values mean a key is being held down. If you divide this number by 256, you'll see a value that indicates the position of the key being pressed. The letters Q, W, E, R, T *and* Y *are numbered consecutively because they're laid out in that order on the keyboard.*

It is well known that the INKEY$ function is missing from ST BASIC and that the statement A=INP(2) is an adequate substitute in many cases. But when you wish to poll the keyboard and go on if no key is pressed, the INP function does not work. I've found that PEEKing &HFFFC02 will return a unique value for each depressed key, thus making polling possible.

Bill Honzik

Deleting Apple Documents

I own an Apple II+ with a single disk drive. I also own *SpeedScript 3.0*, which I use often for word processing. How can I erase an unwanted letter or other document which I have accidentally stored on my *SpeedScript* disk? In some cases I have accidentally stored the same document under two or even three slightly different titles. This usually occurs after I load a stored document, make a few corrections, then save it using an incorrect name.

Donald Wilmot

COMPUTE!'s popular SpeedScript *word processing program for the Apple doesn't have a built-in command for deleting files, but you can easily remove unwanted* SpeedScript *documents with BASIC's DELETE command. Boot the computer with a DOS disk (don't load* SpeedScript*), then enter Applesoft BASIC. At a BASIC] prompt, enter*

DELETE *filename*

where filename *is the name of the document you want to erase. Unwanted ProDOS* SpeedScript *files can also be removed with the Delete File option in the ProDOS* Filer *utility or* System Utilities *package.*

Timing In Compiled Commodore BASIC

One way of speeding up a BASIC program on the Commodore 64 is to compile it. This generally makes data-handling programs more efficient and game programs more challenging. One problem I've experienced in compiling my own programs is with delay loops. If the original program contains any lines of the form FOR TD=0 TO 1000:NEXT TD, the delays become much shorter after the program is compiled. Thus, you may not have enough time to read a message, for instance, or respond to a question before the program moves on. Fortunately, there is a simple solution. Replace all such delay lines in your program with a GOSUB to

a jiffy clock comparison subroutine, such as the one shown here:

```
1000 TI$="000000"
1010 IF TI/60<DELAY THEN 1010
1020 RETURN
```

When you need a delay, just set the variable DELAY equal to the time delay in seconds, then perform GOSUB 1000. For example, to cause a five-second delay, define DELAY as 5.

The Commodore 64's jiffy clock keeps time in 1/60-second units. This routine initially sets the jiffy clock to 0 (line 1000). Line 1010 divides the value of the reserved variable TI to convert to seconds. When the elapsed time equals or exceeds the specified time, the routine returns.

It's possible that your program may already use the jiffy clock for timekeeping. This version of the same routine performs the same function without resetting the clock.

```
1000 JC=TI/60
1010 IF TI/60<DELAY THEN 1010
1020 RETURN
```

Arnold Walter

Thank you for these programming hints.

Autostarting IBM BASIC Programs

I own a Compaq Plus IBM-compatible computer. Is there any way I can make a BASIC program run automatically when the computer is turned on? If so, I would like to do this with a hard drive (drive C:).

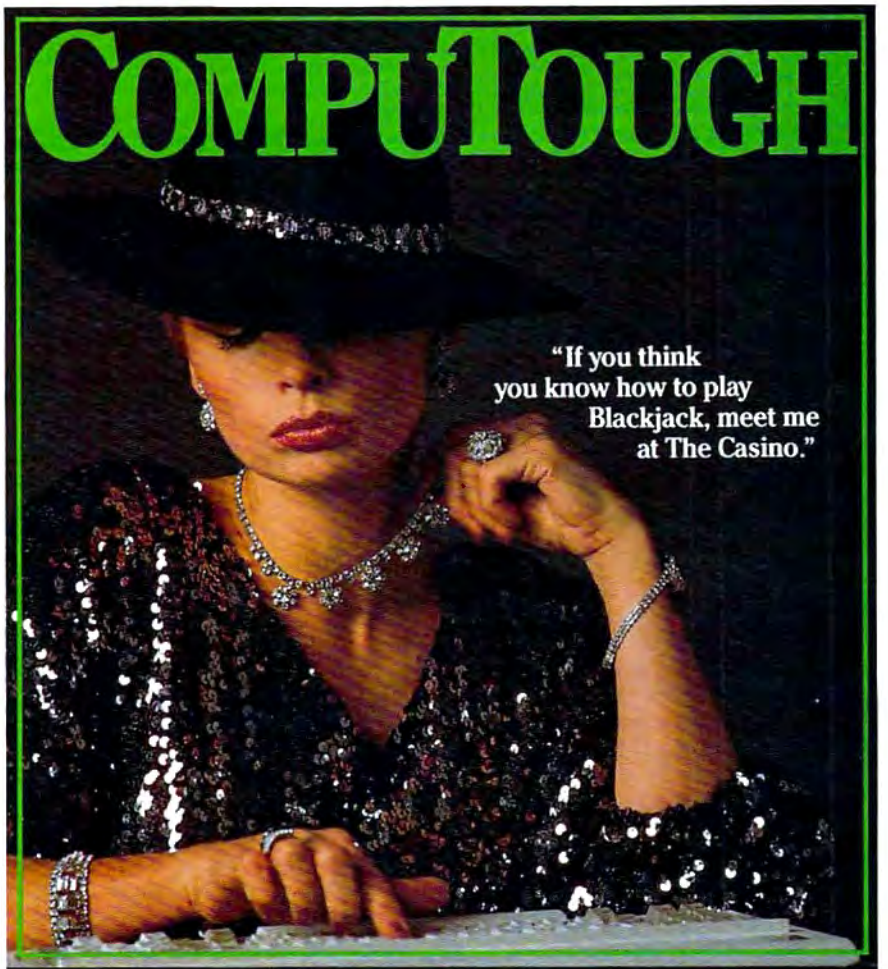
Doug Halbert

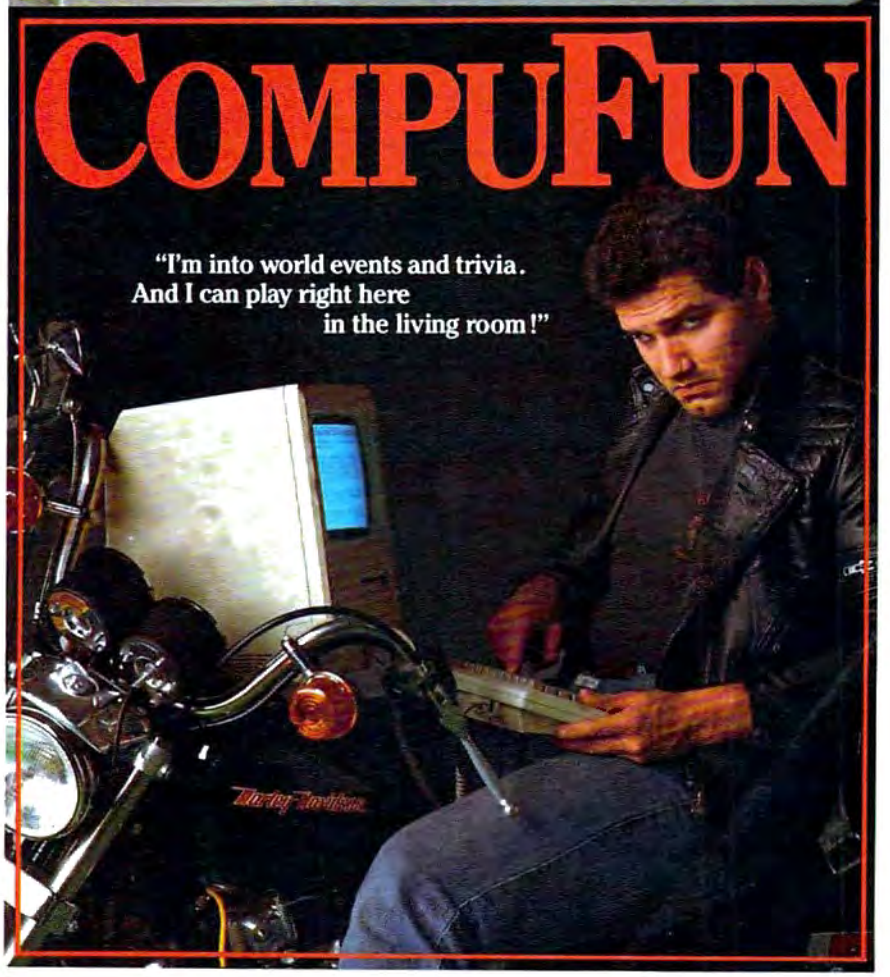
The PC-DOS/MS-DOS operating system used by IBM and compatible PCs has no explicit provision for automatically starting a BASIC program when the computer is booted. However, there is an easy way to achieve this effect. At the end of the boot process, DOS checks the current disk directory for a text file named AUTOEXEC.BAT. If a file with that name exists, the DOS commands from the file are read one at a time and executed as if they had been typed from the keyboard. You can load BASIC and simultaneously load and run a BASIC program with a command of the form

BASIC *filename*

where filename *is the name of the program you wish to start. (If you are using an IBM PC and want to run the program using Advanced Disk BASIC, you would instead use the command* **BASICA** *filename.)*

Thus, to automatically load and run a BASIC program when the computer is booted, you need only have an AUTOEXEC.BAT file containing this command. If your boot disk already contains an AUTOEXEC.BAT file, use a text editor (such





as EDLIN) or a word processor to add the command as the last line of the file. If you don't already have an AUTOEXEC.BAT file on the disk, it's easy to create one. Just enter the following command:

COPY CON: AUTOEXEC.BAT

Next, enter the command:

BASIC *filename (or* **BASICA** *filename)*

Then press the F6 function key and Enter to end entry and write the text to the file. The disk with the AUTOEXEC.BAT file must also contain BASIC itself (BASIC-.COM or BASICA.COM; for compatibles, the file may have a name like BASIC.EXE or GWBASIC.EXE) as well as a copy of the BASIC program to be autostarted.

Exactly the same procedure works from a hard disk. If your system is set up to boot from the hard disk, you must include the AUTOEXEC.BAT file in the root directory of the hard disk. With a hard disk, it's likely that BASIC itself and the program you want to run will reside in a subdirectory. In this case, you'll need to include a CHDIR (change directory) command in your AUTOEXEC file to point DOS in the right direction. For example, to autostart a program named TELCOM-.BAS in a subdirectory named BASIC (which also contains the IBM Advanced BASIC file BASICA.COM), you would place the following commands at the end of your AUTOEXEC.BAT file:

```
CHDIR \BASIC
BASICA TELCOM
```

If your system has a hard disk, but doesn't boot from it, the AUTOEXEC.BAT file must be on the floppy disk used to boot the system. In this case, the CHDIR command must also specify the drive designation. In the example above, the command would change to:

```
CHDIR C:\BASIC
```

IBM PC/PCjr Hidden Files

I would like to create hidden files on my IBM PC, but I don't know how to do so. How are hidden files created? When you copy a disk, are hidden files copied along with the rest of the files?

Scott Cottrile

To answer your last question first, the DISKCOPY command copies all files, including hidden files which are inaccessible with most other DOS commands including COPY. Any bootable DOS disk for the IBM PC/PCjr will contain two important hidden files: IBMBIO.COM and IBMDOS-.COM. On IBM-compatible MS-DOS computers, these files are usually named IO.SYS and MSDOS.SYS, respectively.

Hidden files do not appear when you look at the disk directory with the DIR command from DOS or with the FILES command from BASIC. However, they can be revealed with the DOS command CHKDSK. Put your DOS master disk in drive A and enter this command:

```
CHKDSK A:/V
```

The drive spins for a moment, then the screen displays a list of all the files on the disk, including hidden files. The CHKDSK display ends with a summary which indicates, among other things, how many hidden files the disk contains. If you omit the /V option after the drive specifier, CHKDSK prints only the summary.

Hidden files are used mainly for DOS system files and are of little use in ordinary programming. What good is a BASIC program that you can't LOAD or a data file that you can't OPEN for reading? The same is true of most DOS commands: If a file is hidden, you can't copy it with COPY, list it with DIR, or execute it by typing its name from the DOS prompt. Creating a hidden file from within a program is not easy, since BASIC provides no direct means for handling such files. DOS provides system routines (interrupts) for directly reading and writing a disk sector, but you'll need a machine language subroutine to call such interrupts from BASIC.

The directory entry for each file includes a status byte which determines whether the file is hidden, along with several other attributes. It is possible to change a file's status byte with the DEBUG utility. (For the PC and PCjr, this program is included on the DOS Supplemental Programs disk; for compatibles, it's on the DOS master disk.) Be forewarned, however, that DEBUG is a low-level program with no safeguards: If you accidentally scramble the disk's directory while using DEBUG, you can easily render one or more files unreadable. If you would like to work through the following exercise, do so on a copy of the DOS disk, not on the original.

The figure above illustrates a simple session with DEBUG which changes IBMBIO.COM or IO.SYS from a hidden, system file to a normal file. The text shown in ***boldface*** *is what you type. The rest is printed by the computer. For compatibles, the filenames will vary from those shown. For example, the first entry should be named IO.SYS.*

```
A>debug
-L ds:100 0 5 1
-D 100
0966:0100  49 42 4d 42 49 4f 20 20-43 4f 4d 27 00 00 00 00 IBMBIO  COM'....
0966:0110  00 00 00 00 00 00 00 00-60-54 07 02 00 80 12 00 00 ........'T......
0966:0120  49 42 4d 44 4f 53 20 20-43 4f 4d 27 00 00 00 00 IBMDOS  COM'....
0966:0130  00 00 00 00 00 00 00 00-60-54 07 0c 00 80 42 00 00 ........'T.... B ...
0966:0140  43 4f 4d 4d 41 4e 44 20-43 4f 4d 20 00 00 00 00 COMMAND COM ....
0966:0150  00 00 00 00 00 00 00 00-60-54 07 2e 00 80 45 00 00 ........'T....E ....
0966:0160  41 4e 53 49 20 20 20 20-53 59 53 20 00 00 00 00 ANSI    SYS ....
0966:0170  00 00 00 00 00 00 00 00-60-54 07 51 00 80 06 00 00 ........'T.Q .....
-E 10b
0966:010B 27.20
-W ds:100 0 5 1
-Q
A>
```

After you type debug and press Enter at the DOS prompt, the computer loads and executes the DEBUG utility. The DEBUG prompt is a dash (–). The first DEBUG command (L ds:100 0 5 1) loads the contents of track 0, sector 5 from disk into the memory area beginning at location &h100. The 1 at the end of the command indicates how many sectors to load. After this command executes, you have a copy of the first part of the disk directory in memory, where it can be examined and modified.

The D command causes DEBUG to print the display shown in the next several lines. The central portion of the display shows the hex value of each byte and the right portion shows each byte's ASCII value. The byte immediately after the last byte of each filename is that file's status byte. *This byte determines the file's attributes, including whether it is a hidden file. The value &h27 indicates a hidden, system file; the value &h20 indicates a normal file.*

The next command (E 10B) tells DEBUG that you want to edit a byte. The value 10B indicates which byte to change. DEBUG responds by printing the address and current value of that byte (0966:010B 27.). It then waits for you to enter a new value. To change the byte to &h20, type 20 and press Enter.

The W command writes the data back to disk; Q exits from DEBUG and returns you to the DOS prompt. If you examine the disk with DIR, you'll see that IBMBIO.COM (or IO.SYS) now appears in the normal directory display. To restore its hidden status, repeat the same procedure and change its status byte back to &h27.

Missing MAKEDIR

I am trying to move Workbench commands into a RAMdisk as explained in "Moving AmigaDOS Commands to RAM" from "Readers' Feedback" in the April 1986 issue. Instead of copying the commands, the computer prints these error messages:

Copying AmigaDOS commands to

RAMdisk...
Can't open ram:c/copy - object not found
Can't find ram:c/copy
Assign failed returncode 20

What do these messages mean?

Margaret Hettinger

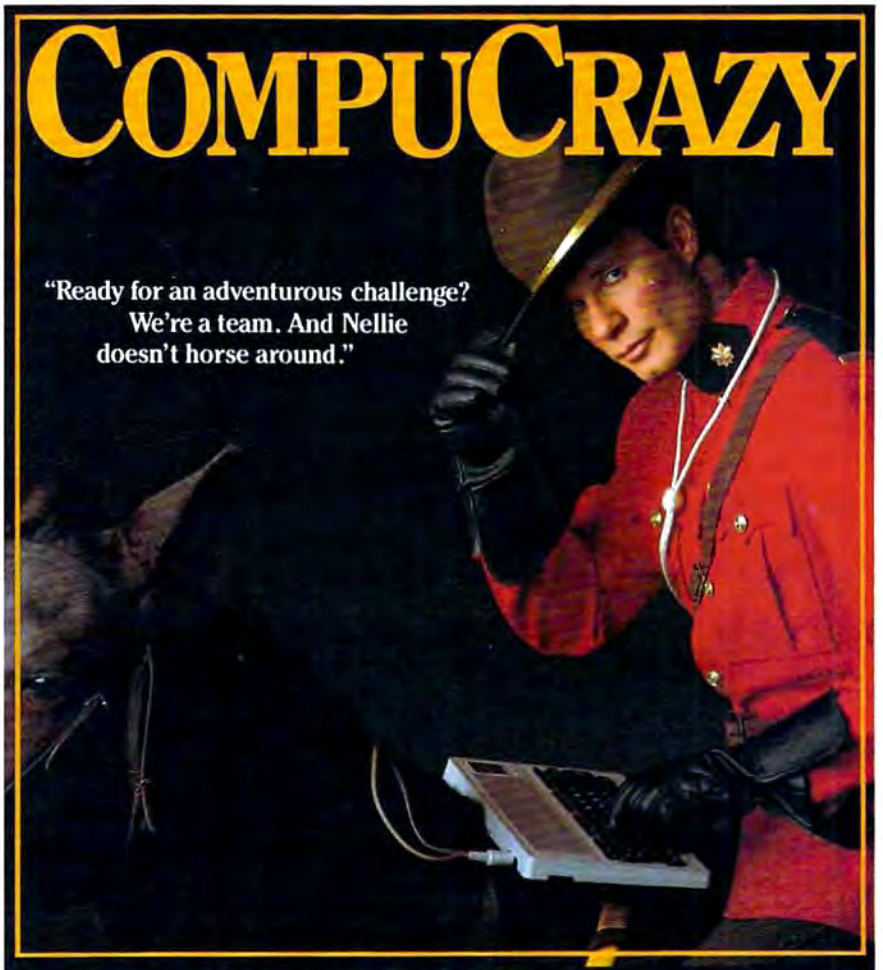
A line was inadvertently left out of the example batch file printed in that answer. Here is the correct batch file in its entirety:

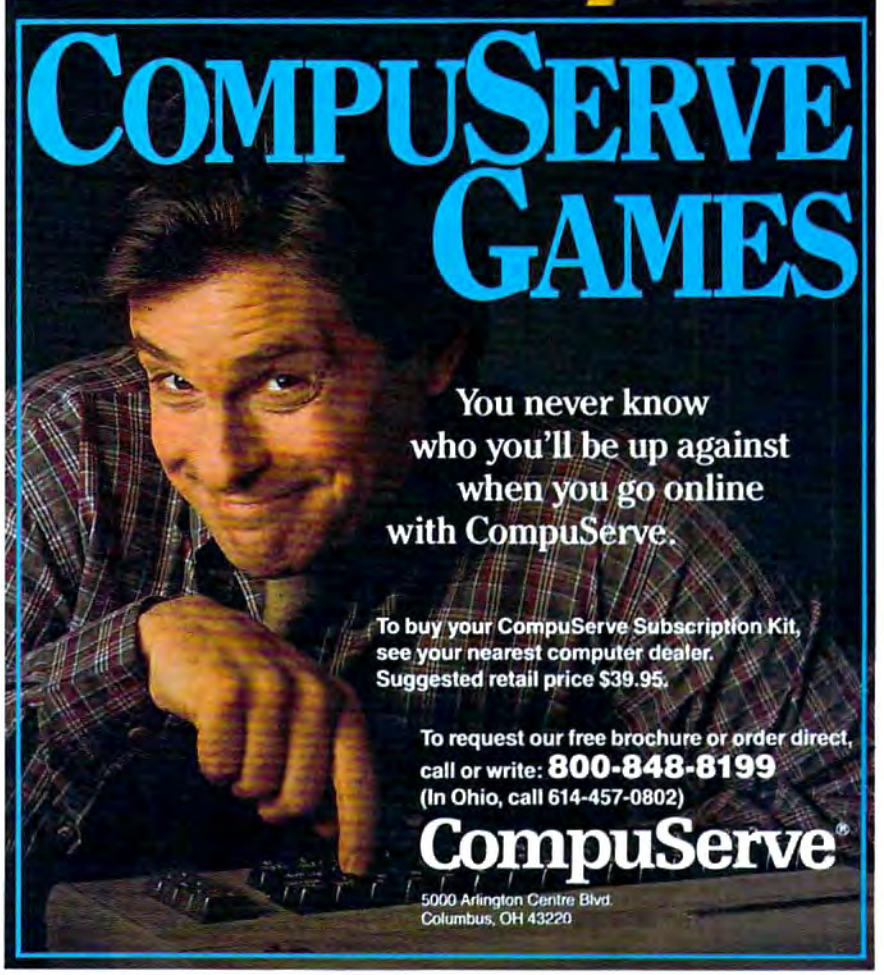
```
echo "Modified Workbench disk"
echo ""
echo "Copying AmigaDOS commands to RAMdisk..."
makedir ram:c
copy c/copy ram:c/copy
assign x: ram:c/copy
assign d: ram:c
cd sys:c
x: assign d:
x: cd d:
x: copy d:
x: delete d:
x: dir d:
x: diskcopy d:
x: echo d:
x: ed d:
x: endcli d:
x: info d:
x: list d:
x: makedir d:
x: newcli d:
x: rename d:
x: run d:
x: type d:
cd sys:
assign c: ram:c
assign d: c:delete
loadwb
endcli > nil:
```

This file replaces the file startup-sequence *which AmigaDOS executes automatically when you boot the system. These commands copy some commonly used AmigaDOS commands to the Amiga's built-in RAMdisk as part of the normal startup procedure. Of course, you can delete commands from this list, or add others if desired. After the startup process is complete, the Amiga will search the RAMdisk to access any AmigaDOS commands. This method saves time and possibly some disk swapping.*

The line which was omitted is the one containing the command makedir ram:c. *That command creates a subdirectory named c in the native RAMdisk device, which is called ram: in AmigaDOS. If the c directory doesn't exist, then subsequent commands which refer to that directory will cause the error messages you saw.*

The April 1986 answer explains how to edit and resave the startup-sequence file with the AmigaDOS editor ED. You can also edit it with any Amiga word processor that saves files in plain ASCII form, without special control codes or formatting information. Be sure to save a copy of your original disk and practice on an unimportant disk first, in case you make a mistake in editing startup-sequence.





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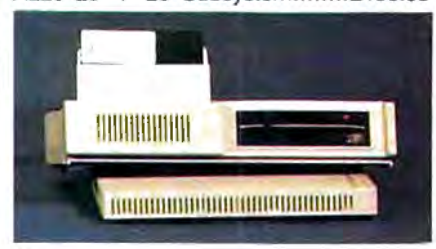
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IBM PrtSc Revisited

I was delighted to see the answer "IBM PrtSc Problems" in the September 1986 installment of this column, since I had the same problem (thin white lines between each row of a graphics printout) with my Mannesman Tally Spirit 80 printer. But your answer did not tell the whole story. The GRAPHICS.COM utility does not reset the printer completely, but it does reset the print *spacing* by sending the code appropriate for an IBM or Epson printer. If your printer works correctly with PrtSc except for the gap between lines, you can fix the problem simply by replacing the spacing number for the printer in the GRAPHICS.COM file. Here is a commented disassembly of the relevant section of GRAPHICS.COM:

```
1. DS:0159-  E8  95  01-  CALL 02F1      send linefeed to printer
2. DS:015C-  B8  1B  00-  MOV AX,001B    load A register with $1B
3. DS:015F-  E8  7A  01-  CALL 02DC      routine sends $1B to printer
4. DS:0162-  B8  33  00-  MOV AX,0033    load A register with $33
5. DS:0165-  E8  74  01-  CALL 02DC      send $33 to printer
6. DS:0168-  B8  18  00-  MOV AX,0018    load A register with $18
7. DS:016B-  E8  6E  01-  CALL 02DC      send $18 to printer
```

The routine at $02DC uses INT $17 to send data to the printer when the value in register AH equals 0. Lines 2–3 of this code fragment send the ESC code ($1B, character 27) to the printer. Lines 4–5 send the code to make the line spacing $n/216$, where n is the number sent in lines 6–7. As shown, GRAPHICS.COM sets up the printer with a line spacing of $18/$D8 = 24/216 = .111 inches.

To get the right spacing, you need to replace the $18 in address $0169 with the correct number for your printer. With the DEBUG utility, I substituted $15 (decimal 21) for that value and got excellent results with a high-resolution screen dump.

If you're interested in making this modification, but don't have much experience with DEBUG, here are step-by-step instructions for performing the change. Before you attempt to edit the file, figure out the spacing you need—in terms of inches—by printing some graphics with PrtSc. Then calculate how many 216ths of an inch it will require to close the gap. If you convert this number to hexadecimal, you then have the number to store in address $0169 of GRAPHICS.COM. Here are the remaining steps.

1. Copy GRAPHICS.COM and DEBUG.COM from your DOS master disk onto a new disk. Do *not* use your original disks, in case you make a mistake with DEBUG and garble a file.
2. From the DOS prompt, type DEBUG GRAPHICS.COM and press Enter. This activates DEBUG and loads GRAPHICS.COM into memory. The DEBUG prompt is a hyphen (-).
3. Use the Display command (D) to look at the section of code to be changed. Type D 0150 016F and press Enter. The computer displays two lines of 16 hexadecimal numbers, in the same order in which they appear in memory. Notice the number $18 in location $0169.
4. Use the Enter command (E) to enter your new value as a two-digit hexadecimal number. For instance, if the new value is $15, type E 0169 15 and press Enter.
5. Repeat the same Display command outlined in step 3. This time you will notice your new value in location $0169.
6. Use the Write command (W) to save the modified copy of GRAPHICS-.COM to disk. Type W and press Enter. This operation works correctly if you follow the exact steps outlined here; it may not work if you have used other features of DEBUG in the meantime.
7. Use the Quit command (Q) to exit DEBUG and return to the DOS prompt. Type Q and press Enter.

It doesn't hurt to experiment, as long as you take care to save an unmodified copy of GRAPHICS.COM on a separate disk. If the first modification doesn't work out, repeat the procedure using a slightly different value.

Larry Bogan

Thank you for the information.

2 Times 8 Is Not 16

Is it possible to link two Atari 400 computers together through the I/O port? If so, would the two memory capacities combine to become 16K? Which keyboard should I use to type in programs? Are there any dangers or complications?

Michael Zucca

Although it is physically possible to connect two Atari computers (or two Commodore 64s, for that matter) through the I/O ports, it would serve no useful purpose to do so. In fact, it may even damage one or both of the computers.

The Atari serial ports are designed to communicate with special "intelligent" peripherals. There is a protocol—a specified means of communication—that any peripheral must follow in order to be recognized. In the case you suggest, neither of the computers is equipped to act as a peripheral for the other, so communication is impossible. In addition, electricity flows through the serial port, so the connection might damage the POKEY chip on one or both of the machines.

It is possible, however, to connect two computers with a null modem *cable, in order to transfer information from one computer to another. A null modem cable is essentially a normal modem cable with the send and receive lines reversed at one end. Information which one computer transmits on its send wire is received on the other's receive line, and vice versa.*

When linked with a null modem cable, the computers would not share their memories, however. It would be more like calling a bulletin board to transfer files from one computer to another. In most cases it's easier to use the disk drive or cassette recorder to transfer files.

If you're running out of RAM, Atari and other manufacturers previously offered memory upgrades up to as much as 48K. You still may be able to find one. However, it may make more sense to buy an Atari 65XE, which is software compatible with the 400 and features 64K of memory and a full, typewriter-style keyboard.

Null String Blues

I have been having trouble with dimensioning arrays. I am writing a program that writes 50 lines of text to a sequential file. I have talked with several of my friends, and they say the program works on their computers, but I still have problems with it. The portion that actually writes the file appears to work, as I've been able to load the file using a word processor that handles text in a sequential file. Here is the routine I use to write the file:

```
10 DIM A$(50)
20 FOR X=1 TO 50
30 INPUT A$(X):IF A$(X)="" THE
   N 100
40 NEXT X
100 OPEN 3,8,3,"SEQ-TEST,S,W"
110 FOR X=1 TO 50
120 PRINT#3,A$(X)
130 NEXT X
140 CLOSE 3
```

When I try to read the file back, the disk drive starts to whir as if it's reading successfully. Then the drive stops, but its red light remains on. Nothing else happens and the program appears to lock up. Here is the routine I use to read the file:

```
500 OPEN 3,8,3,"SEQ-TEST,S,R"
510 FOR X=1 TO 50
520 INPUT#3,A$(X)
```

```
530 NEXT X
540 CLOSE 3
550 FOR X=1 TO 50
560 PRINT A$(X)
570 NEXT X
```

Should I redimension the array in the middle of the program? I heard that this will also produce an error. Can you give me an idea of what's going on here?

Scott Bradbury

Your problem actually has nothing to do with the DIM statement. For the most part, it's caused by the INPUT# statement. By dimensioning A$ to 50 in line 10, you initially set aside room for 51 elements of A$; remember, there's an A$(0) element, even if you don't use it. At the same time, each of those elements is defined as a null string (a string that contains nothing). After you have entered text definitions for as many of these elements as you wish (lines 20–40), the remaining elements are still nulls. When you write A$ to disk as SEQ-TEST in lines 100–140, the null string elements are written as carriage returns (character 13). But so far, you're OK.

The problem arises when you attempt to read the null-string elements back with an INPUT# loop (lines 500–540). INPUT# expects each string to be terminated with a carriage return. Thus, the INPUT# statement in line 520 reads correctly the elements of A$ that are defined as something other than a return. But when the program encounters CHR$(13) alone, it continues to look for some character that's not a return. Since there's nothing to read, the program halts indefinitely, and the drive light remains on.

The solution is simple. Add a FOR-NEXT loop between lines 10 and 20 which initializes every element of A$ to some character that's unlikely to be entered in line 30. Depending on what the rest of the program does, a graphics character such as CHR$(255) might be suitable. This will prevent INPUT# from hanging up when it encounters null elements. You'll also need to add a statement to your reading routine to discard the null markers when they are read back in. For example, if you choose to use CHR$(255) as your null marker, you could add the following line to your reading routine:

```
525 IF A$(X)=CHR$(255) THEN
    A$(X)=""
```



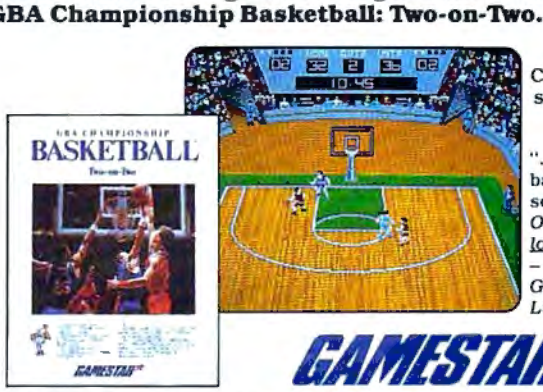

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Commodore Amiga screen shown.

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The guidelines below will permit your good ideas and programs to be more easily edited and published:

1. The upper left corner of the first page should contain your name, address, telephone number, and the date of submission.

2. The following information should appear in the upper right corner of the first page. If your article is specifically directed to one make of computer, please state the brand name and, if applicable, the BASIC or ROM or DOS version(s) involved. In addition, *please indicate the memory requirements of programs.*

3. The underlined title of the article should start about 2/3 of the way down the first page.

4. Following pages should be typed normally, except that in the upper right corner there should be an abbreviation of the title, your last name, and the page number. For example: Memory Map/Smith/2.

5. All lines within the text of the article must be double- or triple-spaced. A one-inch margin should be left at the right, left, top, and bottom of each page. No words should be divided at the ends of lines. And please do not justify. Leave the lines ragged.

6. Standard typing paper should be used (no erasable, onionskin, or other thin paper) and typing should be on one side of the paper only (upper- and lowercase).

7. Sheets should be attached together with a paper clip. Staples should not be used.

8. If you are submitting more than one article, send each one in a separate mailer with its own tape or disk.

9. Short programs (under 20 lines) can easily be included within the text. Longer programs should be separate listings. *It is essential that we have a copy of the program, recorded twice, on a tape or disk.* If your article was written with a word processor, we also appreciate a copy of the text file on the tape or disk. Please use high-quality 10 or 30 minute tapes with the program recorded on both sides. The tape or disk should be labeled with the author's name, the title of the article, and, if applicable, the BASIC/ROM/DOS version(s). Atari tapes should specify whether they are to be LOADed or ENTERed. We prefer to receive Apple programs on disk rather than tape. Tapes are fairly sturdy, but disks need to be enclosed within plastic or cardboard mailers (available at photography, stationery, or computer supply stores).

10. A good general rule is to spell out the numbers zero through ten in your article and write higher numbers as numerals (1024). The exceptions to this are: Figure 5, Table 3, TAB(4), etc. Within ordinary text, however, the zero through ten should appear as words, not numbers. Also, symbols and abbreviations should not be used within text: use "and" (not &), "reference" (not ref.), "through" (not thru).

11. For greater clarity, use all capitals when referring to keys (RETURN, TAB, ESC, SHIFT), BASIC words (LIST, RND, GOTO), and three languages (BASIC, APL, PILOT). Headlines and subheads should, however, be initial caps only, and emphasized words are not capitalized. If you wish to emphasize, underline the word and it will be italicized during typesetting.

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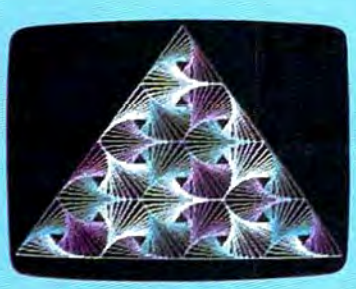
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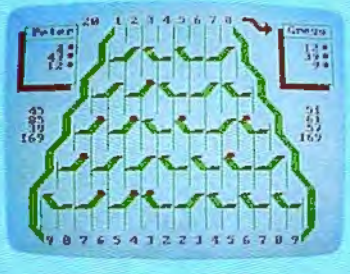
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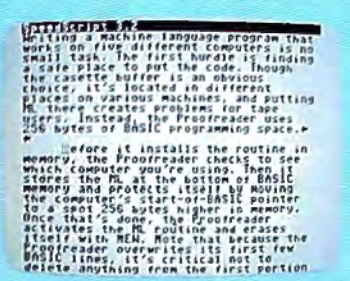
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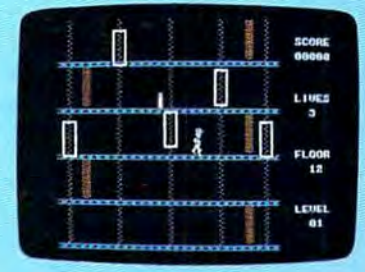
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The Fireworks Continue

Selby Bateman, Features Editor
and Tom R. Halfhill, Staff Editor

A resurgent Commodore, an aggressive Atari, and a raft of inexpensive PC compatibles were among the highlights in the personal computer section of this year's Winter Consumer Electronics Show held in Las Vegas. From the show emerged new Amiga computers, more powerful Atari STs, continuing innovations for the Commodore 64 and 128, more Apple II news, and enough new twists to kick off 1987 with a bang.

Report From The Winter Consumer Electronics Show

The personal computer industry is pulled along in many ways by the oohs and aahs evoked by rapidly advancing technology. Like a giant fireworks display, each new explosion must seem to top the last.

But as the show goes on, the more astute observers realize that the spectacle's subtle patterns and unique tempo are as fascinating and as much a part of the picture as the escalating pops and whistles.

The Winter CES in January featured plenty of fireworks for personal computer users. Not only were there important new announcements, but the industry's tempo and market patterns that emerged made this CES one of the most significant in years—especially as it affects the home, educational, and small business markets.

Despite this fact, much of the general-interest news coverage of CES in January focused almost exclusively on the pop and whistle of the latest high-tech audio and video products. In many newspaper, magazine, and television reports, scarcely a mention was made of the computer segment of CES, even though it takes up at least a third of the entire show and the attention of more than one hundred thousand attendees.

Consider a few of the following twists and turns that emerged from CES:

• Commodore sneak-previewed, for selected dealers and the press, two new Amiga computers—one a low-priced entry-level machine with the same functionality of the original Amiga 1000 and the other an expandable multiprocessing computer that can handle up to nine megabytes of memory. (See "Commodore's New Expandable Amiga 2000" in the March issue.)

• Atari chief Jack Tramiel announced to the press that just ten years after he introduced his first computer at CES, a Commodore PET with only 4K of memory, he was pleased to introduce a *four-megabyte* (4000K) Atari ST, one of two new Mega ST systems. The other machine has two megabytes of RAM.

• Atari also announced a new laser printer for the ST series that will cost under $1,500. With the new two-meg and four-meg STs, that means a desktop publishing system can now be purchased for under $3,000.

• At least five companies, including both Atari and Commodore, announced the introduction of new IBM PC compatibles, joining a host of other companies already selling the MS-DOS computers. At the same time, companies specializing in home and educational software continued to introduce more IBM PC–compatible programs than ever before.

• Commodore showed its new 256K RAM expander for the Commodore 64, which, among other things, will make the 64's new *GEOS* operating system work far faster and easier. At the same time, Commodore officials and third-party software developers gave indications that the Commodore 64 computer will more than likely be supported into the 1990s.

• Commodore also introduced a reconfigured, new-look Commodore 128.

• Atari displayed a prototype of its new XE Video Game System, a reconfigured Atari 65XE personal computer that can be bought as a game machine, but is expandable into a personal computer. Ironically, the videogame machine, once considered dead, has roared back to life for Atari and for several other companies during the past year.

Maturing And Growing

What became abundantly clear at CES was that the personal computer industry is continuing to mature as it grows. The computers are more powerful, their applications more sophisticated, and the surviving software and hardware companies more knowledgeable about what consumers want.

As one company official noted, the 1986 holiday season was the first year-end period in which some computer manufacturer wasn't trying to dump a computer that had failed in the marketplace or been defeated in price wars. IBM was unloading its PCjr in 1985, and in previous holiday seasons Coleco dumped the Adam, Texas Instruments closed out the TI-99/4A, and the pre-Tramiel Atari flooded the market with surplus Atari 800s and 400s before the XL series was ready.

At the end of 1986 and the beginning of 1987, however, all of the major players were supporting their computers to the hilt, from the five-year-old Commodore 64 and the eight-bit Ataris to the latest Amigas and Mega STs. The Apple II series was being extended by the Apple IIGS, and a new generation of Macintoshes was expected. And even if IBM was edging away from a less profitable MS-DOS standard it established, there were plenty of PC-compatible manufacturers supporting those computers.

The Affordable Amiga 500

One of the happiest pieces of news to emerge from CES was the fact that Commodore was planning to introduce two new Amiga computers this spring.

Commodore officials previewed the new Amiga 500, a low-cost machine (under $650), and the powerful Amiga 2000, an expandable Amiga which contains slots for both Amiga and IBM cards and is priced beginning at under $1,500. Both Amigas are completely compatible with the original Amiga 1000, as long as the software being used follows the specifications for version 1.2 of the Amiga operating system.

Although the Amiga 1000 originally sold for about $2,000, the

price dropped below $1,500 during 1986. The new Amiga 500 will sell for about $1,000, which includes the price of Commodore's new $350 A2002 composite/RGB monitor (similar to the present Amiga 1080 monitor).

The Amiga 500 has 512K of RAM, double the memory of the 1000; a built-in 880K 3½-inch floppy disk drive; an expanded keyboard with separate cursor and numeric keypads; the Kickstart 1.2 operating system built into ROM instead of on disk; and a 35-watt power supply. The Amiga 500 uses about half the power of the original Amiga. If other devices or extra memory is added, the 500's power supply will have to be supplemented. But for many 500 owners this will never be necessary.

The 500's keyboard is not detached, as it is with the 1000. Rather, the 500 is a one-piece computer and keyboard with the built-in disk drive in the right side. This is similar in structure and appearance to the Atari 1040ST and the Commodore 128 computers. The 500's motherboard has been efficiently redesigned so that the entire computer is on one board and, consequently, is cheaper to manufacture.

The 500 has the same system expansion bus, stereo audio outputs, RGB and composite video outputs, and two joystick/mouse ports that the original 1000 has. However, the genders of the RS-232 serial port and Centronics-standard parallel port were swapped, allowing the 500 to work with commonly available IBM PC modem and printer cables. Currently under way is an optional RF modulator so that the 500 can use a television as a monitor.

Expanding the Amiga 500 to a full megabyte of memory is an easy process. For under $150, an Amiga owner can buy a 512K memory expansion card that includes a battery-backup realtime clock. The underside of the 500 has a small, easily removable cover which hides the connector for the expansion card. The extra 512K can be installed by the user and doesn't require a trip to the dealer.

The Genlock video interface, designed for the Amiga 1000, won't work with the 500 because of the different physical configuration of the machine. However, according to one Commodore engineer, a redesigned Genlock will more than likely be made for the 500.

The Powerhouse 2000

As highlighted in last month's COMPUTE!, Commodore's Amiga 2000 is a powerful, expandable Amiga that can become an IBM PC compatible with the simple addition of a Bridge Card that fits into two of the 2000's internal slots. Expandable up to nine megabytes, the Amiga 2000 can run IBM and Amiga software simultaneously.

The 2000 is expected to sell for under $1,500, without monitor, and will include one megabyte of memory, seven expansion slots, a built-in 880K 3½-inch floppy drive, three drive ports, a detached keyboard, and a heavy-duty 200-watt power supply. The front section of the 2000's system box contains spaces for one additional half-height PC-compatible 5¼-inch disk drive and two 3½-inch drives. However, the drive spaces can be used with any combination of floppy and hard drives the user wants. And the 2000's internal slots allow a rich variety of coprocessors, drives, and boards. Video digitizers, multifunction cards, math coprocessors, and many more additions can be used in the slots. Additionally, any hard disk you use with the Amiga 2000 can be partitioned into Amiga and PC-compatible sections. The data in the drive can be passed back and forth between the two sections, as well.

Physically, the 2000 has a few other changes. The keyboard, joystick, and mouse ports are on the front rather than on the right side and the underside as on the 1000. The rear of the 2000 has standard connectors and IBM-style vertical slots, rather than the 1000's nonstandard connectors. The 95-key keyboard has also been enlarged and redesigned.

Commodore's new $500 A2080 long-persistence monitor can be used with the 2000, reportedly eliminating the screen jitters that can be seen on the 1000 in the Amiga high-resolution screen modes.

Although some observers believe that Commodore will eventually retire the Amiga 1000 in favor of the two newer models, current 1000 owners have nothing to fear since the three machines are perfectly compatible. Commodore officials, at this point, say that they have no intention of stopping Amiga 1000 production as long as there's a continuing market for the machine.

With the Amiga 500 and 2000, Commodore has answered the call of many Amiga fans who wanted either a low-cost Amiga or a more expandable Amiga. They now have both. Judging from the reactions of those who saw the sneak previews of the new Amigas at Commodore's CES booth, the future of the Amiga seems brighter than ever.

Atari Turns Blue

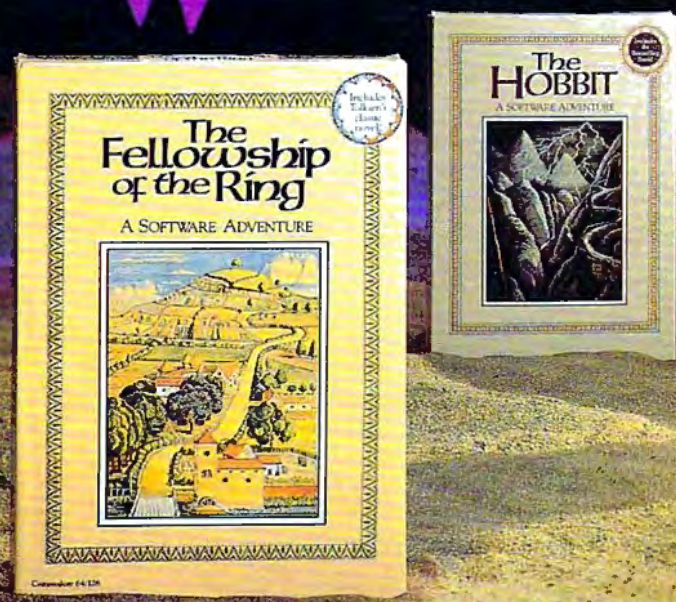
Meanwhile, over at the Atari booth, still more interesting hardware was on display. Atari announced three new ST-series computers and an under-$1,000 laser printer that will make it possible to assemble a complete desktop publishing system for the unheard-of price of $3,000. But paradoxically, it wasn't this new technology that focused most of the attention on Atari at CES.

Instead, it was Atari's announcement of two IBM PC compatibles at rock-bottom prices that reaped the most press coverage and sent Atari's newly public stock soaring. Both of the Atari PCs are aimed at the burgeoning clone market now ruled by Tandy, Leading Edge, Epson, and Blue Chip. Atari plans to undercut them all with two models priced at $499 and $699.

Both models include 512K RAM (expandable to 640K on the motherboard); an additional 256K of video RAM, freeing up the main memory for programs; an internal 5¼-inch floppy disk drive; RS-232 serial and Centronics-standard parallel ports; a mouse port and mouse controller; composite and PC-standard RGBI video outputs; software-switchable clock speeds of 4.77 megahertz (the same as the IBM PC) and 8 megahertz (turbo mode); a socket for an 8087 math coprocessor; a PC-style detached keyboard; and a built-in color graphics adapter.

The $699 model adds a built-in monochrome display adapter; Hercules display adapter; enhanced graphics adapter (EGA); and an EGA-compatible green-screen

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The Atari PC is a low-priced IBM compatible with 512K RAM and a wide variety of built-in display adapters and interfaces. Two models are priced at $499 and $699.

monitor. This makes it the lowest-priced EGA system by far—a plug-in EGA board by itself now costs at least $200.

Atari says both models will also come with the disk-based MS-DOS 3.2 operating system; GW-BASIC; the MS-DOS version of Digital Research's GEM (Graphics Environment Manager); and some applications software for which Atari is still negotiating. According to Atari, the clones should be available from computer dealers and mass merchants sometime this spring.

A Question Of Slots

Atari's announcement stole considerable thunder from other manufacturers who were showing PC clones at CES—including Commodore, Amstrad, Blue Chip, and Victor (see below). Generally they responded by ignoring Atari or by criticizing the Atari clones for lacking expansion slots. Instead of the internal slots found in most PC compatibles, the compact Atari PCs have a connector for adding an external expansion box with slots. As the other manufacturers pointed out, Atari didn't even have a prototype of the expansion box on display.

Given the mass consumer market that Atari is pursuing with its clones, the lack of internal slots probably won't be a major factor. Atari says its goal is to sell "preconfigured" PC clones that are ready to run straight from the box, including software. The Atari PCs already include most of the options that a typical IBM PC owner buys in the form of add-on boards.

However, there are two exceptions: The Atari PCs have no room to add a second internal floppy disk drive, and the absence of slots means there is no place to plug in one of the inexpensive hard disk cards that are so popular with PC users.

Atari was ready with two answers to these criticisms. First, additional 5¼-inch floppy drives can be added externally, and ST-series 3½-inch floppy drives can be plugged directly into an Atari PC. Since the ST drives are compatible with the IBM 3½-inch disk format, the Atari PCs are a step ahead of most clones in the trend toward 3½-inch disks. Second, Atari showed a prototype of an external 20-megabyte hard disk drive that fits neatly atop the Atari PC system unit.

Of course, external floppy drives add to desk clutter, and the announced price of the 20-megabyte hard disk—about $700—is roughly twice as high as the lowest-priced hard disk cards available for other PC compatibles. Still, Atari doesn't perceive these shortcomings as major weaknesses in a pair of clones aimed at the mass market.

Atari has other markets in mind as well. "We have a total commitment to a full line of PC compatibles," said Atari President Sam Tramiel. Later this year, according to Tramiel, Atari will announce a turbo XT clone and an AT clone, both with 80286 microprocessors. In 1988, an 80386-based machine is a possibility. "Once we jump into the market, we've got to be there with everything," said Tramiel. "We can't be just another 'me, too.'"

Mega Memory

Atari emphasized that its jump into the PC world doesn't mean the company is abandoning its other product lines. To reinforce this, Tramiel pointed to the three new ST computers, the low-priced laser printer, and another videogame machine exhibited at CES.

The new Mega STs are fully compatible with the current 520ST and 1040ST computers, but offer more memory and other enhancements. They have one, two, or four megabytes of memory; detached keyboards; internal double-sided floppy disk drives; battery-backup realtime clocks; blitter chips; and expansion connectors for adding external boxes or boards. The system units are very compact—in fact, they use the same cases as the Atari PC system units. And like the Atari PCs, the Mega STs will have a stackable 20-megabyte hard drive available for around $700.

Atari says the Mega STs will be available this spring, but was not very firm on prices. In ballpark figures, the one-megabyte model is expected to sell for slightly more than a 1040ST (probably around $1,200); the two-megabyte model is expected to come in at $1,500; and the four-megabyte model at about $2,000. These prices would include the built-in floppy drive and a monochrome monitor.

One reason why Atari was vague on prices is that the Mega STs will be among the first personal computers to use the new one-megabit dynamic RAM chips. It takes only eight of these high-

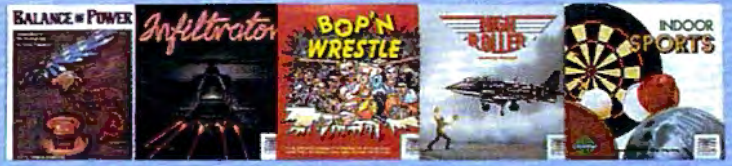


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Atari's Mega ST is available in one-, two-, and four-megabyte models. All have a detached keyboard, internal floppy disk drive, blitter chip, battery-backup clock, and expansion bus.

density chips to yield one megabyte of memory, compared to 32 of the 256-kilobit RAM chips found in current STs and most other personal computers. Because the one-megabit chips are so new, production costs are still high, and the market for them is very volatile. If the chip prices do not drop as fast as Atari and other manufacturers anticipate, the Mega STs will probably be delayed several months.

The one-megabit chips also explain why the system units of the Mega STs are so small and can get by without cooling fans. Four times as much memory can be packed into the same amount of space, and less heat is generated.

Inexpensive Desktop Publishing

Atari is taking advantage of the memory and speed of the Mega STs to introduce a laser printer priced at under $1,500—about one-third the cost of comparable printers. To achieve this reduction, Atari has modified the concept of the laser printer.

One of the major reasons why laser printers are so expensive is that they're really powerful computers in their own right, containing a 16-bit microprocessor and a few megabytes of memory. In fact, it requires at least two megabytes of memory for a laser printer to produce full-page graphics at its highest resolution of 300 dots per inch (dpi).

Atari's solution is to remove the memory and make the printer dependent upon the computer's memory. Thus, a two- or four-megabyte ST will be required to produce full-page, 300 dpi graphics with Atari's laser printer. Half-page graphics could be achieved with a one-megabyte Mega ST, 1040ST, or expanded 520ST. An unexpanded 520ST with 512K of memory could produce quarter-page graphics at 300 dpi. The printer can use any page-description language or type font under software control from the computer.

This approach wouldn't be possible without the ST's high-speed direct-memory access (DMA) port. Capable of transferring data at ten megabits per second, the DMA port is fast enough to drive the laser printer while the computer is buffering an entire page of text and graphics in RAM. No other personal computer currently on the market is fast enough to do this.

Therefore, a complete desktop publishing system capable of full-page, 300 dpi graphics will cost about $3,000—roughly $1,500 for the laser printer and $1,500 for the two-megabyte Mega ST. It also means that Atari will sell a Mega ST with almost every laser printer, since no other computer (besides an expanded 520ST or 1040ST) can drive Atari's printer.

A Secret Engine

With more than two megabytes of memory, it's possible that an ST could run another application while driving the laser printer, according to Atari. Otherwise, the computer will be tied up while the printer does its work—something that's not a problem with other laser printers that have their own memory. Even with this handicap, however, Atari's low-ball desktop publishing system will probably attract those who can't afford more expensive systems.

The printer's output is equivalent in quality to pages produced by competing printers, largely because the printer uses a Japanese printer engine virtually identical to those found in other printers. Atari would not reveal the manufacturer of the engine, saying only that two Japanese suppliers are involved—one for the U.S. market and one for the European market. The prototype printer exhibited at CES contained a Canon printer engine, but Atari said this was not the engine being used in production models. Atari says the production printer will work at eight pages per minute—fairly fast for a laser printer.

The Atari PCs, Mega STs, and laser printer overshadowed Atari's other significant announcements at CES:

- Prices were cut slightly for the 1040ST and drastically for the 520ST. The monochrome 1040ST system was reduced from $999 to $899; the color 1040ST system was cut from $1199 to $1099; and the monochrome 520ST system was slashed from $799 to $499, putting it directly in competition with eight-bit computers like the Commodore 128 and Apple IIc.
- The blitter chip upgrade for 520STs and 1040STs was expected to be released in March. It includes the blitter chip (which speeds up memory moves, and therefore, screen graphics), plus six ROM chips that contain a new version of the TOS operating system slightly modified for the blitter. (No other changes were made to TOS.) Atari says the blitter chip can be switched on or off to reduce compatibility

problems with some existing software. The upgrade is expected to cost less than $100, including installation.

• The SX212 Hayes-compatible modem should finally be available this spring. It works at 300 or 1200 bits per second with any computer that has an RS-232 serial port, including all STs. The modem also has an SIO (Serial Input/Output) port so it can be plugged directly into an Atari 400/800, XL, or XE without an interface. Retail price: $99.

• Behind glass, Atari showed a prototype of a new videogame machine based on—believe it or not—a stripped-down Atari 65XE home computer. Basically, the game machine is a 65XE without a keyboard. One Atari spokesman explained that the 65XE hasn't been selling particularly well in the U.S., partly because the 130XE offers twice as much memory (128K) for only a little more money (roughly $139 versus $89). At the same time, Atari has been enjoying a recent resurgence in videogames, selling thousands of 2600s and 7800s. By converting the 65XE into a game machine, Atari figures it can sell more units and expand the market for cartridge-based software. And in another twist, Atari might offer a plug-in keyboard for the game machine that would turn it back into a 65XE computer.

The Clone Wars

As noted earlier, the MS-DOS invasion was very much in evidence at CES. Although Atari's PC compatibles got the jump on several rivals because of Atari's surprise introduction and the low pricing, Commodore and other computer manufacturers showed PC clones that they are pushing aggressively in the U.S. market. Several companies, including Tandy, Blue Chip Electronics, and Leading Edge, have gotten a big headstart in the PC-clone distribution and visibility races. Commodore, Atari, and the other new entries in this fight will have to work hard to establish themselves.

Commodore exhibited two versions of a PC compatible, the $999 PC10-1 and the $1,199 PC10-2. Although somewhat higher in price than Atari's clones and those

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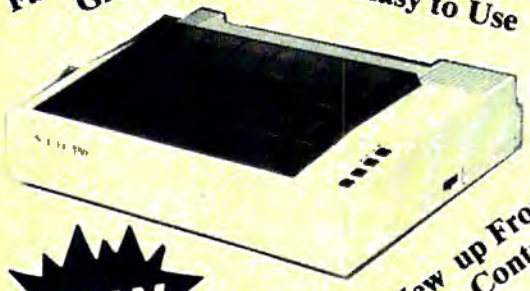
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of several other manufacturers, Commodore's North American general manager Nigel Shepherd was quick to point out that the machines will be sold in different markets by different dealers. Commodore plans to give its dealers profit margins of 35 percent to help get the Commodore PCs distributed widely. They'll also be sold by computer dealers rather than in mass market outlets.

"We haven't gone for the jugular on price," he said. "It's a very competitive business. What we've gone for with the PC is a price/feature combination that gives the dealer a margin [of profit]. And we think it will give us acceptable market share and acceptable profits."

Although it may seem odd to many American Commodore fans that their favorite company is making and selling a PC clone, Commodore has actually been selling these PCs in Canada and Europe for some time. With the current explosion of MS-DOS machines in the U.S., Commodore officials decided the market was ripe for their entry here also.

The $999 PC10-1 has one built-in 360K double-sided, double-density disk drive and 512K of RAM, which can be expanded to 640K. The $1,199 PC10-2 has two drives built in and 640K of RAM standard. And both systems have space for a half-height or full-height hard disk.

Beyond those differences, the computers are identical. Each has the 8088 microprocessor running at a clock speed of 4.77 MHz, MS-DOS 3.2, a PC-XT compatible BIOS, a PC-XT compatible keyboard, and GW BASIC 3.2. There are five full-size expansion slots, and the machines also have as standard equipment an RS-232 serial port, a Centronics parallel port, and an ATI Graphics Solution Adapter, which is a built-in monochrome and color display card compatible with IBM, CGA, MDA, Hercules, and Planatronics video modes. The power supply can handle a 40-meg hard disk, two floppy drives, and five expansion cards. Commodore is also bundling with each PC the popular Borland *Sidekick* desktop organizer.

Although Commodore has had considerable success with the PC compatibles in Europe and Canada, the low prices of other PC-clone competitors in the U.S. market will put pressure on Commodore to lower the prices of its PC10 systems.



Commodore's $1,199 PC10-2 is a PC compatible with two disk drives, 640K of RAM, and five expansion slots. Commodore also introduced to the U.S. market the one-drive PC10-1 with 512K of memory.

Amstrad From England

Among the companies at CES that were also showing PC compatibles were Amstrad, Franklin, and Victor, each of which seems determined to fight vigorously for the PC-compatible buyers' attention.

Amstrad is a British computer manufacturer that has had success in selling its PC 512 PC clone systems in Great Britain and Europe. The computer has now entered the U.S. and is being distributed by Vidco of Longview, Texas.

The Amstrad PC 512 comes with 512K of RAM, expandable to 640K, an 8086 microprocessor running at 8 MHz, MS-DOS 3.2, three full-size expansion slots, a choice of one or two 360K 5¼-inch floppy disk drives or one floppy with one 20-megabyte hard disk drive, standard RS-232 serial and parallel interfaces, a battery-backed realtime clock, mouse, and a socket for an 8087 math coprocessor.

The PC 512 systems can be purchased for as little as $799, which includes a single drive and a monochrome monitor; or, for as much as $1,499, which includes a 20-meg hard drive and color monitor. There are several variations of features and prices between those two systems, as well. The Amstrad units also come with Digital Research's *GEM Desktop*, *GEM BASIC 2*, and *GEM Paint* software and the user manuals.

The Amstrad machines will be sold in mass market outlets in the U.S., similar to the distribution system used in Europe. "We plan to approach the mass market channels in the United States and feel that the market will require a substantial volume to fill demand," said Vidco president, Vernon Moore.

Franklin And Victor

Franklin Computer, which previously sold only Apple-compatible computers and equipment, has entered the PC-compatible market with two different machines—the $699.95 PC-6000 and the $799.95 PC-8000.

The standard features for each computer include 512K of RAM, which is expandable to 640K; built-

64 or 128

Best Sellers of 1986

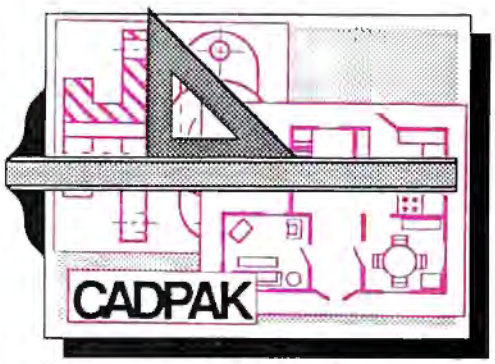
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Features of ***Super Pascal***:

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- advanced error handling
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in 360K floppy drive (the 8000 has two drives); built-in serial, parallel, and monochrome/color graphics adapters; a game port; and MS-DOS 3.1. An optional realtime clock with battery backup is available for $39.95, and a GW-BASIC and MS-DOS 3.2 package can be purchased for $99.

Franklin is aiming its PC compatibles at mass market chains. Some of the major outlets, such as Sears and Electronics Boutique, which already carry the Franklin Ace Apple-compatible computers, are now selling the new Franklin PCs, according to Franklin's president Morton E. David. And like Atari, with its PC compatibles that are usable right out of the box, Franklin and Amstrad are banking on capturing the consumers who don't want to have to learn about expansion slots, accelerator cards, math coprocessors, and the like.

Another MS-DOS machine is the Champion from Victor. Introduced last fall, the $799 Champion PC compatible is an IBM PC/XT clone that uses an 8086 microprocessor running at 4.77 MHz. The system includes 640K of memory, five expansion slots, standard serial and parallel ports, MS-DOS 3.1, *GW BASIC*, one 360K floppy drive (a second is optional), a detachable PC/AT-style keyboard, and a monochrome graphics card. An optional high-resolution monochrome monitor is available for $119.

The New Commodore 128D

Not all of the computer news at CES focused on the 16-bit machines and the MS-DOS clones. The Commodore 64 and 128 computers have continued to sell extremely well. And that has resulted not only in much new software for these computers, but also several important hardware additions.

One of the most noticeable changes within the Commodore booth was an additional configuration of the 128. The Commodore 128D is actually the same machine functionally as the earlier 128, but is structured to be more business-like in its appearance and able to fit more easily on a desk.

The 128D consists of a system box with a built-in 1571 disk drive, a single power supply, and a detachable keyboard with a two-foot cord. The computer console can support a monitor or monitor stand. The 128D works with either a standard television or a computer monitor such as the Commodore 1902 RGBI/composite color monitor.

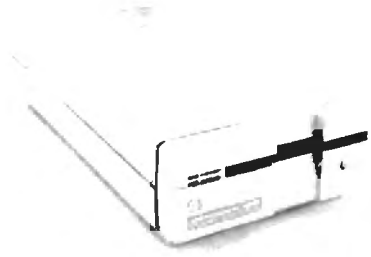
This format of the Commodore 128 has actually been in Europe for more than a year, but couldn't be released in the U.S. at that time because the machine couldn't pass stringent FCC shielding requirements. Now, redesigned to overcome that problem, the computer can enter the U.S. market. The retail price of the 128D should be about $550 when available in May.



The Commodore 128D computer is functionally identical to the original 128, but sports a new business-style configuration with detached keyboard and a system box with built-in 1571 drive that can support a monitor.

New Mass Storage

Both the Commodore 64 and the 128 now have new mass storage options. At CES, Commodofe introduced the 1581 3½-inch disk drive as well as the new 1764 RAM Expansion Module for the 64.



The Commodore 1581 disk drive uses 3½-inch disks that can hold up to 808K of data and can be used with the 64, 128, Plus 4, and 16 computers.

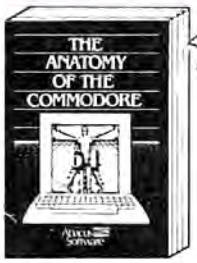
With a retail price of $399, the 1581 drive allows the 64, 128, Plus 4, and 16 computers from Commodore to begin using the increasingly popular 3½-inch disks. Not only do the 3½-inch disks store up to 808K of data, but their hard shells and small size make them easier and sturdier to use. The 1581 is also reportedly three times faster than the 1541 disk drive.

Some Commodore 64 owners have envied 128 owners who've been able to buy either the 1700 or 1750 RAM expanders for their machines. To remedy that, Commodore announced the $129 1764 RAM Expansion cartridge, which gives the 64 a whopping 256K of memory for data or program storage—five times the amount 64 owners have been used to. The expansion module is designed to plug into the 64's expansion port.

The module comes with two software packages, as well. The first is a disk operating system (DOS) program that is designed to help users get the most out of the RAM module as a RAM disk. In other words, memory within the RAM expander is used as a separate floppy drive would be to store and retrieve frequently used data. The loading and saving of information can be virtually instantaneous with a RAM disk.

The second program bundled with the RAM Expansion cartridge is called the *GEOS* RAM Disk, a RAM disk that is set to work under

A few of our Bestsellers



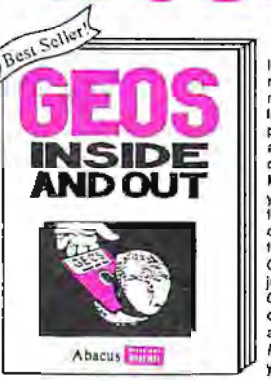
Anatomy of the C-64
Insider's guide to '64 internals. Graphics, sound, I/O, kernal, memory maps, and much more. Complete commented ROM listings. 300pp $19.95



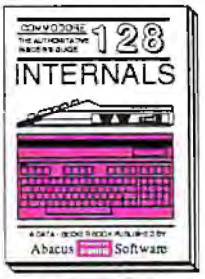
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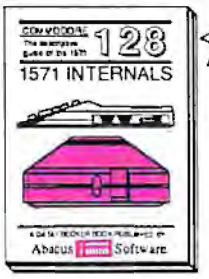
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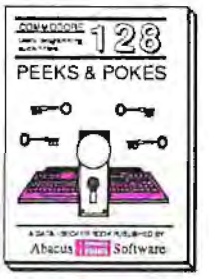
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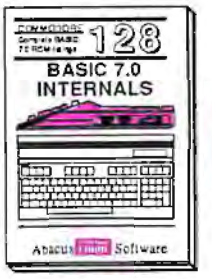
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the popular *GEOS* operating system and its applications. *GEOS* requires disk access numerous times, and the additional memory, when used as a RAM disk, turns *GEOS* and its applications into much easier and faster programs.

More Memory

For those who just can't seem to get *enough* memory, two third-party companies also exhibited their hard drives for the 64 and 128 in the Commodore booth.

JCT (P.O. Box 286, Grants Pass, OR 97526) has 10-meg ($795), 5-meg ($695), and 3.7-meg ($595) hard drives. These work with any machine that uses the Commodore serial bus (128, 64, Plus/4, 16, or VIC, for example). Data transfer on the JCT drives is 1.7–2 times faster than on the 1541, but a parallel option for speeds 10–20 times faster is available (cable and cartridge are $50).

Xetec (2804 Arnold Rd., Salina, KS 67401) displayed its Lt. Kernal 20-Meg Hard Disk Drive. Developed by Fiscal Information, this drive was originally announced more than two years ago, but never distributed. Cardco, a software company, announced its intention to distribute the drive, but soon after, Cardco went out of business. Xetec, awaiting FCC approval at the time of the show, plans to have the drive available through dealers by the time you read this. The suggested retail price for the 64 version is $899; for the 128 version, $949.

Commodore 64 owners will also be happy to know that Commodore is releasing the long-awaited 1351 two-button mouse for cursor movement on the screen. The $49 mouse has two modes of operation: *joystick*, which is familiar to anyone who has used a joystick on the 64, and *proportional*, for precise and measured mouse movements with major applications like *GEOS*.

Moving Ahead

While nothing in the fast-moving microcomputer industry can be taken for granted, CES gave indications that 1987 will be a good year for computer companies and computer users alike.

Commodore has apparently pulled itself out of severe financial straits, posting three consecutive profitable quarters after more than a year and a half in the red. The new Amigas and the continuing successes of the 64 and 128 will certainly help to firm up the bottom line for the rest of 1987 and into 1988.

At the same time, Atari has moved boldly forward in the areas of desktop publishing with the ST, new Mega machines that use state of the art one-megabit dynamic RAM chips, and even the aggressively priced PC compatibles. After going public in late 1986, Atari watched its stock rise steadily.

Apple Computer, with the new GS extension of the Apple II family, looks as though it will move through the year in sound financial shape as well. Although there's bound to be some fallout among the MS-DOS manufacturers as the clone wars heat up, it's clear that this market will be a popular one throughout the year.

What all of this spells for us, the computer users, is the widest selection of popular, powerful, and *usable* machines ever available in the short, turbulent history of this industry. ©

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A Maturing Software Market

Kathy Yakal, Assistant Features Editor

Exciting new hardware was only half the story at January's CES. As the technologies that comprise the consumer electronics industry move closer together and toward the electronic home of the 1990s, software publishers are constantly gauging the entertainment, educational, and personal productivity needs of buyers. Here's a look at how they're doing.

A futurist, observed one computer industry leader recently, is anyone who can even *think* of an idea before Jack Tramiel introduces it on the floor of the Consumer Electronics Show.

Tramiel, the founder of Commodore Business Machines who amazed the industry in 1984 by purchasing the Atari Corporation and bringing it back to financial health, seems to have the ability to come to market faster, and with more inexpensive new products, than anyone else. That's a tough thing to do in this volatile, exciting industry characterized by its rapid growth.

Unfortunately, that growth hasn't helped to foster any single standard of hardware and software, as it has (for the most part) with television, radio, and stereo system components. And no consumer electronics product has achieved widespread household penetration without strict standards for compatibility.

"Over a dozen home computer systems have been marketed over the last few years with totally incompatible operating systems," says David Seuss, president of Spinnaker Software. "Imagine the early days of the TV industry: If you had had to choose from among 15 different TV's, each of which could only receive one channel, and one-third of all the stations went off the air every year, you probably would have said, *TV's not for me, I like my radio. I'll wait 'til next year.*"

Standardization of consumer products like televisions and stereos has not halted improvements in the quality of those items. Witness the recent explosion of improvements in digital TV's, compact disc players, and other electronic entertainment media. Video and audio products continue to get better, smaller, and faster—without confusing the consumer.

Consider, though, what would have happened if the home computer industry had imposed similar standards in its earlier days. Perhaps for every five consumers who scoff at the idea of having a computer in their home, there's one who says, *"Well, this computer doesn't seem to do what I need but this other one does, so I guess I'll buy it...."* And this selectivity is what some industry leaders think attracts many consumers. Uncontrolled growth may make the industry as a whole look unstable, but that free rein has encouraged hardware developers and software publishers to constantly redefine "state-of-the-art."

Further, explorations into new ways of electronically assisting home entertainment, education, and management—extending well beyond the home computer slice of the consumer electronics pie—are paving the way for the powerhouse computers a few years down the road.

Product Pipelines

In the meantime, there's still a healthy and growing installed base of personal computers whose users continue to need software. The U.S. computer manufacturers keep upgrading their existing machines, encouraging third-party peripheral and software development.

Software publishers see several major software niches based on different computers, though each places the order of emphasis differently, depending on their particular specialty. First is the venerable Commodore 64, whose low price and excellent graphics and sound make it a superb game machine.

Second are the PC clones, which are compatible with the MS-DOS format driving the IBM PC. "Over the last year, the PC format has risen to the number 2 position, whereas two years ago it was nonexistent as a home software format," says Trip Hawkins, referring to what he has experienced in the marketing of Electronic Arts popular product line. Hawkins, president of EA, believes MS-DOS software could outsell every other format in 1987.

Third are the powerful 16-bit machines, the Commodore Amiga and Atari ST, which deliver state-of-the-art home computer technology and advanced audio/video features.

And finally the Apple II–series and Macintosh computers continue to redefine educational, desktop publishing, and related markets.

Here are highlights of some of the new products announced at CES, as well as information about



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Moonmist	$22.95
Music Studio	$22.95

Microprose:

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Decision in Desert	$25.95
F-15 Strike Eagle	$22.95
Kennedy Approach	$19.95
Silent Service	$22.95
Top Gunner	$19.95

Microleague:

Micro League Baseball	$24.95
General Manager	$24.95
Stat Disk	$15.95
86 Team Disk	$13.95

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Koronis Rift	$22.95
Summer Games	$23.95

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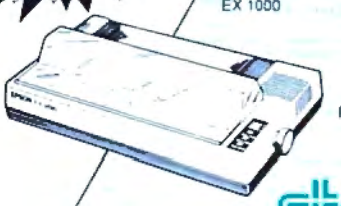
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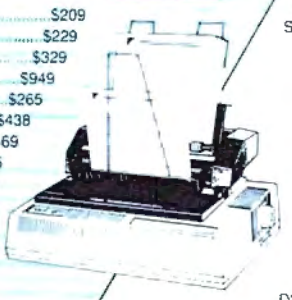


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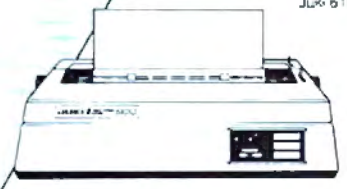
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existing products converted to new machine formats. For more information about new products at CES, see "News & Products," elsewhere in this issue.

Accolade's Comics: This interactive computer comic book was introduced by year-old software publisher Accolade at CES. Its plot revolves around a character named Steve Keene, who must try to thwart evil plots for the Chief of Spystuff, Inc. Unlike text-only adventures, *Accolade's Comics* incorporates detailed color graphics. The player determines the direction of the story by selecting answers to a series of questions. Some of the answers lead to dead ends, and others take you through a variety of themes and plot twists. Several different endings are possible each time the game is played. Arcade action becomes part of the game when Keene falls into traps, inescapable positions, and embarrassing situations. (Commodore 64, $39.95, Accolade)

Aliens: The Computer Game: Based on last summer's hit movie, *Aliens* features six game segments closely tied to the movie's storyline and action. (Commodore 64, $39.95, Activision)

The Bard's Tale: Now available for the Commodore Amiga. ($49.95, Electronic Arts)

The Bard's Tale II: The Destiny Knight: This fantasy sequel to *The Bard's Tale* is even more challenging than its predecessor. It features an expanded dominion for exploration and adventure, and incorporates advanced combat and magic systems. (Commodore 64, $39.95; Apple II version coming, Electronic Arts)

B.I. Calc, File, Spell, Write: Four productivity packages for IBM PC and compatible users, including, respectively, a spreadsheet, a database, a spell checker, and a word processor. The programs are designed for ease of use in home and business environments. ($39.95 each, Batteries Included)

Bop 'N Wrestle, Infiltrator, and *Trailblazer:* Now available for Atari eight-bit computers. ($29.95 each, Mindscape)

Bureaucracy: Fans of Douglas Adams' book *Hitchhiker's Guide to the Galaxy* were delighted when Adams helped design a computer version of that tale for Infocom. Now Adams has lent his comic writing style to Infocom once again by co-designing *Bureaucracy,* a text adventure that wraps up the player in the endless swathes of red tape that everyone faces when dealing with big institutions. (MS-DOS, Apple II and Macintosh, Commodore Amiga, Atari ST, $39.95, Infocom/Activision)

Championship Golf: The Great Courses of the World—Volume One: Pebble Beach: Now available for the Commodore Amiga. ($54.95, Gamestar/Activision)

Create a Calendar: This program offers an assortment of calendar types and a wide variety of decorative fonts, borders, and graphics suitable for special occasions. In addition, graphics from the Epyx *Graphics Scrapbook* series or *The Print Shop* may be used. Multiple lines of text and graphics can be placed on any day of the year, and regularly scheduled events can be repeated automatically. (Commodore 64, Apple II, and MS-DOS compatibles, Epyx)

Dan Dare: Pilot of the Future: In this interactive game, each screen becomes a comic book panel that

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you control, complete with captions, full-color 3-D cartoon graphics, mazes, puzzles, fist fights, and a realistic soundtrack. The game follows the adventures of Britain's popular comic book hero Dan Dare and his pet, Stripey, as they travel to a distant asteroid and neutralize the threat posed by the alien Treens. (Commodore 64, under $20, Electronic Arts)

Data Manager PC: This is a flexible filing and record-keeping system that generates customized data reports and includes a built-in graphics package, print preview mode, and label maker. (IBM PC and compatibles, $59.95, Timeworks)

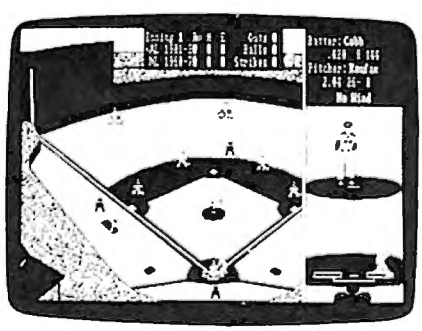
Deluxe Creativity Series: Five productivity packages, compatible with each other, turn the Commodore Amiga and Apple IIGS into home sound/video production studios. The programs include *Deluxe Paint II, Deluxe Music Construction Set, Instant Music, Deluxe Print,* and *DeluxeVideo.* The series is also supported by a growing library of data disks and a quarterly magazine, *DeluxeNews.* (Electronic Arts)

Deluxe Music Construction Set: Now available for the Amiga ($99.95), Macintosh ($99.95), and Apple IIGS. (Electronic Arts)

Deluxe Paint II: Now available for the Apple IIGS. ($99.95, Electronic Arts)

Deluxe Print: Now available for the Apple IIGS. (Electronic Arts)

Earl Weaver Baseball: This is an action/strategy baseball simulation coauthored by Baltimore Orioles' former manager Earl Weaver. (Commodore Amiga, $49.95, Electronic Arts)

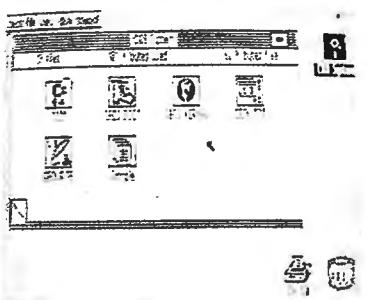


Earl Weaver Baseball *is an action/strategy baseball simulation game for the Commodore Amiga that was designed with the help of former Baltimore Orioles manager Earl Weaver. (Electronic Arts)*

GBA Championship Basketball: Two-on-Two: Now available for the Amiga. ($44.95, Gamestar/Activision)

GFL Championship Football: Now available for the Amiga. ($44.95, Gamestar/Activision)

GEOS: Just one year ago, at the 1986 Winter CES, Berkeley Softworks premiered an operating system/graphics user interface for the Commodore 64 called *GEOS (Graphic Environment Operating System). GEOS* was designed to speed up disk access five to seven times and make the 64 easier to use by providing windows, icons, and pull-down menus. Since then, *GEOS* has been adopted by Commodore as the official operating system for the 64, and it's now bundled with the redesigned Commodore 64C computer.



At the 1986 Winter Consumer Electronics Show, Berkeley Softworks introduced GEOS, *which was adopted as the official graphics user interface for the Commodore 64. At the 1987 WCES, Berkeley premiered an 80-column version of* GEOS *for the Commodore 128. Berkeley also announced a number of new companion packages for the program, including* geoCalc *and* geoFile, *a spreadsheet and database manager.*

At the 1987 Winter CES, Berkeley made a commanding appearance with a large booth across the aisle from Commodore, and the company announced new add-ons for *GEOS. geoCalc* ($49.95) is a spreadsheet program with space for 112 columns and 256 rows of data. It provides basic arithmetic functions to 12 places of accuracy and advanced mathematical functions to nine places of accuracy. In addition, *geoCalc* performs sum and average calculations on data, displays two different portions of a spreadsheet at the same time, does manual or automatic calculations, and lets the user adjust the size of cells.

geoFile ($49.95) is a *GEOS*-based filing system for managing all types of data. And *geoDex* ($39.95) is an electronic card file that lets the user organize names, addresses, phone numbers, and other miscellaneous information by group or alphabetically.

An 80-column version of *GEOS* for the Commodore 128 was also announced. It's expected to be available in the second quarter of 1987. (Commodore 64 and 128, $69, Berkeley Softworks)

GraphicWorks Version 1.1: This product is an upgrade of Mindscape's sophisticated desktop publishing package, *GraphicWorks.* Enhancements include onscreen rulers; color printing; rotation, perspective, skew, and distortion tools; and *PageMaker* 1.2 and 2.0 support. (Apple Macintosh, $99.95; registered owners of the earlier version can receive the upgrade for $19.95; Mindscape)

Guild of Thieves: Firebird offered a sneak preview at CES of its follow-up to its popular text-and-graphics adventure, *The Pawn,* titled *Guild of Thieves.* (Firebird Licensees)

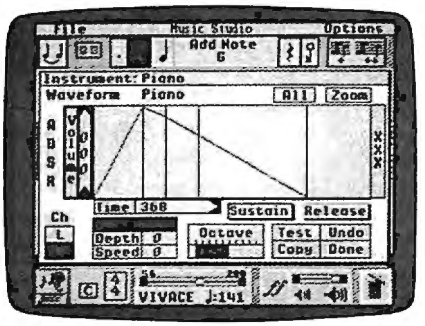
Hollywood Hijinx: The latest Infocom text adventure is a tribute to old Hollywood B-grade movies. You play a character whose Uncle Buddy Burbank has left you a sprawling Malibu estate. The catch is that you must find ten treasures hidden in the estate in one evening, or lose the whole thing. *Hollywood Hijinx* is loaded with the kinds of pure logic problems found in Infocom's classic *Zork* trilogy. (Commodore 64, Atari XE/XL, $34.95; MS-DOS, Apple II and Macintosh, Commodore Amiga, Atari ST, $39.95; Infocom/Activision)

Instant Music: Now available for the Apple IIGS. (Electronic Arts)

Laser Author: One of the first offerings in Firebird Licensees' new business division, *Laser Author* is a document processor/desktop publishing package for the Macintosh. (Apple Macintosh, under $200, Firebird Licensees)

MasterPiece: This professional sequencing program offers dual MIDI port capabilities, 32 tracks, and 24 sequences. (Apple Macintosh and Atari ST, $475, Sonus)

Music Construction Set: Now available for the Apple IIGS. ($49.95, Electronic Arts)



Activision voiced early support for the new Apple IIGS with both entertainment and productivity software. Shown here is The Music Studio, *an easy-to-use music composition tool.*

The Music Studio: Now available for the Apple IIGS. ($79.95, Activision)

PHM Pegasus: Designed in consultation with a former Patrol Hydrofoil Missilecraft (PHM) commander and technical adviser to the U.S. Navy, *PHM Pegasus* puts you in control of a hydrofoil as you battle enemy vessels in any of eight different combat assignments. You complete a basic hydrofoil training session and become part of the Terrorist Action Group (TAG) Force, which can be called to action at any time. (Commodore 64, $39.95; Apple II version to be announced, Electronic Arts)

Partner PC: This is a memory-resident program that operates concurrently with other applications and includes ten time-saving organizational tools. (IBM PC and compatibles, $59.95, Timeworks)

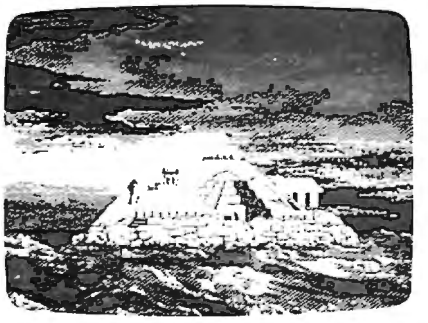
Partner 64: This is a 40-column cartridge-based desktop accessory for the Commodore 64. Memory-resident once it's plugged into the back of the computer, *Partner 64* gives you eight time-saving organizational programs: appointment calendar and date book; memo pad; phone list and autodialer; name and address list; calculator; typewriter; label maker and envelope addresser; and screen print utility. (Commodore 64, $59.95, Timeworks)

PC Voyager: Another of Firebird's new business offerings, *PC Voyager* is an interactive database that helps you plan trips by providing information on such things as hotels, restaurants, ground transportation, and travel routes for specific international locales. (IBM PC and compatibles, under $100, Firebird Licensees)

Portal: Assisted by a biological computer named Homer in the year 2106, you must explore the culture of the twenty-second century to try and find out why all the earth's inhabitants have disappeared. Using Homer's massive database, you learn about such things as the Antarctic Expeditionary Force (AEF), the Elite Neutralization Corps (ENC), and the technology of the era—neurophage weapons, agrobiotics, biomonitors, LN cells, IR nightvision thermography, and induction sensorium. (IBM PC and compatibles, Apple II, $44.95; Macintosh, Commodore Amiga, Atari ST, $49.95; Commodore 64, $39.95, Activision)

PrintMaster Plus: This is an upgrade to Unison World's desktop publishing package, *PrintMaster.* It's designed to allow greater flexibility when creating and printing signs, banners, stationery calendars, and greeting cards. (MS-DOS compatibles, $59.95; Commodore Amiga and 64, Atari ST, $39.95; Apple II version available soon; Unison World)

Red Storm Rising: With the author's assistance, Tom Clancy's bestselling novel *Red Storm Rising* is being developed as a simulation game. The program is expected to appear in late 1987. (Microprose)



One of the first entertainment products announced for the Commodore Amiga at its launch nearly two years ago, Return to Atlantis *is an interactive adventure story with rich graphics and animation. (Electronic Arts)*

Return to Atlantis: One of the first entertainment offerings announced at the launch of the Amiga, this is a novel-sized adventure incorporating stunning graphics and animation. (Amiga, $49.95, Electronic Arts)

Sinbad: This is a new program in the Cinemaware line distributed by Mindscape. Cinemaware titles, available only for the Macintosh, ST, and Amiga, use highly sophisticated color graphics and animation in an interactive game environment. (Cinemaware/Mindscape)



Cinemaware is a line of interactive entertainment software from Mindscape for the Commodore Amiga, Atari ST, and Apple Macintosh that incorporates movie characters and themes in a graphics-intensive environment. Sinbad, *the latest title in the series, debuted at CES.*

Springboard Publisher: Springboard, publisher of the popular productivity programs *The Newsroom* and *Certificate Maker*, has introduced *Springboard Publisher*, a sophisticated desktop publishing program for Apple II–series computers that creates the working environment of the Apple Macintosh on the eight-bit Apple IIs.

Publisher gives the user total control over page design and layout. Pages can be preformatted, or the user can work free-form. Graphics and text can be placed anywhere on the page and rearranged at any time. The program's impressive library of working tools are accessed via pull-down menus, so the user is never required to leave the page currently being designed.

Springboard Publisher is compatible with any Apple IIe, IIc, or IIGS computer with 128K memory, and supports both dot-matrix and laser printers. (Apple II–series with 128K memory, Springboard)

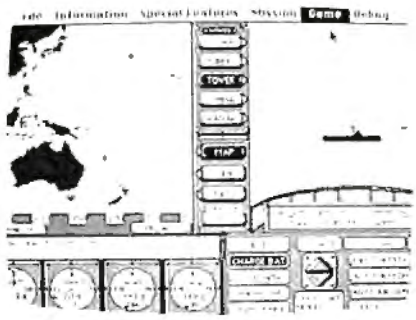
Star Trek: The Promothean Prophecy: Sequel to the popular *Star Trek: The Kobayishi Alternative*, this game features a sophisticated parser that understands nearly 1000 words and can handle multiple sentences and objects. The game's premise involves an alien attack that depletes the U.S.S. Enterprise's food supply; you must beam down to a nearby planet to

replenish the supply. (IBM PC and compatibles, Apple II, $39.95; Commodore 64, $32.95; Simon & Schuster)

Starglider: Excellent 3-D graphics and sound effects contribute to the realism of this fast-action arcade game. Already a hit on the Atari ST, the game requires cunning, skill, and quick reflexes as you do battle with the starship Starglider. (Commodore 64, $39.95; Atari ST, Commodore Amiga, Apple II, and MS-DOS, $44.95; Firebird Licensees)

Stickybear Numbers, Stickybear Math I, Stickybear Reading, Stickybear Typing, and *Stickybear Spellgrabber:* Now available for MS-DOS and compatible computers. ($39.95, Weekly Reader Family Software)

Street Sports Basketball: Epyx made a name for itself in the area of sports simulations with the *Summer Games/Winter Games* series. Now the company has introduced a new sports line, the *Street Sports* series. The first title, *Street Sports Basketball,* was introduced at CES. (Commodore 64, Epyx)



Sub Battle Simulator *signals a return to the kinds of simulations that Epyx published in its early days in the software business. Versions will be available for the Apple II and Macintosh, Atari ST, Commodore 64, and MS-DOS compatibles. The Mac version is shown here.*

Sub Battle Simulator: Another new series announced by Epyx at CES is the Masters Collection, a return to the kinds of simulations that gave Epyx a start in the home computer software business. *Sub Battle Simulator,* first in that series, is a detailed submarine simulation set in World War II. Players can choose from over 60 different missions, all based on actual historical data. (Apple II and Macintosh, Atari ST, Commodore 64; Epyx)

SuperScore: This program loads *SuperScore, Super Sequencer, Glass Tracks,* and *MasterPiece* data files and prints out musical scores; it also serves as an editor and sequencer. (Macintosh and ST, $425, Sonus)

Super Sequencer: A professional MIDI recording system and librarian. (Macintosh, ST, $195, Sonus)

Swiftcalc PC: Now available for IBM PC and compatibles. ($59.95, Timeworks)

Tracker: This game challenges you with fast maneuvers, high-speed 3-D battle sequences, and demanding play action. (Commodore 64, $39.95; Atari ST and Apple Macintosh, $44.95, Firebird Licensees)

TRIO: Already available for the Commodore 64 and Apple II, *TRIO* is an integrated package for the Commodore 128 that includes a word processor, spreadsheet, and database manager. *TRIO WORD* lets you edit text easily, link files together, and work on two documents simultaneously. *TRIO CALC* offers a large, flexible worksheet for financial planning. And *TRIO FILE* offers all the recordkeeping, searching, and printing capabilities of a good database manager. (Commodore 128, $69.95, Softsync)

Word Writer PC: A word processing program for MS-DOS machines, *Word Writer PC* includes a 90,000-word spelling checker, integrated thesaurus with over 60,000 synonyms and alternatives, and an integrated outliner and dictionary. (IBM PC and compatibles, $59.95, Timeworks)

Word Writer 3: This word processor features an 85,000-word spelling checker, integrated thesaurus and outline processor, 80-column print preview mode, and automatic program setup. It's also *GEOS*-compatible. (Commodore 64, $49.95, Timeworks)

Writer's Choice Elite: Part of Activision's Personal Choice line of productivity software, this is an easy-to-use word processing program that offers colored text and highlighting in five colors. (Apple IIGS, $99.95, Activision)

Inexpensive Collections of Oldies

In addition to new products at CES, several companies announced new lower prices for collections of old titles. The Accolade Avantage line includes *Spy vs. Spy I & II, Deceptor,* and *Desert Fox* (Commodore 64, Apple II, Atari 8-bit, $14.95). Electronic Arts added to its line of Software Classics *Archon II: Adept, Skyfox, Movie Maker, Financial Cookbook,* and *Mind Mirror* (most titles available for all eight-bit computers for under $15 each). Activision announced the first in its series of Solid Gold Software titles: *Pitfall!* and *Demon Attack* will be packaged together (Commodore 64/Atari XE/XL "flippy," under $15). Mindscape rolled out its Thunder Mountain Division, previously published and new titles (Apple II and Macintosh, MS-DOS, Commodore 64, and Atari 800, $9.95). And Infocom has bundled its three popular Zork programs in the *Zork Trilogy* (Commodore 64, Atari XL/XE, $59.95; Apple II and Macintosh, Commodore Amiga, MS-DOS compatibles, $69.95).

For more information about any of these products, contact a local retailer or:

Accolade, 20833 Stevens Creek Boulevard, Cupertino, CA 95014

Activision, 2350 Bayshore Parkway, Mountain View, CA 94043

Batteries Included, 30 Mural Street, Richmond Hill, Ontario, Canada L4B 1B5

Berkeley Softworks, 2150 Shattuck Avenue, Berkeley, CA 94704

Electronic Arts, 1820 Gateway Drive, San Mateo, CA 94404

Epyx, 600 Galveston Drive, Redwood City, CA 94063

Firebird Licensees, P.O. Box 49, Ramsey, NJ 07446

Infocom, 125 Cambridge Park Drive, Cambridge, MA 02140

MicroProse, 120 Lakefront Drive, Hunt Valley, MD 21030

Mindscape, 3444 Dundee Road, Northbrook, IL 60062

Simon & Schuster, One Gulf + Western Plaza, New York, NY 10023

Softsync, 162 Madison Avenue, New York, NY 10016

Sonus, 21430 Strathern Street, Ste. H., Canoga Park, CA 91304

Springboard Software, 7808 Creekridge Cir., Minneapolis, MN 55435

Timeworks, 444 Lake Cook Road, Deerfield, IL 60015

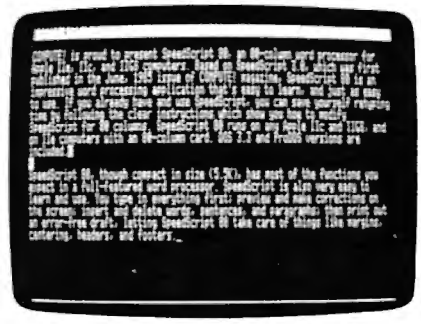
Weekly Reader Family Software, 4343 Equity Drive, P.O. Box 16754, Columbus, OH 43216

SpeedScript 80

The 80-Column Machine Language Word Processor For Apple II

Charles Brannon, Kevin Martin, and Bill Rodrick

COMPUTE! is proud to present SpeedScript 80, *an 80-column word processor for Apple IIe, IIc, and IIGS computers. Based on* SpeedScript 3.0, *which was first published in the June 1985 issue of COMPUTE! magazine,* SpeedScript 80 *is an impressive word processing application that's easy to learn, and just as easy to use. If you already have and use* SpeedScript, *you can save yourself retyping time by following the easy instructions which show you how to modify* SpeedScript *for 80 columns.* SpeedScript 80 *runs on any Apple IIc and IIGS, and on IIe computers with an 80-column card. DOS 3.3 and ProDOS versions are included.*



SpeedScript 80 *is an 80-column version of* SpeedScript, *COMPUTE!'s popular word processor for Apple II computers. This version runs on any Apple IIc and IIGS and on Apple IIe computers with 80-column cards. The program works with either DOS 3.3 or ProDOS.*

SpeedScript 80, though compact in size (5.5K), has most of the functions you expect in a full-featured word processor. *SpeedScript* is also very easy to learn and use. You type in everything first; preview and make corrections on the screen; insert and delete words, sentences, and paragraphs; then print out an error-free draft, letting *SpeedScript 80* take care of things like margins, centering, headers, and footers.

Special Typing Instructions

SpeedScript 80 is a long program, but our "Apple MLX" entry system helps you type it right the first time. MLX can detect most typing errors as they happen. (See the Apple MLX instructions and program elsewhere in this issue.) MLX also lets you type *SpeedScript 80* in more than one sitting. Although the program listing is lengthy, we think you'll agree the effort is worthwhile. If you prefer, you can order this issue's companion disk—which includes *SpeedScript 80*—directly from COMPUTE! Publications by using the coupon in the magazine or by calling COMPUTE! Publications toll-free at 1-800-346-6767 (in NY 1-212-887-8525).

To begin entering the data for *SpeedScript 80,* boot up your Apple with a DOS 3.3 or ProDOS startup disk in the drive. Programs entered with MLX must be saved to disk with the same operating system format as the disk from which MLX was loaded. If you will be using the ProDOS operating system, you must enter the DOS 3.3 version of *SpeedScript 80,* listed at the end of this article, then create a ProDOS version by following the instructions found in the section "ProDOS Modifications."

ProDOS users should read the section "ProDOS Modifications," which explains the conversion procedure, before attempting to run the SpeedScript 80 *program.*

Because the machine language data for *SpeedScript 80* resides in the same area of memory where BASIC programs are normally loaded, it's necessary to reconfigure memory before loading MLX to enter *SpeedScript 80.* Otherwise, the *SpeedScript 80* data you enter with MLX will overwrite the MLX program itself as you type. To reconfigure memory, type the following line in direct mode (no line number) and hit Return:

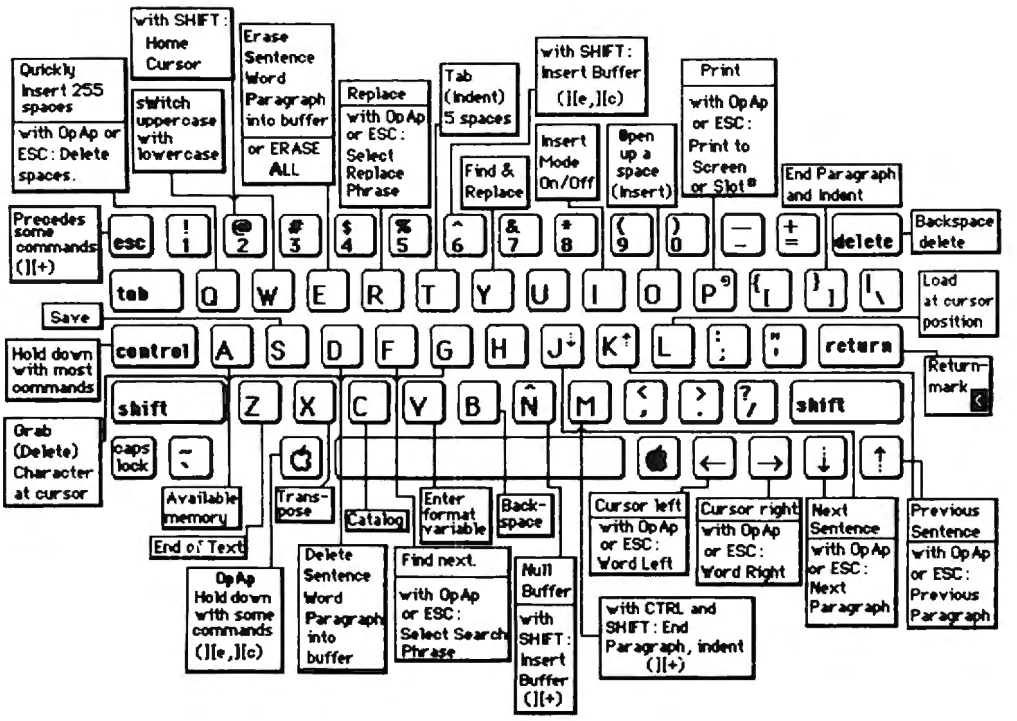
```
POKE 104,32: POKE 8192,0: NEW
```

You must *always* enter this line before loading MLX to enter *SpeedScript 80* data. It is, however, *not* necessary to enter this line before loading the completed *SpeedScript 80* program.

Now run MLX. Respond to its prompts as indicated:

```
STARTING ADDRESS?  0800
ENDING ADDRESS?    1E45
```

An options menu appears next. Press E to Enter the program. Now type the address at which you'd like to start typing. If you're just beginning to type the listing, enter 0800. The screen then shows the first prompt, the number 0800 followed by a colon (:). Type in each two-digit number shown in the *SpeedScript 80* listing (Program 1). Some



of the digits are letters, because the numbers are in hexadecimal. You don't need to type the spaces between the two-digit numbers shown in the listing, but you can for the sake of readability. MLX doesn't let you type illegal characters.

The last number you enter in each line is a *checksum*. If you type the line correctly, the checksum calculated by MLX should match the checksum number you typed in. If it doesn't match, MLX makes you retype the line. MLX is not foolproof, though. It's quite rare, but it's possible that an error in one number could be offset by an error in another. MLX will help catch your errors, but you still must be careful.

Typing in Multiple Sittings

If you want to stop typing the listing at some point and pick up later, press Return at the address prompt without typing anything. Write down the address where you stopped. The options menu reappears, and you can save your typing at this point. To continue entering data the next time, boot your system, enter the direct-mode line given above to configure memory, and load MLX. Answer the STARTING ADDRESS? and ENDING ADDRESS? questions with the same values you used the first time, 0800 and 1E45. Then select Load from the options menu, and press E to enter data. Give MLX the address number where you previously stopped. Then continue typing as before.

When you finish all typing, MLX returns you to the options menu, where you can save the finished program. Since you'll have quite a bit of effort invested in entering all the data, we recommend that you use the MLX Save option to save copies of *SpeedScript 80* on several different disks before you leave MLX.

MLX has now created a binary file on disk. This version of *SpeedScript 80* will run only with DOS 3.3; ProDOS users should read the section "ProDOS Modifications" for information on converting this version of *SpeedScript 80* into a ProDOS version.

Running *SpeedScript 80*

To run *SpeedScript 80* with DOS 3.3, reboot the machine to clear out memory. Then, from BASIC, type **BRUN *filename***, where *filename* is the name you specified when saving *SpeedScript 80* on disk with MLX. *SpeedScript 80* automatically loads and runs. If you prefer, you can write a short program, something like

```
10 PRINT CHR$(4);"BRUN filename"
```

Save it as the HELLO file on the disk (use INIT HELLO to format and set up a blank disk). This makes *SpeedScript 80* load and run automatically when you boot up.

To run the ProDOS version, simply reboot the machine with the *SpeedScript 80* startup disk in the drive, and *SpeedScript 80* will load and run automatically. Alternatively, if you already have ProDOS booted, insert the *SpeedScript 80* disk and at a BASIC] prompt, enter:

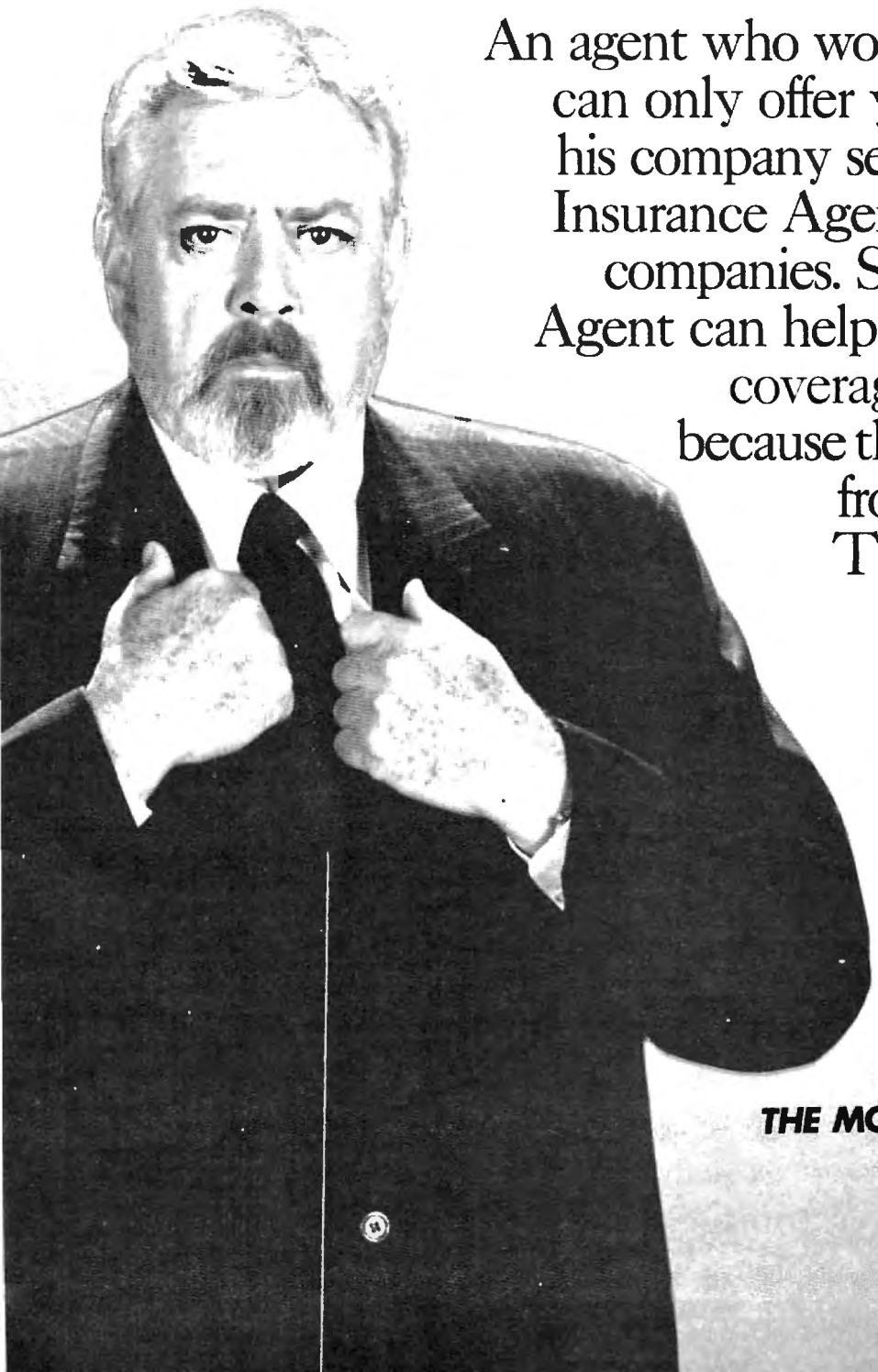
```
-SS.SYSTEM
```

An Empty Page

When you run *SpeedScript 80*, you'll see a blank 80-column screen with

"Before you buy insurance, examine the evidence."

RAYMOND BURR



An agent who works for one company can only offer you the policies that his company sells. An Independent Insurance Agent represents several companies. So your Independent Agent can help you select the right coverage at the right price because there are more policies from which to choose. The evidence is clear.

Independent Insurance Agent.

THE MORE-THAN-ONE-COMPANY INSURANCE AGENT.

You'll find the Independent Insurance Agent nearest you in the Yellow Pages.

a blinking underline cursor. The first line on the screen is in reverse video, white with black letters. *SpeedScript 80* presents all messages on this *command line*. The remaining 20 lines of the screen are used to enter, edit, and display your document.

The clarity of the 80-column display will vary depending on your monitor or television set. If the characters appear fuzzy and a bit unreadable, try adjusting the contrast of the monitor or set while turning up its brightness. This leaves you with a gray background instead of black, but the characters should show up more easily.

The cursor shows where the next character you type will appear on the screen. *SpeedScript 80* lets you move the cursor anywhere within your document, making it simple to find and correct errors.

Entering Text

To begin using *SpeedScript 80*, start typing, just as you would on a typewriter. Hold down the Shift key to type an uppercase letter, and be sure the Caps Lock key is disengaged if you want to type lowercase.

When the cursor reaches the right edge of the screen, it automatically jumps to the beginning of the next line, just as in BASIC. But unlike BASIC, *SpeedScript 80* never splits words at the right edge of the screen. If a word you're typing won't fit at the end of one line, it's instantly moved to the next line. This feature, called *word-wrap*, helps make your text more readable.

Scrolling And Screen Formatting

When you finish typing on the last screen line, *SpeedScript 80* automatically scrolls the text upward to make room for a new line at the bottom. Imagine the screen as a 20-line window on a long continuous document. The DOS 3.3 version provides room in memory for 27,904 characters, or about 10–15 pages of text. Unfortunately, the DOS 3.3 version cannot make use of memory in excess of 48K. However, the ProDOS version of *SpeedScript 80* does give you access to an additional 10K, or about 10,240 more characters.

To check at any time how much space is available, press **Control-A** (hold down the Control key while pressing the A key). The number appearing in the command line indicates how much *available* room remains for characters of text.

If you're used to a typewriter and this is your first experience with word processing, you'll have to unlearn some habits. For one thing, you don't have to press Return at the end of each line as you do on a typewriter. *SpeedScript 80*'s word-wrap takes care of this automatically. Press Return only when you want to force a carriage return to end a paragraph or limit the length of a line. A *return mark* appears on the screen as a reverse less-than sign (<).

Using The Keyboard

Most features are accessed with Control-key commands—you hold down Control while pressing another key. In this article, Control-key commands are represented as **Control-*x*** (where *x* is the key you press in combination with Control). An example is the Control-A, mentioned above, to check on available memory. Control-E means hold down Control and press E.

Some commands have special options. You may be required to press the Open Apple key (the key to the left of the space bar with a hollow Apple symbol on the face) while pressing another key or Control-key combination. The Open Apple key is abbreviated as **OpAp** in this article. **OpAp-Control-*x*** means to press Open Apple in conjunction with a Control-key combination. Other keys are referenced by name or function. See the "Keyboard Map" figure for a complete quick-reference chart of all keyboard commands. Because *SpeedScript 80* uses almost every key, not all combinations are especially mnemonic. Most keys, though, stand for the name of the function they perform.

Some keys let you move the cursor to different places in the document to make corrections or scroll text into view. You can move the cursor by character, word, sentence, or paragraph. Here's how to control the cursor:

- The ← and → keys (cursor-left and cursor-right) move the cursor a single space in either direction. By holding down the Open Apple key while pressing the appropriate cursor key, you can move the cursor to the beginning of the next (→) or previous (←) word.
- The ↑ and ↓ keys (cursor-up and cursor-down) move the cursor to the beginning of either the previous or next sentence. A sentence is defined as any sequence of characters ending in a period, question mark, exclamation point, or return mark. Hold down the Open Apple key as you press the arrow to move to the beginning of the next (↓) or previous (↑) paragraph. A paragraph is defined as any sequence of characters ending in a return mark.
- Pressing **Control-@** (Control-Shift-2) puts the cursor at the top of the screen. If the cursor is already at the top of the screen, Control-@ moves the cursor to the top of the document. To move quickly to the beginning of the document, press Control-@ twice.
- **Control-Z** moves the cursor to the end of the document, scrolling if necessary. It's easy to remember since Z is at the *end* of the alphabet.

Making Corrections

Sometimes, you'll have to insert characters to make a correction. Use **Control-O** to *open up* a single space. Merely position the cursor at the point where you want to insert a space, and press Control-O.

It can be tedious to use Control-O to open up enough space for a whole sentence or paragraph. For convenience, *SpeedScript 80* has an insert mode that automatically inserts space for each character you type. In this mode, you can't type over characters; everything is inserted at the cursor position. To enter insert mode, press **Control-I.** To cancel insert mode, press Control-I again. To let you know you're in insert mode, the cursor changes from a blinking underline to a blinking reverse underline, which looks like a solid square. The cursor changes back to a blinking underline when you exit insert mode. Because of keyboard decoding redundancy, the Tab key works just like Control-I.



	IBM
Algeblaster	27.89
American Challenge	24.89
ASC II Express	74.89
Balance of Power	33.89
Bank Street Writer+	58.89
Breakers	28.89
Certificate Maker Library Vol. 1	41.89
	19.89
dBase III+	419.89
Dollars & Sense	104.89
Easy	88.89
Flight Sim	28.49
Fontrix	88.89
Fontasy	48.89
Fntpks 1 thru 13	ea. 13.89
Framework II	419.89
Fully Powered PC	24.89
Gamecard III	39.89
Gato	21.89
Hacker I or II	24.89
Hellcat Ace	24.89
Jet	31.49
King's Quest I or II	31.89
Load Runner	22.89
Locksmith	56.89
Lotus	319.89
Mean 18	34.89
Mngng Yr Money	114.89
Micro Cookbook	27.89
Microsoft Word	279.00
Multiplan	110.89
Newsroom Pro	74.89
Norton Utilities	58.89
Option Board	79.89
PC Tools	18.89
PFS: Access	59.89
PFS: Files Profes.	148.89
PFS: First Choice	104.89
PFS: Plan Profes.	148.89
PFS: Write Profes.	148.89
Print Shop	34.89
Print Shop Companion	32.89
Print Shop Gr. #1	21.89
Reflex Database	86.89
Report Card	32.89
Sidekick	50.89
Sideways Ver. #3	36.89
Silent Service	22.89
Speedkey	104.89
SuperCalc 4	279.89
Superkey	40.89
Symphony	494.89
Think Tank	99.89
Toy Shop	46.89
Traveling Sidekick	40.89
Turbo Database Tlbx	40.89
Turbo Lighting	58.89
Turbo Pascal 3.0	59.89
Turbo Prolog	58.89
Turbo Tutor	23.89
Ultima III	40.89
Visable 8086	47.89
Volkswriter Dlx #3	141.00
Web. Spell Checker	39.89
Wizardry	36.89
Word Perfect	289.00
Wordstar 2000+	284.89

APPLE SOFTWARE	
Adv. Construction	33.89
Airheart	22.89
Algeblaster	27.89
Alpha Plot	20.89
ASC II Express	74.89
Auto Works	25.89
Bag of Tricks 2	31.89
Bank Street Filer	42.89
Bank Street Mailer	42.89
Bank Street Writer	42.89
Bank Street Speller	42.89
Bard's Tale	39.89
Beagle Bag	15.89
Beagle Basic	18.89
Beagle Compiler	41.89
Beagle Graphics	30.89
Beneath Apple DOS	12.89
Big U	18.49
Bookends	66.89
Bop & Wrestle	18.89
Breakers	28.89
Captain Goodnight	22.89
Carmen Sandiego	25.89
Certificate Maker Library Vol. 1	29.89
	19.89
Chart'n Graph Tlbx	23.89
Classmates	27.89
Database Toolbox	23.89
Dazzle Draw	37.89
D-Code	20.89
DiskQuick	15.89
Dollars & Sense	71.89
DOS Boss	12.89
Double-Take	18.49
Eidolon	24.89
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Insert mode is the easiest way to insert text, but it can become too slow when you're inserting near the top of a very long document, because it must move all the text following the cursor position. So *SpeedScript 80* has even more ways to insert blocks of text.

One way is to use **Control-T**. It's programmed in *SpeedScript 80* to act as a five-space margin indent. To end one paragraph and start another, press Return twice and press Control-T. A shortcut for this is **Control-]**. This key combination automatically inserts two return marks and then indents the margin. Control-T always inserts; you don't need to be in insert mode. You can also use Control-T to open up more space than Control-O. (You cannot set or clear tab stops in *SpeedScript 80* as you can with some word processors.) No matter how much space you want to insert, each insertion takes the same amount of time. So Control-T can insert five spaces five times faster than pressing Control-O five times.

There's an even better way, though. Press **Control-Q** to *quickly* insert 255 spaces. (It doesn't insert a line; use Return for that.) You can press it several times to open up as much space as you need. Control-Q inserts 255 spaces as fast as Control-O opens up one space. Now just type the text you wanted to insert over the blank space. (You don't want to be in Control-I insert mode when you use this trick; that would defeat its purpose.)

Since Delete is also slow when you're working with large documents (it, too, must move all text following the cursor), you may prefer to use the ← key to backspace when using this method.

After you've finished inserting, there may be some inserted spaces left over that you didn't use. Just press **OpAp-Control-Q**. This instantly deletes all extra spaces between the cursor and the start of following text. It's also useful whenever you need to delete a block of spaces for some reason.

Erasing Text

To erase the character on which the cursor is sitting, press **Control-G** (to *grab* the character). The character highlighted by the cursor is re-

ProDOS Modifications

The *SpeedScript 80* word processor listed in this issue is for DOS 3.3. To create an enhanced ProDOS version, you need to do a little more than simply enter the program. (If you've bought this issue's companion disk, the ProDOS version is already on it and no conversion is necessary. However, you will need to refer to the instructions below for putting the *SpeedScript 80* SS.SYSTEM file on a disk with the PRODOS file, but *without* the BASIC.SYSTEM file.)

Apple's ProDOS operating system offers a considerable improvement in performance and utility over DOS 3.3, but it also makes things a little more complicated. ProDOS uses and lays out memory differently from DOS 3.3, so many DOS 3.3 machine language programs are not compatible with ProDOS. Also, many DOS 3.3 functions are not supported in the same way by ProDOS. This is enough to keep the original Apple version of *SpeedScript 80* from running with ProDOS, even if you save it on a ProDOS disk.

The solution is "ProDOS Maker," which changes an existing copy of DOS 3.3 *SpeedScript 80* into a program usable with ProDOS. As a bonus, ProDOS *SpeedScript 80* gives you 10K more of text memory to work with.

Making The Conversion

First, type in *SpeedScript 80* using MLX as described above. To prepare for the conversion, type in and save both Programs 4 and 5 below. Program 4 is a BASIC program that makes the changes to *SpeedScript 80*. Program 5 is a binary file that *must* be typed in with the MLX program.

To enter the data from Program 5, load and run the MLX program. Note that, while special preparations are necessary before loading MLX to enter *SpeedScript 80* data, no unusual steps are needed before loading MLX to enter data from Program 5. Apple MLX asks you for the starting and ending addresses of the program you're typing in. Enter the values as indicated:

```
STARTING ADDRESS? 3AF0
ENDING ADDRESS?   3CBF
```

Next, you'll see a menu. Press E to enter data; then enter **3AF0** as the address at which to begin typing. Program 5 is not a long listing, so take your time and be careful. MLX will ask you to retype a line if you make a mistake. When you finish, you return to the MLX menu. Press S to save the file. You must use the name **SPEEDSCRIPT2** for the data from Program 5, since this is the filename which Program 4 looks for.

After you've typed in the programs (you may want to make backup copies of them on another disk for security), follow these step-by-step instructions:

1. If you have an Apple IIe, load and run the "Filer" system utilities program from your ProDOS master disk. For the Apple IIc, boot up the *System Utilities* disk. For the Apple IIGS, boot up the *System* disk, open the folder SYS.UTILS, and run the application SYSUTIL.SYSTEM.
2. If you're using Filer, select option V (Volume Commands) from the main menu; then select option F (Format a Volume) from the Volume Commands menu. If you're using the IIc *System Utilities* disk, select option 6 (Format a Disk). If you're using the IIGS, select Format a Disk from the column Work on Entire Disks.

   Insert a blank disk into the drive and format it for use with ProDOS. Type in SPEED.DATA for the volume name, or just press Return when asked for the volume name.
3. If you're using Filer, select option F (File Commands) from the main menu; then select option C (Copy Files) from the File Commands menu. From the IIc's *System Utilities* menu, simply select

option 1 (Copy File). For the IIGS, choose Copy File from the column labeled Work on Individual Files.

Copy the file named PRODOS from the ProDOS master disk to your newly formatted ProDOS disk.

4. Now copy the DOS 3.3 version of *SpeedScript 80* to the newly formatted disk. Even if you typed in *SpeedScript 80* and saved it on a ProDOS disk, go ahead and copy it to this disk for convenience. Important: Make sure *SpeedScript 80* is saved on the disk with the filename **SPEEDSCRIPT**, since this is the name Program 4 looks for.
5. Copy Program 4 and the file you created from the data in Program 5 (using MLX) onto the same disk with SPEEDSCRIPT. You can name Program 4 anything you like. We used the name PRODOS.MAKER. Be sure that the binary file created from Program 5 is named SPEEDSCRIPT2.
6. Verify that the disk contains the following files:

PRODOS	*The ProDOS operating system*
SPEEDSCRIPT	*The DOS 3.3 version of SpeedScript 80*
PRODOS.MAKER	*Program 4, the ProDOS Maker BASIC program*
SPEEDSCRIPT2	*The ProDOS Maker binary file (from Program 5)*

7. You're now ready to convert the DOS 3.3 version of *SpeedScript 80* to ProDOS. Run Program 4 (PRODOS.MAKER). It reads the file SPEEDSCRIPT, merges it with SPEEDSCRIPT2, makes some modifications, and then permits you to switch disks before it saves a new file called SS.SYSTEM, which is the ProDOS version of *SpeedScript 80*. We recommend leaving the same disk in the drive the first time you perform the conversion process. Later, you can use ProDOS Maker to create additional copies of ProDOS *SpeedScript 80* on other disks, or simply copy the file SS.SYSTEM onto a backup disk with the Copy Files utility. If you want the backups to be *SpeedScript 80* startup disks, make sure each disk contains the PRODOS file and does *not* have the file BASIC.SYSTEM on it. (Otherwise, BASIC.SYSTEM will take priority over SS.SYSTEM, and SS.SYSTEM will not boot up automatically.)
8. Your new ProDOS *SpeedScript 80* disk is now ready to boot up and use. Just insert the disk into the drive and turn on your computer—*SpeedScript 80* automatically loads and runs. To run *SpeedScript 80* after you've already booted up your system from another ProDOS startup disk, just enter **-SS.SYSTEM**. The hyphen (-) is the ProDOS "smart load" command.

Using ProDOS *SpeedScript 80*

The ProDOS version of *SpeedScript 80* varies only slightly in operation from the original DOS 3.3 version. Because ProDOS is stored in the upper 16K of memory, and because BASIC.SYSTEM is not needed for *SpeedScript 80*, you have about 10K more of text memory in ProDOS than you do with DOS 3.3.

All changes in the instructions for using the ProDOS version of *SpeedScript 80* are to support ProDOS filename conventions. Control-C still displays a disk catalog. But the filename convention for Load, Save, and the **G** (goto file) printkey command has changed. If you boot *SpeedScript 80* off its own startup disk, it remembers the volume name of the disk it was booted from. You don't have to enter a volume name to load, save, or link to a file on that disk. Just enter any legal ProDOS filename. Remember that—unlike DOS 3.3—ProDOS does not allow spaces in filenames. Using spaces in a filename courts disaster.

To access a file on any other disk, though, you'll have to enter the volume name. For example, if you want to load the file named SPROITZ from a disk with the volume name BLANK27, enter /BLANK27/SPROITZ at the LOAD: prompt. Just surround the volume name with slashes. If you have two drives, ProDOS automatically searches for the indicated volume name on both drives.

moved, and all following text is moved toward the cursor to fill the empty space.

Press the **Delete** key to delete the character to the left of the cursor. All the following text is moved with the cursor to fill the empty space.

These keys are fine for minor deletions, but it could take all day to delete a whole paragraph using them. So *SpeedScript 80* has two commands that can delete an entire word, sentence, or paragraph at a time. **Control-E** erases text *after* (to the right of) the cursor position (and can also erase all text), and **Control-D** deletes text *preceding* the cursor.

To use the Control-E erase mode, first place the cursor at the beginning of the word, sentence, or paragraph you want to erase. Then press Control-E. The command line shows the message ERASE (S,W,P,A): RETURN TO EXIT. Press S to erase a sentence, W for a word, or P for a paragraph. Each time you press one of these letters, the text is quickly erased. You can keep pressing S, W, or P until you've erased all the text you wish. Then press RETURN to exit the erase mode.

You also use Control-E to erase all text from memory when you want to start a new document. To erase all text, press Control-E; then press the A *(all)* key. A prompt appears: ERASE ALL TEXT: ARE YOU SURE (Y/N). Press Y to perform the irreversible deed. You cannot recover any text erased in this way. Press N or any other key to cancel this function.

The Control-D delete mode works similarly to Control-E, but it deletes only one word, sentence, or paragraph at a time. First, place the cursor after the word, sentence, or paragraph you want to delete. Then press Control-D. Next, press S, W, or P for sentence, word, or paragraph. The text is immediately deleted and you return to editing. You don't need to press Return to exit the Control-D delete mode unless you pressed this key by mistake. *(In general, you can escape from any function in SpeedScript 80 by simply pressing Return.)* Control-D is most convenient when the cursor is already past what you've been typing.

The Text Buffer

When you erase or delete with Control-E and Control-D, the text isn't lost forever (unless you've performed an Erase All). *SpeedScript 80* remembers what you've removed by storing deletions in a separate area of memory called a *buffer*. The buffer is a fail-safe device. If you erase too much or change your mind, just press **Control-^** (Control-Shift-6) to restore the deletion. Be aware, however, that *SpeedScript 80* normally remembers only the last erase or delete you performed. It's not hard to remember this command, since the ^ (caret) symbol is used in paper-and-pencil editing to signify an insertion.

Another, more powerful use of this buffer is to move or copy sections of text. To move some text from one location in your document to another, first erase or delete it with Control-E or Control-D. Then move the cursor to where you want the text to appear and press Control-^. Control-^ instantly inserts the contents of the buffer at the cursor position. If you want to copy some text from one part of your document to another, just erase or delete it with Control-E or Control-D, restore it at the original position with Control-^, then move the cursor elsewhere, and press Control-^ to restore it again in the new position. You can retrieve the buffer with Control-^ as many times as you like. If there is no room left in memory for inserting the buffer contents, you'll see the message NO ROOM.

Important: The Control-E erase mode lets you erase up to the maximum size of the buffer (2K, or about 2,000 characters). If you try to erase more text than the buffer will hold, you'll get the message BUFFER FULL, and erase mode will be canceled. Each new Control-E removes the previous contents of the buffer. Keep this in mind if there's something in the buffer you'd rather keep. If you don't want the current buffer contents to be erased, hold down the Open Apple key when you press Control-E. **OpAp-Control-E** works just like Control-E, except that it preserves the current buffer contents and adds the newly erased text to the buffer.

If you ever need to erase the contents of the buffer, press **Control-N** *(null buffer)*. As an added safety measure, you'll be asked if you are sure you want to erase the buffer. Press Y to null the buffer, and N (or any other key except Y) to cancel the command.

Search And Replace

SpeedScript 80 has a FIND command that searches through your document to find a selected word or phrase. A Replace option lets you automatically change one word to another throughout the document.

OpAp-Control-F *(find)* lets you define a search phrase, or **OpAp-Control-R** *(replace)* lets you define a replace phrase, and **Control-Y** is used for automatic searching and replacing.

Searching is a two-step process. First, you need to tell *SpeedScript 80* what to search for; then you trigger the actual search. Hold down Open Apple and press Control-F. The command line prompts FIND:. Type in what you'd like to search for—the *search phrase*—and then press Return. If you press Return alone without typing anything, the Find command is canceled.

When you're ready to search for the specified phrase, press **Control-F** (without the Open Apple). *SpeedScript 80* looks for the next occurrence of the search phrase *starting from the current cursor position.* If you want to hunt through the entire document, press Control-@ twice to move the cursor to the very top before beginning the search. Each time you press Control-F, *SpeedScript 80* looks for the next occurrence of the search phrase and places the cursor at the start of the phrase. If the search fails, you'll see the message NOT FOUND.

Control-R works together with Control-F. After you've specified the search phrase with OpAp-Control-F, press OpAp-Control-R to specify the replace phrase. (You can press Return alone at the REPLACE WITH: prompt to select a *null* replace phrase. When you hunt and replace, this deletes the located phrase.) To search and replace manually, start by pressing Control-F. After *SpeedScript 80* finds the search phrase, press Control-R if you want to replace the phrase. If you don't want to replace the phrase, don't press Control-R. You're not in a special search-and-replace mode. You're free to continue writing at any time.

Control-Y links Control-F and Control-R together. (Think of the two branches of the Y linking together Find and Replace.) It first asks for a search phrase, then asks for a replace phrase, and finally, automatically searches and replaces throughout the document starting from the current cursor position.

There are a few things to watch out for when you're using search and replace. First, realize that if you search for *the*, *SpeedScript 80* finds the embedded *the* in words like *therefore* and *heathen*. If you changed all occurrences of *the* to *cow*, these words would become *cowrefore* and *heacown*. If you want to find a single word, be sure to include a space as the first character of the word, since almost all words are preceded by a space. Naturally, if you're replacing, you need to include the space in the replace phrase, too.

SpeedScript 80 also distinguishes between uppercase and lowercase. The word *Meldids* does not match with *meldids*. *SpeedScript 80* will not find a capitalized word unless you capitalize it in the search phrase. To cover all bases, you will sometimes need to make two passes at replacing a word. Keep these things in mind when using Control-Y, since you don't have a chance to stop a linked find-and-replace.

Storing Your Document

To store your text, press **Control-S**. You'll see the prompt SAVE:. Type in a legal filename and press Return. *SpeedScript 80* defaults to drive 1. If you need to access a second disk drive, precede the filename with **2:**. Once specified, this becomes the default drive for future disk access. To return to drive 1, precede the filename with **1:**.

If the filename you specify coincides with one already on the disk, the existing file will be overwritten by the new one. (You won't be given any warning, so be careful

not to accidentally use duplicate filenames.) You can press **Control-C** to display a catalog of the files on the disk. The catalog pauses when the screen is full, waiting for you to press a key to continue. When the catalog is finished, press Return to return to editing.

Control-S always saves the entire document. The cursor position within the document is not important.

When the save is complete, *SpeedScript 80* reports NO ERRORS if all is well, or it gives a message like DISK FULL if not. Check your DOS or BASIC manual for a list of error messages and their causes.

Loading A Document

To recall a previously saved document, press **Control-L**. Answer the LOAD: prompt with the filename. Again, you can precede the filename with **1:** or **2:** to switch drives as necessary. *SpeedScript 80* loads the file and will display NO ERRORS if no problems are encountered in the load; otherwise, it reports the error.

It's important to position the cursor correctly before loading a file. Documents start loading at the cursor position, so be sure to press Control-@ twice or Control-E and A (Erase All) to move the cursor to the start of text, unless you want to merge two documents. When you press Control-L to load, a flashing asterisk appears to warn you if the cursor is not at the top of the document.

To merge two or more files, simply load the first file, press Control-Z to move the cursor to the end of the document, and then load the file you want to merge. Do not place the cursor somewhere in the middle of your document before loading. A load does not insert the text from disk, but overwrites all text after the cursor position. The last character loaded becomes the new end-of-text pointer, and you cannot access any text that appears ahead of this pointer.

SpeedScript 80 stores documents as binary files, so you cannot read a document in BASIC, load a BASIC program into *SpeedScript 80* for editing, or upload a document file with a modem. However, Programs 2 and 3 (both of which appear after the listing for *SpeedScript 80* itself) are file-conversion programs which allow these functions. They convert *SpeedScript 80* binary document files into ASCII text files. They can also convert an ASCII text file into a *SpeedScript 80* binary file. This lets you convert documents from other word processors or change a *SpeedScript 80* document into a text file suitable for uploading via telecommunications. You can even edit BASIC programs with *SpeedScript 80*. Add the following line to your BASIC program and run it. It creates a text file of your BASIC listing.

```
0 PRINT CHR$(4);"OPEN filename":
  PRINT CHR$(4)"WRITE filename":
  LIST
```

Use the *SpeedScript 80* "File Converter" (Program 2 for DOS 3.3 or Program 3 for ProDOS) to convert the program text file into a *SpeedScript 80* file. You can then load this file into *SpeedScript 80* for editing. Save the edited file back to disk, run the File Converter program again to convert the *SpeedScript 80* file back to a text file, and then use EXEC *filename* to read the text file back into BASIC. Although this seems rather tedious, you may find it worthwhile when working with long programs. A similar technique can be used to edit files written by other applications.

Note: Delete any print-formatting commands (described below) before using the File Converter program to change a *SpeedScript 80* file into a text file. Otherwise, the embedded commands will not be converted properly, and the text file may not be usable.

Additional Features

SpeedScript 80 has a few commands that don't do much, but are nice to have. **Control-X** exchanges the character under the cursor with the character to the right of the cursor. Thus, you can fix transposition errors with a single keystroke. **Control-W** (think *sWitch)* changes the character under the cursor from uppercase to lowercase, or vice versa.

Apple *SpeedScript 80* traps the Reset key. Reset and Control-Reset always return you to editing mode. There's no way to exit *SpeedScript 80* once you've run it, short of rebooting.

Printing

If you already think *SpeedScript 80* has plenty of commands, wait until you see what the printing package offers. *SpeedScript 80* supports an array of powerful formatting features. It automatically fits your text between left and right margins that you can specify. You can center a line or block it against the right margin. *SpeedScript 80* skips over the perforation on continuous-form paper, or it waits for you to insert single-sheet paper. A line of text can be printed at the top of each page (a *header*) and/or at the bottom of each page (a *footer*), and can include automatic page numbering, starting with whatever number you like.

SpeedScript 80 can print on different lengths and widths of paper, and single-, double-, or triple- spacing (or any spacing, for that matter) is easy. You can print a document as big as will fit on a disk by linking several files together during printing. You can print to the screen or to a file instead of to a printer. You can send special codes to the printer to control features like underline, boldface, italics, and double-width typeface (depending on the printer).

But with all this power comes the need to learn additional commands. Fortunately, *SpeedScript 80* sets most of these variables to a *default* state. If you don't change the settings, *SpeedScript 80* assumes a left margin position of 5, a right margin position of 75, no header or footer, single-spacing, and continuous-paper page feeding. You can change these default settings if you want (see below).

Before printing, be sure the paper in your printer is adjusted to top-of-form (move the paper perforation just above the printing element). One additional note: Some printers incorporate an automatic skip-over-perforation feature. The printer skips to the next page when it reaches the bottom of a page. Since *SpeedScript 80* already controls paper feeding, you need to turn off this automatic skip-over-perforation feature before running *SpeedScript 80*, or paging won't work properly.

To begin printing, press **Control-P**. If your printer is attached, powered on, and selected (online),

Modifying An Existing Copy Of *SpeedScript 3.0*

If you already have a copy of *SpeedScript 3.0*—typed in from the June 1985 issue of COMPUTE! or from the book *SpeedScript: The Word Processor for Apple Personal Computers*—you don't have to type in the listing for *SpeedScript 80*. Instead, you can modify, or *patch*, *SpeedScript 3.0*. The result, *SpeedScript 80*, is no larger than your original copy and maintains full command and file compatibility. It doesn't even matter if you have a DOS 3.3 or ProDOS version of *SpeedScript 3.0*—methods for patching both are given here.

Bug Fixes

Before you begin to patch *SpeedScript 3.0*, though, you must make some slight corrections to the program. As originally published in both the magazine and book forms, *SpeedScript 3.0* has two bugs: an underline bug, which prints garbage characters whenever the underline toggle (Control-V, U) is used; and the header bug, which shifts the first header on a page to the right of its proper position. These corrections originally appeared in the article "*SpeedScript 3.0* Revisited" in the December 1985 issue and in the "CAPUTE!" column in the March 1986 issue. If you have already made these corections to your copy of *SpeedScript 3.0*, skip ahead to the section entitled "The Patch."

The following corrections apply only to the DOS 3.3 version of *SpeedScript*. To create a corrected ProDOS version, you must correct the DOS 3.3 version, then follow the directions in the section "ProDOS Modifications" to turn this into a ProDOS version.

The following program fragments should be typed in with Apple MLX. Before you load Apple MLX, you must reconfigure memory with the following POKEs. These POKEs prevent memory conflicts between MLX and *SpeedScript*.

```
POKE 104,32:POKE 8192,0:NEW
```

These are the same POKEs used to type in *SpeedScript* with Apple MLX, and must be used every time you wish to edit *SpeedScript* with Apple MLX.

After typing these POKEs and running Apple MLX, enter the starting and ending addresses as indicated:

```
STARTING ADDRESS? 0800
ENDING ADDRESS?   1E45
```

Next, press L to select (L)OAD FILE from the menu, and give the filename of the original *SpeedScript 3.0* file. You *must* load a copy of *SpeedScript 3.0* before making the following patches.

To make the first correction, press E to select (E)NTER DATA, and enter **1C58** for the address. Type in these seven lines:

```
1C58: D0 10 38 AD D7 1E ED 53 45
1C60: 1E 38 ED D6 1E A8 A9 A0 68
1C68: D0 E0 C9 55 D0 0A AD EC C6
1C70: 1E 49 01 8D EC 1E 10 B1 B4
1C78: C9 63 D0 11 8C E5 1E AE 80
1C80: DD 1E AD DE 1E 20 24 ED 7A
1C88: AC E5 1E D0 9C AE E6 A9 78
```

When you've finished this block, press Return on the next line to get back to the main menu. Press E to select (E)NTER DATA; then enter **1DE0** and type in this last line:

```
1DE0: D4 C9 CE C7 AE AE 8D 6C 06
```

Press Return on the next line; then press S, for (S)AVE DATA, to save your modified copy of *SpeedScript 3.0*. Now you're ready to patch your corrected version of *SpeedScript* to turn it into *SpeedScript 80*.

The Patch

First, type in Programs 6 and 7. Program 6 (SS80.MAKER) is a BASIC program and is easily entered using Apple Automatic Proofreader. As listed, though, SS80.MAKER works only with DOS 3.3.

Note: Take a look at line 100 of Program 6. Change the statement F1$ = "SPEEDSCRIPT" *to reflect the filename you used for* SpeedScript 3.0 *(or change the disk filename to match what's in SS80.MAKER).*

If you're using ProDOS, replace lines 100–110 with the following:

```
100 F1$ = "SS.SYSTEM" : F2$ = "
    SS80.SYSTEM"
105 FA$ = ",A$2000" : FL$ = ",L
    $1CBF" : FT$ = ",TSYS"
110 B1 = 8242 : B2 = 4096
```

These lines inform SS.MAKER of the source and destination files being used, as well as their load and program start addresses.

ProDOS users also need to add the following three lines to Program 6:

```
555 PRINT D$;"CREATE ";F2$;FT$
2200 DATA 6964,1,185,20
2210 DATA -1,3038
```

Line 555 contains a ProDOS command which must be executed before saving the new file. Line 2200 prevents a call to a routine which would reset the video output to 40 columns before printing a ProDOS error message.

Before you run Program 6, you must enter the data from Program 7 (PATCH.80). This data must be entered using MLX. Load and run Apple MLX; then respond to the prompts as indicated:

```
STARTING ADDRESS? 2000
ENDING ADDRESS?   2171
```

When you see the menu, press E to enter data; then enter **2000** as the address to begin typing. When you've finished (it shouldn't take you long—PATCH.80 is short), use the S command to save the file. *It's important that you name the file* PATCH.80, *since that's what the SS80.MAKER program expects to find.*

Ready To Convert

You're ready to begin the conversion process. First, though, make sure that your disk contains the necessary files.

For DOS 3.3, the files are

SPEEDSCRIPT	*The corrected version of* **SpeedScript 3.0**
SS80.MAKER	*Program 6*
PATCH.80	*The binary file data from Program 7*

For ProDOS, the files are

PRODOS	*The ProDOS operating system*
BASIC.SYSTEM	*The ProDOS BASIC interface*
SS.SYSTEM	*The corrected ProDOS version of* **SpeedScript 3.0**
SS80.MAKER	*Program 6 with ProDOS modifications*
PATCH.80	*The binary file data from Program 7*

Before running SS80.MAKER to convert a DOS 3.3 version of *SpeedScript 3.0*, type this line in direct mode (without a line number):

```
POKE 104,48: POKE 12288,0: NEW
```

This prevents *SpeedScript 3.0* from overwriting SS80.MAKER as it's loaded into memory.

Now, for both versions, type **RUN SS80.MAKER**. As it's performing the conversion, you'll see a series of progress messages. If any of the DATA statements were entered incorrectly, the message *ERROR IN DATA STATEMENTS* appears. If this happens, correct the appropriate line, save the program again, and start over.

When you're prompted to insert a disk to receive the new file, simply hit Return or insert a new disk in the drive before doing so. (It's a good idea to use the same disk the first time through the procedure.)

Your 80-column version of *SpeedScript* is now ready to use. For the DOS 3.3 version, type **BRUN SPEEDSCRIPT80**. For the ProDOS version, type **−SS80.SYSTEM**. After you're satisfied that everything works as it should, you'll probably want to copy the new version to another disk. For ProDOS, the disk with SS.SYSTEM should contain the PRODOS file, but *not* the BASIC.SYSTEM file.

Changes From 3.0

If you've used *SpeedScript 3.0*, you know all there is to know about *SpeedScript 80*. No new functions or features have been added. However, there are a few purely cosmetic changes that you should be aware of.

First, printer format variables now appear on the screen in reverse video, not as flashing characters. The reason for this is that the Apple cannot display flashing characters in 80-column mode. Instead, the IIe displays that part of its character set as reverse characters. The Enhanced IIe, the IIc, and the IIGS have special graphics characters known as MouseText in part of that area of the character set. Since that would have resulted in an odd-looking display, the original REFRESH routine was modified to display all format codes as reverse video. Internally, though, the codes remain unchanged, maintaining file compatibility with the original version.

Secondly, you may notice that refreshing the screen takes a bit longer than in the original version, simply because the REFRESH routine has about twice as much text to write each time it's called. This is really only noticeable when you continuously hold down a key (using auto-repeat) such as the right- or left-arrow key. Use the program's advanced cursor commands to avoid this.

To gain a little extra speed and improve readability, the second line and the last two lines are unused. A horizontal line is also drawn at the bottom to give a "window" effect.

SpeedScript 80 begins printing immediately. To cancel printing, press Control and the Reset key.

If you need to print to an RS-232 printer or to a printer in a slot other than slot 1, press **OpAp-Control-P**. This brings up the prompt PRINT TO: SCREEN, PRINTER? Press S to print to the screen. *SpeedScript 80* automatically prints to the screen, simulating the printer.

If you select P, you'll be asked for the slot number. Output is sent to the slot number you select. It's similar to PR# in BASIC. If you print to slot 6 (the disk drive), you'll cause the system to reboot, so be careful.

Formatting Commands

The print formatting commands are single letters embedded in text, such as L for left margin. To enter a formatting variable, press **Control-V**. You'll see the prompt ENTER FORMAT VARIABLE:. Now press any key. The print formatting commands must be distinguished from normal text, so they appear on-screen in reverse video. All lettered printer commands should be entered without the Shift key. During printing, *SpeedScript 80* treats these characters as printing commands.

There are two kinds of printing commands—Stage 1 and Stage 2. Stage 1 commands usually control such variables as left and right margins. Most are followed by a number, with no space between the command and the number. Stage 1 commands are executed before a line is printed.

Stage 2 commands, like centering and underlining, are executed while the line is being printed. Usually, Stage 1 commands must be on a line of their own, although you can group several Stage 1 commands together on a line. Stage 2 commands are by nature embedded within a line of text. Again, remember to press Control-V to enter the boldface characters shown below.

Stage 1 Commands

L Left margin. Follow with a number from 0 to 255. Use 0 for no margin. Defaults to 5.

R Right margin position, a number from 1 to 255. Defaults to 75. Be sure the right margin value is greater than the left margin value, or *SpeedScript 80* will behave unpredictably.

T Top margin. The position at which the first line of text is printed, relative to the top of the page. Defaults to 5. The header (if any) is always printed on the first line of the page, before the first line of text.

B Bottom margin. The line at which printing stops before continuing to the next page. Standard 8½ × 11–inch paper has 66 lines. Bottom margin defaults to line 58. Don't make the bottom margin greater than the page length.

P Page length. Defaults to 66. If your printer does not print six lines per inch, multiply lines-per-

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inch by 11 to get the page length. European paper is usually longer than American paper—11⅝ or 12 inches. Try a page length of 69 or 72.

S Spacing. Defaults to single-spacing. Follow with a number from 1 to 255. Use 1 for single-spacing, 2 for double-spacing, and 3 for triple-spacing.

@ Start numbering *at* page number given. Page numbering normally starts with 1.

? Disables printing until selected page number is reached. For example, a value of 3 would start printing the third page of your document. Normally, *SpeedScript 80* starts printing with the first page.

X Sets the page width in columns (think *a cross*). Defaults to 80. You need to change this for the sake of the centering command if you're printing in double width or condensed type, or if you're using a 40-column or wide-carriage printer.

N Forced paging. Normally, *SpeedScript 80* prints the footer and moves on to the next page only when it has finished a page, but you can force it to continue to the next page by issuing this command. It requires no numbers.

M Margin release. Disables the left margin for the next printed line. Remember that this executes before the line is printed.

W Page wait. This command should be placed at the beginning of your document before any text. With page wait turned on, *SpeedScript 80* prompts you to INSERT NEXT SHEET, PRESS RETURN when each page has been printed. Insert the next sheet, line it up with the printhead, and then press RETURN to continue. Page wait is ignored during disk or screen output.

J Causes *SpeedScript 80* to automatically add a linefeed character after each carriage return sent to the printer. Like W, this command must be placed before any text. Use this command only if your printer puts all text on the same line when you try to print your document. (Don't use this command to achieve double-spacing.)

I Information. This works like REM in BASIC. You follow the command with a line of text, up to 255 characters, ending in a return mark. This line will be ignored during printing and is handy for making notes to yourself (such as the filename of the document).

H Header define and enable. The header must be a single line of text (up to 254 characters) ending in a return mark. The header prints on the first line of each page. You can include Stage 2 commands such as centering and page numbering in a header. You can use a header by itself without a footer. The header and footer should be defined at the top of your document, before any text. If you want to prevent the header from printing on the first page, put a return mark by itself at the top of your document before the header definition.

F Footer define and enable. The footer must be a single line of text (up to 254 characters) ending in a return mark. The footer prints two lines prior to the last line of each page. As with the header, you can include Stage 2 printing commands, and you don't need to set the header to use a footer.

G Go to (link) next file. Put this command as the last line in your document. Follow the command with the filename (with no spaces between the G and the filename), including the drive number prefix 1: or 2: if appropriate. After the text in memory is printed, the link command loads the next file into memory. You can continue linking successive files, but don't include a link in the last file. Before you start printing a linked file, make sure the first of the linked files is in memory. When printing is finished, the last file linked to will be in memory.

Stage 2 Commands

These commands either precede a line of text or are embedded within one.

C Centering. Put this at the beginning of a line you want to center. This centers only one line ending in a return mark. Repeat this command at the beginning of every line you want centered. Centering uses the page-width setting (see above) to center the line properly. To center a double-width line, either set the page width to 40 or pad out the rest of the line with an equal number of spaces. If you use double width, remember that the spaces preceding the centered text will be double-wide spaces.

E Edge right. This works in the same way as centering, but it blocks the line flush with the right margin.

When *SpeedScript 80* encounters this command, it prints the current page number. You usually embed this within a header or footer.

U A simple form of underlining. It works only on printers that recognize CHR$(8) as a backspace and CHR$(95) as an underline character. Underlining works on spaces, too. Use the first U to start underlining and another one to turn off underlining.

Fonts And Styles

Most dot-matrix printers are capable of more than just printing text at 10 characters per inch. Some printers have several character sets, with italics and foreign language characters. Most can print in double width (40 characters per line) or condensed (132 characters per line), and in either pica or elite. Other features may include programmable characters, programmable tab stops, and graphics modes. Many word processors customize themselves to a particular printer, but for flexibility *SpeedScript 80* was purposely designed not to be printer-specific. Instead, *SpeedScript 80* lets you define your own Stage 2 printing commands.

You define a programmable *printkey* by choosing any character that is not already used for other printer commands. The numbers 0–9, most symbols, and some alphabetic characters are available for printkeys. You enter these commands, like printer commands, with Control-V. The printkeys are like variables in BASIC.

To define a printkey, press **Control-V**; then type the key you want to assign as the printkey, then an equal sign (=), and finally the ASCII value to be substituted for the printkey during printing. As a result, whenever *SpeedScript 80* encounters the printkey embedded in text, it prints the character with the ASCII value you previously defined. (If you have trouble passing some printkeys to the printer, try adding 128 to the ASCII value you

wish to send. Otherwise, some printer interfaces intercept the printkey.)

For example, to define the + key as the letter z, first look up the ASCII value of the letter z (in either your printer manual or in the BASIC manual). The ASCII value of z is 122, so the definition is

```
+=122<
```

Now, anywhere you want to print the letter z, substitute the printkey:

```
Gad+ooks! The +oo is +any!<
```

This will appear on paper as

Gadzooks! The zoo is zany!

More practically, here's how you could program italics on an Epson MX-80–compatible printer. You switch on italics by sending an ESC (a character with an ASCII value of 27), then the character 4. You turn off italics by sending ESC 5. So, define * as the escape code (27). Anywhere you want to print a word in italics, bracket it with *4 and *5.

You can similarly define whatever codes your printer uses for features like double width or emphasized mode. For your convenience, four of the printkeys are predefined, though you can change them. The keys 1–4 are defined as character codes 27, 14, 15, and 18, common values for most printers. On most printers, CHR$(27) is the ESC key, CHR$(14) starts double-width printing, CHR$(15) either stops double-width or starts condensed characters, and CHR$(18) usually cancels condensed characters.

Keep one thing in mind about printkeys: *SpeedScript 80* always assumes it is printing to a rather dumb, featureless printer, the least common denominator. *SpeedScript 80* doesn't understand the intent of a printkey; it justs sends out its value. So if you make one word within a line double width, it may make the line overflow the specified right margin. There's no way for *SpeedScript 80* to include built-in font and type style codes without being customized for a particular printer, since no set of codes is universal to all printers.

Hints And Tips

It may take you a while to fully master *SpeedScript 80*, but as you do, you'll discover many ways to use the editing and formatting commands. For example, there is a simple way to simulate tab stops, say, for a columnar table. Just type a period at every tab stop position. Erase the line with Control-E; then restore it with Control-^ many times. When you're filling in the table, just use word-left/word-right to jump quickly between the periods. Or you can use the programmable printkeys to embed your printer's own commands for setting and jumping to tab stops.

You don't have to change or define printer commands every time you write. Just save these definitions and load this file for each session. You can create many custom definition files and have them ready to use on disk. You can create customized "fill-in-the-blank" letters. Just type the letter, and everywhere you'll need to insert something, substitute a unique character, such as an * or a Control character. When you're ready to customize the letter, use Find to locate each symbol and insert the specific information. Instead of typing an oft-used word or phrase, substitute a unique character; then use Control-Y to automatically change these characters into the actual word or phrase. You can even use *SpeedScript 80* as a simple filing program. Just type in all your data, flagging each field with a unique character. You can use Find to quickly locate any field.

Program 1: *SpeedScript 80*

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
0800: A9 80 8D 00 03 4C 28 08 58
0808: 20 B4 FE 20 00 C3 8D 01 56
0810: C0 8D 0D C0 A0 17 20 BC EF
0818: 0A A9 DF A0 50 20 ED FD 7A
0820: 88 D0 FA 4C 90 0A 00 00 79
0828: 20 29 0A 20 9B 09 4C 18 87
0830: 08 A5 06 8D 51 08 A5 08 C6
0838: 8D 52 08 A5 19 8D 54 08 AE
0840: A5 1B 8D 55 08 A6 F9 F0 B0
0848: 20 A9 00 8D 53 1E A0 00 FF
0850: B9 FF FF 99 FF FF C8 CC 35
0858: 53 1E D0 F4 EE 52 08 EE C2
0860: 55 08 E0 00 F0 07 CA D0 43
0868: E0 A5 1D D0 DE 60 A5 F9 C0
0870: AA 05 1D D0 01 60 18 8A 0C
0878: 65 08 8D 99 08 A5 06 8D F8
0880: 98 08 18 8A 65 1B 8D 9C D9
0888: 08 A5 19 8D 9B 08 E8 A4 75
0890: 1D D0 04 F0 0D A0 FF B9 97
0898: FF FF 99 FF FF 88 C0 FF 7F
08A0: D0 F5 CE 99 08 CE 9C 08 C6
08A8: CA D0 EA 60 A2 01 20 61 70
08B0: 14 AD 4F 1E 20 74 14 AD AA
08B8: 50 1E 20 7E 14 E8 A0 00 E9
08C0: B9 FF FF C8 C9 82 F0 1C 90
08C8: C9 3C F0 18 C0 50 D0 F0 46
08D0: 88 B9 FF FF C9 80 F0 0B D0
08D8: 29 3F C9 20 F0 05 88 D0 06
08E0: F0 A0 4F C8 84 ED 88 86 7B
08E8: FE 98 4A B0 0B 84 FD 88 E1
08F0: 48 38 E9 01 10 07 30 0B 88
08F8: 88 84 FD C8 48 8D 54 C0 9C
0900: 20 97 14 68 A4 FD 8D 55 9E
0908: C0 20 97 14 A6 FE A4 ED 1F
0910: 18 98 6D C1 08 20 74 14 DB
0918: AD C2 08 69 00 20 7E 14 DA
0920: E0 02 D0 03 8C 4E 1E C0 08
0928: 50 F0 24 98 4A 90 09 69 BC
0930: 00 85 FD 38 E9 01 10 02 5C
0938: 85 FD A8 A9 A0 8D 54 C0 E0
0940: 20 B0 14 A4 FD C0 28 F0 8F
0948: 06 8D 55 C0 20 B0 14 20 83
0950: 61 14 E8 E0 16 F0 03 4C 0A
0958: BE 08 AD C1 08 8D 59 1E E4
0960: AD C2 08 8D 5A 1E 8D 54 8E
0968: C0 60 00 00 00 04 05 05 12
0970: 06 06 07 07 04 04 05 05 97
0978: 06 06 07 07 04 04 05 05 9F
0980: 06 06 07 07 80 00 80 00 6D
0988: 80 00 80 28 A8 28 A8 28 CC
0990: A8 28 A8 50 D0 50 D0 50 D4
0998: D0 50 D0 AD 46 1E 85 EB BD
09A0: 8D 4F 1E 8D 55 1E 85 FB 14
09A8: AD 47 1E 85 EC 8D 50 1E DB
09B0: 8D 56 1E 85 FC 38 AD 49 A8
09B8: 1E ED 47 1E AA A9 A0 A0 FD
09C0: FF C6 EC 91 EB C8 E6 EC 78
09C8: 91 EB C8 D0 FB E6 EC CA E4
09D0: D0 F6 91 EB 60 85 ED 84 73
09D8: EE 20 80 FE A0 00 B1 ED C0
09E0: F0 06 20 ED FD C8 D0 F6 7B
09E8: 60 20 F5 09 F0 FB C9 C0 4E
09F0: 90 02 29 DF 60 2C 00 C0 63
09F8: 10 2C AD 00 C0 C9 C0 90 13
0A00: 21 2C 00 03 30 1C 85 E3 C0
0A08: AD 61 C0 0D 44 1E 4D 63 CC
0A10: C0 10 08 A5 E3 09 20 8D F4
0A18: 10 C0 60 A9 00 8D 44 1E E7
0A20: A5 E3 8D 10 C0 60 A9 00 8D
0A28: 60 20 84 FE A9 00 8D 52 AF
0A30: 1E 8D 46 1E 8D 48 1E 8D B8
0A38: 4A 1E 8D 4C 1E 8D F0 1E 96
0A40: 8D 19 1F EA EA EA A9 60 AA
0A48: 8D D5 A6 A9 01 20 5D A2 ED
0A50: A9 22 18 69 01 8D 47 1E 46
0A58: A9 90 8D 49 1E A9 91 8D F3
0A60: 4B 1E A9 99 8D 4D 1E A9 F7
0A68: FF 8D EE 1E 20 78 0E A9 48
0A70: A0 8D F2 03 A9 0A 8D F3 4B
0A78: 03 49 A5 8D F4 03 A9 DF D4
0A80: 85 FF 20 08 08 A9 D1 A0 07
0A88: 1C 20 D5 09 EE 51 1E 60 57
0A90: 20 A6 0A A9 C1 A0 1C 20 23
0A98: D5 09 A9 00 8D 51 1E 60 5D
0AA0: 20 82 0A 4C 18 0B 20 BA 53
0AA8: 0A 20 80 FE A2 50 20 4A AA
0AB0: F9 20 84 FE 4C BA 0A 00 AB
0AB8: 00 60 A0 00 A2 00 8E 7B A6
0AC0: 05 84 25 4C 22 FC A9 27 61
0AC8: ED 7B 05 60 A0 00 B1 FB BD
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0AD8: F0 0B 29 3F C9 20 D0 0A BB
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0AE8: EC 0A A9 81 91 FB 20 AC AC
0AF0: 08 A0 00 A5 1F 91 FB A2 65
0AF8: 12 20 F5 09 D0 19 C8 D0 BA
0B00: F8 CA D0 F5 20 AC 08 A2 25
0B08: 12 20 F5 09 D0 09 C8 D0 8B
0B10: F8 CA D0 F5 4C D2 0A 60 F0
0B18: AD 45 1E 30 12 D0 0B A9 B0
0B20: 00 8D 44 1E CE 45 1E 4C 18
0B28: 2F 0B A9 00 8D 45 1E 20 AB
0B30: CC 0A AA AD 51 1E F0 07 4B
0B38: 8A 48 20 90 0A 68 AA 8A 84
0B40: C9 FF D0 06 20 5A 0F 4C 8A
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0B58: 8A 20 B9 0A 48 A0 00 B1 0A
0B60: FB C9 3C F0 05 AD 52 1E 1F
0B68: F0 03 20 BE 10 68 A0 00 0B
0B70: 91 FB 20 AC 08 38 A5 FB 85
0B78: ED 55 1E 85 ED A5 FC ED E4
0B80: 56 1E 05 ED 90 0E A5 FB CC
0B88: 69 00 8D 55 1E A5 FC 69 45
0B90: 00 8D 56 1E E6 FB D0 02 81
0B98: E6 FC 20 1F 0C 4C 18 0B 24
0BA0: 8A 48 20 AC 08 68 AE C7 E3
0BA8: 0B DD C7 0B F0 06 CA D0 6B
0BB0: F8 4C 18 0B CA 8A 0A AA 49
0BB8: A9 0B 48 A9 17 48 BD E6 46
0BC0: 0B 48 BD E5 0B 48 60 1D DB
0BC8: 95 88 8B 8A 82 8F 84 80 C1
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0BD8: 90 96 87 97 8E 86 81 94 6D
0BE0: 91 92 9D 99 9B D4 0C E8 E2
0BE8: 0C 94 0D 08 0E 59 0F BD FD
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0BF8: 11 E3 13 EE 12 CB 14 58 22
0C00: 15 EC 15 78 0D 82 16 BC 63
0C08: 13 74 0F FC 15 65 0E B5 88
0C10: 1A 98 1C 7A 10 64 10 5C 15
0C18: 1B A2 10 94 1A B2 1C 20 A5
0C20: 7D 0C 38 A5 FB ED 4F 1E AF
0C28: A5 FC ED 50 1E B0 20 38 41
0C30: AD 4F 1E ED 46 1E 85 ED 39
0C38: AD 50 1E ED 47 1E 05 ED 88
0C40: F0 0D A5 FB 8D 4F 1E A5 14
0C48: FC 8D 50 1E 20 AC 08 38 2A
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0C58: 5A 1E E5 FC 85 EC 05 EB 87
0C60: F0 02 B0 18 18 AD 4F 1E 3D
0C68: 6D 4E 1E 8D 4F 1E AD 50 06
0C70: 1E 69 00 8D 50 1E 20 AC B2
0C78: 08 4C 4F 0C 60 38 AD 55 E6
0C80: 1E ED 48 1E 85 ED AD 56 A3
0C88: 1E ED 49 1E 05 ED 90 0C 43
0C90: AD 48 1E 8D 55 1E AD 49 F5
0C98: 1E 8D 56 1E 38 A5 FB ED 0E
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0CA8: 1E 05 ED B0 0B AD 46 1E 93
0CB0: 85 FB AD 47 1E 85 FC 60 16
0CB8: 38 A5 FB ED 55 1E 85 ED D0
0CC0: A5 FC ED 56 1E 05 ED B0 9F
0CC8: 01 60 AD 55 1E 85 FB AD 31
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0CE8: 0C AD 61 C0 0D 44 1E 4D AD
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0CF8: C6 FC C6 FB 4C 1F 0C A5 E8
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0D08: EC A0 FF B1 EB C9 A0 F0 94
0D10: 04 C9 3C D0 03 88 D0 F3 03
0D18: B1 EB C9 A0 F0 08 C9 3C C0
0D20: F0 04 88 D0 F3 60 38 98 FB
0D28: 65 EB 85 FB A5 EC 69 00 14
0D30: 85 FC 4C 1F 0C A0 00 B1 5C
0D38: FB C9 A0 F0 08 C9 3C F0 B6
0D40: 04 C8 D0 F3 60 C8 D0 0B BA
0D48: E6 FC A5 FC CD 56 1E 90 2E
0D50: 02 D0 19 B1 FB C9 A0 F0 17
0D58: EC C9 3C F0 E8 18 98 65 30
0D60: FB 85 FB A5 FC 69 00 85 C6
0D68: FC 4C 1F 0C AD 55 1E 85 3D
0D70: FB AD 56 1E 85 FC 4C 1F 78
0D78: 0C A9 00 8D 4F 1E AD 56 80
0D80: 1E 38 E9 04 CD 47 1E B0 AD
0D88: 03 AD 47 1E 8D 50 1E 20 64
0D90: AC 08 4C 6C 0D AD 61 C0 F5
0D98: 0D 44 1E 4D 63 C0 30 03 64
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0DA8: FC 85 EC C6 EC A0 FF B1 48
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0DC0: 04 88 D0 EB 60 B1 EB C9 43
0DC8: AE F0 1B C9 A1 F0 17 C9 3F
0DD0: BF F0 13 C9 3C F0 0F 88 52
0DD8: D0 EB C6 EC A5 EC CD 46 C0
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0DE8: C6 ED C8 F0 0A B1 EB C9 C2
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0E00: FB AD 47 1E 85 FC 4C 1F 28
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0E20: A1 F0 19 C9 BF F0 15 C9 BE
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0E30: A5 FC CD 56 1E F0 E2 90 88
0E38: E0 4C 6C 0D C8 D0 0E E6 C2
0E40: FC A5 FC CD 56 1E 90 05 12
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0E70: 20 38 11 F0 03 4C 90 0A 50
0E78: AD 4A 1E 8D CA 1E AD 4B 10
0E80: 1E 8D CB 1E 20 A6 0A A9 C3
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0EF0: FE A0 1C 20 D5 09 A9 01 61
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0F10: CA 1E AD CF 1E 85 F9 6D 36
0F18: CB 1E 8D CB 1E 20 31 08 ED
0F20: AD D0 1E 85 06 AD D1 1E 0E
0F28: 85 08 AD D2 1E 85 19 AD D4
0F30: D3 1E 85 1B 38 AD 55 1E 63
0F38: E5 19 85 1D AD 56 1E E5 FA
0F40: 1B 85 F9 20 31 08 38 AD 56
0F48: 55 1E ED CE 1E 8D 55 1E 33
0F50: AD 56 1E ED CF 1E 8D 56 E5
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0F60: 20 B1 0E 38 AD CA 1E E9 FE
0F68: 01 8D CA 1E AD CB 1E E9 68
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0F78: 20 94 0E 20 F4 0C 20 B1 59
0F80: 0E 4C 63 0F 20 78 0E 20 35
0F88: A6 0A A9 0A A0 1D 20 D5 E1
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0FD0: ED A5 FC ED 50 1E 05 ED C0
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0FE0: 50 1E 85 FC 60 AD 46 1E 93
0FE8: 85 FB AD 47 1E 85 FC 4C 40
0FF0: 1F 0C A5 FB 85 EB 85 19 16
0FF8: A5 FC 85 EC 85 1B A0 00 82
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1008: F7 A5 EC CD 56 1E 90 0F 63
1010: AD 55 1E 85 EB AD 56 1E 59
1018: 85 EC A0 00 4C 24 10 E6 44
1020: EC 4C 00 10 18 98 65 EB A4
1028: 85 06 A9 00 65 EC 85 08 B3
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1038: AD 56 1E E5 1B 85 F9 38 02
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10B0: 91 FB 20 AC 08 20 E0 0C F5
10B8: 20 E0 0C 4C 7B 10 A9 01 D7
10C0: 8D E8 1E A9 00 8D E9 1E 68
10C8: 20 D4 10 A9 A0 A0 00 91 E3
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10D8: 6D E8 1E AD 56 1E 6D E9 78
10E0: 1E CD 49 1E 90 05 68 68 60
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10F8: 08 6D E9 1E 85 1B 38 AD 4E
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1188: 5D 0D A5 FB 85 EB A5 FC 35
1190: 85 EC C6 EC A0 FF B1 EB AC
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11C8: 84 ED 18 A5 EB E5 ED 85 5E
11D0: EB A5 EC E9 00 85 EC 4C CA
11D8: 9C 11 A5 EB 85 FB A5 EC 55
11E0: 85 FC 4C 1F 0C AD 61 C0 1B
11E8: 0D 44 1E 4D 63 C0 10 03 7C
11F0: 20 78 0E 20 A6 0A A9 3F F4
11F8: A0 1D 20 D5 09 20 CC 0A 80
1200: C9 C0 90 02 29 DF C9 D7 9F
1208: D0 09 20 3A 12 20 35 0D 07
1210: 4C 49 12 C9 D3 D0 09 20 9F
1218: 3A 12 20 17 0E 4C 49 12 99
1220: C9 D0 D0 09 20 3A 12 20 36
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1230: 03 4C 4B 11 20 1F 0C 4C 45
1238: 90 0A A5 FB 85 19 8D C4 0C
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1260: 0E AD C4 1E 85 FB AD C5 AE
1268: 1E 85 FC 20 AC 08 4C FD BA
1270: 11 20 C6 0A EA 8D 57 1E FB
1278: 20 84 FE A0 00 A9 5F 20 3D
1280: ED FD 8C 58 1E 20 F5 09 98
1288: F0 FB AC 58 1E 85 ED A9 CB
1290: 88 20 ED FD A9 20 20 ED 9A
1298: FD A9 88 20 ED FD A5 ED D9
12A0: C9 9B F0 37 C9 8D F0 39 C1
12A8: C9 FF F0 04 C9 88 D0 0F 31
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12C0: ED 29 7F C9 20 90 86 CC 30
12C8: 57 1E F0 B1 A5 ED 20 B9 38
12D0: 0A 99 83 1E 20 ED FD C8 30
12D8: 4C 7D 12 20 B3 1C 4C 7D EA
12E0: 12 20 ED FD A9 00 99 83 B7
12E8: 1E 98 20 80 FE A8 60 20 C9
12F0: A6 0A A9 76 A0 1D 20 D5 17
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1318: 8D 6D AA A9 30 8D 5F AA 71
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1338: 0A AE C5 B5 20 02 A7 A9 25
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1348: 51 1E 60 00 20 71 12 D0 66
1350: 06 20 90 0A 68 68 60 20 F9
1358: 95 A0 A9 00 8D 51 AA 8D 3B
1360: 52 AA 8D 74 AA 8D 66 AA 56
1368: 8D 6C AA 8D 6D AA 8D 63 33
1370: AA 8D 70 AA 8D 71 AA 8D 1D
1378: D3 9C A2 00 A0 01 B9 83 04
1380: 1E C9 BA D0 1F AD 83 1E 61
1388: 38 E9 B0 F0 0D 30 0B C9 73
1390: 03 B0 07 8D 68 AA C8 4C E9
1398: A6 13 68 68 20 A6 0A A2 BC
13A0: 02 4C 3C 13 A0 00 B9 83 8F
13A8: 1E 20 2F 16 C9 E0 90 02 22
13B0: 29 DF 9D 75 AA E8 C8 CC C5
13B8: 58 1E D0 EA 60 20 A6 0A 36
13C0: A9 5F A0 1D 20 D5 09 20 04
13C8: CC 0A C9 C0 90 02 29 DF DB
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13D8: F0 03 20 BE 10 20 90 0A 54
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13E8: FB CD 46 1E D0 07 A5 FC 16
13F0: CD 47 1E F0 05 A9 6A 8D D3
13F8: 27 04 A9 86 A0 1D 20 D5 E0
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1478: D2 08 8D 99 14 60 8D C2 57
1480: 08 8D D3 08 8D 9A 14 60 6A
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14E8: 09 C9 8D D0 F9 4C 08 08 DF
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14F8: 8E C8 1E 8E C9 1E 38 B1 30
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1508: 26 0E C6 1E 2E C7 1E 0E 5E
1510: C6 1E 2E C7 1E 0E C6 1E 3C
1518: 2E C7 1E 0E C6 1E 2E C7 C2
1520: 1E 0D C6 1E 8D C6 1E C8 E3
1528: D0 D4 E6 EC 4C FE 14 F8 1B
1530: AD C6 1E 0D C7 1E F0 1C 2C
1538: 38 AD C6 1E E9 01 8D C6 D9
1540: 1E AD C7 1E E9 00 8D C7 F1
1548: 1E EE C8 1E D0 03 EE C9 72
1550: 1E 4C 30 15 AD C8 1E D8 99
1558: 60 38 AD CA 1E ED 4A 1E 7E
1560: 8D CC 1E AD CB 1E ED 4B 21
1568: 1E 8D CD 1E 0D CC 1E D0 49
1570: 10 20 A6 0A A9 A1 A0 1D 52
1578: 20 D5 09 A9 01 8D 51 1E E2
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1588: 1E 85 19 A5 FC 85 0B 6D 1C
1590: CD 1E 85 1B 38 AD 55 1E CC
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15A8: 1E 90 10 20 A6 0A A9 99 54
15B0: A0 1D 20 D5 09 A9 01 8D 52
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15E0: 85 06 AD 4B 1E 85 08 20 F0
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15F8: C8 8A 91 FB 60 A0 00 8C 2E
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1618: 4C 2A 16 C9 C0 90 0B C9 7C
1620: E0 90 05 29 DF 4C 2A 16 AE
1628: 09 20 91 FB 4C E0 0C 2C FC
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16F8: 20 84 FE A2 00 8E D5 1E 64
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1708: 1E BD 42 16 9D D6 1E E8 CB
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1718: 1E 8D E2 1E A2 04 BD 4D E4
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1770: 1E 4C 7F 17 C8 B1 EB C9 D0
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1780: 38 65 EB 85 EB A5 EC 69 33
1788: 00 85 EC A0 00 AD E4 1E 5E
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17B0: D7 20 05 1C 20 B6 18 AD EE
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17C0: 00 18 38 A5 EB ED 55 1E 36
17C8: 85 ED A5 EC ED 56 1E 05 C2
17D0: ED F0 2A 90 28 AD D5 1E 42
17D8: F0 0B A9 00 8D D4 1E 8D 01
17E0: D9 1E 20 00 18 AD EA 1E F2
17E8: C9 03 D0 03 20 E9 09 A9 6B
17F0: 00 EA EA EA A2 FA 9A 20 3C
17F8: 08 08 4C 18 0B 4C 31 17 3B
1800: 38 AD D8 1E ED E4 1E A8 9C
1808: 88 88 F0 0A 30 08 A9 8D DF
1810: 20 52 16 88 D0 F8 AD D5 CB
1818: 1E F0 11 8D 53 1E A9 C2 B7
1820: 85 D6 A9 21 85 D7 20 A5 81
1828: 18 20 05 1C A9 8D 20 52 E4
1830: 16 20 52 16 20 52 16 EE 84
1838: DD 1E D0 03 EE DE 1E AD 06
1840: DC 1E D0 31 AD EA 1E C9 B2
1848: 03 F0 2A 38 AD DD 1E ED 0E
1850: DF 1E AD DE 1E ED E0 1E 24
1858: 90 1B A9 00 20 B9 14 20 FC
1860: A6 0A A9 E8 A0 1D 20 D5 B9
1868: 09 20 E9 09 20 76 16 AD A7
1870: EA 1E 20 95 FE AD D4 1E 71
1878: F0 11 8D 53 1E A9 C2 85 EE
1880: D6 A9 20 85 D7 20 A5 18 85
1888: 20 05 1C A9 8D 20 52 16 CF
1890: AC D9 1E 8C E4 1E 88 88 53
1898: F0 0A 30 08 A9 8D 20 52 60
18A0: 16 88 D0 F8 60 A9 A0 AC 3F
18A8: D6 1E 8C E3 1E F0 06 20 7C
18B0: 52 16 88 D0 FA 60 AC DB 3C
18B8: 1E 18 98 6D E4 1E 8D E4 87
18C0: 1E A9 8D 20 52 16 88 D0 EA
18C8: FA 60 8D E6 1E AE 10 19 93
18D0: DD 10 19 F0 09 CA D0 F8 34
18D8: CE E3 1E 4C 09 1A CA 8A C2
18E0: 0A AA 8C E5 1E A9 18 48 C0
18E8: A9 F3 48 BD 22 19 48 BD 93
18F0: 21 19 48 60 38 AD E5 1E 69
18F8: 65 EB 85 EB A5 EC 69 00 F9
1900: 85 EC 4C 31 17 B1 EB C9 ED
1908: 3C F0 01 88 8C E5 1E 60 D5
1910: 10 57 4C 52 54 42 53 4E 6F
1918: 48 46 40 50 7F 58 4D 49 4E
1920: 47 7D 19 86 19 90 19 9A B8
1928: 19 A4 19 AE 19 B8 19 C7 C3
1930: 19 E9 19 63 19 73 19 53 DE
1938: 19 49 19 40 19 02 1A 29 9E
1940: 1A C8 A9 00 8D E2 1E 4C 67
1948: 05 19 C8 20 F0 14 8D E1 33
1950: 1E 4C 05 19 C8 20 F0 14 93
1958: 8D DF 1E AD C9 1E 8D E0 AA
1960: 1E 4C 05 19 C8 20 F0 14 A3
1968: 8D DD 1E AD C9 1E 8D DE 38
1970: 1E 4C 05 19 C8 20 F0 14 B3
1978: 8D D8 1E 4C 05 19 A9 00 10
1980: 8D DC 1E C8 4C 05 19 C8 72
1988: 20 F0 14 8D D6 1E 4C 05 2F
1990: 19 C8 20 F0 14 8D D7 1E 39
1998: 4C 05 19 C8 20 F0 14 8D 5C
19A0: D9 1E 4C 05 19 C8 20 F0 3E
19A8: 14 8D DA 1E 4C 05 19 C8 F6
19B0: 20 F0 14 8D DB 1E 4C 05 7F
19B8: 19 AC E5 1E C8 98 48 20 9A
19C0: 00 18 68 A8 8C E5 1E 60 29
19C8: 20 E2 19 88 8C D4 1E A0 04
19D0: 01 B1 EB 99 C1 20 C8 CC F3
19D8: D4 1E 90 F5 F0 F3 C8 4C A3
19E0: 05 19 C8 B1 EB C9 3C D0 DF
19E8: F9 60 20 E2 19 88 8C D5 3C
19F0: 1E A0 01 B1 EB 99 C1 21 FF
19F8: C8 CC D5 1E 90 F5 F0 F3 91
1A00: 4C 05 19 20 E2 19 4C 05 D9
1A08: 19 C8 B1 EB C9 BD F0 07 1E
1A10: 88 AD E6 1E 4C 4C 17 C8 3D
1A18: 20 F0 14 48 AD E6 1E AA 8F
1A20: 68 9D 42 1F 20 05 19 4C BD
1A28: F4 18 A2 00 C8 B1 EB C9 DF
1A30: 3C F0 0A 20 2F 16 9D 83 92
1A38: 1E E8 4C 2C 1A 8E 58 1E DB
1A40: 20 9B 09 20 57 13 A5 FB DC
1A48: 8D 72 AA A5 FC 8D 73 AA 3F
1A50: A9 32 8D 5F AA A9 01 8D 19
1A58: 65 AA 20 60 14 20 80 A1 B7
1A60: AE 60 AA AC 61 AA AD C5 FA
1A68: B5 F0 0B 20 96 14 A9 00 6F
1A70: 20 95 FE 4C 36 13 8E 55 2F
1A78: 1E 8C 56 1E A5 FB 18 6D 46
1A80: 55 1E 8D 55 1E A5 FC 6D DC
1A88: 56 1E 8D 56 1E 20 96 14 39
1A90: 68 68 4C 27 17 20 C1 1A E5
1A98: AD F0 1E F0 16 20 68 1B CF
1AA0: 20 E7 1A AD EE 1E C9 FF 80
1AA8: F0 09 20 8B 1B 20 AC 08 0F
1AB0: 4C A0 1A 4C 90 0A AD 61 A4
1AB8: C0 0D 44 1E 4D 63 C0 30 A4
1AC0: 26 20 A6 0A A9 08 A0 1E 52
1AC8: 20 D5 09 20 71 12 8D F0 85
1AD0: 1E D0 03 4C 90 0A A0 00 5B
1AD8: B9 83 1E 99 F1 1E C8 CC 8E
1AE0: 58 1E D0 F4 4C 90 0A A5 90
1AE8: FB 85 EB A5 FC 85 EC A9 D5
1AF0: FF 8D EE 1E A0 01 A2 00 96
1AF8: AD F0 1E F0 50 BD F1 1E 8E
1B00: D1 EB F0 05 E0 00 D0 EE 20
1B08: CA C8 D0 0B E6 EC A5 EC C3
1B10: CD 56 1E F0 02 B0 36 E8 BD
1B18: EC F0 1E D0 E0 18 98 65 CF
1B20: EB 85 ED A5 EC 69 00 85 58
1B28: EE AD 55 1E C5 ED AD 56 65
1B30: 1E E5 EE 90 18 38 A5 ED B0
```

```
1B38: ED F0 1E 85 FB 8D ED 1E CD
1B40: A5 EE E9 00 85 FC 8D EE 6C
1B48: 1E 20 1F 0C 60 20 A6 0A 15
1B50: A9 0E A0 1E 20 D5 09 A9 E8
1B58: 01 8D 51 1E 60 AD 61 C0 BB
1B60: 0D 44 1E 4D 63 C0 30 23 68
1B68: 20 A6 0A A9 18 A0 1E 20 D3
1B70: D5 09 20 71 12 8D 19 1F 07
1B78: F0 0E A0 00 B9 83 1E 99 70
1B80: 1A 1F C8 CC 58 1E D0 F4 43
1B88: 4C 90 0A 38 A5 FB 85 19 0F
1B90: ED ED 1E 85 ED A5 FC 85 DA
1B98: 1B ED EE 1E 05 ED D0 62 7B
1BA0: A9 FF 8D EE 1E 18 AD F0 E9
1BA8: 1E 65 FB 85 06 A9 00 65 5B
1BB0: FC 85 08 38 AD 55 1E E5 30
1BB8: 19 85 1D AD 56 1E E5 1B 6D
1BC0: 85 F9 20 31 08 38 AD 55 21
1BC8: 1E ED F0 1E 8D 55 1E AD 35
1BD0: 56 1E E9 00 8D 56 1E AD A6
1BD8: 19 1F F0 26 8D E8 1E A9 D9
1BE0: 00 8D E9 1E 20 D4 10 A0 AE
1BE8: 00 B9 1A 1F 91 FB C8 CC 9D
1BF0: 19 1F D0 F5 18 A5 FB 6D B1
1BF8: 19 1F 85 FB A5 FC 69 00 E7
1C00: 85 FC 4C 1F 0C A0 00 CC 65
1C08: 53 1E F0 21 B1 D6 30 04 EE
1C10: C9 40 B0 1A 20 2F 16 20 FE
1C18: 52 16 AD EC 1E F0 0A A9 F5
1C20: 88 20 52 16 A9 DF 20 52 AF
1C28: 16 C8 4C 07 1C 60 8C E5 F8
1C30: 1E 8D E6 1E 20 2F 16 C9 4D
1C38: 43 D0 1B 38 AD E1 1E ED 4C
1C40: 53 1E 4A 38 ED D6 1E A8 26
1C48: A9 A0 20 52 16 88 D0 FA 16
1C50: AC E5 1E 4C 29 1C C9 45 73
1C58: D0 10 38 AD D7 1E ED 53 45
1C60: 1E 38 ED D6 1E A8 A9 A0 68
1C68: D0 E0 C9 55 D0 0A AD EC C6
1C70: 1E 49 01 8D EC 1E 10 B1 B4
1C78: C9 63 D0 11 8C E5 1E AE 80
1C80: DD 1E AD DE 1E 20 24 ED 7A
1C88: AC E5 1E D0 9C AE E6 1E EC
1C90: BD 42 1F 20 52 16 4C 29 CA
1C98: 1C 20 A6 0A 38 AD 48 1E 83
1CA0: ED 55 1E AA AD 49 1E ED 50
1CA8: 56 1E 20 24 ED A9 01 8D 7F
1CB0: 51 1E 60 AD 44 1E 49 80 AD
1CB8: 8D 44 1E A9 01 8D 45 1E 0E
1CC0: 60 D3 D0 C5 C5 C4 D3 C3 41
1CC8: D2 C9 D0 D4 A0 B3 AE B0 26
1CD0: 00 88 88 88 88 A0 C2 D9 EA
1CD8: A0 C3 AE A0 C2 D2 C1 CE E5
1CE0: CE CF CE A0 A6 A0 CB AE 56
1CE8: A0 CD C1 D2 D4 C9 CE 00 B5
1CF0: C2 D5 C6 C6 C5 D2 A0 CE CE
1CF8: D5 CC CC C5 C4 00 C2 D5 C6
1D00: C6 C6 C5 D2 A0 C6 D5 CC CD
1D08: CC 00 C4 C5 CC C5 D4 C5 BA
1D10: A0 A8 D3 AC D7 AC D0 A9 C6
1D18: 00 BA A0 C1 D2 C5 A0 D9 F9
1D20: CF D5 A0 D3 D5 D2 C5 BF 4E
1D28: A0 A8 D9 AF CE A9 BA 00 A5
1D30: C5 D2 C1 D3 C5 A0 C1 CC 78
1D38: CC A0 D4 C5 D8 D4 00 C5 D7
1D40: D2 C1 D3 C5 A0 A8 D3 AC 27
1D48: D7 AC D0 AC C1 A9 BA A0 49
1D50: D2 C5 D4 D5 D2 CE A0 D4 45
1D58: CF A0 C5 D8 C9 D4 00 C5 50
1D60: CE D4 C5 D2 A0 C6 CF D2 AF
1D68: CD C1 D4 A0 D6 C1 D2 C9 CB
1D70: C1 C2 CC C5 BA 00 D3 C1 71
1D78: D6 C5 BA 00 CE CF A0 C5 A3
1D80: D2 D2 CF D2 D3 00 CC CF 08
1D88: C1 C4 BA 00 D0 D2 C5 D3 5D
1D90: D3 A0 D2 C5 D4 D5 D2 CE 06
1D98: 00 CE CF A0 D2 CF CF CD CD
1DA0: 00 CE CF A0 D4 C5 D8 D4 D6
1DA8: A0 C9 CE A0 C2 D5 C6 C6 4B
1DB0: C5 D2 AE 00 D0 D2 C9 CE 8C
1DB8: D4 A0 D4 CF BA A0 D3 C3 E0
1DC0: D2 C5 C5 CE AC A0 D0 D2 D7
1DC8: C9 CE D4 C5 D2 BF 00 D3 FB
1DD0: CC CF D4 A0 CE D5 CD C2 36
1DD8: C5 D2 BF 00 D0 D2 C9 CE D6
1DE0: D4 C9 CE C7 AE AE 8D 00 99
1DE8: C9 CE D3 C5 D2 D4 A0 CE 8C
1DF0: C5 D8 D4 A0 D3 C8 C5 C5 FB
1DF8: D4 AC A0 D0 D2 C5 D3 D3 13
1E00: A0 D2 C5 D4 D5 D2 CE 00 DE
1E08: C6 C9 CE C4 BA 00 CE CF 83
1E10: D4 A0 C6 CF D5 CE C4 00 28
1E18: D2 C5 D0 CC C1 C3 C5 A0 5F
1E20: D7 C9 D4 C8 BA 00 CC CF 21
1E28: D7 C5 D2 C3 C1 D3 C5 A0 E1
1E30: DB D9 AF CE DD BF 60 00 62
1E38: CE D5 CC CC A0 C2 D5 C6 3A
1E40: C6 C5 D2 00 00 00 00 00 AB
```

Program 2: *SpeedScript 80* File Converter For DOS 3.3

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
E9 5 HIMEM: 8191
4A 10 HOME
52 20 D$ = CHR$ (4)
3F 30 PRINT D$;"MAXFILES1"
25 40 PRINT "DO YOU WANT TO:"
A6 50 PRINT " (1) MAKE A SPEEDSC
      RIPT FILE INTO A TEXT
      FILE"
AE 60 PRINT " (2) MAKE A TEXT FI
      LE INTO A SPEEDSCRIPT
      FILE"
67 70 GET A$:A = VAL (A$)
47 80 IF A < > 1 AND A < > 2 THE
      N 70
65 90 ON A GOTO 100,200
53 100 PRINT "ENTER SPEEDSCRIPT
       FILE NAME": INPUT ":";A$
89 110 PRINT "ENTER TEXT FILE NA
       ME TO CREATE": INPUT ":";
       B$
7E 120 PRINT D$;"BLOAD ";A$;",A$
       2000"
A8 125 L = PEEK (43616) + PEEK (
       43617) * 256 + 8192
33 130 PRINT D$;"OPEN ";B$
A1 131 PRINT D$;"DELETE ";B$
3B 132 PRINT D$;"OPEN ";B$
0A 140 PRINT D$;"WRITE ";B$
5A 150 FOR I = 8192 TO L - 1
E5 155 B = PEEK (I)
11 160 IF B = 60 THEN B = 141
DF 170 PRINT CHR$ (B);
09 180 NEXT
F2 190 PRINT
27 195 PRINT D$;"CLOSE ";B$
B3 196 END
6D 200 PRINT "ENTER TEXT FILE NA
       ME": INPUT ":";B$
06 210 INPUT "ENTER SPEEDSCRIPT
       FILE NAME TO CREATE   :";
       A$
32 220 PRINT D$;"OPEN ";B$
FC 230 PRINT D$;"READ ";B$
49 235 L = 0
AB 240 ONERR GOTO 270
C6 250 GET C$:A = ASC (C$ + CHR$
       (0)) + 128: IF A = 141 T
       HEN A = 60
48 260 POKE 8192 + L,A:L = L + 1
       : GOTO 250
04 270 POKE 216,0
F1 280 PRINT
14 290 PRINT D$;"CLOSE ";B$
0C 295 PRINT D$;"BSAVE ";A$;",A8
       192,L";L - 1
B4 296 END
```

Program 3: *SpeedScript 80* File Converter For ProDOS

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
4A 10 HOME
52 20 D$ = CHR$ (4)
25 40 PRINT "DO YOU WANT TO:"
A6 50 PRINT " (1) MAKE A SPEEDSC
      RIPT FILE INTO A TEXT
      FILE"
AE 60 PRINT " (2) MAKE A TEXT FI
      LE INTO A SPEEDSCRIPT
      FILE"
67 70 GET A$:A = VAL (A$)
47 80 IF A < > 1 AND A < > 2 THE
      N 70
65 90 ON A GOTO 100,200
53 100 PRINT "ENTER SPEEDSCRIPT
       FILE NAME": INPUT ":";A$
89 110 PRINT "ENTER TEXT FILE NA
       ME TO CREATE": INPUT ":";
       B$
7E 120 PRINT D$;"BLOAD ";A$;",A$
       2000"
A4 125 L = PEEK (48859) + PEEK (
       48860) * 256 + 8192
5A 150 FOR I = 8192 TO L - 1
39 160 IF PEEK (I) = 60 THEN POK
       E I,141
09 180 NEXT
C9 190 PRINT D$;"CREATE ";B$;",T
       TXT"
F5 195 PRINT D$;"BSAVE ";B$;",A$
       2000,E";L - 1;",TTXT"
B3 196 END
6D 200 PRINT "ENTER TEXT FILE NA
       ME": INPUT ":";B$
06 210 INPUT "ENTER SPEEDSCRIPT
       FILE NAME TO CREATE   :";
       A$
25 220 PRINT CHR$ (4);"BLOAD ";B
       $;",A$2000,TTXT"
93 230 L = PEEK (48859) + PEEK (
       48860) * 256 + 8192
59 240 FOR I = 8192 TO L - 1
1A 245 IF PEEK (I) = 141 THEN PO
       KE I,60
06 260 NEXT
4A 295 PRINT D$;"BSAVE ";A$;",A8
       192,E";L - 1
B4 296 END
```

Program 4: ProDOS Maker

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
5C 100 D$ = CHR$ (4)
9E 110 PRINT "LOADING MLX FILES"
09 120 PRINT D$;"BLOAD SPEEDSCRI
       PT,A$2032"
1C 130 PRINT D$;"BLOAD SPEEDSCRI
       PT2,A$3AF0"
2F 140 PRINT "READING DATA STATE
       MENTS"
E4 150 FOR I = 632 TO 641: POKE
       I + 8192,234: NEXT
A3 160 C = 0: READ I: IF I = - 1
        THEN 190
1D 170 READ L: FOR I = I TO I +
       L: READ A:C = C + A: POKE
        I + 8192,A: NEXT : READ
       CS: IF C < > CS THEN 310
A0 180 GOTO 160
F7 190 C = 0
9E 200 READ I: IF I = - 1 THEN 2
       20
B2 210 READ A:C = C + A: POKE I
       + 8192,A: GOTO 200
1C 220 READ CS: IF C < > CS THEN
        310
F7 230 PRINT "INSERT DISK TO REC
       EIVE SS.SYSTEM": PRINT "
        PRESS ANY KEY WHEN READY
       ": GET A$
66 240 PRINT "SAVING SS.SYSTEM"
AA 250 ONERR GOTO 270
DB 260 PRINT D$;"DELETE SS.SYSTE
       M"
6B 270 ONERR GOTO 0
C8 280 PRINT D$;"CREATE SS.SYSTE
       M,TSYS"
```

```
7E 290 PRINT D$"BSAVE SS.SYSTEM,
       A$2000,L$1CBF,TSYS"
0A 300 PRINT "SUCCESSFULLY CONVE
       RTED. BOOT DISK TO RUN":
       END
B5 310 PRINT "ERROR IN DATA STAT
       EMENTS": END
7E 320 DATA 0,49
78 330 DATA 160,0,185,0,32,153
6F 340 DATA 0,144,200,208,247,76
E0 350 DATA 14,144,169,32,133,25
       1
5F 360 DATA 169,50,133,250,169,8
ED 370 DATA 133,253,169,0,133,25
       2
0E 380 DATA 177,250,145,252,200,
       208
0D 390 DATA 249,230,251,230,253,
       165
D8 400 DATA 253,201,37,208,239,7
       6
FF 410 DATA 0,8,7499
35 420 DATA 2862,5
62 430 DATA 32,194,34,76,83,20
AF 440 DATA 439
BE 450 DATA 3136,5
31 460 DATA 32,82,35,76,57,20
24 470 DATA 302
51 480 DATA 4728,5
6E 490 DATA 32,82,35,76,118,26
28 500 DATA 369
B1 510 DATA -1
B5 520 DATA 643,36,651,175,656,1
       76
17 530 DATA 661,184,2953,76,2954
       ,158
32 540 DATA 2955,35,3332,76,3333
       ,184
5B 550 DATA 3334,35
5B 560 DATA -1,1135
```

Program 5: MLX Data For SPEEDSCRIPT2 File

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
3AF0: 45 32 31 03 20 00 BF C1 2D
3AF8: 54 24 20 60 14 20 00 BF 8B
3B00: C0 57 24 B0 55 20 00 BF 27
3B08: C8 63 24 B0 4D AD 68 24 61
3B10: 8D 6A 24 8D 6F 24 8D 77 E3
3B18: 24 AD 55 1E 38 ED 46 1E BC
3B20: 8D 6B 24 8D 72 24 AD 56 6B
3B28: 1E ED 47 1E 8D 6C 24 8D E7
3B30: 73 24 AD 46 1E 8D 70 24 AF
3B38: AD 47 1E 8D 71 24 20 00 50
3B40: BF D0 69 24 B0 14 20 00 50
3B48: BF CB 6E 24 B0 0C 20 00 97
3B50: BF CC 76 24 B0 04 20 96 57
3B58: 14 60 8D AB 1E 20 96 14 10
3B60: A9 00 8D 77 24 20 95 FE A0
3B68: 20 00 BF CC 76 24 20 A6 DE
3B70: 0A A9 85 A0 24 20 D5 09 67
3B78: AD AB 1E 20 DA FD A2 FA 85
3B80: 9A 4C 18 0B 20 60 14 20 D5
3B88: 00 BF C8 63 24 B0 CB AD 67
3B90: 68 24 8D 79 24 8D 7E 24 06
3B98: 8D 77 24 20 00 BF D1 78 55
3BA0: 24 B0 B7 AD 7A 24 8D 81 28
3BA8: 24 AD 7B 24 8D 82 24 A5 B2
3BB0: FB 8D 7F 24 A5 FC 8D 80 77
3BB8: 24 20 00 BF CA 7D 24 B0 8A
3BC0: 99 20 00 BF CC 76 24 B0 41
3BC8: 91 AE 7A 24 AC 7B 24 60 41
3BD0: A0 00 B9 83 1E 29 7F 99 35
3BD8: AC 1E C8 CC 58 1E D0 F2 E2
3BE0: 8C AB 1E 60 8D AB 1E 4C F5
3BE8: 2E 23 20 00 BF C5 46 24 09
3BF0: B0 F2 A0 00 AD 00 BE 29 A4
3BF8: 0F 8D AB 1E B9 01 BE 99 9A
3C00: AD 1E C8 CC AB 1E D0 F4 29
3C08: C8 8C AB 1E A9 2F 8D AC 31
3C10: 1E 20 00 BF C8 63 24 B0 6B
3C18: CB A9 AF 20 ED FD 20 00 80
3C20: BF CA 4A 24 B0 BE A9 B9 44
3C28: 85 D7 A9 04 85 D6 A0 00 97
3C30: B1 D6 C9 00 D0 08 C8 B1 5A
3C38: D6 F0 34 4C 29 24 8D E5 7E
3C40: 1E 29 0F AA E8 8E 58 1E EE
3C48: C8 B1 D6 09 80 20 ED FD 5B
3C50: C8 CC 58 1E D0 F3 A9 8D 84
3C58: 20 ED FD A9 27 18 65 D6 F1
3C60: 85 D6 A5 D7 69 00 85 D7 B1
3C68: C9 BB F0 B2 4C FC 23 20 BA
3C70: 00 BF CC 52 24 4C DA 14 B3
3C78: 02 60 00 BE 04 01 00 B9 D3
3C80: 00 02 00 00 01 01 01 AB 33
3C88: 1E 07 AB 1E C3 06 00 00 5F
3C90: 01 00 00 00 00 03 AB 1E 0B
3C98: 00 BB 00 02 00 00 00 00 20
3CA0: 04 00 00 00 00 00 00 00 1B
3CA8: 01 00 02 00 00 00 00 04 E5
3CB0: 00 00 00 00 00 00 00 C5 EE
3CB8: D2 D2 CF D2 A0 A3 00 C0 CA
```

Program 6: SS80.MAKER

Be sure to use "Apple Automatic Proofreader," found elsewhere in this issue, to enter the following program.

```
55 50 D$ = CHR$ (4)
B1 100 F1$ = "SPEEDSCRIPT":F2$ =
       "SPEEDSCRIPT80"
64 105 FA$ = ",A$800":FL$ = ",L$
       1645":FT$ = ""
F5 110 B1 = 2048:B2 = 8192
F9 120 PRINT "LOADING MLX FILES.
       .."
D6 130 PRINT D$;"BLOAD ";F1$;FA$
       ;FT$
ED 140 PRINT D$;"BLOAD PATCH.80,
       A";B2
7F 150 PRINT "READING DATA STATE
       MENTS..."
04 155 C = 0
12 160 READ I: IF I = - 1 THEN 1
       90
38 170 READ L: FOR I = I TO I +
       L: READ A:C = C + A
35 175 POKE I + B1,A: NEXT
A0 180 GOTO 160
59 190 READ CS: IF C < > CS THEN
        1000
2F 200 PRINT "PATCHING FROM PATC
       H FILE..."
ED 210 READ D: IF D = - 1 THEN 5
       00
BB 220 READ S: READ L:D = D + B1
       :S = S + B2
8B 230 FOR I = 0 TO L: POKE (D +
        I), PEEK (S + I): NEXT
15 240 GOTO 210
69 500 PRINT "INSERT DISK TO REC
       EIVE ";F2$
A6 510 PRINT "PRESS ANY KEY WHEN
        READY": GET A$
E3 520 PRINT "SAVING ";F2$
99 530 ONERR GOTO 550
CE 540 PRINT D$;"DELETE ";F2$
6A 550 ONERR GOTO 0
C9 560 PRINT D$;"BSAVE ";F2$;FA$
       ;FL$;FT$
E4 600 PRINT "SUCCESSFULLY CONVE
       RTED.": END
13 1000 PRINT "ERROR IN DATA STA
       TEMENTS": END
17 2000 DATA 554,1,132,254
4A 2020 DATA 579,2,234,234,234
49 2040 DATA 643,1,8,8
BD 2060 DATA 3276,5,32,132,254,3
       2,88,252
25 2080 DATA 3310,1,8,8
FD 2100 DATA 4081,2,234,234,234
46 2120 DATA 4189,1,185,20
6E 2140 DATA 4088,1,8,8
43 2200 DATA -1,2833
A1 2300 DATA 0,0,39
D6 2310 DATA 172,40,192
7B 2320 DATA 678,233,37
6C 2330 DATA 2673,271,13
E9 2340 DATA 3168,285,39
3B 2350 DATA 3222,325,43
1B 2400 DATA -1
```

Program 7: PATCH.80

For mistake-proof program entry, use "Apple MLX," found elsewhere in this issue, to type in this program.

```
2000: A9 80 8D 00 03 4C 28 08 88
2008: 20 84 FE 20 00 C3 8D 01 86
2010: C0 8D 0D C0 A0 17 20 BC 20
2018: 0A A9 DF A0 50 20 ED FD AA
2020: 88 D0 FA 4C 90 0A 00 00 A9
2028: A2 01 20 61 14 AD 4F 1E 28
2030: 20 74 14 AD 50 1E 20 7E B4
2038: 14 E8 A0 00 B9 FF FF C8 67
2040: C9 82 F0 1C C9 3C F0 18 1F
2048: C0 50 D0 F0 88 B9 FF FF 51
2050: C9 80 F0 0B 29 3F C9 20 5E
2058: F0 05 88 D0 F0 A0 4F C8 E1
2060: 84 ED 88 86 FE 98 4A B0 77
2068: 0B 84 FD 88 48 38 E9 01 8F
2070: 10 07 30 0B 88 84 FD C8 4C
2078: 48 8D 54 C0 20 97 14 68 C6
2080: A4 FD 8D 55 C0 20 97 14 63
2088: A6 FE A4 ED 18 98 6D C1 0F
2090: 08 20 74 14 AD C2 08 69 9E
2098: 00 20 7E 14 E0 02 D0 03 A5
20A0: 8C 4E 1E C0 50 F0 24 98 B1
20A8: 4A 90 09 69 00 85 FD 38 34
20B0: E9 01 10 02 85 FD A8 A9 67
20B8: A0 8D 54 C0 20 B0 14 A4 D3
20C0: FD C0 28 F0 06 8D 55 C0 16
20C8: 20 B0 14 20 61 14 E8 E0 D7
20D0: 16 F0 03 4C BE 08 AD C1 B0
20D8: 08 8D 59 1E AD C2 08 8D A3
20E0: 5A 1E 8D 54 C0 60 00 00 54
20E8: 00 20 BA 0A 20 80 FE A2 CC
20F0: 50 20 4A F9 20 84 FE 4C A7
20F8: BA 0A 00 00 60 A0 00 A2 41
2100: 00 8E 7B 05 84 25 4C 22 19
2108: FC A9 27 ED 7B 05 60 20 C7
2110: C6 0A EA 8D 57 1E 20 84 66
2118: FE A0 00 A9 5F 60 BD 6D 02
2120: 09 8D A9 14 8D B2 14 BD DD
2128: 84 09 8D A8 14 8D B1 14 79
2130: 60 8D C1 08 8D D2 08 8D 14
2138: 99 14 60 8D C2 08 8D D3 56
2140: 08 8D 9A 14 60 60 AA B9 12
2148: FF FF 10 08 C9 83 B0 06 D0
2150: A5 FF 90 02 29 3F 9D FF 19
2158: FF CA 88 88 10 E9 60 99 69
2160: FF FF C8 C0 28 D0 F8 60 9E
2168: A9 07 85 36 A9 C3 85 37 F3
2170: 60 74 AA 8D 74 AA D0 E9 08
```

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Menu Planner

W. M. Shockley

For those who like to plan ahead, here's an easy-to-use BASIC program that lets you plan dinner menus for an entire week in advance. Versions are included for the Commodore 64, IBM PC/PCjr, Apple II series, Atari ST, Amiga, and Atari 400, 800, XL, and XE. A disk drive is required. A printer is optional. The IBM PC/PCjr version requires BASICA for the PC or Cartridge BASIC for the PCjr.

In a world where there's almost always too much to do, a computer can be a wonderful ally. "Menu Planner" is a time-saving program which allows you to plan an entire week of daily menus in advance, with only a few minutes at the keyboard. When the menu is complete, it can be printed out for use in shopping and in preparing meals. Previous menus can be loaded from disk and reviewed, reused, or edited. Since the entire program is written in BASIC, it's also a simple matter to customize it for your own particular needs.

Typing The Program

Type in and save the program for your computer. Because each version is almost the same, we've published one main program (Program 1) with line changes for specific computers (except for eight-bit Ataris—see below). If you are using a Commodore 64, IBM PC/PCjr, Apple II, Atari ST, or Amiga, type in all of Program 1 and then type in the line changes printed in the separate listing for your computer. Be sure to save the complete program before you run it.

Amiga users should remember that Amiga BASIC doesn't use line numbers, unlike most other versions of BASIC. In an Amiga BASIC program, line numbers are treated as labels; the numeric value of the line number is not significant. That is, if you type in the main program, then type line 600 from Program 6, the added line will not automatically be placed between the existing lines labeled 540 and 999. Instead, the line is added *at the position where it is typed*. When adding the lines from Program 6 to the main program, you must manually position the cursor in the proper spot in the listing before entering each line. The line shown as line 5 should be added as the first line of the program. The remaining lines from Program 6 should be added between existing lines 540 and 999 of Program 1.

A separate program is provided for the eight-bit Atari computers (400, 800, XL, and XE models). If you have one of these computers, type in and save Program 7.

Main Menu

Menu Planner is a menu-driven program, meaning that you make program choices by selecting from convenient, onscreen menus. When you first run the program, it prints the main menu on the screen. By pressing the indicated letter keys, you can make a new menu, review the current menu, print the current menu, save the current menu, load a previous menu from disk, edit the current menu, or quit the program.

For instance, the first time you use Menu Planner, you will want to press M to make a new menu. The computer clears the screen and prints a new display with onscreen prompts that tell you what to do.

You will be creating a dinner menu for each day of the week, beginning with Sunday. You begin with the entree: Choosing from the program's built-in list of entrees, Menu Planner prints the first entree choice on the screen. To move to the next entree, press the space bar. Continue cycling through entree selections until you find the one you want; then press RETURN to select it.

Under the entree section is a special offering called *Eat Out*. If you select this choice, the program jumps to the next day of the week. The last selection in each category is called *Choice*. This selection allows you to type in any food that is not offered in the program's built-in list.

After you choose an entree, the same process is repeated for three additional categories: a vegetable dish, a starch or bread dish, and a dessert. When you have completed an entire meal, the entire cycle repeats until you have made an entire week of menus. At this point, the main menu reappears.

Other Options

The Review option lets you review the entire current menu, one meal at a time. Press the space bar to continue to the next meal.

The Print option prints a menu to a printer with a couple of extra items to aid you in shopping for the week. Be sure that the printer is connected and turned on before you select this option.

The Save option saves the current menu to disk. When you select this option, Menu Planner prompts you to enter a number for the menu. Enter a 1 for the very first menu, 2 for the second, and so on. You do not have to type in a filename: Menu Planner automatically creates a filename using the number you supply. Do not use the same number twice.

The Load option loads an existing menu from disk. This selection should be used whenever you want to review, edit, or print out an old menu. Again, you don't need to type in a filename. Simply enter the number of the menu you wish to load.

The Edit feature allows you to

change an existing menu. This is done by reentering the selections for an entire day. Note that you must have a menu in memory before you select this option (if you don't, Menu Planner has nothing to edit). Type in the day of the week when prompted; you must spell out the day completely (for instance, type MONDAY instead of MON). When the menu has been altered, the main program menu reappears. This feature simplifies the process of making similar menus. Simply reload an old menu, change the meals for one or more days, and then resave it.

The Quit option ends the program. If you have not already saved the current menu, be sure to do so before quitting.

Customizing Menu Planner

The program can be changed easily for personal preference. For example, you may prefer to start the week's menus with Monday rather than Sunday. To do so, rearrange the order of the days in line 90. If you don't like some of the foods offered in the built-in lists, substitute different foods of your own. This is done by editing the DATA statements that contain the names of dishes. If you make this change, be sure that the total number of items matches the values in lines 10–40. These lines contain REMarks to indicate which category they control. For example, to change the total number of entrees from 40 to 45, change the 40 in line 10 to 45. A more significant modification might be to add an entirely new category—say, a second vegetable dish or a beverage.

For instructions on entering these programs, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

Program 1: Menu Planner—Main Program

```
10 NI(0)=40:REM NUMBER OF ENTRE
ES
20 NI(1)=20:REM NUMBER OF VEGET
ABLES
30 NI(2)=20:REM NUMBER OF STARC
H/BREADS
40 NI(3)=20:REM NUMBER OF DESSE
RTS
50 FOR I = 1 TO 17:EL$=EL$+CHR$
(32):NEXT
60 T=0:FOR I = 0 TO 3:IF NI(I)
> T THEN T=NI(I)
70 NEXT:DIM MN$(3,T+1),SE$(3,7)
80 FOR N = 1 TO 7:READ DA$(N):N
EXT
90 DATA SUNDAY,MONDAY,TUESDAY,W
EDNESDAY,THURSDAY,FRIDAY,SAT
URDAY
100 FOR I = 0 TO 3:READ TI$(I):
TI$(I)=TI$(I)+":":NEXT
110 DATA ENTREE,VEGETABLE,STARC
H/BREAD,DESSERT
120 FOR I = 0 TO 3:FOR N = 1 TO
 NI(I):READ MN$(I,N):NEXT:M
N$(I,N)="CHOICE":NEXT
130 CH$="MRPSLEQ":GOTO 350
140 N=1
150 RW=1:CL=14:GOSUB 900:PRINT"
MENU PLANNER"
160 RW=3:CL=0:GOSUB 910:PRINT D
A$(N)
170 RW=12:CL=11:GOSUB 910:PRINT
"<C> TO CANCEL"
180 RW=13:GOSUB 910:PRINT"<RETU
RN> TO SELECT"
190 RW=14:GOSUB 910:PRINT"<SPAC
E BAR> TO CYCLE"
200 I=0:FOR K = 0 TO 3:SE$(K,N)
="":NEXT
210 RW=5+I:CL=0:GOSUB 910:PRINT
 TI$(I)
220 R=1
230 RW=5+I:CL=15:GOSUB 910:PRIN
T MN$(I,R);EL$
240 GOSUB 930
250 IF A$ <> CHR$(13) THEN 280
260 IF R = NI(I)+1 THEN GOSUB 4
80:SE$(I,N)=IM$:GOTO 310
270 SE$(I,N)=MN$(I,R):GOTO 310
280 IF A$ = "C" THEN GOTO 150
290 IF A$ = CHR$(32) THEN R=R+1
:IF R > NI(I)+1 THEN 220
300 GOTO 230
310 IF SE$(0,N) = "EAT OUT" THE
N 330
320 I=I+1:IF I < 4 THEN 210
330 IF FL = 1 THEN FL=0:GOTO 35
0
340 N=N+1:IF N < 8 THEN 150
350 RW=1:CL=14:GOSUB 900:PRINT"
MENU PLANNER"
360 RW=5:CL=9:GOSUB 910:PRINT"<
M>AKE A MENU"
370 RW=6:GOSUB 910:PRINT"<R>EVI
EW"
380 RW=7:GOSUB 910:PRINT"<P>RIN
T"
390 RW=8:GOSUB 910:PRINT"<S>AVE
"
400 RW=9:GOSUB 910:PRINT"<L>OAD
"
410 RW=10:GOSUB 910:PRINT"<E>DI
T"
420 RW=11:GOSUB 910:PRINT"<Q>UI
T"
430 RW=15:CL=6:GOSUB 910:PRINT"
TYPE LETTER OF YOUR CHOICE"
440 GOSUB 930:FOR L = 1 TO 7:IF
 A$ <> MID$(CH$,L,1) THEN 4
60
450 ON L GOTO 140,600,600,700,7
50,510,800
460 NEXT
470 GOTO 440
480 GOSUB 920:RW=10:CL=0:GOSUB
910:INPUT"CHOICE";IM$
490 IF IM$ = CHR$(32) OR IM$ =
"" THEN 480
500 R=46:RW=10:CL=0:GOSUB 910:P
RINT EL$;EL$:RETURN
510 RW=2:CL=5:GOSUB 900:INPUT"D
AY TO EDIT";DA$
520 FOR N = 1 TO 7:IF DA$ = DA$
(N) THEN FL=1:GOTO 150
530 NEXT:RW=4:CL=3:GOSUB 910:PR
INT"DAY MUST BE SPELLED OUT
 IN FULL"
540 FOR R = 1 TO 2000:NEXT:GOTO
 350
999 REM ENTREES:
1000 DATA HOT DOGS,HAMBURGERS,P
ORK CHOPS,STEAK,ROAST BEEF
,ROAST PORK,LAMB CHOPS
1010 DATA VEAL CUTLETS,ROAST CH
ICKEN,FRIED CHICKEN,CHICKE
N SALAD,SPAGHETTI
1020 DATA LASAGNA,TACOS,TUNA PA
TTIES,TUNA SALAD,TUNA NOOD
LE CASSEROLE,BEEF STEW
1030 DATA TURKEY,POTATO CHEESE
SOUP,COTTAGE CHEESE,PEA SO
UP,OMELETTE
1040 DATA FETTUCINI,CANNELLONI,
MANICOTTI,CREPES,SCRAMBLED
 EGGS,BURRITOS
1050 DATA MEAT LOAF,LEG OF LAMB
,VEAL SCALOPPINE,HALIBUT,F
ISH,LOBSTER,CRAB
1060 DATA CHOW MEIN,CHOP SUEY,B
EEF VEGETABLE SOUP,EAT OUT
1099 REM VEGETABLES:
1100 DATA CORN,PEAS,TOMATOES,GR
EEN BEANS,SPINACH,GREEN SA
LAD,FRUIT SALAD,CARROTS
1110 DATA BROCCOLI,CAULIFLOWER,
SQUASH,ZUCCHINI,LETTUCE,CU
CUMBER,PICKLE,MUSHROOMS 11
20 DATA CELERY,ONIONS,GREE
NS,LIMA BEANS
1120 DATA CELERY,ONIONS,GREENS,
LIMA BEANS
1199 REM STARCH/BREADS:
1200 DATA BREAD,FRIED POTATOES,
NOODLES,ROLLS,PILAF,PITA,K
ASHA,MATZOHS,CRACKERS
1210 DATA SWEET POTATOES,RICE,F
RENCH FRIES,MASHED POTATOE
S,BAKED POTATO
1220 DATA BREAD STICKS,GARLIC B
READ,FRIED RICE,POILED POT
ATOES,BUNS,PASTA
1299 REM DESSERTS:
1300 DATA ICE CREAM,POPSICLE,CA
KE,DOUGHNUT,FRUIT,CHEESECA
KE,COOKIES,PUDDING
1310 DATA JELLO,SORBET,BROWNIES
,FUDGE,FRUIT PIE,CREAM PIE
,SWEET ROLL,TORTE
1320 DATA BOMBE,BAKED ALASKA,DR
IED FRUIT,JELLY ROLL
```

Program 2: Commodore 64 Line Changes

```
DX 600  RW=0:CL=17+M:GOSUB900
SM 610  PRINT"MENU:":IFB$="P"TH
        ENPRINTSPC(45)"ON HAND
        {5 SPACES}NEED TO BUY"
GD 620  FORN=1TO7:PRINT:PRINTSP
        C(20-LEN(DA$(N))/2)DA$(
        N):PRINT
MR 630  FOR I=0 TO 3:PRINTSPC(4
        );TI$(I);SPC(14-LEN(TI$
        (I)));SE$(I,N):NEXT
AH 640  IFB$="R"THEN GETA$:IFA$
        =""THEN640
RM 650  NEXT
CM 660  IFB$="P"THENPRINT#4:CLO
        SE4
AS 670  GOTO350
JK 700  RW=2:CL=3:GOSUB900:NO$=
        "":INPUT"NUMBER OR MENU
         TO SAVE";NO$:IFNO$=""T
        HEN350
DP 710  OPEN3,8,3,"0:MENU"+NO$+
        "S,W"
BA 720  FORN=1TO7:FORI=0TO3:PRI
        NT#3,SE$(I,N):NEXTI,N
AK 730  CLOSE3:GOTO350
```

```
AJ 750 RW=2:CL=3:GOSUB900:NO$=
       "":INPUT"NUMBER OF MENU
        TO LOAD";NO$:IFNO$=""T
       HEN350
KB 760 OPEN3,8,3,"0:MENU"+NO$+
       "S,R"
QS 770 FORN=1TO7:FORI=0TO3:INP
       UT#3,SE$(I,N):NEXTI,N
QR 780 CLOSE3:GOTO350
AD 800 RW=0:GOSUB900:END
RG 900 PRINTCHR$(147)
CM 910 POKE781,RW:POKE782,CL:P
       OKE783,0:SYS65520:RETUR
       N
JQ 920 POKE198,0:RETURN
QJ 930 GETA$:RETURN
```

Program 3: IBM PC/PCjr Line Changes

```
NB 5 KEY OFF:DEF SEG=0:DEFINT A-
     Z:POKE 1047,PEEK(1047) OR 6
     4:WIDTH 40:LOCATE ,,0
PA 290 IF A$ = CHR$(32) THEN R=R
       +1:RW=5+I:CL=15:GOSUB 910
       :PRINT SPACE$(21):IF R >
       NI(I)+1 THEN 220
KL 600 B$=A$:RW=0:CL=17:GOSUB 90
       0
MF 610 IF B$="P" THEN OPEN "LPT1
       :" FOR OUTPUT AS #1:PRINT
        #1,SPC(18) ELSE OPEN "SC
       RN:" FOR OUTPUT AS #1
CL 620 PRINT #1,"MENU:":IF B$="P
       " THEN PRINT #1,SPC(45);"
       ON HAND      NEED TO BUY"
OH 630 FOR N = 1 TO 7:PRINT #1,C
       HR$(13):PRINT #1,SPC(20-L
       EN(DA$(N))/2);DA$(N):PRIN
       T #1,CHR$(13)
PH 640 FOR I = 0 TO 3:PRINT #1,S
       PC(4);TI$(I);SPC(14-LEN(T
       I$(I)));SE$(I,N):NEXT
GC 650 IF B$="R" AND INKEY$="" T
       HEN 650
LE 660 NEXT:CLOSE #1:GOTO 350
IK 700 RW=2:CL=3:GOSUB 900:INPUT
        "NUMBER OR MENU TO SAVE"
       ;NO$:IF NO$="" THEN 350
JM 710 OPEN "MENU"+NO$ FOR OUTPU
       T AS #1
GK 720 FOR N=1 TO 7:FOR I=0 TO 3
       :PRINT #1,SE$(I,N):NEXT I
       ,N
BA 730 CLOSE #1:GOTO 350
HH 750 RW=2:CL=3:GOSUB 900:INPUT
        "NUMBER OR MENU TO LOAD"
       ;NO$:IF NO$="" THEN 350
FN 760 OPEN "MENU"+NO$ FOR INPUT
        AS #1
OA 770 FOR N=1 TO 7:FOR I=0 TO 3
       :INPUT #1,SE$(I,N):NEXT I
       ,N
CK 780 CLOSE #1:GOTO 350
EJ 800 CLS:END
AF 900 CLS
LM 910 LOCATE RW+1,CL+1:RETURN
CK 920 WHILE INKEY$<>"":WEND:RET
       URN
HI 930 A$=INKEY$:RETURN
```

Program 4: Apple II Line Changes

```
44 5 D$ = CHR$ (4):I$ = CHR$ (9)
5F 600 RW = 0:CL = 0: GOSUB 900
AE 610 B$ = A$: IF B$ = "P" THEN
        PRINT : PRINT D$;"PR#1":
        PRINT I$;"80N"
DB 620 PRINT "MENU:": IF B$ = "P
       " THEN PRINT SPC( 45)"ON
       HAND      NEED TO BUY"
92 630 FOR N = 1 TO 7: PRINT : P
       RINT SPC( 20 - LEN (DA$(N
       )) / 2)DA$(N): PRINT
CA 640 FOR I = 0 TO 3: PRINT SPC
       ( 4);TI$(I); SPC( 14 - LE
       N (TI$(I)));SE$(I,N): NEX
       T
F1 650 IF B$ = "R" THEN GET A$
9A 660 NEXT
F8 670 IF B$ = "P" THEN PRINT D$
       ;"PR#0"
A5 680 GOTO 350
4B 700 RW = 2:CL = 3: GOSUB 900:
        INPUT "NUMBER OR MENU TO
        SAVE";NO$: IF NO$ = "" T
       HEN 350
CF 710 FF$ = "MENU" + NO$: PRINT
        D$;"OPEN";FF$
9B 720 PRINT D$;"WRITE";FF$: FOR
        N = 1 TO 7: FOR I = 0 TO
       3: PRINT SE$(I,N): NEXT
       I,N
3E 730 PRINT D$;"CLOSE";FF$: GOT
       O 350
D4 750 RW = 2:CL = 3: GOSUB 900:
        INPUT "NUMBER OF MENU TO
        LOAD";NO$: IF NO$ = "" T
       HEN 350
D9 760 FF$ = "MENU" + NO$: PRINT
        D$;"OPEN";FF$
61 770 PRINT D$;"READ";FF$: FOR
        N = 1 TO 7: FOR I = 0 TO
       3: INPUT SE$(I,N): NEXT I
       ,N
4B 780 PRINT D$;"CLOSE";FF$: GOT
       O 350
1F 800 HOME : END
4C 900 HOME
2D 910 VTAB RW + 1: HTAB CL + 1:
        RETURN
1D 920 RETURN
65 930 GET A$: RETURN
```

Program 5: Atari ST Line Changes

```
5      FULLW 2:CLEARW 2
600    B$=A$:RW=0:CL=17:GOSUB 90
       0:IF B$ = "P" THEN 650
610    PRINT "MENU:"
620    FOR N = 1 TO 7:PRINT:PRIN
       T SPC(20-LEN(DA$(N))/2);D
       A$(N):PRINT
630    FOR I = 0 TO 3:PRINT SPC(
       4);TI$(I);SPC(14-LEN(TI$(
       I)));SE$(I,N):NEXT
640    A=INP(2):NEXT:GOTO 350
650    LPRINT "MENU:"
660    FOR N = 1 TO 7:LPRINT:LPR
       INT SPC(20-LEN(DA$(N))/2)
       ;DA$(N):LPRINT
670    FOR I = 0 TO 3:LPRINT SPC
       (4);TI$(I);SPC(14-LEN(TI$
       (I)));SE$(I,N):NEXT
680    NEXT:GOTO 350
700    RW=2:CL=3:GOSUB 900:INPUT
        "NUMBER OR MENU TO SAVE"
       ;NO$:IF NO$="" THEN 350
710    FF$="MENU"+NO$:OPEN "O",#
       1,FF$
720    FOR N = 1 TO 7:FOR I = 0
       TO 3:PRINT #1,SE$(I,N):NE
       XT I,N
730    CLOSE #1:GOTO 350
750    RW=2:CL=3:GOSUB 900:INPUT
        "NUMBER OR MENU TO LOAD"
       ;NO$:IF NO$="" THEN 350
760    FF$="MENU"+NO$:OPEN "I",#
       1,FF$
770    FOR N = 1 TO 7:FOR I = 0
       TO 3:INPUT #1,SE$(I,N):NE
       XT I,N
780    CLOSE #1:GOTO 350
800    CLEARW 2:END
900    CLEARW 2
910    GOTOXY CL,RW:RETURN
920    RETURN
930    A$=CHR$(INP(2))
935    RETURN
```

Program 6: Amiga Line Changes

```
5 DEFINT A-Z:SCREEN 1,320,200,4,
1:WINDOW 3,"",(0,0)-(311,186),16
,1:WINDOW OUTPUT 3↵
600 B$=A$:RW=0:CL=17:GOSUB 900↵
610 IF B$="P" THEN OPEN "LPT1:"
FOR OUTPUT AS #1:PRINT #1,SPC(18
) ELSE OPEN "SCRN:" FOR OUTPUT A
S #1↵
620 PRINT #1,"MENU:":IF B$="P" T
HEN PRINT #1,SPC(45)"ON HAND
NEED TO BUY"↵
630 FOR N = 1 TO 7:PRINT #1,CHR$
(13):PRINT #1,SPC(20-LEN(DA$(N))
/2);DA$(N):PRINT #1,CHR$(13)↵
640 FOR I = 0 TO 3:PRINT #1,SPC(
4);TI$(I);SPC(14-LEN(TI$(I)));SE
$(I,N):NEXT↵
650 IF B$="R" AND INKEY$="" THEN
650↵
660 NEXT:CLOSE #1:GOTO 350↵
700 RW=2:CL=3:GOSUB 900:INPUT "N
UMBER OR MENU TO SAVE";NO$:IF NO
$="" THEN 350↵
710 OPEN "MENU"+NO$ FOR OUTPUT A
S #1↵
720 FOR N=1 TO 7:FOR I=0 TO 3:PR
INT #1,SE$(I,N):NEXT I,N↵
730 CLOSE #1:GOTO 350↵
750 RW=2:CL=3:GOSUB 900:INPUT "N
UMBER OR MENU TO LOAD";NO$:IF NO
$="" THEN 350↵
760 OPEN "MENU"+NO$ FOR INPUT AS
#1↵
770 FOR N=1 TO 7:FOR I=0 TO 3:IN
PUT #1,SE$(I,N):NEXT I,N↵
780 CLOSE #1:GOTO 350↵
800 WINDOW CLOSE 3:SCREEN CLOSE
1:END↵
900 CLS↵
910 LOCATE RW+1,CL+1:RETURN↵
920 WHILE INKEY$<>"":WEND:RETURN
↵
930 A$=UCASE$(INKEY$):RETURN↵
↵
```

Program 7: Menu Planner For Atari 400, 800, XL, And XE

```
HK 5 DIM NI(3),IM$(21),T$(21
     ),EL$(17),DE$(9),CH$(7)
     ,FF$(9),NO$(3),A$(1),B$
     (1)
KM 10 NI(0)=40:REM NUMBER OF
      ENTREES
HI 20 NI(1)=20:REM NUMBER OF
      VEGETABLES
DN 30 NI(2)=20:REM NUMBER OF
      STARCH/BREADS
AH 40 NI(3)=20:REM NUMBER OF
      DESSERTS
DD 45 OPEN #1,4,0,"K:":POKE
      752,1:POKE 82,0
AO 50 EL$=CHR$(32):EL$(17)=C
      HR$(32):EL$(2)=EL$
BK 60 NI=0:FOR I=0 TO 3:IF N
      I(I)>NI THEN NI=NI(I)
NI 70 NEXT I:DIM MN$(4*(NI+1
      )*21+21),DA$(8*9),SE$(
      4*21+7*4*21),TI$(4*13)
LG 75 FOR J=0 TO 3:FOR N=1 T
      O 7:K=J*21+(N-1)*4*21+
      1:SE$(K,K+16)=EL$:NEXT
       N:NEXT J
```

```
DK 80 FOR N=1 TO 7:READ T$:L
      =LEN(T$):IF L<9 THEN T
      $(L+1)=EL$
KM 85 K=(N-1)*9+1:DA$(K)=T$:
      NEXT N
IK 90 DATA SUNDAY,MONDAY,TUE
      SDAY,WEDNESDAY,THURSDA
      Y,FRIDAY,SATURDAY
IE 100 FOR I=0 TO 3:READ T$:
      L=LEN(T$):IF L<13 THE
      N T$(L+1)=EL$
JJ 105 T$(L+1,L+1)=":":K=I*1
      3+1:TI$(K)=T$:NEXT I
OO 110 DATA ENTREE,VEGETABLE
      ,STARCH/BREAD,DESSERT
DG 120 FOR I=0 TO 3:FOR N=1
      TO NI(I):READ T$:L=LE
      N(T$):IF L<21 THEN T$
      (L+1)=EL$
OK 125 K=I*(NI+1)*21+(N-1)*2
      1+1:MN$(K)=T$:NEXT N:
      K=K+21:MN$(K)=EL$:MN$
      (K,K+5)="CHOICE":MN$(
      K+6)=EL$:NEXT I
PD 130 CH$="MRPSLEQ":GOTO 35
      0
FB 140 N=1
LL 150 RW=1:CL=14:GOSUB 900:
      PRINT "MENU PLANNER"
FA 160 RW=3:CL=0:GOSUB 910:K
      =(N-1)*9+1:? DA$(K,K+
      8)
KO 170 RW=12:CL=11:GOSUB 910
      :PRINT "<C> TO CANCEL
      "
PP 180 RW=13:GOSUB 910:PRINT
       "<RETURN> TO SELECT"
BC 190 RW=14:GOSUB 910:PRINT
       "<SPACE BAR> TO CYCL
      E"
NM 200 I=0:FOR J=0 TO 3:K=J*
      21+(N-1)*4*21+1:SE$(K
      ,K+16)=EL$:SE$(K,K+17
      )=EL$:NEXT J
MK 210 RW=5+I:CL=0:GOSUB 910
      :K=I*13+1:PRINT TI$(K
      ,K+12)
FE 220 R=1
CF 230 RW=5+I:CL=15:GOSUB 91
      0:K=I*(NI+1)*21+(R-1)
      *21+1:PRINT MN$(K,K+2
      0)
LC 240 GOSUB 930
LL 250 IF A$<>CHR$(155) THEN
       280
CI 260 K=I*21+(N-1)*4*21+1:I
      F R=NI(I)+1 THEN GOSU
      B 470:SE$(K,K+20)=IM$
      :GOTO 310
EG 270 K1=I*(NI+1)*21+(R-1)*
      21+1:SE$(K,K+20)=MN$(
      K1,K1+20):GOTO 310
FA 280 IF A$="C" THEN GOTO 1
      50
JI 290 IF A$=CHR$(32) THEN R
      =R+1:IF R>NI(I)+1 THE
      N 220
GB 300 GOTO 230
HB 310 K=(N-1)*4*21+1:IF SE$
      (K,K+6)="EAT OUT" THE
      N 330
AE 320 I=I+1:IF I<4 THEN 210
FO 330 IF FL=1 THEN FL=0:GOT
      O 350
BM 340 N=N+1:IF N<8 THEN 150
LN 350 RW=1:CL=14:GOSUB 900:
      PRINT "MENU PLANNER"
GA 360 RW=5:CL=9:GOSUB 910:P
      RINT "<M>AKE A MENU"
GB 370 RW=6:GOSUB 910:PRINT
      "<R>EVIEW"
BO 380 RW=7:GOSUB 910:PRINT
      "<P>RINT"
MC 390 RW=8:GOSUB 910:PRINT
      "<S>AVE"
KM 400 RW=9:GOSUB 910:PRINT
      "<L>OAD"
NL 410 RW=10:GOSUB 910:PRINT
       "<E>DIT"
PK 420 RW=11:GOSUB 910:PRINT
       "<Q>UIT"
BP 430 RW=15:CL=6:GOSUB 910:
      PRINT "TYPE LETTER OF
       YOUR CHOICE"
JN 440 GOSUB 930:FOR L=1 TO
      7:IF A$<>CH$(L,L) THE
      N 450
DI 445 ON L GOTO 140,600,600
      ,700,750,500,800
CE 450 NEXT L
GL 460 GOTO 440
OB 470 RW=10:CL=0:GOSUB 910:
      PRINT "CHOICE";:INPUT
       IM$
HP 480 IF IM$=CHR$(32) OR IM
      $="" THEN 470
PE 490 RW=10:CL=0:GOSUB 910:
      PRINT EL$;EL$:RETURN
FN 500 RW=2:CL=5:GOSUB 900:P
      RINT "DAY TO EDIT";:I
      NPUT DE$:IF DE$="" TH
      EN 350
JO 510 FOR N=1 TO 7:K=(N-1)*
      9+1:IF DE$=DA$(K,K+LE
      N(DE$)-1) THEN FL=1:G
      OTO 150
IJ 520 NEXT N:RW=4:CL=3:GOSU
      B 910:PRINT "DAY MUST
       BE SPELLED OUT IN FU
      LL"
EK 530 FOR R=1 TO 200:NEXT R
      :GOTO 350
KP 600 B$=A$:RW=0:CL=17:GOSU
      B 900
CN 610 DE$="P:":IF B$="R" TH
      EN DE$="E:"
LI 620 OPEN #2,8,0,DE$
DA 630 PRINT #2;"MENU:":IF B
      $="P" THEN PRINT #2;E
      L$;EL$;EL$;"ON HAND
      (5 SPACES)NEED TO BUY
      "
FE 640 FOR N=1 TO 7:PRINT #2
      ;CHR$(155):K=(N-1)*9+
      1:PRINT #2;EL$(1,16);
      DA$(K,K+8)
HP 650 FOR I=0 TO 3:K=I*13+1
      :K1=I*21+(N-1)*4*21+1
      :PRINT #2;TI$(K,K+12)
      ;EL$(1,2);SE$(K1,K1+2
      0):NEXT I
DE 660 IF B$="R" THEN GET #1
      ,A
DK 670 NEXT N:CLOSE #2:GOTO
      350
EP 700 RW=2:CL=3:GOSUB 900:P
      RINT "NUMBER OR MENU
      TO SAVE";:INPUT NO$:I
      F NO$="" THEN 350
EH 710 FF$="D:MENU":FF$(5)=N
      O$:OPEN #2,8,0,FF$
AG 720 FOR N=1 TO 7:FOR I=0
      TO 3:K=I*21+(N-1)*4*2
      1+1:PRINT #2;SE$(K,K+
      20):NEXT I:NEXT N
HA 730 CLOSE #2:GOTO 350
EF 750 RW=2:CL=3:GOSUB 900:P
      RINT "NUMBER OR MENU
      TO LOAD";:INPUT NO$:I
      F NO$="" THEN 350
EI 760 FF$="D:MENU":FF$(5)=N
      O$:OPEN #2,4,0,FF$
HF 770 FOR N=1 TO 7:FOR I=0
      TO 3:K=I*21+(N-1)*4*2
      1+1:INPUT #2;T$:SE$(K
      ,K+20)=T$:NEXT I:NEXT
       N
HF 780 CLOSE #2:GOTO 350
DF 800 ? CHR$(125):POKE 752,
      0:END
MC 900 ? CHR$(125)
IN 910 POSITION CL,RW:RETURN

MG 930 GET #1,A:A$=CHR$(A):R
      ETURN
IM 999 REM ENTREE:
BF 1000 DATA HOT DOGS,HAMBUR
      GERS,PORK CHOPS,STEA
      K,ROAST BEEF,ROAST P
      ORK,LAMB CHOPS
LI 1010 DATA VEAL CUTLETS,RO
      AST CHICKEN,FRIED CH
      ICKEN,CHICKEN SALAD,
      SPAGHETTI
AI 1020 DATA LASAGNA,TACOS,T
      UNA PATTIES,TUNA SAL
      AD,TUNA NOODLE CASSE
      ROLE,BEEF STEW
GN 1030 DATA TURKEY,POTATO C
      HEESE SOUP,COTTAGE C
      HEESE,PEA SOUP,OMELE
      TTE
DA 1040 DATA FETTUCINI,CANNE
      LLONI,MANICOTTI,CREP
      ES,SCRAMBLED EGGS,BU
      RRITOS
DG 1050 DATA MEAT LOAF,LEG O
      F LAMB,VEAL SCALOPPI
      NE,HALIBUT,FISH,LOBS
      TER,CRAB
OJ 1060 DATA CHOW MEIN,CHOP
      SUEY,BEEF VEGETABLE
      SOUP,EAT OUT
HN 1069 REM VEGETABLE:
KA 1070 DATA CORN,PEAS,TOMAT
      OES,GREEN BEANS,SPIN
      ACH,GREEN SALAD,FRUI
      T SALAD,CARROTS
ME 1080 DATA BROCCOLI,CAULIF
      LOWER,SQUASH,ZUCCHIN
      I,LETTUCE,CUCUMBER,P
      ICKLE,MUSHROOMS
FC 1090 DATA CELERY,ONIONS,G
      REENS,LIMA BEANS
ED 1099 REM STARCH/BREAD:
JA 1100 DATA BREAD,FRIED POT
      ATOES,RICE,FRENCH FR
      IES,MASHED POTATOES,
      BAKED POTATO
BO 1110 DATA SWEET POTATOES,
      NOODLES,ROLLS,PILAF,
      PITA,KASHA,MATZOHS,C
      RACKERS
FF 1120 DATA BREAD STICKS,GA
      RLIC BREAD,FRIED RIC
      E,BOILED POTATOES,BU
      NS,PASTA
ML 1129 REM DESSERT
KM 1130 DATA ICE CREAM,POPSI
      CLE,CAKE,DONUT,FRUIT
      ,CHEESE CAKE,COOKIES
      ,PUDDING
CK 1140 DATA JELLO,SORBET,BR
      OWNIES,FUDGE,FRUIT P
      IE,CREAM PIE,SWEET R
      OLL,TORTE
HJ 1150 DATA BOMBE,BAKED ALA
      SKA,DRIED FRUIT,JELL
      Y ROLL
```

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Tass Times In Tonetown

Ervin Bobo

Requirements: Amiga (reviewed here), Apple II series, Atari ST, Commodore 64, IBM PC and compatibles, and Macintosh computers. Different computer versions may vary slightly. Color monitor required.

Gramps has disappeared, Spot is following you all around the house, and in the lab is a fishbowl full of guitar picks. (Well, where else would you keep them?)

This is the beginning—almost—of *Tass Times In Tonetown*, a new graphics adventure from Activision and Interplay Productions, the team who brought *Mind Shadow* and *Borrowed Time* to the home computer.

Like those predecessors, *Tass Times* is a mystery, and the disappearance of Gramps is only the beginning. Before you're through, you'll see strange places, deal with stranger people, and learn a strange new dialect in which the word "tass" equates—somewhat—with what a long-ago generation called "hip."

After a striking opening screen and theme music, you'll find yourself in the living room of Gramps. His dog Spot is here and so is a receipt for an anchovy and pepperoni pizza, but no Gramps.

The screen is divided into four main sections. In the upper left quarter you'll see Gramps' living room, while the upper right quarter contains eight icons that will speed your communication with the parser (the portion of the program that interprets your commands). Just below this and running the width of the screen is another bar where your inventory will be displayed and where simple directional commands can be executed by clicking on the proper compass point. At the bottom of the screen is the text area, large enough to display seven lines of text. It waits for you to make your move.

Mouse Magic

As you might expect, moves may be made with the Amiga mouse or by typing them in the conventional manner, although the mouse can be used for almost all communication. For example, it's possible to move through the house, examine objects, and even find the key inside the cookie jar by using only mouse control. But to use the key to unlock the door to the lab, you'll have to type, "unlock door."

In using mouse control, you click on one of the eight icons. (It will be obvious that the picture of an eye means "look" or "examine.") As you click on it, the operative verb appears in the text area just where you would have typed it, and the flashing cursor tells you the parser is waiting for you to complete the command. Assuming you are in the kitchen, move your pointer into the graphic scene and click on the cookie jar. A key appears, floating in midair, and the text area indicates that you see a key. To take the key it is not necessary to click on the "take" icon; simply click on the key and it will be added to your inventory.

Similarly, should you at any point in the game need to reexamine, use, or drop an object, you may do so by clicking on its picture in the inventory file.

It is in this method of mouse communication that *Tass Times* moves a great stride beyond other parsers and, in doing so, speeds up the game. Another benefit is this: Although the graphics are superb and even fine detail is rendered well, there may be times when you wish to examine an object for which you have no name. In most games, you might need to type several guesses. Here, point at it and click. If it is important to the game, it will be identified for you.

Nor does this method affect your interaction with the parser, for it is only your own moves that are being automated. Do something stupid, and you'll receive the same acid reply as if you had typed in the stupid move.

Anyway, you have the key and you've unlocked the lab. There you find a fishbowl full of guitar picks and a large loop that seems to be connected to the generator. As you turn on the generator, a strange humming fills the room. Spot leaps through the hoop and disappears. You follow him and find yourself in Tonetown.



Tass Times In Tonetown *from Activision features a colorful graphics interface.*

So far, that's not giving away much of the game, and it's all you're going to get. Well, one more thing: Spot's name is now Ennio, and he's capable of speech. Listen to him, for he has been here before, and although he talks like a human he still retains certain dog instincts that can aid you in your search for Gramps.

As stated before, the graphics are excellent. As you move from one room to the next, the scene changes quickly in what is best described as a very fast dissolve. Sound, from the hum of the generator to the rock band in Tonetown, is very good, using the two-channel feature of the Amiga. More to the point, if no sounds are appropriate to the scene, then there are no sounds.

Documentation consists of a book that defines the controls and a copy of the Tonetown Times. A careful reading of the newspaper is essential, for you've involved yourself in much more than a search for Gramps. Other things have been happening in Tonetown, many of them instigated by the evil Franklin Snarl, and you seem to be a catalyst.

Further, you'll find that both Gramps and Ennio/Spot have been here before and are held in high regard. You, on the other hand, are invariably referred to as a "stupid tourist," and, until you can shed that image, you're going to feel handicapped. Your clothing and the way you talk are dead

giveaways. Until you discover the ultratouch way to ultratass, you're going to look like a tourist; and until you learn the Tonetown dialect, you're going to sound like one.

Get tone quick, for you don't have that many moonal periods in which to find Gramps. And if you don't, you may find yourself in the position of Jonboi Waltune, who recently had to leave town after being cited for aggravated tonelessness.

Tass Times In Tonetown
Activision
2350 Bayshore Frontage Rd.
Mountain View, CA 94043
$34.95 Commodore 64 version
$39.95 Apple II series and IBM PC and compatibles versions
$44.95 Amiga, ST, and Macintosh versions

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Airheart For The Apple II

James V. Trunzo

Requirements: Apple II-series computer with a minimum of 128K; joystick and color monitor required.

A quick look at current entertainment software available for the Apple II-series computer systems certainly indicates the trends that have developed over the last year or so. More elaborate dungeon games, increasingly realistic wargames, and super-sophisticated text adventures claim all the top spots on most bestseller lists. Ironically, the genre that started the computer entertainment craze, the arcade game, is not represented. But Brøderbund's latest game may change all that.



Airheart *from Brøderbund mixes action and strategy in a game with excellent color graphics.*

Airheart, a stunning graphics arcade adventure game, challenges both your strategic skills and your hand-eye coordination just as well as any of its illustrious predecessors. Designed by Dan Gorlin of *Choplifter* fame, this state-of-the-art arcade game utilizes double hi-res graphics and a simple task-oriented approach to come up with one of the best arcade games in years.

Striving for the title of the legendary champion Airheart, you must prove yourself worthy both of the name and the task of caring for the infant prince (who, incidentally, awaits your coming in a state of suspended animation). To do so, you must use your highly mobile, jet-powered sled to overcome the robotic defenses that have been installed to insure that only the best of warriors succeed. Spirit guardians will present you with increasingly difficult tasks: You must retrieve a sword (strength), a goblet (generosity), and a harp (harmony) before earning the right to enter into the final battle. Barring your way are seven types of robots, each with a different form of deadly defense aimed at thwarting your efforts.

These various robots provide *Airheart* with not only its challenge but also with its variety. Some of the robots, like the Bumper, simply harass you; others, like the Spitter, may destroy you or your craft. A different strategy is needed to defeat each type of robot, and only a steady hand and quick thinking allow you any chance of success. All the robots can be shot, of course, but that's only half the battle. Once you've destroyed a robot, you must pick up the Pod that remains, or it regenerates into a new robot of the type just destroyed.

Topnotch Graphics And Animation

As mentioned earlier, *Airheart* offers excellent graphics in all phases of the game. The animation is top-of-the-line stuff, and, each time you play, you'll notice something new that will delight you. Whether it's the Spirit Guardians casting spells over you, a deadly bubble encasing you, or jet-sledding underwater, the details that have gone into the graphic rendering of the action would be worth the price of the program even if the game was only mediocre—which it definitely is not. What kind of graphics surprise awaits the winner of the game I can only guess at, for the best I've been able to do is secure the sword and the goblet.

Airheart contains other features, including sound effects, a vanity score board, and so on. Additionally, it should be noted that the game does require 128K of memory and a joystick. Due to the speed and sensitivity of the jet-powered sled, it's easy to understand that keyboard control would not have proved sufficient for the task of guiding the sled.

Airheart proves that there is still room for arcade games in the software entertainment field, providing that ingenuity and programming skill go into the product. Both of these elements are aptly presented in *Airheart*.

Airheart
Brøderbund
17 Paul Dr.
San Rafael, CA 94903-2101
$34.95

Lance Haffner Games

James V. Trunzo

Requirements:
3-In-1 Football—*Apple II series, Macintosh, Commodore 64, Amiga, Atari 800/XL/XE, Atari ST, and IBM PC and all compatible computers.*

Basketball: The Pro Game—*Apple II series, Commodore 64, Amiga, and IBM PC and compatibles.*

Final Four College Basketball—*Apple II series, Atari 800/XL/XE, Commodore 64, Amiga, and IBM PC and compatibles.*

Full Count Baseball—*Apple II series, with Commodore 64 and IBM and compatibles available by April.*

A printer is recommended, but not required.

Lance Haffner's statistical sports games, while not widely known, are excellent entertainment packages.

Basketball: The Pro Game, Final Four College Basketball, and *3-In-1 Football* are the heart of the game line, although by the time this review goes to press, a fourth game, *Full Count Baseball,* will be available. There are also a variety of utility disks available.

The first three programs have many features in common, so, before looking at each product's individual attributes, let's examine the similarities. The games are statistically oriented, and there are no frills, such as flashy graphics. Instead, all their programming power is poured into reproducing accurately played contests based on actual player and team statistics. No matter which game you are playing, it's obvious that the emphasis is on statistics. All screens keep you informed of both the overall stats, on which each player's performance is based, and on current game stats, which reflect the actual game taking place.

Additionally, in keeping with this emphasis, all Lance Haffner games let you print complete game stats appropriate to the sport being played and then compile those figures for one or all teams being used. Whether you simply want to see the outcome of a particular game or replay an entire season, Lance Haffner software allows you to do so.

A third similarity among the programs is the ease and speed of play. Whether you're choosing your lineup, selecting plays, or making substitutions, you have complete flexibility and the constant aid of onscreen instructions. Football games can be played in as little as 25 minutes, while basketball can be played in approximately 45 minutes (due to the greater number of options and the necessary substitutions).

Finally, all games stress user participation. Even with their statistical bent, these aren't passive programs (though all of them can play computer-versus-computer contests, if you wish).

For example, *3-In-1 Football* allows you to select from among 16 offensive plays and from 6 defensive formations; the basketball games constantly demand that the user choose who will be handling the ball and what he'll do with it once he gets it. You can play against the computer or against a human opponent, and the enjoyment level is top-notch in either case. Now let's take a quick look at each game.

Dream Matchups

3-In-1 Football features 176 college teams, 28 NFL teams, and 14 USFL teams from the most recently completed season. In addition, a second disk (included with the game) offers the user a choice of 174 great college teams and 189 great pro teams of the past. Watch Navy, led by Roger Staubach, take on Dan Marino's Pitt Panthers. Match the 1967 USC Trojans against the defensive giants of the 1983 Nebraska team—can OJ Simpson run against those guys? See if the Pittsburgh Steelers' Steel Curtain can contain the explosive AFL San Diego Charger greats like Keith Lincoln and John Hadl.

The football game allows you to select all plays, call time-outs, elect to accept or decline penalties, go for two-point conversions, and do much more. Individual player stats are provided at half time and at the conclusion of the game, although it should be noted that when selecting plays, the computer—not the user—determines who is carrying, throwing, or receiving the ball. This is determined by the actual player stats from the given year and results in very accurate statistics. It insures that a player will not be overused and that a seldom-used player with a high average-yards-gained record will not be used in every crucial situation. This method also helps speed the game along. Individual players are announced with each play, however, and your knowledge of a team's personnel will dictate your play-calling.

Final Four College Basketball and *Basketball: The Pro Game* offer the same exceptional value as the football game. The college game includes 292 teams from the 1985–86 season plus 70 all-time great teams. Remember the classic matchup between the Houston Cougars, led by Elvin Hayes, and the UCLA Bruins, led by Lew Alcindor? Replay that contest and see if the Cougars can repeat their upset victory. Or match Alcindor against Georgetown's Patrick Ewing.

The Pro game features all 23 NBA teams from the most recently completed season and throws in 100 great teams of the past. Bill Russell's Celtics can go head-to-head against West, Chamberlain, and Baylor of the Lakers.

In either game, you select who will take the shot, who will pass the ball, who will intentionally foul, and who will be fouled. Starting line-ups are yours to determine, but, more importantly, it's your coaching throughout the game that will determine the outcome. It's an absolute must that you substitute wisely and timely. Leave a tired player in the game too long and he'll become exhausted and be of no use for the remainder of the game. Ignore the number of fouls on a player, and it's certain that he'll watch the rest of the contest from the bench. On-screen stats give you the percentage chance of each shooter with each potential shot. Players are rated for their ability to rebound, pass, shoot, and play defense.

Other features? In the Pro game, you can elect to play with the three-point shot. In the college game, you can play with or without a 45-second shot clock. In either game, you select the type of team defense you wish to play, the type of offense, whether to press after a basket, and much more. Home court advantage is built into the games, based upon home and away records. Competition between teams in the college game takes into consideration the strength of a team's schedule and conference to insure realism and accuracy.

It's obvious from the preceding information that I'm sold on these products. Sure, it would be nice if fancy graphics enhanced the programs, but for those of us who like realism and the ability to play complete seasons, Lance Haffner game programs are hard to beat.

All Lance Haffner games come with a stat compiler and a report generator, plus more teams than you'll use in a lifetime. The $39.95 price for each program is an excellent value, especially considering all that you get. New team disks are available each year for $12.99.

Lance Haffner Games
P.O. Box 100594
Nashville, TN 37210
$39.95 each
Annual team disks: $12.99

Instant Music For The Amiga

Neil Randall

Instant Music from Electronic Arts breaks new ground in computer entertainment software. Not only does it encourage the nonmusician to play music, it makes playing music easy. Only minutes after loading the program, anyone—no matter how little musical training he or she has—can be playing along, creating music that has no choice but to sound good. The Amiga's mouse becomes the instrument, playing whatever instrument the player chooses in key, in tempo, and in tune with the rest of the song.

Of course, there are those who think that music—like all art—should be tough, because only the most exacting standards allow us to understand the sheer importance of creative expression. To that end, such purists would suggest that playing a musical instrument is something to be perfected over years of study, after which point we are free to compose and experiment on our own. Nobody, not even the designer of *Instant Music*, would disagree with that. What he would disagree with, however, is the notion that only music scholars should be allowed the joy of musical performance.

Unique Notation

When *Instant Music* appears, the screen shows a unique and colorful display. Immediately noticeable is the actual music display, or score window, that occupies the majority of the picture. The musical notation for *Instant Music*, unlike any other music program I have seen, is not standard. Instead of the usual staffs, quarter notes, half rests, naturals, and so on, *Instant Music* displays its music as a series of squares or bars. The notation for each instrument (four appear at once) is colored differently, so that you can tell at a glance which instrument you currently control. If the electric guitar is in green, for instance, you can see how its notes ascend and descend by watching the cursor roll by the sequence of green squares and bars that make up the guitar's "notes." The display itself is divided into eight bars, and you can view all eight at once, or, by using the zoom bar, you can look at as few as you wish.

Below the display are the four instrument boxes, showing the instruments currently used for the song. Each box contains the name of the instrument, a bar to adjust that instrument's volume, and a button that allows you to get rid of that instrument's notation from the viewscreen. By clicking on any of the instruments, you can either play that instrument, change its notation in the score window, or select a different instrument.

Above the score window is the scroll bar, which allows you to scroll ahead or back; the tempo bar, with which you speed up or slow down the music; the zoom bar; and a chord control. The chord control allows you to select one-, two-, or three-note chords for the instrument you are working with. I have found that a three-note drum adds volume and weight to the drum beat, while a two-note guitar places one note on each stereo channel. Also on this line above the score window are the QuickDraw and MouseJam selection buttons, and the button that stops and starts the music.

Instant Music opens with a song already playing. The instruments make full use of the Amiga's built-in sound capabilities, and many of them sound digitized. Four instruments play at once, with many combinations possible. Electric piano, drums, electric bass, strings, saxophone, trumpet, pipe organ, electric guitar, vibes, accordian, steel drums—the choices are plentiful. One of the first things you will want to do, after listening for a moment to the song itself, is to change the instrumentation.

To do so, you simply move the mouse pointer to the bottom of the screen, where the instruments are shown, and click the one you want to get rid of. Then you move to the menus at the top of the screen and select from three lists of instruments. When you have chosen the one you want, the program loads that instrument in, and the song now uses it in place of the original instrument.

The MouseJam

There are several ways of making music with *Instant Music*. The first, and by far the most fun, is the MouseJam. In this mode, you press the left mouse button as the music plays, and move the mouse up and down. You are now playing your chosen instrument. Moving the mouse downwards lowers the notes, while pushing it up raises them. *Instant Music* will not let you stray from the chords or the rhythm of the song unless you specify that you want to, so everything you play will be musically competent, occasionally even musically brilliant.

After you have tried your hand at playing lead, adding bass, or drumming, to every song on the disk, you will want to experiment a bit. To add to your flexibility as a musician, *Instant Music* allows you to move beyond the standard rhythm of the piece to either "keypad rhythm" or "free rhythm." To use keypad rhythm, you press any key on the numeric keypad; each key offers a rhythm different from the original. The 8 key, for instance, offers a beat off the normal syncopation of the tune, while the 6 key presents a driving rhythm especially effective at higher volumes. The rhythms work for any instrument you choose. Free rhythm, as its name suggests, allows you to choose your own beat, completely from scratch. While this mode offers the greatest originality, it also allows you, unlike the other rhythms, to make mistakes.

MouseJam is not the only way to make music, though. With QuickDraw, you can not only play your own lead line, you can also record the changes to the original. The procedure is very simple. All you do is drag the mouse across the screen for a chosen distance, going up or down on an angle as you choose. In this way, you will change the appearance of that instrument's track on the screen, and when the cursor gets around to that position, it will play the new notes instead of the old. Once again, the program keeps your changes within the pitch and rhythm guides for that song.

The menus for the program allow considerable flexibility in editing and arranging compositions. Perhaps the most interesting menu is the Draw menu, which contains such commands as Rhythm Guide and Scale Ruler. When you select Scale Ruler, the left and right sides of the Score Window open up to reveal a small musical keyboard and several other bits of information. Now as you play the music, you can watch the names and keyboard positions of the notes change. This information helps you compose your own songs. The Rhythm Guide lets you change the rhythm of the song, allowing such rhythmic variations as 1/4, 1/8, 1/8 triplet, 1/16, and multiples of the current rhythm. Although the Draw menu takes practice to get used to, it greatly increases your ability to control the music.

Instant Music offers much more than what is described here, but, until you actually use the program, most of its features won't mean much. *Instant Music* is so different from any other available music programs that it really must be seen to be believed. For those who want to turn up the volume and blast away at an electric guitar with a prerecorded band, this is an indispensible program. For those who want to compose music that sounds good, but does not demand a thorough knowledge of music theory, *Instant Music* allows that, too. And for those who are

learning a band instrument, and who hate practicing without the backing of the rest of the band, *Instant Music* is just the thing.

Thanks to this program, I've picked up my electric guitar again and am quickly relearning all those licks I'd forgotten several years ago. With a band at my command, playing whatever song I want them to, I can crank up my Fender and let fly with whatever my fingers are willing to give. Unlike a real band, nobody complains about the mistakes, and nobody gets impatient when I ask for the same song to be played for the twenty-second time. An excellent program, *Instant Music* offers pure fun. Besides the fun, it teaches music, even to those who know nothing to begin with. In other words, *Instant Music* allows you to expand your horizons, and that, in my opinion, is what computers are all about.

Instant Music
Electronic Arts
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The SoundMouse

Rhett Anderson

Requirements: Any eight-bit Atari computer with at least 48K and a disk drive.

The SoundMouse is a small peripheral box that plugs into the first joystick port of any Atari eight-bit computer with at least 48K and a disk drive. Surprisingly, it adds a large range of capabilities to your computer.

The Hardware

The SoundMouse is called a mouse simply because it looks like a mouse that plugs into the Amiga, Atari ST, and Apple computers. But it's not motion that drives this mouse—it's sound. To give your Atari an ear, just plug this sturdy little piece of hardware into the first joystick port. The computer reads the SoundMouse as if it were a game paddle, so it's easy to write programs that use the SoundMouse, no matter what language you wish to use. The SoundMouse is partial to low-frequency sounds, responding well to a clap or a thump, but ignoring a whistle.

The Software

When you boot up the disk that comes with The SoundMouse, you select from three options: the Graphics Menu, the Games Menu, and the SoundMouse Band. The Graphics Menu lets you synchronize computer graphics with music that you play on your stereo. The Games Menu offers a selection of sound-controlled games. The SoundMouse band is a trio of computer-drawn musicians that appear to perform the music you play.

There are ten games from which to choose. Some of them aren't really games, though. One checks the speed of your reactions and one just draws a foot on the screen every time you make a noise. But the *real* games are well done. The author of these programs clearly knows the capabilities of the Atari. "Bugsquasher," in which you pulverize small insects by making loud sounds, was my favorite. The games can be played in a variety of ways—by tapping on the table where the SoundMouse rests, by tapping on the SoundMouse itself, by snapping your fingers, or by shouting. Because the SoundMouse is partial to low-frequency sounds, it appears to be a bit of a chauvinist—while I can shout from across the room to squash a bug, the SoundMouse turns a deaf ear to my wife's loudest and lowest shouts, so she plays by clapping her hands. One game, "Soundman" (a *Pac-Man*–style game in which you turn corners by making sounds), is so difficult that I can get a higher score by playing a radio next to the SoundMouse than by playing the game myself.

If you program your own games you'll have no problem making the computer respond to sounds. The manual describes programming the SoundMouse in a special section near the end. All Atari languages I'm aware of are capable of using the SoundMouse. There are other possible applications for the SoundMouse, and the ease of programming the peripheral makes experimentation easy.

Another option on the menu, the SoundMouse Band, is disappointing. A drummer, a lead guitarist, and a keyboard player made a shallow attempt at playing some of my favorite songs. Fortunately, the third menu option, the Graphics Menu, is a genuine prize.

The SoundMouse manual states that the programs included in the Graphics Menu are like *color organs*—a fad of the early seventies. They came in two varieties: one plugged into your stereo like a speaker and the other was accompanied by its own little microphone. Color organs had two or three colored light bulbs that turned on and off in time with the music.

The Graphics program that comes with the SoundMouse is like a high-resolution color organ that uses the SoundMouse as a microphone. Patterns bounce, dance, and explode across the screen in a variety of changing colors. You've probably never seen anything like this. You can even program your own light shows. The display moves to low-frequency sounds—drums and bass, mostly—so the manual recommends rock-and-roll music, but jazz and a few classical pieces worked as well for me. On the basis of the Graphics Menu programs, and the potential for use in my own programs, I believe that the SoundMouse is an unique and exceptional peripheral.

SoundMouse
Soundsoft
Box 740, 10 Maple Ave.
Andover, NJ 07821
$29.95 (plus $2 shipping and handling)

©

The Beginner's Page

C. Regena

Odds And Ends

Here are a couple of questions about BASIC programming that I have recently received in the mail.

Q. "What is the REM statement?"

A. REM is the BASIC word for "remark." This statement can be used as an explanation to someone reading a listing of the program. When the program runs, the computer ignores it. For example, I often use a REMark as the first line of a program to indicate the title of the program. You may also add an author's byline, address, or other information about the program:

```
100 REM EXAMPLE TITLE
110 REM BY REGENA
```

As you are creating a program, you may want to use lots of REM statements to help you keep track of different sections of your program. This is a way to document or annotate your program and to write reminders to yourself as you are programming. You may want to label your subroutines or the major sections of a program, or you may want to give expanations for particular programming sequences or equations. Some examples are:

```
200 REM DRAW TITLE SCREEN
300 REM PRINT INSTRUCTIONS
400 REM START GAME
500 REM SUBROUTINE TO SHOOT
    ALIEN
600 REM SUB TO CHECK POSITIONS
```

Some computers use an apostrophe or an exclamation point as an abbreviation for REM.

Many programmers believe it is wise not to GOTO or GOSUB to a REMark statement. (For example, use line 500 for the REMark to label the subroutine to shoot an alien, but actually start the subroutine in line 510, or the very next line.) One reason to avoid using GOTO or GOSUB to a REM is that if you later delete the REMark statement, you won't have to remember all the places where you referred to that line number. In using published programs, readers often don't type in REM statements; this, too, would be a problem if that skipped line were referenced elsewhere.

In general, it is a good idea to use REM statements in your program while you are working on it or if anyone else will be trying to interpret your programming techniques. It is easier to modify or correct a program that has REM statements because you can quickly locate its various sections.

A couple of readers have asked me why I don't use REMark statements in my programs, probably because another magazine that publishes programs insists that all explanations be within the program in REM statements. I choose instead to describe my programs in their accompanying articles or to include a line-by-line description with the programs. Also, I don't use a lot of REM statements because a lot of my early computer work was on computers with limited memory (such as the VIC-20 or the MC-10), and REM statements use valuable memory [and valuable magazine space — Ed]. I got used to programming without REMs. But even if you don't have to worry about memory constraints, a program will run faster if it is shorter.

Q. "After typing in a program and trying to RUN it, I get a SYNTAX ERROR message. What is the problem?"

A. SYNTAX ERROR is one of the most common error messages. It usually means that a BASIC word is spelled or used incorrectly. The first thing to do is to check each word in that line to make sure it is spelled right.

A syntax error may also indicate an incorrect number of parentheses, unmatched parentheses, or parentheses which are not in the right places. Or, you could have an incorrect number of parameters (numbers separated by commas). For example, the CIRCLE command needs a horizontal coordinate and a vertical coordinate for the center, plus a radius. If you forget to specify a radius, you will get a syntax error. In this example, you also need to use parentheses in the right places and put the numbers in the right order—different computers have different requirements:

```
CIRCLE 120,100,50      Atari ST
CIRCLE (120,100),50    IBM, Amiga, and
                       others
```

The manual that comes with your computer (or with BASIC) should have a list of other error messages or error codes. Some computers give an error code number that you look up in the manual; others give a short error message. However, most manuals provide explanations for the various errors.

One kind of error message is particularly perplexing, however, because the program line to which it refers isn't actually the culprit. If you have DATA statements in your program, the error message may refer to a different line number, but the error is actually in a DATA statement. Make sure that you have the right number of commas among your data.



Computers and Society

David D Thornburg, Associate Editor

A Meeting With An Ex-Pirate

A recent flurry of articles and legal opinions on software copyrights were piling up on my desk. The more I read, the more confused I got. "How can I make some sense out of this?" I asked.

The answer was obvious—once again it was time to start a trek up the side of the Santa Cruz mountains near Silicon Valley to visit the intrepid software pirate, Long John Silicon. The last time I had seen Long John (COMPUTE!, February 1982), he was actively engaged in software piracy. If anyone knew how to sort out my confusion, he would.

Armed with my climbing gear and a few days' supply of food, I started towards my goal. After hours of climbing through the poison oak and wild berries, I could see the opening to his cave looming above me. As I drew nearer I could make out a sign: "THIS ENTRANCE IS CLOSED. PLEASE ENTER THROUGH THE FRONT DOOR."

This was strange—the last time I had come here, this had been the only entrance. I climbed to the top of the mountain and saw that a freeway exit had been created to bring people to a large parking lot in front of a stunning building. A heliport on the building's roof had a steady stream of traffic, and I felt out of place in my climbing gear. The building was teeming with people in three-piece suits. The sign on the building said "Long, John, and Silicon, Copyright Law." There were two entrances to the building, one marked "Sue-ers" and the other marked "Sue-ees." I picked Sue-ers and went inside.

I presented myself to the receptionist and started to tell her I had an appointment to see Long John. Just then, he appeared in the lobby: "Ahoy there, matey!™," he shouted.

I looked up to see my old friend, the pirate. He still wore his eye patch, and he had a sword strapped to his waist, but even he was wearing a three-piece suit.

"Ahoy there, matey," I shouted back.

Instantly I was pinned against the wall by a team of Trademark Police. "Ah," said Long John, "let the laddie go, mates! He meant no harm. He just a dinna know that 'Ahoy there matey™' is a registered trademark of Long, John, and Silicon."

Needless to say, by the time I was seated in his office I was quite disoriented. What follows is our interview.

The Interview

DT: Tell me what this new business of yours is all about! The last time I visited, you were in the software copying business—now you have a law firm.

LJS: Aye, 'tis true, I have changed. Ah laddie, there is no money in software copyin' any more. The real money is in litigation. I tell you, it's enough to make you hang up your disks.

DT: Are you telling me you have become a lawyer?

LJS: Oh no, I have too much pride for that. But I did form a law firm with two partners, Long and John.

DT: How did you pick them?

LJS: Well, y'see, I had a lot of stationery with LJS printed on it, so I picked partners whose names would fit.

DT: Now that I have regained my composure, why don't you tell me why the police pinned me to the wall when I said, "Ahoy there matey!"

LJS: Ah there you go again! 'Tis enough to make me want to slit you from your stack to your index register! You left out the ™

DT: The what?

LJS: The ™. The sentence "Ahoy there matey™" is a trademark of LJS, Inc. No one, not even you, can use this sentence without our express permission.

DT: You have to be kidding!

LJS: Ah, another one! We used "You have to be kidding!™" in a project last year. I'm sorry, you'll have to say something else.

DT: Well, let's get to the real purpose of my visit. I just read a few articles about user interfaces for some of the newer computers like the MacIntapple that said that the ideas expressed in their user interface could not be used on any other computers.

LJS: 'Tis true, laddie, 'tis true. We handled that case ourselves. 'Tis enough to make you flush your buffer, the way people think they can use other people's ideas when the ideas are protected by copyright law.

DT: Well wait just a minute. I'm not a lawyer, but I recall reading somewhere that copyright law protects only the expression of ideas, not the ideas themselves. Furthermore, if an idea is indistinguishable from its expression, that is, if the idea is "merged" into its expression, the expression cannot be protected under copyright laws. To my feeble mind this means that if I write a word processor program that includes a feature to translate English into Pig Latin, I can protect the source code and the object code for this program, but not the idea of a program that does this type of translation.

LJS: It depends.

DT: What do you mean, it depends?

LJS: Well, keepin' in mind that I'm not a lawyer meself, what you say may be true, as it stands. But there is another level between the program and its idea—there is the "look and feel" of the program.

DT: Oh, by look and feel you must mean things like the Range Top interface used in the MacIntapple computer.

LJS: Exactly. In their case they defined a user interface around the concept of a kitchen. The main screen has a stove top with burners on it. Programs look like pots and pans, and documents for these programs look like plates. To start a program you just place the pan on a burner and click on the spaghetti strainer. To throw a program away, you just empty the pan into the disposal. Now, the company that designed this interface has a copyright on the source code, the object code, and the "gestalt" or feel of the interface. Anyone who creates a program usin' this look and feel will have *me* to contend with!

At that, LJS drew his sword and threw it through a stack of floppy disks, neatly pinning them to the wall within six inches of my left ear.

DT: Wait a minute, friend—you're saying that copyright protection is not limited to the literal aspects of a computer program, but rather that it extends to the overall structure of a program, including its audiovisual displays.

LJS: Ah, 'tis a pleasure to see that your monitor is startin' to warm up, matey; you've got the truth.

DT: If this is true, then why limit this to programs? Suppose I decide to copyright a sentence structure—say a sentence form that has an adjective-noun-verb-adjective-noun form.

LJS: Oh, like "Green frogs eat blue shoes?" Sorry, it's already copyrighted. We handled that one, too.

DT: Hold on. The form of a sentence seems more like an idea than an expression.

LJS: Not really; after all, you could say "The green frogs eat blue shoes" and you'd be OK as far as we are concerned. Since there are many ways of expressin' sentences in this form, we decided to try to protect the form, not just a particular sentence.

DT: What is this going to do for poets and other writers?

LJS: Why do you think we are so busy! The reason I started this firm was to make sure that anyone who lifted fingers to keyboard or pen to paper would need our services.

DT: Isn't that going to stifle creativity in this country?

LJS: I'm not in this for the philosophy; I'm in it for the money.

DT: Wait a minute™, I think you are going too far here©.

LJS: Look matey™, I've tried to make an honest livin' as a software pirate© but couldn't™©, so now I've had to compromise™ my values™© and work to defend our way of life™.

DT: Your way of life™ seems© to be one where©™ no one can do anything without securing your services ™©™.

LJS: Sounds good to me!™

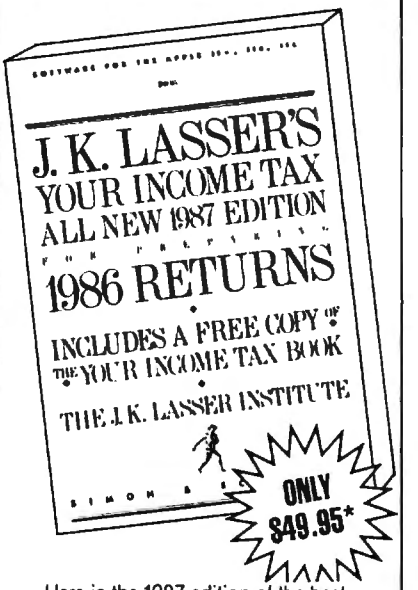
DT: On this note™ I left, more confused than ever. What freedom do software developers have to expand on ideas for programs that they see elsewhere? What freedom will customers have if there is only one word processor, one graphics program, or one spreadsheet on the market? To my naive mind, it seems that the copyright of the overall structure, sequencing, and organization of a program is another way of copyrighting the program's idea.

Maybe I should go back in time and ask Benjamin Franklin what *he* would have thought of this!

David Thornburg, founder of Innovision™ and an associate editor of COMPUTE!™, is also a software developer who is confused by the recent flurry of rulings in the software copyright field. (Contents ©, 1986 by David Thornburg, Innovision; and COMPUTE! Publications, Inc. All rights reserved.) ©

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The COMPUTEREYES/2 Digitizer

If you'd like to turn your computer into a desktop publishing and video workstation, or if you're a frequent user of *Print Shop*, *Newsroom*, *Dazzle Draw*, or other popular Apple II graphics programs, you should take a look at the COMPUTEREYES/2 video digitizer from Digital Vision.

The digitizer itself is a green circuit card with three gray cables snaking out the back. The circuit card goes into any slot in an Apple II–series computer, and your video camera plugs into an attached cable. COMPUTEREYES retails for $129.95. (Note: There is no version of COMPUTEREYES/2 for the Apple IIc yet, only the basic product, COMPUTEREYES.)

I used two video cameras with COMPUTEREYES/2: a Sony 8mm camcorder (the CCD-V8AFU) and a JVC camcorder (the GR-C7U). Both cameras hooked up easily to the cables and immediately generated a video signal on the Apple II screen.

Make sure you have a copy of the COMPUTEREYES/2 disk. The COMPUTEREYES/2 enhanced software comes separately from the circuit card and costs an additional $24.95.

Single Or Double Hi-Res

When you boot up the disk, it asks you whether you want to use the DOS 3.3 or ProDOS operating system. This turns out to be an important question. The two versions have different features. In DOS 3.3, you can create single-hi-res digitized images which you can later use in *Print Shop* and *Newsroom*. In ProDOS, you can create double-hi-res images which you can use in *Dazzle Draw*.

After you "configure" your system (I chose NTSC video, 80-column extended memory, and slot 3), a master menu appears on the computer screen. At the master level, you can view direct video input from your video camera, capture (digitize) the video image, adjust the image brightness and/or contrast, modify the image, save the image onto disk, or load a new image from a disk file.

I set my JVC camera up on a tripod so the lens was pointed down at the floor. On the floor (mounted on a couch pillow) I placed an 8 × 10 black-and-white photo of my daughter Catie. I chose the COMPUTEREYES/2 *capture* menu option and *standard hi-res*. The program automatically calibrated the brightness and contrast, and, voilà! I had a very nice digitized image of Catie. I played with the brightness and contrast a little and improved the image slightly, then I saved it onto my DOS 3.3 data disk.

Now the real fun began. I returned to the main menu, and after choosing *modify*, I shrank the digitized image of Catie, inverted it (so it looked like a photographic negative), flipped it over (using the *mirror* function), and restored it to its original form. Next, I created a *Print Shop* graphic version of the image (using the *convert* function) and a *Newsroom* "photo," and saved them on the data disk.

Using The Image

Leaving the COMPUTEREYES/2 program, I booted up *Print Shop* and *Newsroom*, retrieved the digitized photo files, and incorporated them into a *Print Shop* "sign" and a *Newsroom* "panel." *Print Shop* gave me the option of shrinking or enlarging the photo and placing it anywhere I wanted on my sign page. In *Newsroom*, I learned that the best way to use the digitized image was to first load it into the Photo Lab, then crop it, save it on disk, and load it into a *Newsroom* panel at the Copy Desk. Last, I typed in a little *Newsroom* story which wrapped around the picture in the panel. I printed the picture and story panel and the *Print Shop* sign without any problem. The quality of the ImageWriter II's printed copy was quite good.

When I returned to COMPUTEREYES/2, I chose ProDOS as my operating system so I could create *Dazzle Draw* images. I returned to the master menu, captured a new image of Catie from the photo, and this time saved it as a *Dazzle Draw* file. I left COMPUTEREYES/2, booted up *Dazzle Draw*, and loaded the digitized photo of Catie. As a double-hi-res image, it was much sharper than the single-hi-res images I had used in *Print Shop* and *Newsroom*. In *Dazzle Draw* I cropped the photo (keeping only the part I wanted), drew an orange picture frame around it, created a nice caption box, framed it in blue, and printed the entire graphic out on the ImageWriter II. Next, I disconnected the monitor cable from the back of the picture screen, plugged it into the VIDEO IN outlet of my VCR, and copied the entire picture onto videotape as a title screen for a little video of Catie's birthday party.

You can also use COMPUTEREYES/2 to capture a *Print Shop* graphic, then convert it into a *Newsroom* "photo" for use in a newsletter, or you can use it to capture a *Newsroom* "photo" and convert it into a *Print Shop* graphic.

Digital Vision, the manufacturer of COMPUTEREYES/2, is located at 66 Eastern Ave., Dedham, MA 02026. ©

Microscope

Sheldon Leemon

The Winter Consumer Electronics Show isn't a computer show as such, but the kinds of computer products exhibited there are indicative of current trends in the computer market in general, and home computers in particular.

Considering the current size of the personal computer industry, it's almost impossible to believe that six or seven years ago it didn't exist—at least not as we know it today. But as recently as the January 1981 CES, Commodore was showing off the new VIC-20, which was still awaiting FCC approval (some things never seem to change). Since then, the industry has been through a lot of ups and downs in a very short period of time. If the latest CES is any indication, though, things are finally leveling off, and the industry is at last entering a more mature phase. I spent most of the show peering through binoculars (the big end), trying to spot trends, and here's some of what I turned up:

• **Exhibition Space.** The exhibition space devoted to computers overall appears to be up somewhat, but there seems to be less diversity than in former years. In the "glory days" of 1983, large displays were hosted by every major software and hardware manufacturer, while smaller booths showcased the many unknown hopefuls. At this show, a great many of the larger software firms were represented, but mostly at the booths of the software distributors that sell their wares. Rather than having a large display devoted to one manufacturer, these booths were shared by competing firms. There are far fewer "wildcard" exhibits, like the guys who used to show an Apple-compatible computer built into a TV set, that also played Atari 2600 game cartridges.

• **PC Clones.** It used to be that a PC's place was in the office, but no more. As a result of price cutting reminiscent of the Home Computer Wars a few years back, PC compatibles have crashed through the $1,000 price barrier, and are poised on the brink of becoming the next Commodore 64. This CES was notable not only for the number of inexpensive PC clones shown, but also for the names and the quality behind them. Blue Chip was showing its $700 Korean PC, built by Hyundai, the car manufacturer, and Victor Technology had an $800 PC. But the most interesting development came when two of the top home computer manufacturers, Commodore and Atari, entered the PC sweepstakes.

Commodore's machines, the PC-10 and PC-20, were far more conservative than Atari's. Commodore's clones look like the PC, feel like the PC, and act like the PC. They run at the standard (slow) 4.77 MHz clock rate, and their only nonstandard feature is a built-in video adapter that emulates the Hercules monographics card and the Plantronics color card. Likewise, their pricing ($1,000 for the PC-10 and $1,200 for the PC-20) is far from innovative. Commodore is apparently depending on its name, and the previous success of these machines in Europe and Canada, to draw in the customers. Their slogan: "It's not a clone. It's a Commodore."

Atari's entry, however, is anything but conventional. In a move that took many observers by surprise, Atari announced two new very low-priced compatibles. These units look much more like audio or video components than the boxy old PC. In fact, the styling is the same as that of the Mega ST series—sleek, white plastic squares that ride low on the table. These models come complete with dual clock speed (4.77 and 8 MHz), serial port, parallel port, graphics adapter, and floppy drive, but no built-in expansion slots. This strategy resembles that used with the Apple IIc—build in the most popular options, and the consumer won't need slots. In Apple's case it didn't really work out that way, but Atari has one thing going for it that Apple didn't—the price. At $500 for the basic model, and $700 for one with a monochrome monitor and built-in EGA-type graphics adapter, there will undoubtedly be a few who'll decide that they don't need expansion slots after all.

• **Videogames.** A couple of years ago, you'd have sworn that the videogame was dead. The Adam had dragged down the Colecovision system, Mattel had abandoned Intellevision, and Atari was on the ropes. This year, however, videogames have made their comeback in a big way. Sega and Nintendo both have hot new systems with improved graphics and lots of RAM, Atari is healthy again and showing more game machines than ever, and even the Intellevision system had a booth. Since the success of videogames has always boded well for the home computer (which can play the same or better games, and do a lot more besides), this can only be taken as an encouraging sign. Although the idea of making a videogame machine into a computer isn't new (Nintendo's machine is part of a popular computer system in Japan), Atari's scheme of turning its 65XE into a videogame machine adds a new twist. It does make a kind of sense, though. The 65XE was so low-priced that it was hard to take it seriously as a full-fledged computer (which, of course, it was). Maybe it will get more respect as a high-end videogame machine than it did as a low-end computer. ©

ST Outlook

Philip I. Nelson, Assistant Editor

Atari Does It Again

It's not easy to startle insiders in the computer industry, but Atari did just that with its new product announcements in January at the Winter Consumer Electronics Show (CES) in Las Vegas. True, there had been talk of expanded-memory ST models and a low-cost Atari laser printer, but very few people in or out of this business had advance knowledge of the new "Atari PC"—an IBM PC–compatible computer sporting the Atari logo. Combine those products with a solid 8-bit computer line and a videogame division that won't quit, and you can understand why many folks are bullish on Atari these days.

Not surprisingly, the Atari PC comes with the PC version of the GEM desktop (as well as MS-DOS and GW BASIC for conventional PC applications). As you may have heard, Apple Computer recently convinced Digital Research, the creator of GEM, to alter GEM on grounds that it unfairly duplicated the "look and feel" of Apple's Macintosh user interface. But you needn't worry about GEM changing on the ST. The changes apply only to the original, PC-based version of GEM and are largely cosmetic, in any case. For instance, the trash can appears in a menu rather than as an icon on the desktop. Both incarnations of GEM are similar enough that ST and Atari PC users should be able to switch from one to the other without difficulty.

The new Mega ST is a large-memory ST computer aimed primarily at the business market. The machine comes with one, two, or four megabytes of RAM; has a detached keyboard and battery-backed clock; and includes the long-awaited blitter chip for enhanced graphics. Coupled with the under-$1,500 laser printer, a two-megabyte desktop publishing system based on the Mega ST will cost about $3,000. That price tag could make the Mega ST a serious contender in the red-hot desktop publishing market, still dominated by the Macintosh.

Incidentally, the announcement of the Mega ST in no way signals the demise of the 520ST and 1040ST models. In fact, prices were cut $100 on both the monochrome and color 1040ST systems, and reduced from $799 to $499 for the monochrome 520ST system.

New Software

The flood of new ST software titles shows no signs of abating. Smaller software companies continue to introduce new ST programs, while more established firms are rounding out their catalogs with ST translations of already-popular titles. Electronic Arts, for example, is releasing the highly rated *Chessmaster 2000* for the ST, as well as games like *Skyfox* and *Ogre*. And Epyx is translating titles like *Winter Games* and the *Temple of Apshai Trilogy*.

If you do a lot of writing, you may be interested in *WordPerfect* for the ST. Long a favorite with IBM PC owners, *WordPerfect* is a professional word processor with advanced features such as keyboard macros, footnotes and endnotes, a built-in thesaurus, and automatic generation of a table of contents or index. If you don't need all the bells and whistles, it's still a dandy word processor. The ST version, of course, is fully GEM-based; virtually all functions are available with the mouse or keyboard, and you can also use desk accessories.

Another interesting third-party BASIC has surfaced, this time from Computer Concepts in England. *Fast BASIC* exists in a ROM cartridge rather than loading from disk. Putting BASIC on a cartridge has two major advantages: You don't have to wait for BASIC to load, and you have more RAM space for programs. Although I haven't seen this package, its specifications look intriguing, to say the least. Besides the usual commands, the language includes a wide array of debugging modes and an enhanced SWITCH–CASE–END-SWITCH decision-making structure (the latter will be familiar to C programmers). *Fast BASIC* also offers a GEM-based editor with word processor–style features such as search and replace, cut, copy, and paste. Moreover, it supports C-style pointer operations (variable indirection) and permits you to mix assembly language instructions with BASIC statements. *Fast BASIC* programs don't appear to run without the cartridge, however, which means you can't share programs with friends who don't own the cartridge, too.

In the MIDI arena, Sonus now offers ST versions of four different recording and sequencing programs: *GlassTracks*, *The Super Sequencer*, *The Master Piece*, and *The Super Score*. The first three include recording, sequencing, and librarian functions, and the fourth is a scoring and layout application.

Computer Concepts
Gaddesden Pl.
Hemel Hempstead
Herts.
HP2 6EX England
U.S. and Canadian distribution:
G-Plus Marketing
130 Albert St., Ste B-8
Ottawa, Ontario
Canada K1P 5G4

Electronic Arts
1820 Gateway Dr.
San Mateo, CA 94404

Epyx Software
600 Galveston Dr.
Redwood City, CA 94063

Sonus
21430 Strathern St.
Canoga Park, CA 91304

WordPerfect Corporation
266 W. Center
Orem, UT 84057

©

Donald B. Trivette

Low-priced Speed And Space

There are dozens of speed-up boards on the market for the IBM PC, costing from three hundred to thousands of dollars, and all working with some degree of success. Although I've tested many of these boards in the past, I have never made one of them a permanent part of my aging PC. Either they had compatibility problems or they required special software to effect the speed-up; at the very least they took up one of my expansion slots.

Enter the NEC V20, an exact replacement for the Intel 8088 processor that is found in the IBM PC, PCjr, XT, and most PC clones. The V20 is faster than the Intel processor and costs—are you ready?—only $10. NEC has designed the circuits inside its chip to execute more instructions in fewer clock cycles. In addition, a second internal data-bus contributes to the increased speed. While the processor is considerably faster than its Intel counterpart, the computer's clock still runs at 4.77 MHz, and thus the overall performance is not astounding—in fact, the performance varies from application to application. The V20 is rated 6 percent faster than the Intel 8088, but recalculating a spreadsheet which performs lots of calculations is speeded up more than copying a file.

Before It's Too Late

While I have yet to find any cases of dramatically improved speed, I did buy and install V20s in both my IBM PC and my PCjr. At $10 each, I figure I can't go wrong. And I confess that the possibility that this chip may soon be pulled from dealers' shelves also influenced me to part with $20—the lure of the unobtainable and all that.

Intel is in court with NEC over alleged patent infringements and, should Intel win, it's expected that the V20 processors will be swiftly withdrawn. Even as you read this, the case may already be settled and the V20 unavailable. Nevertheless, here are (were?) two sources: Leo Electronics, P.O. Box 11307, Torrence, CA, 90510, (213) 212-6133 or (800) 421-9565 outside CA; and Ariel Computer Corp., Box 866 Flemington, NJ, 08822, (201) 788-9002. Leo is selling the V20 for $9.50 plus $2 shipping, and Ariel is selling it for a few dollars more.

The installation isn't complicated. For the IBM PC, pull the power plug out of the wall, remove the two screws in the rear that hold the cover on, and then slide the metal case slightly up, forward, and off. The Intel 8088 chip is located on the motherboard to the left of the power supply and just behind the disk drive. It's not necessary to remove any option boards to remove the 8088. Once you've found it (it'll have "Intel 8088" printed on it), carefully note its location and orientation. The empty socket to the right is for the 8087 coprocessor. Before removing the 8088, notice the notch or cut in one end of the chip. Be sure to insert the V20 with its notch in the same orientation.

To remove the old processor, slip a small screwdriver (or nail file blade) between the chip and its socket; gently rock from side to side to loosen one end of the chip from its base; apply the same gentle rocking motion to the other end. By using gradually leverage under each end of the chip you can safely free it from its socket. (Be sure you are working on the chip and not the socket, which is soldered into the motherboard.) Carefully insert the V20 into the socket and push firmly into place. I found it fit more easily when I bent the tines on one side of the V20 just slightly inward. Verify that all the tines are in the sockets before reinstalling the cover.

Installing the NEC V20 in the PCjr is a bit more troublesome because the 8088 is located under the disk drive. Pull the wall plug, remove the two cables—one signal, the other power—from the head of the drive, then gently push the drive's plastic tabs up through the bottom of the case. The disk drive is not screwed into the chassis but rather is held in place by friction tabs. Follow the PC instructions for removing, orienting, and installing the V20 chip in the PCjr. If you discover significant increases in speed, please let me know.

More Disk Space

Once you have a faster computer, you're going to want more disk space, and there's even an inexpensive way to get that. SoftLogic Solutions makes a product called *Cubit* that compresses the data in a file—sometimes by as much as 60 percent. For example, this article is 6194 bytes long (or was, before the editor's heavy hand), and *Cubit* shrank it to 3445 bytes—is a compression ratio of 44 percent.

Not only does *Cubit* make the file smaller, it also includes a memory resident program that can automatically decompress and recompress a file every time it is used. (Decompression for this article into my word processor took about 3.5 seconds.) When I'm finished using the file and the word-processing program issues the close-file instruction, *Cubit* jumps in and recompresses the file, a process which takes about six seconds.

Since I have a hard disk with a few million spare bytes, I use *Cubit* mostly for backup files and for archiving old letters and articles onto floppy disks. *Cubit* costs $49.95 and is available from SoftLogic Solutions; 530 Chestnut St., Manchester, NH 03101, (603) 644-5555. ©

AmigaView

Sheldon Leemon

The New Amigas

If the Winter Consumer Electronics Show is any indication, things are looking up for Commodore and the Amiga. Though Commodore has had to reduce its presence at trade shows for the last couple of years due to financial problems, this year they were back with their usual large booth. And this was the first time the Amiga's been displayed along with the Commodore 64 and 128 at a consumer product show. One side of the booth, packed throughout the show, was devoted to Amiga hardware and software.

Electronics Arts previewed *Return to Atlantis*, a cinematic adventure game. Digi-View was showing an even newer version of its video digitizing software, this time with 320 × 400 HAM mode. New Horizons had its *Pro Write* word processor, displayed on a Commodore prototype long-persistence phosphor monitor, which nearly eliminates flicker in interlace mode.

But Commodore's was not the only spot where the Amiga was on display. Aegis Software had a booth where they previewed a video titling program whose graphics extend to the edges of the screen, a telecommunications package that allows simultaneous file transfer in both directions while an online "chat" is taking place, and a 3-D animation system. Progressive Peripherals showed a two-megabyte memory card, a file utility called *CLI-Mate*, and a word processor, *Vizawrite*, that allows you to mix IFF graphics and different text fonts. Master Designer Software showed new titles in their Cinemaware line, including *SDI* and *Sinbad*, and Amigas could be seen in several of the booths hosted by large software distributors.

Amiga Senior And Junior

The Amiga products shown could easily provide enough material to fill this column, but the most exciting new Amiga products weren't on display—not publicly, at least. Upstairs at the Commodore booth, there were private showings of the two new Amiga models that we've been hearing rumors and hints about for many months. The smaller and less expensive of the two, the Amiga 500, is a one-piece unit similar in appearance to the 128. Senior Engineer Jeff Porter said that this machine was code-named the B-52 because he was told if he couldn't reduce the size, power requirements, and component count of the Amiga, "they might as well send in the bombers and level the place."

Fortunately they were able to do it, and the result of the redesign is a single circuit board that looks no more complex than a 128, but is a complete Amiga. The 500 contains 512K of chip memory, a built-in 3½-inch disk drive, and has room internally for a plug-in board with 512K of fast RAM and a clock-calendar. It has the same external ports as the A1000, including an expansion bus connector, though some of these plugs have different pin configurations and are located closer to the table than those on the 1000. With proper cabling it can use all Amiga 1000 peripherals, providing power requirements don't exceed the capabilities of the smaller external power supply that comes with the 500. Though pricing isn't firm, it will probably be in the $650 range for the A500, under $150 for the 512K expansion card, and $350 for the color monitor.

While the Amiga 500 is meant to fill in at the low end of the home market, the Amiga 2000 is designed for maximum power and performance. Its case is twice as tall as the current A1000, and the extra space is used to provide more room for internal disk drives, and built-in expansion slots. There's space for two 3½-inch drives and one 5¼-inch drive, which may be made up of any combination of floppy and hard drives. There are two rows of slots for up to seven expansion cards, with four full-size PC-AT slots at the rear of the computer, five 100-pin Amiga slots at the front, and two of each type overlapping.

Continuity, Compatibility

The PC slots are electrically inert, and become active only when you plug in the Bridge card. That's a Sidecar on a card which plugs into a PC slot at one end and an Amiga slot at the other. You can plug the Bridge card into either of two positions, to get either three free PC slots and three Amiga slots, or two PC slots and four Amiga slots.

Amiga intends to market peripherals for the expansion slots, including two- and eight-meg RAM cards, and a DMA hard disk controller that supports two ST-506 (IBM type) hard drives or four SCSI drives. In addition to the regular slots, there is an 86-pin slot for special cards (like a 68020 coprocessor, or expanded video capabilities), and a connector that brings out the raw RGB video signals for an internal genlock or other professional video peripherals. List priced at about $1,500, the 2000 will come with one 3½-inch drive, a meg of RAM, and a clock-calendar. Both machines will have Kickstart 1.2 in ROM.

Despite rumors to the contrary, the two new Amiga models do not support either expanded graphics resolution or more than 512K of chip memory. Both use the 68000 processor, and neither supports a math coprocessor. Although the lack of new features will disappoint some, a lot of current Amiga owners will be relieved to find that the new models maintain complete compatibility and don't make their current computers obsolete. ©

Telecomputing Today

Arlan R Levitan

April Antics

First, the good news.

Intel Corporation, the semiconductor folks responsible for the 8000 series of microprocessors that beat within the hearts of most IBM and compatible PCs, has announced a new low-cost 2400-bps modem chip set that requires little outboard electronics support. The Intel product will be available in quantity to modem manufacturers by the end of the summer. Expect to see a flock of full-featured high-speed modems based on the Intel set to hit retailers' shelves by year's end. Manufacturers who opt to stick with the Rockwell chip set currently in vogue will face stiff competition. Projected average list price of the new 2400-bps units is only $200.

Happy April from Levitan's Lexicon of Telecomputing Tomfoolery:

Acoustic Modem: A modem jury-rigged from spare electronic parts and a wooden staff normally used to play billiards.

ASCII: Ancient deity of telecomputing. Rumored to bestow vast volumes of data upon supplicants. Hence the saying, "ASCII and ye shall receive."

Auto Answer: What the author of this column should do when informed that a COMPUTE! editor is calling to find out where in blazes this month's column is.

BBS: Tall tales of telecomputing told by insects that produce honey.

Block Parity: One heck of a good time.

Buffering: A popular pain reliever.

Carrier Detect: Raison d'être for premarital blood tests.

CBBS: More tall tales of telecomputing told by Naval engineers.

Ethernet: Device used to catch the Ether Bunny.

File Transfer: Procedure followed by telecomputerists who become tired of their present job.

Hayes Compatible: Prone to riding with a grizzled old cowhand who sings off key. Gene Autry is the accepted industry standard.

Kermit: A popular file-transmission protocol, most effective for short hops.

Local Area Network: A UHF television station that carries high school sporting events.

Macro: A tasty saltwater fish.

Modem: What landscapers do to lawns.

OAG: The sound a telecomputing buff makes after opening the monthly phone bill. (Moral: Ask not for whom Bell tolls.)

Off Hook: What the author of this column is after finally finishing it.

Online: Where you hang your laundry to dry.

Prime Time: Any hour of the day divisible only by 1 and itself.

Packet Switch Delay: Intermittent data flow caused by heavy traffic in a packet network. Most famous example was HULANET, a packet network set up in Hawaii to facilitate communications between manufacturers of pineapple, guava, papaya, and passion fruit juices. Due to high data volume, HULANET was plagued with frequent, excessive delays. Moral: Don't wait for the punch line.

Protocol: For golf, Arnold Palmer or Jack Nicklaus.

Serial Interface: A spoon.

Terminal Emulation: Function performed by canines when commanded to lie on their backs with legs in the air.

Upload: A group of tourists on their way to the observation deck of the Sears Tower.

Videotex: The largest commercial purveyor of VCRs and televisions in Dallas.

XModem: A telecommunications device that was on the losing end of an encounter with lightning.

Wretched Excess

Many commercial information services provide special "complimentary" (comp) IDs to the shakers and movers of the micro industry. One of the largest and most popular information services recently moved to restrict the privileges of comp IDs. It seems that an extremely well-known public relations mouthpiece for a major microcomputer manufacturer got hooked on playing a popular online multiplayer game—so much so that the space-happy VIP started taking unfair advantage of the fact that the longer one played the game in question, the stronger one's starship became. Things got way out of hand as novice and experienced players alike were mauled as they entered the online melee by a starship that had accumulated *days* of strength points. Beset with a raft of complaints from paying customers, the information service graciously kneeled to user pressure and yanked all game access for its comp IDs.

Monty Python And The Art Of Telecomputing

Americans don't have a monopoly on misbehavior. Consider the strange case of Paul Needs of London, England. Needs, employed as an editor for Britain's Prestel videotex system, pleaded guilty to illegally using British Telecom's electronic mail system during 1986.

Needs pleaded to four counts of "theft of electricity," pulling a $150 fine for each count (would a dozen or so Duracells have sufficed?), and was ordered to pay an additional $195 in packet-switching charges. After the January decision, Needs' computer equipment, impounded for three months, was returned to him. ©

Bill Wilkinson

Retry, Retry, Retry Again

In the past, I have claimed in this column that I have *never* had an Atari disk "crash" on me if I wrote to it with verify turned on. Thanks to the little display panel on my Indus drives, I finally figured out why. A couple of times now, I have been writing programs or articles to disk (with verify turned on) and have noticed the Indus drive indicate that an error occurred. Yet neither DOS nor BASIC (nor the word processor) have reported any such error. Why?

Simple: Because of a safety feature in Atari DOS called a *retry counter*. Any time a disk operation fails, Atari DOS tries to perform the task again. In fact, it tries up to three more times. Now, if you write to the disk *without* verify, the drive may not know if something goes wrong (for example, if there is a defective spot on the disk). So you don't find out that the write failed until the next day (or week or year), when you try to reread the data. Kablooey! Even the fact that DOS retries the read three times may not help.

On the other hand, if you write with verify turned on, the drive writes the information to the disk and then immediately reads it to be sure the write was successful. Assuming that there was an error, though, you would seem to be no better off than you were without verify mode turned on *except* that the drive tells DOS about the verify error and DOS tries again (and again and again if it needs to) to write that same sector.

Soft Errors

Usually, disk write errors are what are called *soft* errors. That is, if you try again, the write succeeds. And after three attempts, if the write still fails, that disk is in really bad shape (or you forgot to format the disk or remove the write-protect tab). Well, very few of my disks are in *really* bad shape, so DOS tries again—and I don't even realize that I had a near miss with a blown file.

The point of all this is twofold: First, I would like to try to convince anyone doing work which would require a long time to reconstruct to use the "write with verify" mode. (If you are using DOS 2.5, this is easy, since the SETUP.COM program allows you to choose verify mode with just a few keystrokes. DOS 2.0 users can type POKE 1913,87 and then make the change permanent by using the DOS menu's WRITE DOS option.) Second, although three retries seem like enough for any write operation, I have had a few disks where a file seemed "slightly" damaged—that is, one time it would seem to read okay and the next time it would give me an error (usually ERROR 164). Well, I really *should* move that file to another disk (and I do), but how can I increase my chances that I can read it well enough to do the transfer? Answer: Change the number of retries that DOS makes.

Time for another program: Program 1 is a short BASIC program that you can use to modify DOS 2.5's retry count (and, incidentally, turn on verify mode for writes). Once you run it, all DOS disk operations will be tried as many times as you specify until you boot DOS again. (And, if you would like to make the changes permanent on a given disk, just answer the question in the program appropriately. An error message from this operation probably indicates that the disk was full, the disk was write-protected, or the DOS.SYS file was locked. In any case, try another disk.)

Finally, if you are still using DOS 2.0s (or DOS XL, most versions), just change three lines in the listing. I doubt seriously that either Atari version is compatible with any other DOS, so you may need to experiment and/or contact the publisher of your DOS to change the retry counts. Anyway, the three lines to change are

```
J 40 IF PEEK(1932)<>169 OR
     PEEK(1933)>10 THEN 230
F 100 POKE 1933,RETRY
M 230 REM *** APPARENTLY NO
     T DOS 2.0 ***
```

Random Ramblings

Unlike most personal computers, the Atari 8-bit machines use a hardware random number generator which is supposed to produce better random numbers than purely software schemes. Notice the words "supposed to." In practice, the hardware random number generator operates in a fairly predictable manner, and, if you were to take two values from it in very close succession ("very close" means under a dozen microseconds or so), you would find that certain values tend to follow certain other values.

Atari BASIC itself pulls a pair of hardware random numbers in very close succession. Most of the time, the results of the bias this creates are unnoticeable, especially when the range of random numbers you want is under 200 or so (for reasons too complicated to go into here). But look at what happens when you run Program 2. If BASIC's *RND* function produced truly random results, then you would expect the four counts that are printed to be approximately equal. They obviously aren't.

My suggested solutions: If you are a BASIC programmer having problems with Atari's randomness (and remember, most of you won't), look at Program 3. We avoid the RND function and instead read two random bytes directly from the hardware register. Because BASIC takes so long (rela-

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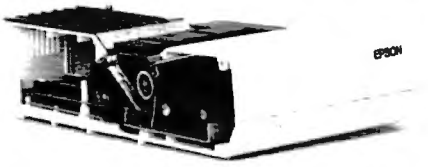
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tively speaking) to do this, there is plenty of time between the PEEKs, and the generator gives pretty good results. For machine language programmers who need to get two random numbers in quick succession, try a sequence like this:

```
LDA RNDLOC ; get first random byte
STA WSYNC  ; wait for horizontal sync
LDX RNDLOC ; get second random byte
```

Program 1: DOS Reliability Enhancer

```
PJ 10 REM **** DOS RELIABILI
      TY ENHANCER ****
DD 20 DIM Q$(1)
NM 30 IF PEEK(1913)<>80 AND
      PEEK(1913)<>87 THEN 23
      0
KI 40 IF PEEK(1947)<>169 OR
      PEEK(1948)>10 THEN 230
PL 50 POKE 1913,87:REM TURN
      ON VERIFY MODE
CH 60 PRINT "HOW MANY TIMES
      SHOULD DOS RETRY"
BF 70 PRINT "A DISK OPERATIO
      N (0 TO 10) ";
IO 80 INPUT RETRY
HH 90 IF RETRY<0 OR RETRY>10
       OR RETRY<>INT(RETRY)
      THEN RUN
FI 100 POKE 1948,RETRY
OG 110 PRINT :PRINT
PH 120 PRINT "DO YOU WANT TO
       MODIFY THE DOS ON"
BF 130 PRINT "  THE DISK IN
      DRIVE 1 (Y/N) ";
GE 140 INPUT Q$:IF Q$<>"Y" T
      HEN STOP
FP 150 TRAP 200
AP 160 OPEN #1,8,0,"D1:DOS.S
      YS"
GC 170 CLOSE #1
FI 180 PRINT :PRINT "DOS MOD
      IFIED"
HB 190 END
DB 200 PRINT "ERROR WHILE TR
      YING TO MODIFY DOS ON
      "
PH 210 PRINT "  DISK IN DRIV
      E 1.  ERROR #";PEEK(1
      95)
GL 220 END
OB 230 REM *** APPARENTLY NO
      T DOS 2.5 ***
DI 240 PRINT "INCOMPATIBLE W
      ITH THIS DOS"
GO 250 END
```

Program 2: Random Number Generator Test

```
BP 100 DIM TEST(3):FOR I=0 T
      O 3:TEST(I)=0:NEXT I
JE 110 FOR I=1 TO 1000
HN 120 R=INT(RND(0)*65535/12
      8+0.5)
BA 130 T=INT(R/4):R=R-T*4
PE 140 TEST(R)=TEST(R)+1
BO 150 NEXT I
CE 160 PRINT
NP 170 PRINT "VALUE","COUNT"
AH 180 FOR I=0 TO 3
HG 190 PRINT I,TEST(I)
BK 200 NEXT I
```

Program 3: Improved Random Number Routine

```
BP 100 DIM TEST(3):FOR I=0 T
      O 3:TEST(I)=0:NEXT I
JE 110 FOR I=1 TO 1000
AH 120 R=PEEK(53770)*256+PEE
      K(53770)
BA 130 T=INT(R/4):R=R-T*4
PE 140 TEST(R)=TEST(R)+1
BO 150 NEXT I
CE 160 PRINT
NP 170 PRINT "VALUE","COUNT"
AH 180 FOR I=0 TO 3
HG 190 PRINT I,TEST(I)
BK 200 NEXT I                  C
```

Attention Programmers

COMPUTE! magazine is currently looking for quality articles on Commodore, Atari, Apple, and IBM computers (including the Commodore Amiga and Atari ST). If you have an interesting home application, educational program, programming utility, or game, submit it to COMPUTE!, P.O. Box 5406, Greensboro, NC 27403. Or write for a copy of our "Writer's Guidelines."

Wari

All versions of this game program from the February issue (p. 62) suffer from the same quirk: The game doesn't play according to its stated rules. When 12 or more counters are sown from a compartment, the starting compartment should be skipped as the counters are sown around the board. (The starting compartment should contain zero counters after the sowing is completed.) This is not the case with any of the versions as published. If you enjoy the game the way it is, no change is required. To make the game obey the stated rule, add the appropriate line.

Program 1 (Commodore 64):

1335 IF T=I THEN 1320

Program 2 (Apple II series):

1365 IF T=I THEN 1350

Program 3 (Atari ST):

1375 IF T=I THEN 1360

Program 4 (IBM PC/PCjr):

1305 IF T=I THEN 1290

Program 5 (Amiga):

In the *movecounters:* subroutine, add the label **addone:** immediately before the line that reads **t=t+1**; then add the line **IF t=i THEN addone** following the existing line that reads **IF t>12 THEN t=1.**

Program 6 (Atari 400, 800, XL, XE):

1325 IF T=I THEN 1310

Amiga Jigsaw

This game for the Amiga from the February 1987 issue (p. 46) is a puzzle with a missing piece. In addition to the problem of misplaced lines described in last month's "CAPUTE!" column, an important subroutine was also left out. For a functioning version, rearrange the program as described last month, then add the following lines:

```
CoLr.Shift:<
coLr.index=(coLr.index+1) MOD nc
oLrs<
FOR j=0 TO ncoLrs-1<
i=(coLr.index+j) MOD ncoLrs<
PALETTE j+6,coLrs(i,1),coLrs(i,2
),coLrs(i,3)<
NEXT<
RETURN<
<
```

Simple Banners For IBM PC/PCjr

Vic Neupauer

With just a few modifications, a screen graphics program for the IBM PC/PCjr can be used to print paper banners. A dot-matrix printer is required. You must also have BASIC for the IBM PC or cartridge BASIC for the PCjr.

After using the program "IBM PC/PCjr One-Liner" from the December 1986 issue of COMPUTE!, I decided to modify the program into one that adults could use. The result is an easily modified program that prints banners on a dot-matrix printer. By following the instructions on the screen, you'll see how easy it is to use "Simple Banners."

The modified program uses essentially the same routine as the original, but it stores the characters in the array A$. Several other features were added to choose the type and size of print and to allow a longer message. The characters in the A$ array are printed sideways on the paper. The message can be as long as 255 characters.

Anyone using a non-IBM printer may need to change the value of T in lines 20 and 30, since some printers cannot print the solid block character. Choose the ASCII value of the new character you wish to use; then subtract 32 from that value to get the new value for T.

Simple Banners For IBM PC/PCjr

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
DP 10 KEY OFF:DIM A$(8)
PD 20 CLS:PRINT"Choose One":PRIN
      T:T=144:PRINT"E=End Progra
      m":PRINT"L=Light Print":PR
      INT"M=Medium Print":PRINT"
      D=Dark Print":PRINT:INPUT
      A$:IF A$="D" OR A$="d" THE
      N T=187
NC 30 IF A$="M" OR A$="m" THEN T
      =174
QP 40 IF A$="E" OR A$="e" THEN C
      LS:END
NG 50 PRINT:INPUT"Letter Size 1
      - 9 Inches ";X$:SIZE=VAL(X
      $)
PP 60 IF SIZE<1 THEN SIZE=1
CG 70 IF SIZE>9 THEN SIZE=9
MA 80 Q=25-(SIZE*2)
AH 90 WIDE=INT(SIZE/2):IF WIDE<1
      THEN WIDE=1
DO 100 PRINT:LINE INPUT"Enter Me
      ssage ",L$:IF LEN(L$)<1 O
      R LEN(L$)>255 THEN 20
JG 110 CLS:DEF SEG=&HFFA6
HO 120 FOR X=1 TO LEN(L$):N=ASC(
      MID$(L$,X,1)):C=8
KB 130 FOR L=0 TO 7
NE 140 B=(N*8)+L+14:A=PEEK(B):A$
      (C)=""
PE 150 FOR J=0 TO 7:M=A AND 1:W=
      32+(M*T)
BD 160 A$(C)=CHR$(W)+A$(C)
KK 170 A=(A-M)/2
OB 180 NEXT J
EF 190 PRINT A$(C):C=C-1
OG 200 NEXT L
KO 210 FOR I=1 TO 8
GO 220 FOR Z=1 TO WIDE:LPRINT SP
      C(Q);
LE 230 FOR K=1 TO 8
CB 240 B$="":REM INCREASE SIZE O
      F PRINTED LETTERS
CE 250 FOR S=1 TO SIZE:B$=B$+MID
      $(A$(K),I,1):NEXT S
CM 260 LPRINT B$;
EP 270 NEXT K:LPRINT
IC 280 NEXT Z
DP 290 NEXT I:LPRINT
GP 300 NEXT X
QJ 310 CLS:FOR X=1 TO 8:LPRINT:N
      EXT X:GOTO 20
```

Easy BASIC Autoboot

Ron Goodman

This utility for eight-bit Atari computers lets you run any Atari BASIC program automatically when you boot up the system. For Atari DOS versions 2.0 and higher.

How do you make a BASIC program start up automatically when you boot up the computer? If you want a machine language program to start, it's easy. Just rename the program file as AUTORUN.SYS; as soon as the computer boots DOS, it loads and runs AUTORUN.SYS. But that method doesn't work for BASIC files. "Easy BASIC Autoboot" lets you make any BASIC program into an autobooting file, even if you don't understand all the ins and outs of AUTORUN.SYS and the boot process.

Type in the program and save it; then insert the disk that contains the program you want to start automatically. When you run the program, it asks you to enter the BASIC statement you want to execute when the system boots up. You can include any BASIC command or commands up to 27 characters in length.

For instance, if you want to autorun the BASIC program named SAMPLE, just type RUN"D:SAMPLE.BAS". To autorun a different program, simply replace SAMPLE with the filename of your choice. You can also perform commands that don't involve running a program. For example, to start in graphics mode 8, just type GRAPHICS 8 at the prompt. When the system boots, you'll be in GRAPHICS 8 instead of GRAPHICS 0.

This program creates a special AUTORUN.SYS file on the disk. The AUTORUN.SYS file contains a short machine language program that is temporarily placed in page 6 memory during the boot process. The machine code first checks if there is a cartridge in place. If there isn't, it loads DOS normally. If a cartridge is present, however, it displays and executes the command you specified when creating the file.

Easy BASIC Autoboot

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" in this issue of COMPUTE!.

```
FF 10 GRAPHICS 0:SETCOLOR 2,
      0,0:? "This program wi
      ll create a":? "AUTORU
      N.SYS file on a disk t
      hat will"
EC 20 ? "execute any BASIC c
      ommands":? "automatica
      lly on bootup."
FL 30 ? :? "This includes co
      mmands like:":? "
      {3 SPACES}RUN";CHR$(34
      );"D:FILENAME.BAS";CHR
      $(34)
CE 40 ? :DIM B$(27),A$(38)
EB 50 ? "Enter the line you
      want executed.":? " ";
      :FOR X=1 TO 27:? "_";:
      NEXT X:? :TRAP 50:INPU
      T B$:IF B$="" THEN 50
NM 55 A$="POKE842,12:":A$(12
      )=B$
KA 57 ? :? "Command will be
      written as:":? B$
MD 60 ? :? "Put the disk tha
      t you want the":? "AUT
      ORUN.SYS file on and p
      ress RETURN.":INPUT B$
PJ 70 OPEN #4,8,0,"D:AUTORUN
      .SYS"
CI 80 FOR X=1 TO 4:READ A:PU
      T #4,A:NEXT X:PUT #4,L
      EN(A$)+34
HP 90 FOR X=1 TO 34:READ A:P
      UT #4,A:NEXT X
NK 100 M=PEEK(88)+PEEK(89)*2
      56
EC 110 FOR X=1 TO LEN(A$):PO
      SITION 0,0:? A$(X,X);
      :PUT #4,PEEK(M):NEXT
      X
HK 120 FOR X=1 TO 8:READ A:P
      UT #4,A:NEXT X
OF 130 CLOSE #4:POKE M,0:POS
      ITION 2,23
OA 1000 DATA 255,255,0,6,6,1
      65,6,240,36
FO 1010 DATA 169,13,141,74,3
      ,165,88,24,105,82,13
      3,203,165
EB 1020 DATA 89,133,204,160,
      0,185,33,6,240,5,145
      ,203,200,208,246,96
GN 1030 DATA 0,0,224,2,225,2
      ,0,6
```

©

HyperScan
A Full-Featured Mandelbrot Graphics Program

Kenneth W. Shepard

This sophisticated, full-featured Commodore 64 program lets you explore the fascinating Mandelbrot set—a mathematical object which forms the basis of some stunning graphic designs. A disk drive is required to save and reload graphics screens. If you wish to print out graphics screens, you must have a Commodore-compatible printer capable of printing bitmapped graphics.

"HyperScan" opens a window onto the world of the Mandelbrot set, which has been called the most complicated object in mathematics. HyperScan takes care of the complex math and lets you explore the fascinating and intricate pictures and places to be found within this world. In fact, with HyperScan you can find patterns and images that no one has ever seen before and be an explorer in the truest sense of the word.

Getting Started

HyperScan is written in two parts: Program 1 is a BASIC program and Program 2 is written in machine language. When you run Program 1, it loads and activates Program 2 automatically.

Type in and save both programs. Program 2 must be entered with "MLX," the machine language entry program listed elsewhere in this issue. When you run MLX, you'll be asked for starting and ending addresses for the data you'll be entering. Here are the addresses to use for Program 2:

Starting address: C000
Ending address: CA2F

Follow the MLX instructions carefully and be sure to save the program before you exit MLX. You *must* save Program 2 with the filename HS.MAC because that is the name used by Program 1 when it loads Program 2. After you save the programs, load and run Program 1. HyperScan begins by displaying its help screen, followed by its command prompt. The command prompt is where you enter HyperScan commands. You can summon the help screen at any time by typing HELP at the prompt and pressing RETURN. Like other commands, HELP can be abbreviated (as H). On the help screen, the abbreviation for each command is shown in reverse video.

The World Map

The first time you run HyperScan, you'll want to start with a SCAN command. Enter SCAN at the command line. HyperScan begins scanning and simultaneously displays the results as a multicolor contour map. In a few moments, HyperScan completes the scan, giving you an overall view of the world of the Mandelbrot set.

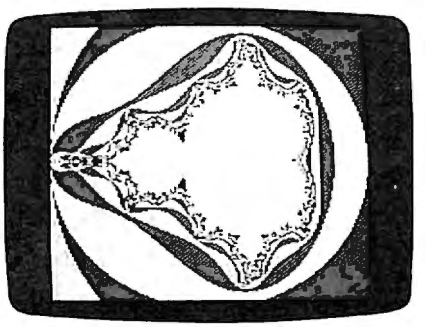
In the middle of the world map is a strangely shaped central plateau, shown in red, surrounded by terrain that becomes very steep and complex along the edges of the plateau. The edge regions contain the most interesting features. One striking aspect of this world is that it's infinitely detailed—as a portion is magnified, more and more structure and form are revealed. HyperScan is a very powerful exploratory tool, since it is capable of magnifying portions of the overall view more than 100,000 times.

When the map is complete, press the f1 function key several times: This command toggles the display between text and graphics. You can enter commands from graphics mode, but the results can be seen only from text mode.

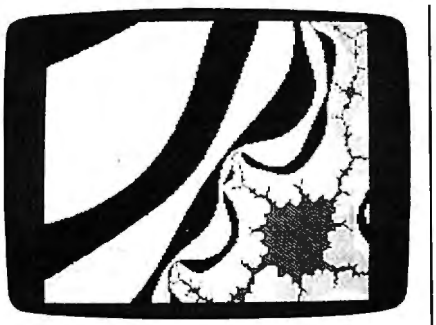
Since you may often begin exploration from the world map, you should save this map to disk with the PUTMAP command. When HyperScan prompts you for a filename, enter the name WORLD.MAP and press RETURN. The disk drive spins as the map is saved. Now you can recall the map at any time with a GETMAP command. Again, keep in mind that these commands can be abbreviated.

Delving Deeper

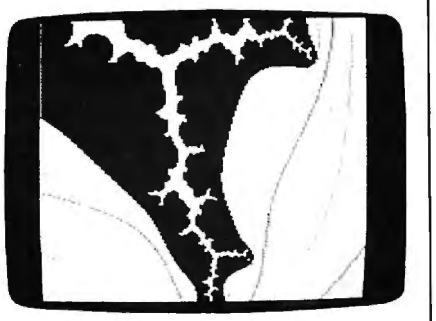
The FRAME command allows you to delve deeper into the Mandelbrot world. When you enter this command, four cross-shaped markers appear on the graphics screen. You can move the frame around the screen by using the cursor keys in the usual way. To resize the frame, press B to make it bigger or S to



A view of the Mandelbrot world map created by "HyperScan," a sophisticated graphics program. More interesting screens are created by magnifying selected portions of this world view.



This screen shows a highly magnified portion of the Mandelbrot set—an enormously detailed mathematical object.



Close-up views of the Mandelbrot set reveal a highly intricate world of form and color.

make it smaller. The C key changes the marker colors in case they become difficult to see against the graphics background.

Move and size the frame to enclose an area that you would like to explore more closely. Once you have chosen an interesting region, press X to set the new coordinates. The markers disappear. To exit frame mode, press Q.

Now press f1 to return to text mode and perform another scan. HyperScan begins scanning the new area. By repeating the FRAME and SCAN sequence, you can obtain higher and higher magnification, burrowing deeper and deeper into the Mandelbrot set. Before going much further, however, you'll need some of the more advanced features of HyperScan.

Infinite Detail

Since the Mandelbrot set is a mathematical object, it has, in a sense, an existence of its own. No one has seen, or is likely ever to see, all of it. The analogy of exploring a new world is a good one. Scanning the full area available to HyperScan at the highest useful magnification would produce several billion full-screen maps—so there is a lot of virgin territory to be explored.

HyperScan calculates the "altitude of the terrain" around the Mandelbrot set with a special fixed-point multiplication algorithm that achieves high speed and also uses a lot of memory. A high-altitude, high-resolution scan can take several hours to perform. During this time, your 64 is performing roughly 4000 multibyte arithmetic operations every second.

If you are interested in the mathematical basis of HyperScan and the properties of the Mandelbrot set, read the "Computer Recreations" column in the August 1985 issue of *Scientific American*.

The following sections list all of the HyperScan commands.

Scanning Commands

SCAN. Scans the current coordinates and displays a contour map according to the current parameters.

LIMIT. Sets the altitude limit for scanning. The initial setting is 20 and the maximum legal value is 767. The higher the altitude, the longer it takes to complete the scan, so you should experiment with the limit to give the best results for the particular terrain you are exploring. If the actual altitude exceeds the limit, the scanning routine returns an altitude value of zero.

COLORS. This command lets you choose four map colors and the border color. In the hi-res graphics mode, only colors 1 and 4 are used. Changing colors affects the current map.

CONTOURS. Assigns a color to a range of altitudes. Up to 85 different ranges can be specified. The default assignment is color 1 for even altitudes (2, 4, 6, and so on) and color 2 for odd altitudes. Remember to assign the color for the altitudes exceeding the limit to the value zero (for instance, 4,0,0).

MODE. Allows you to select one of the three available graphics modes. The HIRES mode includes two colors on a 320 × 200 screen; this is suitable for examining very fine detail. The MULTICOLOR mode gives the most colorful display, with four colors on a 160 × 200 screen. The LORES mode is best for performing a fast, preliminary scan of an area; it has four colors on a 40 × 50 grid.

FRAME. FRAME mode lets you select a portion of the current map visually and set new range coordinates automatically.

RANGE. The RANGE command permits you to enter new coordinates manually, rather than automatically, as with the FRAME command. Both the vertical and the horizontal coordinates must be within the range −2 to 2.

STATUS. Lists the current values of all parameters.

Disk Commands

HyperScan provides several commands for loading and saving maps and performing disk maintenance.

DISK. The DISK command can also be activated by pressing the f3 key. It returns you to the text screen and prompts you to enter a disk command. To view the disk directory, type $ and press RETURN. Other disk commands can be entered as described in your disk drive manual. For instance, the command I0 initializes the current disk. The command S0: followed by a filename scratches the designated file from disk, and so on. If you press RETURN at the prompt without typing anything, HyperScan displays the drive's error status (the message OK means that all is well).

PUTMAP. Saves the current map as a sequential (SEQ) disk file. The filename must end with the characters .MAP (a period followed by

MAP) so that HyperScan can recognize it as a map file.

GETMAP. Retrieves the designated map from disk and displays it.

DSCAN. This command performs the same function as SCAN, except that the raw altitude data is saved to disk in addition to being displayed on a map.

DLOAD. With DLOAD, you can map a DSCAN altitude data file with different color values and contour intervals. You can also map a HIRES file in MULTICOLOR mode. The advantage of this process is that it is much faster than SCAN, which can take several hours to scan complex, high-altitude terrain. DLOADing an existing altitude file lets you find the best way to map and display an area without wasting time.

Miscellaneous Commands

PRINT. Prints the current graphics display on a dot-matrix printer. You must have a printer capable of printing bitmapped graphics. Different combinations of printers and printer interfaces may produce different vertical scales. If the printout seems squashed or stretched unnaturally, try changing the value of the variable PL in line 41 of HyperScan. The smaller the value of PL, the taller the printout will be.

f5. The f5 key allows you to abort any SCAN, DSCAN, DLOAD, or PRINT process and return to text mode.

f1. This key toggles between graphics and text display modes. You can also enter TOGGLE from the command prompt.

Program 1: HyperScan

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
JR 1  IFQ=0THENQ=1:PRINT"LOADIN
      G HS.MAC....":LOAD"HS.MAC
      ",8,1
DK 2  POKE53281,0:POKE53280,0:P
      RINT"{CLR}{GRN}HYPER-SCAN
       ..............  ";:SYS505
      21:PRINT"{UP}"
XQ 3  DIM TL%(256),CL$(17):CL$=
      "{BLK}{WHT}{RED}{CYN}
      {PUR}{GRN}{BLU}{YEL}{13}
      {2}{3}{4}{5}{6}{7}{8}":M1
      $="{RVS}{15 T}{OFF}{GRN}"
FM 4  GOSUB52:R$=CHR$(13):D$=CH
      R$(20):Q$=CHR$(34)
FB 5  CS$="C{RIGHT}{LEFT}{DOWN}
      {UP}BSXQ":DATA"FRAME","GE
      TMAP","HELP","LIMIT","MOD
      E","QUIT","RANGE"
XJ 6  DATA"TOGGLE","DISK","DLOA
      D","DSCAN","PRINT","PUTMA
      P","SCAN","STATUS"
QA 7  DATA"COLORS","CONTOURS",3
      ,13,20,4
CA 8  E1$="{RVS}DISK ERROR{OFF}
      ":E2$="{RVS}IMPROPER VALU
      E - RE-DO{OFF}":MD=2:LM=2
      0
JA 9  CR=-2:DR=3:CI=-1.25:DI=2.
      5:CL%(1)=6:CL%(2)=14:CL%(
      3)=7:CL%(4)=9:BC=14
JS 10 RT=51968:S1=50429:FORI=0
      TO16:READCL$(I):Z$=Z$+"
      {SPACE}":E$=E$+D$:NEXTI
AH 11 FORI=0TO3:READTL%(I):NEX
      TI:GOSUB93:POKE53064,0:Z
      $=Z$+E$+">":GOTO114
BD 12 SYS51:PRINT:GOSUB93:SYS5
      0553:RETURN
QG 13 SYS51:IO$="R":GOSUB108:I
      FDS<>0THENRETURN
RK 14 INPUT#8,A$:IFA$<>".DTA"T
      HENCLOSE8:CLOSE15:PRINT"
      {RVS} NOT .DTA FILETYPE
      {SPACE}{OFF}":RETURN
XJ 15 POKE50596,96:INPUT#8,X,L
      M,CR,DR,CI,DI:IFX<>1ORMD
      <>2THENMD=X:GOTO19
BP 16 PRINT"HIRES FILE - WANT
      {SPACE}MULTICOLOR DISPLA
      Y":PRINT"(Y OR N)? ";:M$
      =" "
AA 17 GOSUB152:IFC$="Y"THENPOK
      E50596,76
PM 18 IFC$<>"Y"THENMD=X
KX 19 GOSUB93:SYS50545:CLOSE8:
      CLOSE15
PA 20 RETURN
DB 21 SYS51:IO$="W":GOSUB108:I
      FDS<>0THENRETURN
MF 22 GOSUB93:PRINT#8,".DTA";R
      $;MD;R$;LM;R$;CR;R$;DR;R
      $;CI;R$;DI;R$;
FS 23 SYS50549:CLOSE8:CLOSE15:
      RETURN
GS 24 SYS51:PRINTR$R$"MODE=";M
      D;R$"LIMIT=";LM
PX 25 PRINT"HORIZ=";CR;R$"HRAN
      GE=";DR:PRINT"VERT=";CI;
      R$"VRANGE=";DI:PRINT
FH 26 FORI=1TO4:PRINT"COLOR"I"
      {3 LEFT}({RIGHT})="CL%(I
      ),MID$(CL$,CL%(I)+1,1)"
      {RVS}{4 SPACES}{OFF}
      {GRN}":NEXTI
CB 27 PRINT"BORDER COLOR="BC,M
      ID$(CL$,BC+1,1);"{RVS}
      {4 SPACES}{OFF}{GRN}"
JR 28 PRINT:PRINT"CONTOUR :":P
      RINT"INTERVAL:":PRINT"LI
      MITS{2 SPACES}:{3 UP}"
QD 29 PRINT," COLOR"," LOWER
      {5 SPACES}UPPER":I=0
CE 30 X=TL%(I):IFX=0ORI>254THE
      NPRINT:RETURN
SQ 31 PRINT,X;MID$(CL$,CL%(X)+
      1,1);"{RVS}{4 SPACES}
      {OFF}{GRN}",TL%(I+1),TL%
      (I+2):I=I+3:GOTO30
GG 32 PRINT:IF(PEEK(53265)AND3
      2)<>0THENSYS51:RETURN
GJ 33 SYS50269:RETURN
FJ 34 SYS51:PRINT":(1=HIRES,2=
      MCOL,4=LORES)=";:INPUTX
RK 35 IFX<>1ANDX<>2ANDX<>4THEN
      PRINT"{RVS}*IMPROPER VAL
      UE*{OFF}":RETURN
JK 36 MD=X:GOTO93
BJ 37 SYS51:INPUT": COUNT LIMI
      T=";X
BR 38 IFX<0ORX>767THENPRINT"
      {RVS}*IMPROPER VALUE*
      {OFF}":RETURN
FS 39 LM=X:TL%(0)=0:GOSUB93:GO
      TO131
PB 40 REM**TO INCREASE/DECREAS
      E LENGTH OF
DJ 41 REM**SCREEN PRINTOUT, DE
      C/INC PL
MG 42 PL=160:POKE53068,INT(PL/
      256):POKE53069,PL-INT(PL
      /256)
SJ 43 PRINT:OPEN4,4:PRINT#4:SY
      S51437:PRINT#4
PM 44 PRINT#4,SPC(33);"HYPER-S
      CAN MAP"
XQ 45 A$="HORIZ="+STR$(CR)+" H
      RNG="+STR$(DR)+"
      {2 SPACES}VERT="+STR$(CI
      )+" VRNG="+STR$(DI)
XQ 46 PRINT#4,SPC(INT((80-LEN(
      A$))/2+.5));A$:PRINT#4:P
      RINT#4:CLOSE4:RETURN
QE 47 SYS51:PRINT":DISK COMMAN
      D:";
AC 48 GOSUB152:PRINT:IFC$="$"T
      HENGOTO146
GE 49 OPEN15,8,15,C$:INPUT#15,
      E,E$:CLOSE15:IFE<>0THENP
      RINTE1$;
AG 50 PRINTE,E$:RETURN
JS 51 SYS51:PRINT
AC 52 PRINT"{RVS}F1{OFF}/{RVS}
      T{OFF}OGGLE - TOGGLES CO
      MMAND/DISPLAY MODE"
GE 53 PRINT"{UP}{RVS}F3{OFF}/
      {RVS}DI{OFF}SK - ACCESSE
      S DISK DRIVE"
PJ 54 PRINT"{RVS}F5{OFF} - ABO
      RTS SCAN,DSCAN,DLOAD,AND
       PRINT"
CF 55 PRINT"{DOWN}{RVS}SC{OFF}
      AN - CALCULATES ALTITUDE
       AND MAPS"
RH 56 PRINT"{RVS}DS{OFF}CAN -
      {SPACE}SCANS AND SAVES D
      ATA TO DISK"
SM 57 PRINT"{RVS}DL{OFF}OAD -
      {SPACE}MAPS DATA FROM DI
      SK FILE"
EG 58 PRINT"{RVS}G{OFF}ETMAP -
       RETRIEVES MAP FROM DISK
       FILE"
CE 59 PRINT"{RVS}PU{OFF}TMAP -
       SAVES MAP TO DISK"
HB 60 PRINT"{RVS}L{OFF}IMIT -
      {SPACE}SETS ALTITUDE LIM
      IT"
CS 61 PRINT"{RVS}CON{OFF}TOURS
      - SET MAP CONTOUR INTER
      VALS"
HF 62 PRINT"{RVS}COL{OFF}ORS -
       SET MAP COLORS"
BB 63 PRINT"{RVS}M{OFF}ODE - S
      ET DISPLAY RESOLUTION"
XK 64 PRINT"{RVS}R{OFF}ANGE -
      {SPACE}INPUT MAPPING RAN
      GE MANUALLY"
HP 65 PRINT"{RVS}F{OFF}RAME -
      {SPACE}RANGE + SUBSET OF
       CURRENT MAP"
JM 66 PRINT"{6 SPACES}'B'-TO E
      NLARGE:'S'-TO REDUCE FRA
      ME"
FS 67 PRINT"{UP}{6 SPACES}'X'-
      TO SET FRAME:'Q'-TO EXIT
      "
BS 68 PRINT"{RVS}M{OFF}ODE - S
      ET DISPLAY RESOLUTION"
```

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```
HR 69 PRINT"{RVS}ST{OFF}ATUS -
      DISPLAY CURRENT PARAMET
      ERS"
FP 70 PRINT"{RVS}PR{OFF}INT -
      {SPACE}PRINTOUT MAP ON C
      BM PRINTER"
QH 71 PRINT"{RVS}H{OFF}ELP - D
      ISPLAY HELP SCREEN":RETU
      RN
XC 72 SYS51:IO$="R":GOSUB108:I
      FDS<>0THENRETURN
DG 73 INPUT#8,A$:IFA$<>".MAP"T
      HENPRINT"{RVS} NOT .MAP
      {SPACE}FILE {OFF}":CLOSE
      8:CLOSE15:RETURN
QQ 74 INPUT#8,MD,LM,CR,DR,CI,D
      I,CL%(1),CL%(2),CL%(3),C
      L%(4),BC:I=0
QH 75 INPUT#8,TL%(I):IFTL%(I)<
      >0THENINPUT#8,TL%(I+1),T
      L%(I+2):I=I+3:GOTO75
XH 76 GOSUB93:SYS50269:SYS5077
      9:CLOSE8:CLOSE15:RETURN
KR 77 SYS51:IO$="W":GOSUB108:I
      FDS<>0THENRETURN
GC 78 PRINT#8,".MAP";R$;MD;R$;
      LM;R$;CR;R$;DR;R$;CI;R$;
      DI;R$;CL%(1);R$;CL%(2);R
      $;
DK 79 PRINT#8,CL%(3);R$;CL%(4)
      ;R$;BC;R$;:I=0
AP 80 PRINT#8,TL%(I);R$;
CS 81 IFTL%(I)<>0THENPRINT#8,T
      L%(I+1);R$;TL%(I+2);R$;:
      I=I+3:GOTO80
JB 82 SYS50725:CLOSE8:CLOSE15:
      RETURN
SF 83 PRINT:SYS51:SYS50269:SYS
      50981:POKE650,128
CP 84 GETA$:X=0:FORI=1TO9:IFMI
      D$(CS$,I,1)=A$THENX=I:I=
      9
RR 85 NEXTI:IFX=0THEN84
PS 86 IFX<8THENPOKE253,X-1:SYS
      51279:GOTO84
GB 87 IFX>8THEN92
BM 88 XL=(PEEK(53248)+256*(PEE
      K(53264)AND1)-12)/319
HE 89 X=(PEEK(53252)+64*(PEEK(
      53264)AND4)-12)/319:X=X-
      XL:IFX=0THEN84
HS 90 Y=(PEEK(53249)-40)/199:Y
      H=(PEEK(53253)-40)/199:Y
      =YH-Y:IFY=0THEN84
SH 91 CR=CR+XL*DR:DR=X*DR:CI=C
      I+DI-YH*DI:DI=Y*DI:POKE5
      3269,0
CD 92 FORI=1TO100:GETA$:NEXT:P
      OKE53269,0:POKE650,0:RET
      URN
QM 93 CC=53058:FORI=1TO4:POKEC
      C-1+I,CL%(I):NEXTI:POKE5
      3053,BC
ED 94 IFMD=1THENPOKECC+1,CL%(4
      ):POKECC+2,CL%(1)
QE 95 DX=DR*MD/320:DY=DI/200:I
      FMD=4THENDY=DY*4
DF 96 V=CI+DI-DY/2:I=53026:GOS
      UB138:I=53036:V=-DY:GOSU
      B138
FX 97 I=53041:V=CR+DX/2:GOSUB1
      38
XM 98 V=DX:I=53031:GOSUB138:PO
      KE53047,MD
KA 99 I=0:POKE53046,1:IF(ABS(D
      X)+ABS(DY))<2.E-4THENPOK
      E53046,0
CD 100 POKERT+I,TL%(I):IFTL%(I
       )=0THEN103
DH 101 X=TL%(I+1):GOSUB104:POK
       ERT+I+1,X
BC 102 X=TL%(I+2):GOSUB104:POK
       ERT+I+2,X:I=I+3:GOTO100
XQ 103 X=INT(LM/256):POKE53020
       ,X:POKE53019,LM-256*X:R
       ETURN
JS 104 IFLM<256THENRETURN
JR 105 IFX<128THENRETURN
QS 106 IFX<256THENX=128+(X-128
       )/2
RH 107 X=192+(X-256)/8:RETURN
BS 108 DS=1:NM$="":INPUT":FILE
       NAME";NM$:IFNM$=""THENR
       ETURN
GM 109 OPEN15,8,15:OPEN8,8,8,N
       M$+",SEQ,"+IO$:INPUT#15
       ,E,E$:IFE=0THENDS=0:RET
       URN
SP 110 PRINTEM$;E,E$:CLOSE8:CL
       OSE15:IFE<>63THENRETURN
GJ 111 PRINT"SAVE WITH REPLACE
       ?(Y OR N) ";:GOSUB152
CE 112 PRINT:IFC$<>"Y"THENRETU
       RN
FP 113 NM$="@0:"+NM$:GOTO109
HX 114 IFPEEK(53064)<>0THENPOK
       E53064,0:SYS51:PRINT"
       {RVS} BREAK{2 SPACES}-
       {SPACE}INTERRUPT OF RUN
       {OFF}"
MD 115 PRINT:PRINT"<";:GOSUB15
       2:PRINT">":X=0
MK 116 FORI=0TO7:IFLEFT$(C$,1)
       =LEFT$(CL$(I),1)THENX=I
       +1:I=7
JQ 117 NEXTI:IFX<>0THENPRINT"
       {UP}{RIGHT}"CL$(X-1);Z$
       ;
XC 118 IFX<>0THENONXGOSUB83,72
       ,51,37,34,163,125,32:GO
       TO114
XF 119 FORI=8TO14:IFLEFT$(C$,2
       )=LEFT$(CL$(I),2)THENX=
       I-7:I=14
SE 120 NEXTI:IFX<>0THENPRINT"
       {UP}{RIGHT}"CL$(X+7);Z$
       ;
EX 121 IFX<>0THENONXGOSUB47,13
       ,21,42,77,12,24:GOTO114
AX 122 FORI=15TO16:IFLEFT$(CL$
       (I),3)=LEFT$(C$,3)THENX
       =I-14:I=16
PJ 123 NEXTI:IFX<>0THENPRINT"
       {UP}{RIGHT}"CL$(X+14);Z
       $;:ONXGOSUB140,131:GOTO
       114
CE 124 PRINTR$"{RVS}UNKNOWN CO
       MMAND - FOR HELP ENTER
       {SPACE}"Q$"HELP"Q$:GOTO
       114
BM 125 SYS51:PRINTR$"{DOWN}
       {2 SPACES}{RVS}
       {2 SPACES}SPECIFY REGIO
       N 0F COMPLEX PLANE
       {OFF}{DOWN}"
XR 126 INPUT"REAL INITIAL VALU
       E, RANGE";CR,DR
EB 127 IFABS(CR)>3.9999ORABS(D
       R)>3.9999THENPRINTE2$:G
       OTO126
XR 128 INPUT"IMAGINARY INIT VA
       LUE, RANGE";CI,DI
HD 129 IFABS(CI)>3.9999ORABS(D
       I)>3.9999THENPRINTE2$:G
       OTO128
JA 130 GOTO93
KF 131 SYS51:PRINT":INTERVALS
       {SPACE}FOR CONTOURS"
MF 132 PRINTSPC(5);"{RVS} RESE
       T ALL PLOTTING INTERVAL
       S {OFF}":I=0
BR 133 PRINT"INPUT COLOR (1-4)
       , LOWER AND UPPER PLOT
       {SPACE}RANGES (0-255)"
XG 134 CL=-1:INPUT"COLOR,LL,UL
       ";CL,LL,UL:IFCL=-1THENT
       L%(I)=0:RETURN
AB 135 IFCL<1ORCL>4ORLL<0ORUL>
       LMORLL>ULTHENPRINTE2$:G
       OTO134
RR 136 TL%(I)=CL:TL%(I+1)=LL:T
       L%(I+2)=UL:I=I+3:GOTO13
       4
CX 137 RETURN
JD 138 X=64*ABS(V):FORK=0TO3:P
       OKEI+K,X:X=256*(X-INT(X
       )):NEXTK:X=0:IFV<0THENX
       =255
QB 139 POKEI+4,X:I=I+5:RETURN
MM 140 SYS51:PRINT:FORI=1TO8:P
       RINTI-1;MID$(CL$,I,1);M
       1$" ";
BH 141 PRINTMID$(CL$,I+8,1);M1
       $;I+7:NEXTI
JR 142 PRINT"{DOWN}NAME FOUR C
       OLORS: EX.: 0,5,6,7":IN
       PUT CL%(1),CL%(2),CL%(3
       ),CL%(4)
PE 143 FORI=1TO4:IFCL%(I)<0ORC
       L%(I)>15THENPRINTE2$:GO
       TO142
CE 144 NEXTI:INPUT"BORDER COLO
       R";BC:IFBC<0ORBC>15THEN
       144
JC 145 GOTO93
CK 146 OPEN8,8,0,"$0":GET#8,A$
       ,A$,A$,A$:A$=CHR$(0):B$
       =CHR$(0):F=-1:GOTO148
JP 147 F=-1:GET#8,B$,B$,A$,B$:
       IFB$=""THENB$=CHR$(0)
FH 148 PRINT(ASC(A$)+256*ASC(B
       $));CHR$(13);"{UP}
       {6 RIGHT}";
HQ 149 FORI=1TO28:GET#8,A$:IFA
       $=CHR$(34)ORF=1THENPRIN
       TA$;:F=1
JM 150 NEXTI:IFST=0THENPRINT:G
       OTO147
BF 151 PRINT"***BLOCKS FREE***
       ":CLOSE8:RETURN
DX 152 C$=""
DH 153 I=0:PRINT"{RVS} {OFF}
       {LEFT}";
MR 154 GETA$:I=I+1:IFA$<>""THE
       NIFA$=D$ORA$=R$OR(ASC(A
       $)>31ANDASC(A$)<94)THEN
       GOTO159
KK 155 IFA$=CHR$(133)THENA$=R$
       :C$="TO":GOTO159
JE 156 IFA$=CHR$(134)THENA$=R$
       :C$="DI":GOTO159
XR 157 IFI=7ORI=14THENPRINT"
       {LEFT}";:IFI=14THEN153
JB 158 GOTO154
QF 159 PRINT" {LEFT}";:IFA$<>D
       $ANDA$<>R$THENPRINTA$;:
       C$=C$+A$:GOTO153
GA 160 IFA$=D$THENX=LEN(C$):IF
       X<>0THENPRINTD$;:C$=LEF
       T$(C$,X-1)
JX 161 IFA$=D$THEN153
BA 162 RETURN
CF 163 SYS51:STOP
```

Program 2: HS.MAC

Please refer to the "MLX" article in this issue before entering the following program.

```
C000:A2 0C A9 00 95 25 CA D0 B2
C008:FB A0 32 A9 28 AA 20 5D 1A
C010:C1 A0 3C A9 2D A2 28 20 21
C018:2D C1 A0 37 A9 2D AA 20 9F
C020:5D C1 A2 32 A0 37 20 CF 2A
C028:C2 B0 52 E6 26 D0 02 E6 4F
```

```
C030:27 A5 26 C5 41 D0 0B A5 D8
C038:27 C5 42 D0 05 A9 00 85 68
C040:26 60 20 C2 C2 A0 43 20 5C
C048:CD C2 B0 31 A2 28 20 38 B8
C050:C3 06 2B 26 2A 26 29 26 5F
C058:28 B0 22 06 3F 26 3E 26 F3
C060:3D 26 3C B0 18 A2 3C A0 01
C068:48 20 CF C2 B0 0F A2 2D 70
C070:20 38 C3 06 30 26 2F 26 87
C078:2E 26 2D 90 8C A5 42 F0 B9
C080:1A A5 27 F0 0B 4A 4A A5 28
C088:26 6A 4A 4A 09 C0 D0 09 9B
C090:A5 26 10 07 4A 29 BF 09 60
C098:80 85 26 60 A2 31 BC FF D9
C0A0:CE B5 25 9D FF CE 94 25 FE
C0A8:CA D0 F3 60 BD 00 70 7D 94
C0B0:00 50 79 00 40 90 03 E6 A6
C0B8:A6 18 85 A7 68 AA B9 00 20
C0C0:50 79 00 70 79 00 60 90 EC
C0C8:03 E6 A6 18 65 A7 85 A7 58
C0D0:90 03 E6 A6 18 BD 00 50 AA
C0D8:7D 00 70 7D 00 40 90 03 24
C0E0:E6 A6 18 7D 00 60 90 03 FF
C0E8:E6 A6 18 65 A7 90 03 E6 4D
C0F0:A6 18 85 39 B9 00 51 79 F9
C0F8:00 71 79 00 41 90 03 E6 3F
C100:A5 18 65 A6 85 A6 90 03 5E
C108:E6 A5 18 BD 00 51 7D 00 87
C110:77 79 00 67 90 03 E6 A5 28
C118:18 65 A6 90 03 E6 A5 18 F5
C120:85 38 B9 00 51 79 00 77 93
C128:65 A5 85 37 60 8C 2B C1 39
C130:C8 8C 21 C1 C8 8C F3 C0 9C
C138:8C 52 C1 C8 8C 54 C1 C8 5D
C140:8C 4A C1 A8 B9 04 00 55 92
C148:04 85 40 A9 00 85 A5 85 B8
C150:A6 85 3E 85 3F AD 36 CF 95
C158:D0 68 4C 35 C2 8C 2B C1 9B
C160:C8 8C 21 C1 C8 8C F3 C0 CC
C168:8C 82 C1 C8 8C 84 C1 C8 5A
C170:8C 7A C1 A8 B9 04 00 55 CE
C178:04 85 3B A9 00 85 A5 85 48
C180:A6 85 39 85 3A AD 36 CF FC
C188:F0 43 B5 01 29 0F 09 50 04
C190:8D F6 C0 B5 01 4A 4A 4A 1C
C198:4A 09 70 8D F9 C0 B5 00 A8
C1A0:29 0F 09 40 8D FC C0 09 8C
C1A8:50 8D 0D C1 8D 24 C1 B5 AB
C1B0:00 4A 4A 4A 4A 09 60 8D 79
C1B8:13 C1 09 70 8D 10 C1 8D 1C
C1C0:27 C1 B6 01 B9 00 00 A8 A5
C1C8:A9 00 4C F1 C0 B5 02 4A F4
C1D0:4A 4A 4A 09 70 8D C3 C0 E7
C1D8:B5 02 29 0F 09 50 8D C0 33
C1E0:C0 B5 01 4A 4A 4A 4A 09 10
C1E8:60 8D C6 C0 09 70 8D DA E4
C1F0:C0 8D F9 C0 B5 01 29 0F 96
C1F8:09 40 8D B4 C0 09 50 8D 66
C200:D7 C0 8D F6 C0 B5 00 4A E9
C208:4A 4A 4A 09 60 8D E5 C0 E4
C210:8D 13 C1 09 70 8D AE C0 C1
C218:8D 10 C1 8D 27 C1 B5 00 25
C220:29 0F 09 40 8D DD C0 8D 16
C228:FC C0 09 50 8D B1 C0 8D C4
C230:0D C1 8D 24 C1 B9 01 00 97
C238:48 B9 02 00 AA B9 00 00 CC
C240:A8 18 4C AC C0 A5 FB 9D A6
C248:00 50 85 FD A5 FC 9D 00 CE
C250:60 85 FE 98 A0 04 06 FD EF
C258:26 FE 88 D0 F9 A8 18 65 D6
C260:FB 85 FB 90 02 E6 FC A5 19
C268:FD 9D 00 70 A5 FE 9D 00 BF
C270:80 E8 D0 D1 EE 49 C2 EE B8
C278:50 C2 EE 6B C2 EE 70 C2 E0
C280:C8 86 FC 86 FB 98 C9 10 F9
C288:D0 BB 60 A5 EE A2 FE E5 B1
C290:41 CD FA 79 4A 45 9B 2D EC
C298:A9 6B A9 40 8D 49 C2 A9 C7
C2A0:50 8D 50 C2 A9 60 8D 6B 3D
C2A8:C2 A9 70 8D 70 C2 A2 0F C3
C2B0:BD 8A C2 5D BD C2 20 D2 F1
C2B8:FF CA D0 F4 A9 00 A8 AA A3
C2C0:F0 BF B5 04 85 A9 59 04 2F
C2C8:00 D0 0D F0 29 A2 A5 B5 08
C2D0:04 85 A9 59 04 00 D0 1E 64
C2D8:18 B5 03 79 03 00 85 A8 9B
C2E0:B5 02 79 02 00 85 A7 B5 2C
C2E8:01 79 01 00 85 A6 B5 00 9F
C2F0:79 00 00 85 A5 60 38 B5 60
C2F8:03 F9 03 00 85 A8 B5 02 1B
C300:F9 02 00 85 A7 B5 01 F9 6D
C308:01 00 85 A6 B5 00 F9 00 CC
C310:00 85 A5 90 02 18 60 A9 91
C318:00 38 E5 A8 85 A8 A9 00 17
C320:E5 A7 85 A7 A9 00 E5 A6 6F
C328:85 A6 A9 00 E5 A5 85 A5 C7
C330:A9 FF 45 A9 85 A9 18 60 33
C338:A5 A5 95 00 A5 A6 95 01 A2
C340:A5 A7 95 02 A5 A8 95 03 55
C348:A5 A9 95 04 60 A9 FE 25 CC
C350:01 85 01 20 9C C0 60 20 A4
C358:9C C0 A9 01 05 01 85 01 DB
C360:60 A2 43 A0 4D 20 CF C2 80
C368:20 38 C3 60 A2 48 A0 52 56
C370:20 CF C2 20 38 C3 60 00 E7
C378:55 AA FF 80 40 20 10 08 08
C380:04 02 01 7F BF DF EF F7 F7
C388:FB FD FE A9 00 8D 39 CF 80
C390:A5 FD 29 F8 48 0A 2E 39 1F
C398:CF 0A 2E 39 CF 0A 2E 39 20
C3A0:CF 8D 38 CF 68 4A 4A 4A C2
C3A8:6D 39 CF 8D 39 CF A5 FB 58
C3B0:29 F8 18 6D 38 CF 8D 38 39
C3B8:CF A5 FC 6D 39 CF 69 A0 84
C3C0:8D 39 CF A5 FD 29 07 18 6C
C3C8:6D 38 CF 8D 38 CF 90 03 0D
C3D0:EE 39 CF 60 20 8B C3 AD 82
C3D8:38 CF 8D FB C3 8D 01 C4 FC
C3E0:AD 39 CF 8D FC C3 8D 02 74
C3E8:C4 A5 FB 29 07 AA BD 7B 28
C3F0:C3 2D 3A CF 8D 3B CF BD A0
C3F8:83 C3 2D 00 FF 0D 3B CF 53
C400:8D 00 FF 60 AD 37 CF C9 0A
C408:02 F0 13 C9 01 F0 02 D0 6E
C410:1F 20 34 C5 20 D4 C3 E6 D6
C418:FB D0 02 E6 FC 60 20 34 60
C420:C5 20 D4 C3 E6 FB 20 D4 A7
C428:C3 E6 FB D0 02 E6 FC 60 DF
C430:A9 04 8D 40 CF 8D 41 CF 4C
C438:20 34 C5 20 D4 C3 E6 FD 1B
C440:CE 41 CF D0 F6 A9 04 8D 7C
C448:41 CF A5 FD 38 E9 04 85 F1
C450:FD E6 FB D0 02 E6 FC CE 93
C458:40 CF D0 DF 60 A9 01 CD 87
C460:37 CF F0 08 A9 10 0D 16 D5
C468:D0 8D 16 D0 AD 02 DD 09 C7
C470:03 8D 02 DD AD 00 DD 29 4F
C478:FC 09 01 8D 00 DD AD 18 A6
C480:D0 29 07 09 38 8D 18 D0 27
C488:AD 11 D0 09 20 8D 11 D0 02
C490:AD 21 D0 8D 3C CF AD 42 EA
C498:CF 8D 21 D0 AD 20 D0 8D BB
C4A0:3E CF AD 3D CF 8D 20 D0 8C
C4A8:AD 86 02 8D 3F CF AD 45 9D
C4B0:CF 8D 86 02 AD 43 CF 0A 9A
C4B8:0A 0A 0A 0D 44 CF A2 00 82
C4C0:9D 00 8C 9D 00 8D 9D 00 F5
C4C8:8E 9D F7 8E E8 D0 F1 AD 05
C4D0:45 CF 9D 00 D8 9D 00 D9 BB
C4D8:9D 00 DA 9D 00 DB E8 D0 78
C4E0:F1 60 A9 A0 8D EE C4 A9 16
C4E8:00 8D ED C4 9D 00 A0 E8 F6
C4F0:D0 FA EE EE C4 A9 C0 CD 8A
C4F8:EE C4 D0 EB 60 AD 00 DD 9B
C500:09 03 8D 00 DD AD 18 D0 29
C508:29 07 09 10 8D 18 D0 AD 28
C510:11 D0 29 DF 8D 11 D0 A9 77
C518:EF 2D 16 D0 8D 16 D0 AD CA
C520:3C CF 8D 21 D0 AD 3E CF 0B
C528:8D 20 D0 AD 3F CF 8D 86 52
C530:02 4C 27 CA A2 FD A5 26 DF
C538:E8 E8 E8 BC 00 CB D0 05 31
C540:29 01 A8 10 0D 88 DD 01 FD
C548:CB 90 ED DD 02 CB F0 02 9C
C550:B0 E6 B9 77 C3 8D 3A CF 35
C558:60 20 5D C4 20 E2 C4 20 4A
C560:FD C4 20 8B C2 A9 40 85 9B
C568:34 85 36 85 38 8D 84 02 91
C570:60 A9 FF 30 06 A9 01 D0 43
C578:02 A9 00 8D 46 CF 20 4D 47
C580:C3 20 5D C4 20 E2 C4 A9 AD
C588:00 85 FD AD 37 CF C9 04 A0
C590:F0 02 A9 01 8D 47 CF AD 31
C598:46 CF C9 01 D0 09 20 85 F4
C5A0:C6 4C B0 C5 4C CF FF C9 80
C5A8:FF D0 05 A2 08 20 C6 FF 81
C5B0:A2 05 BD 30 CF 95 42 CA AD
C5B8:D0 F8 A9 00 85 FB 85 FC 44
C5C0:AD 46 CF C9 FF D0 11 20 D0
C5C8:CF FF 20 A4 C5 85 26 20 3B
C5D0:B7 FF 29 C0 D0 3B F0 0F CD
C5D8:20 00 C0 AD 46 CF C9 01 6D
C5E0:D0 05 A5 26 20 CF C6 20 1B
C5E8:04 C4 20 61 C3 A5 C5 C9 CB
C5F0:06 D0 05 8D 48 CF F0 19 A9
C5F8:A5 FB C9 40 D0 C2 A5 FC 6D
C600:F0 BE 20 6C C3 A5 FD 18 49
C608:6D 47 CF 85 FD C9 C8 90 A9
C610:11 AD 46 CF C9 01 D0 03 4E
C618:20 DD C6 20 CC FF 20 57 06
C620:C3 60 4C B0 C5 A9 FE 25 34
C628:01 85 01 A2 08 20 C9 FF 36
C630:A9 A0 8D 39 C6 A2 00 BD 7E
C638:00 A0 20 D2 FF 20 B7 FF 0F
C640:29 C0 D0 0D E8 D0 F0 EE D8
C648:39 C6 A9 C0 CD 39 C6 D0 17
C650:E6 20 CC FF A9 01 05 01 4F
C658:85 01 60 A2 08 20 C6 FF 6D
C660:20 E2 C4 A9 A0 8D 6F C6 CA
C668:A0 00 20 CF FF 99 00 A0 4E
C670:20 B7 FF 29 C0 D0 0A C8 B4
C678:D0 F0 EE 6F C6 A9 C0 D0 AE
C680:E9 20 CC FF 60 A9 E0 8D 9D
C688:D1 C6 A9 00 8D D0 C6 60 83
C690:A9 E0 8D AE C6 8D B1 C6 5E
C698:A9 60 8D AB C6 8D B5 C6 1E
C6A0:78 A9 FD 25 01 85 01 A2 A9
C6A8:00 BD 00 60 BC 00 E0 9D F0
C6B0:00 E0 98 9D 00 60 E8 D0 87
C6B8:F0 EE AB C6 EE AE C6 EE 0B
C6C0:B5 C6 EE B1 C6 D0 E2 A9 BC
C6C8:02 05 01 85 01 58 60 8D C8
C6D0:00 E0 EE D0 C6 D0 05 EE F3
C6D8:D1 C6 F0 01 60 48 20 90 24
C6E0:C6 A2 08 20 C9 FF A9 5F 7E
C6E8:8D F4 C6 A9 FF 8D F3 C6 D2
C6F0:D0 0D AD 00 60 20 D2 FF 09
C6F8:20 B7 FF 29 C0 D0 1B EE 85
C700:F3 C6 D0 03 EE F4 C6 AD 0C
C708:D0 C6 CD F3 C6 D0 E3 AD 99
C710:D1 C6 38 E9 80 CD F4 C6 CB
C718:D0 D8 20 90 C6 20 85 C6 DB
C720:20 CC FF 68 60 A2 08 A9 C0
C728:00 9D F7 8F CA D0 FA 85 2C
C730:FB 85 FC 85 FD 85 FE 8D A8
C738:49 CF 8D 4A CF A2 3F A9 E7
C740:00 9D FD 7F 9D FF 7F A9 84
C748:08 9D FE 7F CA CA CA D0 03
C750:EE A2 03 A9 FF 9D 1D 80 2C
C758:CA D0 FA A9 0F 8D 15 D0 25
C760:A9 72 8D 00 D0 8D 06 D0 AC
C768:8D 01 D0 8D 03 D0 A9 B2 53
C770:8D 02 D0 8D 04 D0 A9 9A 8B
C778:8D 05 D0 8D 07 D0 A9 00 D1
C780:8D 10 D0 A9 01 A2 04 9D C7
C788:26 D0 CA D0 FA 60 EE 84 81
C790:C7 A9 0F CD 84 C7 B0 EB BD
C798:A9 00 8D 84 C7 F0 E4 A5 68
C7A0:FC 18 7D FF CF 9D FF CF 29
C7A8:A5 FB 18 F0 1B 30 0A 7D 47
C7B0:FE CF 9D FE CF B0 0A 90 3D
C7B8:0F 7D FE CF 9D FE CF B0 45
C7C0:07 98 4D 10 D0 8D 10 D0 52
C7C8:98 4A A8 CA CA 60 A2 08 1E
C7D0:A0 08 A9 00 85 FD 20 E2 2F
C7D8:C7 CA CA 98 4A A8 8A D0 BC
```

```
C7E0:F5 60 A5 FD D0 0F 98 2D 39
C7E8:10 D0 F0 0A BD FE CF C9 C6
C7F0:4C 90 0C E6 FD 60 BD FE A6
C7F8:CF C9 0C B0 02 90 F4 BD 69
C800:FF CF C9 F0 90 02 B0 EB A7
C808:C9 28 B0 E9 90 E5 A2 08 A6
C810:A0 08 20 9F C7 8A D0 FA F6
C818:20 CE C7 A5 FD F0 11 A9 40
C820:00 38 E5 FB 85 FB A9 00 AB
C828:38 E5 FC 85 FC 4C 0E C8 45
C830:A9 00 85 FB 85 FC 60 A9 91
C838:01 85 FB D0 D1 A9 FF 85 F2
C840:FB D0 CB A9 01 85 FC D0 01
C848:C5 A9 FF 85 FC D0 BF A5 CF
C850:FD C9 01 F0 E2 C9 02 F0 B5
C858:E4 C9 03 F0 E6 C9 04 F0 95
C860:E8 C9 05 F0 3B C9 06 F0 86
C868:50 4C 8E C7 A9 00 85 FC D8
C870:AD 49 CF 85 FB A2 06 A0 94
C878:04 20 9F C7 20 9F C7 A9 3D
C880:00 85 FB AD 4A CF 85 FC 67
C888:A2 08 A0 08 20 9F C7 20 31
C890:9F C7 20 CE C7 A9 00 85 3F
C898:FC 8D 49 CF 8D 4A CF 60 C7
C8A0:A2 01 8E 49 CF A5 FE 18 55
C8A8:6D D3 C8 85 FE 90 03 8E 26
C8B0:4A CF 20 6C C8 A5 FD F0 EF
C8B8:19 A2 FF 8E 49 CF A5 FE 3C
C8C0:38 ED D3 C8 85 FE B0 03 7D
C8C8:8E 4A CF 20 6C C8 A5 FD FF
C8D0:D0 CE 60 A0 10 31 34 00 42
C8D8:80 A5 FD C9 C7 B0 03 4C C3
C8E0:8B C3 A9 77 8D 38 CF A9 6C
C8E8:C3 8D 39 CF 60 A5 01 29 A8
C8F0:FE 85 01 A9 00 85 FE 85 B7
C8F8:FD A9 01 8D 3A CF A2 04 47
C900:20 C9 FF A9 08 20 D2 FF 17
C908:A9 00 85 FB 85 FC AA BD 14
C910:D4 C8 C9 00 F0 06 20 D2 2C
C918:FF E8 D0 F3 A5 FD 8D 4A C9
C920:CF A5 FE 8D 4B CF A2 00 9C
C928:20 D9 C8 AD 38 CF 8D 38 8A
C930:C9 AD 39 CF 8D 39 C9 AD CA
C938:00 FF 8D 38 CF A9 01 CD F5
C940:37 CF F0 26 CD 3A CF F0 CB
C948:21 AD 38 CF 29 AA 8D 41 2C
C950:CF 4A 8D 40 CF 0D 41 CF 19
C958:8D 41 CF AD 38 CF 29 55 80
C960:0A 0D 40 CF 2D 41 CF 8D DC
C968:38 CF AD 38 CF 9D 4E CF A6
C970:A5 FE 18 6D 4D CF 85 FE 24
C978:A5 FD 6D 4C CF 85 FD A9 0B
C980:01 4D 3A CF 8D 3A CF E8 0A
C988:8A C9 07 D0 9B A9 80 8D D3
C990:D8 C8 A2 07 A9 00 8D 49 39
C998:CF AD D8 C8 3D 4D CF F0 D6
C9A0:09 A9 01 18 6D 49 CF 8D 82
C9A8:49 CF 0E 49 CF CA D0 E9 60
C9B0:6E 49 CF AD 49 CF 09 80 BE
C9B8:20 D2 FF 4E D8 C8 D0 D2 54
C9C0:A9 01 4D 3A CF 8D 3A CF AF
C9C8:A9 08 18 65 FB 85 FB 90 0B
C9D0:02 E6 FC A9 40 C5 FB D0 3B
C9D8:29 A9 01 C5 FC D0 23 A9 03
C9E0:0D 20 D2 FF A9 01 4D 3A 83
C9E8:CF 8D 3A CF AD 4D CF 18 66
C9F0:65 FE 85 FE AD 4C CF 65 3B
C9F8:FD 85 FD C9 C7 B0 19 4C C8
CA00:08 C9 AD 4B CF 85 FE AD B6
CA08:4A CF 85 FD A5 C5 C9 06 25
CA10:F0 03 4C 1C C9 8D 48 CF 0F
CA18:A9 0F 20 D2 FF 20 CC FF 91
CA20:A5 01 09 01 85 01 60 A2 8D
CA28:00 4C D2 C4 00 00 00 00 77
```

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Disk COMpacker

For IBM PC/PCjr

Ronald Dorchester

Are you running out of room on your IBM PC/PCjr disks? Are your disk directories cluttered with a multitude of small COM programs? This utility conserves disk space and simplifies the directory structure of a disk by packing several COM programs into a single file. It also works with PC compatibles.

Most IBM PC/PCjr owners have a collection of favorite COM programs that perform various tasks. "Disk COMpacker" takes several small COM programs and packs them into a single disk file. By packing several programs together, you can save disk space and reduce the number of directory entries on the disk.

Type in and save the program before you run it. The BASIC program begins by READing all the DATA lines and checking them against checksums to confirm that they have been typed correctly. If no errors appear, the program creates the file COMPACKR.COM on the disk; this is the machine language program that you'll use to pack other files.

Packing COM Files

Before you use COMPACKR.COM, you must collect on one disk the files which you wish to compact. The COM files can be any collection of programs that run independently. (You should not attempt to pack a program that is called from within another application, since that application will have no way to know that the program has been packed.) Make sure that COMPACKR.COM is present on the disk and that the disk is in the current default drive, as well. You invoke COMPACKR.COM by typing its name from the DOS prompt. You do not need to type the .COM extension after COMPACKR. Here's the general syntax to use:

compackr *output input1 input2 ...*

The command COMPACKR is followed by three or more filenames separated by spaces. The first name (*output*, in the example command) is the name of the file you wish to create; this file will contain all the COM files in packed form. The remaining names indicate which COM files you wish to pack into the output file.

For instance, say that you want to pack three COM files named DEMO1.COM, DEMO2.COM, and DEMO3.COM into a single file called BIGONE.COM. Here is the command to use:

compackr bigone demo1 demo2 demo3

Notice that it is not necessary to type the .COM extension for any of the filenames. COMPACKR.COM supplies the extensions automatically. Do not use any drive specifiers, pathnames, or extensions in the command. COMPACKR.COM assumes that all the input files are in the current directory of the default drive and it places the output file there, too. You cannot use the same name for an input file and the output file; for instance, if one of the input files is DISKFS, you can't name the output file DISKFS.

Be sure to keep a copy of each original file that is packed. COMPACKR.COM makes no provision for unpacking the components of a packed file, and you may want to use the COM files separately or pack them with other COM files in the future.

Leader Of The Pack

Once you have created the packed file, you can access any of the COM programs which it contains. Here is the syntax to use:

mainfile comfile parameter(s)

In this example, *mainfile* represents the output filename you used when creating the large packed file. The parameter *comfile* represents the name which the desired individual packed COM file had before you packed it. If the COM file takes additional parameters, those should be typed after the filename.

For instance, say that you have created the file BIGONE containing the COM files DEMO1.COM, DEMO2.COM, and DEMO3.COM, and that DEMO2.COM requires you to supply one parameter—the password *secret*. Here's how to invoke DEMO2.COM after packing:

```
bigone demo2 secret
```

If you invoke the main file without supplying any parameters, an appropriate error message is displayed (the program returns errorlevel 255). The program also displays the names of all the packed COM files as a reminder.

Why Pack?

You may wonder why packing several COM files into one file saves disk space. The answer has to do with the way that PC-DOS (or MS-DOS, if you are using an IBM PC compatible) allocates disk space. When you create a file, DOS allocates space in the form of uniform *clusters* rather than using only as many bytes as the file requires. The size of a cluster depends on what sort of drive you're using. A cluster normally contains 512 bytes (one sector) on a single-sided floppy disk, 1024 bytes (two sectors) on a double-sided floppy, or 4096 bytes (eight sectors) on a 10-megabyte hard disk.

Since few programs are an exact multiple of the cluster size, most disks contain a considerable amount of wasted space. The amount of waste varies, based on how much of the last cluster each program uses and the type of drive. For example, a 4500-byte program on a double-sided floppy disk uses five clusters, or 5120 bytes, wasting the last 620 bytes of the final cluster. On a 10-megabyte hard disk, the same 4500-byte file uses two clusters, or 8192 bytes, wasting 3692 bytes of disk space.

The theoretical average number of bytes you can save per packed program is half the cluster size for the type of disk in use. This does not apply to a program whose file size is an exact multiple of the cluster size, of course.

The packed file includes code to find and run the program you choose, and to display appropriate error messages. This overhead amounts to about 512 bytes, plus an extra 10 bytes for every program packed in the main file. Note that the packed file must not exceed 62K in length. Since the DOS command line is limited to 127 characters, you can usually pack only about 12 files into a single main file. If the filenames of the original input files are short, you may be able to pack more than 12, providing that you don't exceed the 62K maximum length for the main file.

Disk COMpacker For IBM PC/PCjr

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
PJ 130 CLS:DEFINT I:FOR I=0 TO 5
       :READ MSG$(I):NEXT
BM 131 READ PGM$,I1MAX,I2MAX,GRT
       OTCK,ILOF
BJ 140 IPASS=IPASS+1:PRINT MSG$(
       IPASS):IF IPASS=0 OR IPAS
       S=3 THEN END
BI 150 PRINT:IF IPASS=2 THEN OPE
       N PGM$ AS #1 LEN=1:FIELD
       #1,1 AS BYTE$
BH 160 RESTORE 501:GRTOT=0:FOR I
       1=1 TO I1MAX:FOR I2=1 TO
       I2MAX
AD 170 READ IBYTE:ITOT=ITOT+IBYT
       E
PF 180 IF IPASS=2 AND ICLOF<ILOF
        THEN LSET BYTE$=CHR$(IBY
       TE):PUT #1:ICLOF=ICLOF+1
JL 190 NEXT I2:READ ICHECK:IF IC
       HECK=ITOT GOTO 210
JL 200 PRINT MSG$(4);500+I1:IPAS
       S=-1
GM 210 GRTOT=GRTOT+ITOT:ITOT=0:N
       EXT I1:PRINT
GN 220 IF IPASS>0 AND GRTOTCK=GR
       TOT GOTO 140
AH 230 IF IPASS<>-1 THEN PRINT M
       SG$(5):END ELSE GOTO 140
HA 300 DATA Correct Errors.,Chec
       king DATA Lines.,Creating
        Program.
HB 310 DATA Program Created.,Err
       or(s) On Line -,Check Lin
       e 500.
ED 500 DATA "COMPACKR.COM",133,1
       0,126794,1327
PF 501 DATA 233,143,3,233,4,1,13
       ,9,13,10, 662
JB 502 DATA 67,79,77,80,65,67,75
       ,82,32,45, 669
FF 503 DATA 32,32,80,97,99,107,1
       15,32,83,109, 786
HJ 504 DATA 97,108,108,32,67,79,
       77,32,80,114, 794
DN 505 DATA 111,103,114,97,109,1
       15,32,73,110,116, 980
CP 506 DATA 111,32,79,110,101,46
       ,13,10,0,0, 502
KI 507 DATA 0,0,0,0,0,0,0,0,0,0,
       0
KL 508 DATA 0,0,0,0,0,0,0,0,0,0,
       0
KO 509 DATA 0,0,0,0,0,0,0,0,0,0,
       0
IF 510 DATA 0,0,0,0,0,0,0,0,0,0,
       0
JI 511 DATA 0,0,0,0,0,0,0,0,0,0,
       0
JL 512 DATA 0,0,0,0,0,0,0,0,0,0,
       0
JO 513 DATA 0,0,0,0,0,0,0,0,0,0,
       0
JB 514 DATA 0,0,0,0,0,0,0,0,0,0,
       0
OD 515 DATA 26,73,110,118,97,108
       ,105,100,47,77, 861
LE 516 DATA 105,115,115,105,110,
       103,32,79,112,116, 992
DE 517 DATA 105,111,110,46,46,46
       ,86,97,108,105, 860
GO 518 DATA 100,32,79,112,116,10
       5,111,110,115,32, 912
CA 519 DATA 65,114,101,58,13,10,
       9,44,32,47, 493
DC 520 DATA 0,0,0,80,87,51,192,1
       72,60,13, 655
EM 521 DATA 116,33,191,186,1,185
       ,4,0,242,174, 1132
MG 522 DATA 116,241,139,214,74,2
       54,196,172,60,13, 1479
MK 523 DATA 116,13,191,186,1,185
       ,4,0,242,174, 1112
FG 524 DATA 117,239,248,235,1,24
       9,51,201,138,204, 1683
ME 525 DATA 95,88,195,60,97,114,
       6,60,122,119, 956
FI 526 DATA 2,36,223,195,80,83,1
```

```
      87,2,0,180,  988
KN 527 DATA 64,205,33,91,88,195,
      252,136,38,190,  1292
LA 528 DATA 1,83,81,82,87,86,128
      ,62,128,0,  738
CF 529 DATA 0,119,59,186,8,1,185
      ,178,0,198,  934
DK 530 DATA 6,140,1,10,232,213,2
      55,185,10,0,  1052
OA 531 DATA 190,237,2,139,92,8,1
      41,120,10,184,  1123
BO 532 DATA 32,32,57,5,117,3,184
      ,13,10,139,  592
IO 533 DATA 214,135,68,8,232,183
      ,255,135,68,8,  1306
FJ 534 DATA 139,247,61,32,32,116
      ,222,184,255,76,  1364
EG 535 DATA 205,33,190,129,0,232
      ,101,255,227,189,  1561
CH 536 DATA 78,131,249,8,119,183
      ,191,129,0,160,  1248
MD 537 DATA 128,0,152,3,199,43,1
      98,162,128,0,  1013
PJ 538 DATA 139,200,65,243,164,1
      87,237,2,129,63,  1429
PN 539 DATA 32,32,116,155,191,93
      ,0,139,243,185,  1186
PN 540 DATA 8,0,243,166,116,8,13
      9,119,8,141,  948
OO 541 DATA 88,10,235,230,83,138
      ,30,190,1,50,  1055
EJ 542 DATA 255,190,108,0,191,92
      ,0,185,16,0,  1037
QH 543 DATA 243,164,191,108,0,17
      6,0,170,176,32,  1260
LN 544 DATA 185,11,0,243,170,51,
      192,171,171,128,  1322
MI 545 DATA 62,128,0,0,116,27,19
      0,129,0,232,  884
LE 546 DATA 253,254,114,19,232,2
      48,254,139,242,191,  1946
GF 547 DATA 108,0,184,14,41,205,
      33,60,255,117,  1017
LG 548 DATA 2,183,255,139,195,91
      ,139,79,8,141,  1232
ML 549 DATA 119,10,191,0,1,137,6
      2,254,0,255,  1029
DF 550 DATA 38,191,1,32,32,69,79
      ,70,243,164,  919
HP 551 DATA 94,95,90,89,91,255,3
      8,254,0,10,  1016
OB 552 DATA 70,111,114,109,97,11
      6,58,32,32,67,  806
AD 553 DATA 79,77,80,65,67,75,82
      ,32,111,117,  785
FA 554 DATA 116,112,103,109,95,1
      10,97,109,101,32,  984
LA 555 DATA 105,110,112,103,109,
      49,32,105,110,112,  947
QL 556 DATA 103,109,50,32,46,46,
      46,13,10,10,  465
JN 557 DATA 78,111,116,101,58,32
      ,32,32,32,80,  672
QL 558 DATA 114,111,103,114,97,1
      09,115,32,77,85,  957
QN 559 DATA 83,84,32,98,101,32,1
      05,110,32,116,  793
BB 560 DATA 104,101,32,67,117,11
      4,114,101,110,116,  976
NI 561 DATA 32,68,105,114,101,99
      ,116,111,114,121,  981
JB 562 DATA 32,111,102,13,10,9,3
      2,32,116,104,  561
KI 563 DATA 101,32,68,101,102,97
      ,117,108,116,32,  874
OA 564 DATA 68,114,105,118,101,4
      6,32,32,78,111,  805
LB 565 DATA 32,69,120,116,101,11
      0,115,105,111,110,  989
OM 566 DATA 115,46,13,10,36,47,6
      ,47,6,46,  372
PL 567 DATA 67,79,77,0,32,32,32,
      32,32,32,  415
FP 568 DATA 32,32,32,45,32,32,67
      ,114,101,97,  584
JN 569 DATA 116,101,100,32,66,12
      1,32,116,104,101,  889
AC 570 DATA 32,67,79,77,80,65,67
      ,75,82,32,  656
ED 571 DATA 80,114,111,103,114,9
      7,109,46,32,32,  838
AD 572 DATA 58,92,46,78,111,32,7
      9,117,116,112,  841
IP 573 DATA 117,116,32,70,105,10
      8,101,13,10,36,  708
DA 574 DATA 78,111,32,73,110,112
      ,117,116,32,70,  851
KA 575 DATA 105,108,101,115,13,1
      0,36,68,114,105,  775
BJ 576 DATA 118,101,47,80,97,116
      ,104,47,69,120,  899
LP 577 DATA 116,101,110,115,105,
      111,110,115,32,78,  993
FB 578 DATA 111,116,32,65,108,10
      8,111,119,101,100,  971
KE 579 DATA 13,10,36,68,105,114,
      101,99,116,111,  773
GP 580 DATA 114,121,32,70,117,10
      8,108,32,111,114,  927
NG 581 DATA 32,82,101,97,100,32,
      79,110,108,121,  862
AE 582 DATA 32,70,105,108,101,13
      ,10,36,68,105,  648
HE 583 DATA 115,107,32,70,117,10
      8,108,13,10,36,  716
GF 584 DATA 32,70,105,108,101,32
      ,78,111,116,32,  785
NK 585 DATA 70,111,117,110,100,1
      3,10,36,32,70,  669
FO 586 DATA 105,108,101,32,78,97
      ,109,101,32,84,  847
DK 587 DATA 111,111,32,76,111,11
      0,103,13,10,36,  713
JN 588 DATA 80,114,111,103,114,9
      7,109,32,84,111,  955
CL 589 DATA 111,32,76,111,110,10
      3,13,10,36,67,  669
ED 590 DATA 79,77,80,65,67,75,82
      ,32,70,105,  732
BC 591 DATA 110,105,115,104,101,
      100,13,10,36,180,  874
QP 592 DATA 9,205,33,195,252,128
      ,62,128,0,0,  1012
KC 593 DATA 119,24,235,3,232,238
      ,255,198,6,140,  1450
LH 594 DATA 1,36,186,8,1,232,227
      ,255,186,253,  1385
MA 595 DATA 2,232,221,255,205,32
      ,190,129,0,172,  1438
NE 596 DATA 60,13,116,21,232,54,
      253,136,68,255,  1208
MK 597 DATA 191,198,3,185,3,0,24
      2,174,117,235,  1348
HB 598 DATA 186,235,3,235,205,19
      0,129,0,232,236,  1651
HD 599 DATA 252,115,12,227,5,186
      ,218,3,235,190,  1443
CM 600 DATA 186,201,3,235,185,86
      ,139,242,191,152,  1620
GH 601 DATA 3,243,164,87,190,152
      ,3,191,10,1,  1044
ME 602 DATA 185,46,0,243,164,95,
      185,5,0,190,  1113
EP 603 DATA 147,3,243,164,94,232
      ,189,252,131,249,  1704
NH 604 DATA 0,119,3,233,156,0,13
      1,249,8,118,  1017
LF 605 DATA 5,186,80,4,235,134,8
      6,139,242,139,  1250
BM 606 DATA 217,139,62,145,3,243
      ,164,185,8,0,  1166
BE 607 DATA 43,203,176,32,243,17
      0,139,203,139,242,  1590
LE 608 DATA 191,93,0,243,164,185
      ,5,0,190,147,  1218
FL 609 DATA 3,243,164,186,93,0,1
      84,0,61,205,  1139
CJ 610 DATA 33,115,25,190,93,0,1
      39,214,172,60,  1041
DO 611 DATA 0,117,251,198,68,255
      ,36,232,55,255,  1467
MK 612 DATA 186,62,4,232,49,255,
      205,32,139,216,  1380
BI 613 DATA 51,201,139,209,184,2
      ,66,205,33,80,  1170
GC 614 DATA 131,250,0,117,12,3,6
      ,145,3,114,  781
PD 615 DATA 6,59,6,6,0,114,9,88,
      186,102,  576
CJ 616 DATA 4,232,11,255,205,32,
      184,0,66,205,  1194
JP 617 DATA 33,89,139,62,145,3,1
      37,77,8,141,  834
FD 618 DATA 85,10,139,194,3,193,
      163,145,3,180,  1115
GH 619 DATA 63,205,33,180,62,205
      ,33,94,78,233,  1186
MD 620 DATA 89,255,190,237,2,139
      ,62,145,3,185,  1307
MD 621 DATA 5,0,1,14,145,3,243,1
      64,139,62,  776
GK 622 DATA 145,3,139,199,45,66,
      3,144,163,191,  1098
DN 623 DATA 1,190,242,2,185,11,0
      ,1,14,145,  791
IN 624 DATA 3,243,164,184,144,14
      4,191,0,1,171,  1245
NE 625 DATA 170,51,201,186,152,3
      ,180,60,205,33,  1241
HI 626 DATA 115,8,186,15,4,232,1
      63,254,205,32,  1214
DB 627 DATA 139,216,186,0,1,185,
      237,2,43,202,  1211
KF 628 DATA 180,64,205,33,59,193
      ,116,19,180,62,  1111
FA 629 DATA 205,33,186,152,3,180
      ,65,205,33,186,  1248
LF 630 DATA 50,4,232,126,254,205
      ,32,139,22,143,  1207
BL 631 DATA 3,139,14,145,3,43,20
      2,180,64,205,  998
BA 632 DATA 33,59,193,117,219,18
      0,62,205,33,186,  1287
IP 633 DATA 121,4,232,96,254,205
      ,32,0,0,0,  944
```

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Amiga System Fonts

Daniel L. Stockton

This short program illustrates how to select different system fonts and text styles under program control in Amiga BASIC.

Nearly every Amiga owner recognizes that there are two system text fonts. If you open the Preferences tool, you can switch between the 80-column font, actually called Topaz Eight Point, or the 60-column font, called Topaz Nine Point. The font which you select from Preferences is carried over when you activate Amiga BASIC. Many Amiga BASIC programs are written with the assumption that you have selected one font or the other—either Topaz Eight or Topaz Nine. If you run a program only to find that printing is not aligned correctly, the cause is usually that you're using the wrong font. The only remedy is to exit BASIC, open Preferences, select the other font, and run the program all over again.

In fact, there's no need to make users play "guess the font" when they run Amiga BASIC programs. With a relatively simple system call, you can select either of the system fonts under program control. And the same system call can be used to select special text styles, including boldface, italics, and underlining. The subprogram included with this article makes it all easy to do.

Opening The Library

To change fonts under program control, you must make a call to operating system routines. A group of system routines is known as a *library;* the particular library which we need is called *graphics.library.* The door to the library is opened with the BASIC statements LIBRARY and CALL.

Type in the program and save it. Before you run the program, you must make sure that a special system file is on your BASIC work disk. When BASIC executes the LIBRARY command in this program, the Amiga looks for a file named *graphics.bmap* which enables it to locate graphics.library routines. If graphics.bmap can't be found, the computer displays an error box.

The simplest way to make sure that graphics.bmap can be found is to copy it from the BasicDemos drawer (subdirectory) of your Extras disk to the LIBS subdirectory of your BASIC work disk. Enter these commands to perform the copy from the CLI:

```
COPY Extras:BasicDemos/graphics.bmap
  TO ram:
COPY ram:graphics.bmap TO work-
  bench: libs
DELETE ram:graphics.bmap
```

These commands assume that your BASIC work disk is named *workbench.* If it is not, substitute your disk name for *workbench* in the second AmigaDOS command. (If the disk name contains a space, you must enclose that portion of the command in quotes. For example, if your work disk is named *BASIC Programs,* then the command will be COPY ram:graphics.bmap TO BASIC Programs:libs.) When it encounters LIBRARY in a program, the computer automatically searches the LIBS subdirectory for the designated file.

Another way to insure access to the .bmap file is to use CHDIR before the LIBRARY statement. CHDIR can be used to specify a particular subdirectory as the current directory for DOS access. If you create a subdirectory devoted exclusively to .bmap files, then every program can perform a CHDIR to that directory before attempting a LIBRARY command. One advantage of the second method is that it avoids unnecessary duplication of .bmap files in a case where you keep BASIC programs in more than one subdirectory on a disk.

Styles

Once graphics.bmap is located in the correct place, load and run the program. It prints eight different text styles in each of the two system fonts. The variable *style%* controls which style is selected; here is an explanation of the different values assigned to that variable:

style%	Result
0	plain text
1	underlined
2	boldface
3	boldface, underlined
4	italics
5	italics, underlined
6	italics, boldface
7	italics, boldface, underlined

The subprogram named *FontChange* is designed to be merged with your own programs. Once you know that the demonstration works correctly, you can delete everything but the *FontChange* subprogram and save it in ASCII form (type SAVE "FontChange",A and press RETURN). You can then add it to another program with a MERGE command.

Amiga System Fonts

```
◄
REM The next three lines must be
in the main body of your program
◄
REM and occur before any calls t
o subroutine FontChange◄
◄
```

```
DECLARE FUNCTION AskSoftStyle& L
IBRARY
DECLARE FUNCTION OpenFont& LIBRA
RY
REM  Place optional CHDIR comman
d here to point to the
REM  graphics.bmap file director
y as next line example:
REM  CHDIR "ABC:D"
REM  which points to volume/disk
ABC directory D
LIBRARY "graphics.library"

REM  The format for a CALL to Fo
ntChange is:
REM       CALL FontChange ("topa
z.font",height%,style%)
REM       "topaz.font" is the na
me of the system font
REM       height% is a short int
eger variable to be selected
REM            as 8 or 9
REM       style% is a short inte
ger variable to be selected
REM            as 0 through 7

REM  The nine lines of Testit be
low are for testing only
REM  and should be replaced by y
our application(The main body
REM  of your program).

Testit:
CLS
FOR height%=8 TO 9
FOR style%=0 TO 7
CALL FontChange ("topaz.font",he
ight%,style%)
PRINT  "This is the topaz font o
f height ";height%;" style ";sty
le%
NEXT style%
NEXT height%
CALL FontChange ("topaz.font",8,
0)
REM The library should be closed
when no longer required

LIBRARY CLOSE
END

REM  The subroutine FontChange s
hould be placed at the bottom
REM  of your program after the E
ND statement

SUB FontChange(font$,height%,sty
le%) STATIC
SHARED pFont&
IF pFont&<>0 THEN CALL CloseFont
(pFont&)
fontA$=font$+CHR$(0)
textAttr&(0)=SADD(fontA$)
textAttr&(1)=height%*65536& + st
yle%*256
pFont&=OpenFont&(VARPTR(textAttr
&(0)))
IF pFont& <> 0 THEN SetFont WIND
OW(8),pFont&
permit%=AskSoftStyle&(WINDOW(8))

SetSoftStyle WINDOW(8),style%,pe
rmit%
END SUB


```

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Structured BASIC 64

Scott Kell

This unusual Commodore 64 utility should interest anyone who wants to learn about structured programming techniques. It introduces several new commands and programming features to Commodore 64 BASIC.

Recently, structured programming languages such as Pascal, Modula-2, Forth, and C have been growing in popularity. In the most general sense, a structured language is one which encourages you to break a program down into different parts, each of which performs a separate, identifiable function. Among other things, this technique simplifies the process of writing big, complicated programs because each module, or section of the program, can be tested separately. In addition, structured programs can be easier for others to read and understand.

BASIC, on the other hand, does little to encourage structured programming, a feature for which it has often been criticized. "Structured BASIC 64" is designed to help you make the transition from BASIC to the world of structured programming. It modifies Commodore 64 BASIC to support a more structured programming style. (It does not, however, reproduce all the features of any of the languages mentioned above. Obviously, if you wish to learn C or Pascal, you need a compiler and some good programming texts—not a modification of BASIC.)

Since Structured BASIC 64 is written in machine language, it has to be typed in with COMPUTE!'s "MLX" machine language entry program, found elsewhere in this issue. When you run MLX, you'll be asked for starting and ending addresses for the data you'll be entering. The addresses you need for Structured BASIC 64 are as follows:

Starting address: C000
Ending address: C44F

Load Structured BASIC 64 with the command, LOAD "*filename*",8,1 for disk or LOAD "*filename*",1,1 for tape. When the READY prompt reappears, type NEW and press RETURN. To activate Structured BASIC 64, type SYS 49152 and press RETURN. When using this program, take care not to POKE new values in locations 49152–50671, since that area is used by the program itself. It also uses the RAM hidden underneath the computer's BASIC ROM, so you also should avoid any activity that disturbs that memory. Because Structured BASIC 64 changes the

way that BASIC works, it may not work with other BASIC programming utilities.

Begin At The Beginning

Structured BASIC 64 adds several new or modified keywords to BASIC. Four of these are IF, THEN, ELSE, and ENDIF. IF and THEN are among the most popular, and most frequently abused, BASIC statements. These lines exemplify a common form of misuse:

```
10 INPUT A
20 IF A=0 THEN PRINT"A IS ZERO
   "
30 IF A<>0 THEN PRINT"A IS NOT
    ZERO"
```

These three lines check whether A is equal to zero, but the method is cumbersome and inefficient, since it requires two separate IF tests and two separate THEN statements. In Structured BASIC 64, the previous example can be replaced by the following lines:

```
10 INPUT A
20 IF A=0 THEN PRINT"A IS ZERO
   " : ELSE PRINT"A IS NOT ZER
   O"
30 : ENDIF
```

This version is much more compact. When the computer finds the IF statement, it checks whether the expression after IF is true. If the expression is true, the computer executes only the statements between THEN and ELSE. If the expression is false, it performs only the statements between ELSE and ENDIF. After BASIC finds ENDIF, the program continues normally.

With ELSE and ENDIF, the traditional IF clause becomes more flexible. The ELSE and THEN statements need not appear on the same line as IF:

```
5 INPUT A
10 IF A=0
20 : THEN PRINT"A IS ZERO"
30 : ELSE PRINT"A IS NOT ZERO"
40 : ENDIF
```

This code is easier to understand than the first example. Locating THEN and ELSE statements on separate lines can serve a practical purpose, as well. How many times have you run out of space on a line after an IF statement? For example, let's say that a long string of characters is to be printed when the variable A$ is equal to "STRUCTURED-PROGRAMMING". Here's how you might write the code in conventional Commodore 64 BASIC:

```
10 INPUT A$
20 IF A$="STRUCTURED PROGRAMMI
   NG" THEN 40
30 GOTO 50
40 PRINT"THIS IS THE SUPER LON
   G STRING OF CHARACTERS THAT
    WON'T FIT ON LINE 20"
50 STOP
```

This program's logic is needlessly complex, simply because the statement which should come after THEN is too long to fit into the remainder of line 20. Two extra GOTO statements are required: the implied GOTO after THEN on line 20 and the explicit GOTO in line 30. The more unnecessary GOTOs a program includes, the harder it is to read and debug. Here's how to do the same job with Structured BASIC 64:

```
10 INPUT A$
20 IF A$="STRUCTURED PROGRAMMI
   NG" THEN
30 PRINT"THIS IS THE SUPER LON
   G STRING OF CHARACTERS THAT
    WON'T FIT ON LINE 20"
40 ENDIF
50 STOP
```

Now the program's structure is simple and straightforward, without needless GOTO branches. In Structured BASIC 64, every IF clause *must* end with an ENDIF statement. However, ELSE is optional. Thus, you can use IF–THEN–ELSE–ENDIF or IF–THEN–ENDIF, but you may not use IF-THEN without a closing ENDIF.

Looping Around

Loops are an integral part of any kind of programming. In fact one of a computer's main strengths is the ability to do repetitive tasks quickly. Most structured languages support several different looping methods. Commodore 64 BASIC supports only one explicit loop structure: FOR-NEXT. (You can create loops with IF and GOTO, but GOTO is usually considered a branching command.) Unfortunately, FOR-NEXT loops are inconvenient for certain programming tasks. Consider the following code fragment:

```
10 PRINT"PRESS 'Q' IF YOU WANT
    TO QUIT THE PROGRAM."
20 GET A$
30 IF A$="" THEN GOTO 20
40 IF A$="Q" THEN STOP
50 PRINT"THE PROGRAM IS CONTIN
   UING"
60 REM PROGRAM CONTINUES
```

This program contains a loop in lines 20–30, but the loop is disguised in the form of an IF with a GOTO. What the programmer wants to do is loop *until a specified condition is satisfied* (in this case, until you press a key). Structured BASIC 64 borrows a technique from Pascal to solve such problems. This program accomplishes the same task:

```
10 PRINT"PRESS 'Q' IF YOU WANT
    TO QUIT THE PROGRAM."
20 : REPEAT
30 GET A$
40 : UNTIL A$<>""
50 IF A$="Q" THEN STOP : ENDIF
60 PRINT"THE PROGRAM IS CONTIN
   UING."
70 REM PROGRAM CONTINUES
```

In this version, the loop is found in lines 20–40. The REPEAT statement tells BASIC to perform all the statements it finds between REPEAT and UNTIL. The UNTIL statement marks the end of the loop and it also states the condition to be tested. If the expression after UNTIL is false, the computer repeats everything between REPEAT and UNTIL and tests the expression again. This process continues until the condition is satisfied, at which point the computer exits the loop and proceeds with the rest of the program.

The keywords REPEAT and UNTIL make it clear what is happening. The effect is to enhance the program's readability while eliminating the mishmash of IF and GOTO statements.

It's important to note that the statements inside a REPEAT–UNTIL loop are always performed at least once. This occurs because the computer doesn't check the condition until it reaches UNTIL at the end of the loop. In some programming situations, you might want the computer to check the condition *before* it performs the statements contained in the loop. The WHILE-WEND loop is designed for exactly such cases:

```
10 : WHILE A$=""
20 GET A$
30 : WEND
40 PRINT"THE KEY '";A$;"' HAS
   JUST BEEN PRESSED"
```

This program does the same thing as the previous example; as long as you have not pressed a key, it scans the keyboard over and over. However, the logic is different. When it encounters the WHILE statement, the computer immediately tests the condition that appears after WHILE. If that expression is true, the computer executes all the statements found between the WHILE condition and the WEND which closes the loop. If the expression is false, the computer falls through all of the intervening statements and executes the next statement after WEND.

In this case, both examples do the same ultimate task. But if the condition after WHILE had been false, the computer would have skipped immediately past WEND, without performing anything in the loop.

REPEAT–UNTIL and WHILE-WEND loops can both be nested—that is, either kind of loop can exist inside another loop. Just remember that each REPEAT needs an UNTIL, and each WHILE needs a WEND. If there are too many UNTILs or too many WENDs, Structured BASIC 64 prints the error message *WEND, UNTIL, OR CASE ERROR IN XXXXX*, replacing *XXXXX* with the line number in which the error occurred.

CASE For Complex Decisions

Have you ever written a menu-driven program that uses a bunch of IF clauses like this?

```
10 PRINT"WHICH CHOICE DO YOU W
   ANT";:INPUT A$
20 IF A$="A" THEN GOSUB 100:GO
   TO 10
30 IF A$="B" THEN GOSUB 200:GO
   TO 10
40 IF A$="C" THEN GOSUB 300:GO
   TO 10
50 IF A$="D" THEN GOSUB 400:GO
   TO 10
60 IF A$="E" THEN GOSUB 500:GO
   TO 10
70 PRINT"I DON'T UNDERSTAND YO
   UR CHOICE"
80 GOTO 10
```

This program waits for you to make a menu choice by pressing a letter from *A* to *E*. If you pick *A*, the program branches to a subroutine at line 100. If you choose *E*, it goes to a routine at line 500. After the subroutine is complete, the program asks for your next choice. If you choose something that's not offered, it tells you to make another choice.

The long series of IF statements, each paired with identical GOTO statements, is not an efficient solution. BASIC does provide ON-GOTO and ON-GOSUB for such situations, but those statements have limitations, too. Here's how you can handle the same problem in Structured BASIC 64, which adds a CASE statement similar to that of the C language:

```
10 PRINT"WHICH CHOICE DO YOU WA
   NT";:INPUT A$
20 : CASES OF A$
30 : CASE "A":GOSUB 100:ENDCASE
40 : CASE "B":GOSUB 200:ENDCASE
50 : CASE "C":GOSUB 300:ENDCASE
60 : CASE "D":GOSUB 400:ENDCASE
70 : CASE "E":GOSUB 500:ENDCASE
80 : OTHERWWISE
90 : PRINT"I DON'T UNDERSTAND Y
   OUR CHOICE"
95 ENDCASES
99 GOTO 10
```

Here are five new statements: CASES OF, CASE, ENDCASE, OTHERWISE, and ENDCASES. We'll look at each of them in turn.

This sort of structure is well-suited for a situation where you want to perform several different tasks based on a single condition. In this circumstance, you want to branch to different subroutines, depending on what value A$ has been given.

The entire decision-making structure is enclosed by CASES OF and ENDCASES. The CASES OF statement indicates which condition to test—in this example, the value of A$. The ENDCASES statement marks the end of the structure.

Each CASE statement is followed by an expression. When it encounters each CASE, the computer tests the expression to see whether it matches the condition stated in CASES OF. If the expression is false, the computer passes on to the next CASE. If it is true, the computer executes all the statements found between that CASE and the next ENDCASE statement. Thus, each CASE must be matched by its own ENDCASE.

The OTHERWISE statement allows you to take some action in the event that none of the CASE statements are true. This statement is optional; if it is absent, the computer simply falls though to ENDCASES. (If you include OTHERWISE, be sure to put it at the very end of the CASES OF–ENDCASES structure, as shown in this example.)

Every CASES OF structure must begin with CASES OF, end with ENDCASES, and include at least one CASE–ENDCASE pair. Incidentally, a CASE statement can be followed by a list of variables or constants, separated by commas; if any of the expressions match the CASES OF condition, the statements after CASE are performed. This example demonstrates the use of multiple expressions with CASE, as well as the nesting of CASES OF structures.

```
10 INPUT"WHAT DO YOU WANT N TO
    BE";N
15 : CASES OF N
20 : CASE 1,2:PRINT"N IS EITHE
   R ONE OR TWO"
25 : INPUT"WHAT DO YOU WANT X
   TO BE";X
30 : CASES OF X
35 : CASE 1:PRINT "X=1":ENDCAS
   E
40 : CASE 2:PRINT "X=2":ENDCAS
   E
45 : ENDCASES
50 : ENDCASE
55 : CASE 2,3:PRINT"N IS EITHE
   R TWO OR THREE":ENDCASE
60 : OTHERWISE:PRINT"I DON'T K
   NOW WHAT N IS"
65 ENDCASES
```

This example adds another feature beloved by many structured programmers: meaningful indentation. Notice how the indentation of lines make the overall structure more clear. If you wish to indent lines for readability, you must put a colon at the beginning of the line. (BASIC ignores any spaces between the line number and the first alphanumeric character.)

Labeled Subroutines

Another drawback of Commodore 64 BASIC is that the target of a GOSUB statement must always be a line number. Say that you are reading a program and encounter the statement GOSUB 6100. The only way to discover what that subroutine does is to find line 6100 and examine the code. Once you get sidetracked, you can easily lose your place in the main program or

forget what was happening prior to the GOSUB.

Wouldn't it be nice if BASIC let you call a subroutine by name instead of a number? Languages like C and Pascal (as well as some versions of BASIC) let you refer to subroutines with meaningful labels. Here is an example of a labeled subroutine in Structured BASIC 64:

```
1000 "PRINT 'HI' ON THE SCREEN
   " : PRINT"HI" : RETURN
```

You can call this routine in the old way, with GOSUB 1000, or you can do it the new way, with GOSUB "PRINT 'HI' ON THE SCREEN". As this example shows, a meaningful label can make the purpose of a subroutine immediately apparent.

The label must be enclosed in quotation marks and it must be the first thing in the line. A colon must follow the label to separate it from other statements on the line.

You can GOTO a labeled line, as well. However, you cannot use labels with ON-GOTO or ON-GOSUB. That's not a problem with Structured BASIC 64, since you can always replace ON-GOSUB with the more powerful CASES OF structure.

Subroutines are an important part of structured programming, since they help break a big, complicated job into smaller, more manageable jobs. They are also very useful in debugging. If you separate each part of the program into discrete, testable modules, it's much easier to pinpoint problems.

Abbreviations

Structured BASIC 64 adds or modifies 15 BASIC commands. Most of them have abbreviations, just like the normal BASIC commands.

Command	Abbreviation
REPEAT	R-SHIFT-E
UNTIL	U-SHIFT-N
WHILE	W-SHIFT-H
WEND	W-SHIFT-E
CASES OF	C–SHIFT–A–SPACE–OF
CASE	no abbreviation
ENDCASE	no abbreviation
OTHERWISE	O-SHIFT-T
ENDCASES	END-SHIFT-C
IF	no abbreviation
THEN	T-SHIFT-H
ELSE	E-SHIFT-L
ENDIF	END-SHIFT-I
GOTO	G-SHIFT-O
GOSUB	GO-SHIFT-S

Now it's your turn to experiment with Structured BASIC 64. By experimenting with this version of Commodore BASIC, you'll be exposed to some of the ideas behind the new wave of microcomputer programming languages. This exposure, in turn, may help you decide if you want to make the leap to another one of the high-level languages. Once you become comfortable with using these new tools, you'll find it easier to learn the rules of those languages, as well.

Structured BASIC 64

Please refer to the "MLX" article in this issue before entering the following program.

```
C000:A9 37 85 01 A2 00 A0 A0 DB
C008:8C 18 C0 8E 17 C0 8C 1B C6
C010:C0 8E 1A C0 A0 20 AD FF C5
C018:FF 8D FF FF EE 17 C0 D0 23
C020:03 EE 18 C0 EE 1A C0 D0 20
C028:03 EE 1B C0 CA D0 E7 88 48
C030:D0 E4 A2 03 BD CF C3 9D 2A
C038:06 03 CA 10 F7 A2 02 BD E3
C040:18 C4 9D FF A5 BD 1B C4 D1
C048:9D B3 A5 CA 10 F1 A9 36 B8
C050:85 01 A9 A0 8D 20 A0 A9 EB
C058:C0 8D 21 A0 A9 D7 8D 00 93
C060:03 A9 C0 8D 01 03 A9 01 27
C068:8D 1B A8 A9 C2 8D 1C A8 54
C070:A9 00 8D 1E A0 A9 C2 8D 19
C078:1F A0 A9 DF 8D 26 A0 A9 D4
C080:C1 8D 27 A0 60 08 C9 CC B8
C088:90 10 C9 D9 B0 0F 24 0F 46
C090:30 0B 20 46 C2 38 E9 4C 6C
C098:D0 03 20 62 C2 28 4C 1A D6
C0A0:A7 08 20 F6 C2 28 4C 71 2C
C0A8:A8 20 AF C0 4C AE A7 20 15
C0B0:73 00 C9 CC 90 15 C9 D9 38
C0B8:B0 11 38 D8 E9 CC 0A AA AC
C0C0:BD 1F C4 48 BD 1E C4 48 3E
C0C8:4C 73 00 C9 22 F0 15 68 51
C0D0:68 20 79 00 4C E7 A7 08 17
C0D8:48 8A 30 03 20 F6 C2 68 22
C0E0:28 4C 8B E3 4C 67 C3 20 E0
C0E8:FE C2 F0 03 4C DB C2 4C 8C
C0F0:C1 C2 20 9C C2 20 FE C2 29
C0F8:F0 01 60 20 DB C2 A9 D0 4F
C100:8D 11 C3 8D 15 C3 A2 CE AB
C108:8E 19 C3 20 04 C3 A2 D1 D9
C110:8E 19 C3 A2 D3 8E 11 C3 82
C118:E8 8E 15 C3 60 20 C1 C2 5C
C120:4C F5 C0 20 FE C2 D0 0E 14
C128:20 04 C3 C9 00 F0 CB C9 F6
C130:3A B0 0A 4C 01 C2 20 79 CF
C138:00 C9 00 F0 BD 4C B2 C0 82
C140:20 04 C3 4C B2 C0 A0 00 EB
C148:8C EF C5 20 73 00 C9 46 3E
C150:F0 03 4C 08 AF 20 73 00 FB
C158:20 9C C2 4C FE C2 20 9C 10
C160:C2 20 DB C2 20 C1 C2 20 A2
C168:67 C3 E8 E8 E8 E8 8E ED 32
C170:C5 84 93 20 C1 C2 20 DB A1
C178:C2 A9 FF 20 84 C3 D0 54 F2
C180:2C EE C5 30 46 A2 00 20 6E
C188:73 00 C9 00 F0 21 C9 CF 6E
C190:D0 01 E8 C9 D6 D0 0B E0 67
C198:00 D0 06 20 73 00 4C DB 23
C1A0:C2 CA C9 D5 D0 0F 8A D0 77
C1A8:DE 20 73 00 4C 5E C1 20 91
C1B0:C6 C3 4C 87 C1 C9 D7 D0 40
C1B8:CE 8A D0 CB 20 73 00 2C 18
C1C0:EF C5 30 C1 60 A9 FF 8D 07
C1C8:EF C5 60 20 73 00 20 9C 3C
C1D0:C2 4C 73 C1 2C EE C5 10 0C
C1D8:F1 A9 00 85 66 4C 3B C3 B6
C1E0:C9 22 F0 03 4C 83 A8 A9 8B
C1E8:03 20 FB A3 A5 7B 48 A5 01
C1F0:7A 48 A5 3A 48 A5 39 48 AF
C1F8:A9 8D 48 20 09 C2 4C AE 5A
C200:A7 C9 22 F0 04 18 4C A0 D8
C208:A8 A5 39 85 3B A5 3A 85 35
C210:3C 20 67 C3 84 93 20 8E 26
C218:A6 20 A8 C3 B0 15 20 73 D7
C220:00 C9 22 F0 19 A5 9E 85 8D
C228:7A A5 9F 85 7B 20 7B C3 B7
C230:4C 19 C2 A5 3B 85 39 A5 DC
C238:3C 85 3A 4C E3 A8 A9 00 5E
C240:20 84 C3 F0 E0 60 18 48 7F
C248:8A 48 A2 45 BD 9E A0 B0 28
C250:03 BD D3 C3 9D 9E A0 CA F0
C258:10 F2 A9 36 85 01 68 AA E6
C260:68 60 48 A9 37 85 01 38 DF
C268:B0 DE B9 9E A0 D0 10 AD 35
C270:9E A0 C9 45 F0 0A 20 62 4D
C278:C2 A0 00 84 0B A9 FF 60 2F
C280:20 46 C2 A0 44 B9 9E A0 F0
C288:60 08 48 98 48 20 46 C2 E4
C290:A0 4C 84 0B 68 A8 68 28 99
C298:86 7A CA 60 AE ED C5 A5 BD
C2A0:7A 20 B7 C2 A5 7B 20 B7 A1
C2A8:C2 A5 39 20 B7 C2 A5 3A 70
C2B0:20 B7 C2 8E ED C5 60 9D 5A
C2B8:ED C4 E8 F0 01 60 4C 35 E9
C2C0:A4 AE ED C5 F0 22 BD EC D6
C2C8:C4 85 3A BD EB C4 85 39 EB
C2D0:BD EA C4 85 7B BD E9 C4 4C
C2D8:85 7A 60 AE ED C5 F0 08 27
C2E0:CA CA CA CA 8E ED C5 60 9C
C2E8:20 F6 C2 A9 38 85 22 A9 F4
C2F0:C4 85 23 4C 47 A4 48 A9 6A
C2F8:00 8D ED C5 68 60 20 9E 9F
C300:AD A5 61 60 A2 00 20 7B CA
C308:C3 20 73 00 C9 00 F0 22 3A
C310:C9 D3 F0 0B C9 D4 F0 07 CA
C318:C9 D1 D0 ED E8 D0 EA E0 33
C320:00 F0 0C C9 D3 F0 E2 E0 0B
C328:00 F0 0D CA 4C 09 C3 4C 94
C330:73 00 20 C6 C3 4C 09 C3 07
C338:4C 08 AF A9 00 8D EE C5 52
C340:20 79 00 4C 49 C3 20 73 08
C348:00 C9 00 F0 0F C9 3A F0 56
C350:0B C9 2C F0 08 99 4D C4 6A
C358:C8 4C 46 C3 60 24 66 10 CC
C360:F4 A9 FF 8D EE C5 60 A0 95
C368:00 84 66 20 3B C3 A9 29 45
C370:99 4D C4 A9 B2 C8 99 4D 84
C378:C4 C8 60 A5 7A D0 02 C6 DC
C380:7B C6 7A 60 85 66 A4 93 6F
C388:20 3B C3 A9 00 99 4D C4 C7
C390:C8 20 9C C2 A9 C4 85 7B 2B
C398:A9 4C 85 7A 20 FE C2 08 EA
C3A0:20 C1 C2 20 DB C2 28 60 9D
C3A8:A0 01 B1 7A 85 9E C8 B1 88
C3B0:7A 85 9F F0 0F A9 60 8D 47
C3B8:E1 A7 20 C6 A7 A9 6C 8D D5
C3C0:E1 A7 18 60 38 60 20 A8 58
C3C8:C3 90 FA 18 4C 4B A8 85 9D
C3D0:C0 A9 C0 52 45 50 45 41 97
C3D8:D4 55 4E 54 49 CC 57 48 A3
C3E0:49 4C C5 43 41 53 45 D3 C2
C3E8:57 45 4E C4 49 C6 54 48 D9
C3F0:45 CE 45 4C 53 C5 45 4E C6
C3F8:44 49 C6 43 41 53 C5 45 2A
C400:4E 44 43 41 53 45 D3 4F E4
C408:54 48 45 52 57 49 53 C5 E7
C410:45 4E 44 43 41 53 C5 00 6F
C418:20 6A C2 20 89 C2 9B C2 F7
C420:E6 C0 F1 C0 45 C1 1C C1 C2
C428:22 C1 2A C1 3F C1 F9 C0 4A
C430:5D C1 9D C1 BE C1 C4 C1 F0
C438:57 45 4E 44 2C 20 55 4E A7
C440:54 49 4C 2C 20 4F 52 20 95
C448:43 41 53 C5 28 00 00 00 CB
```

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Merge 128

Jeffrey D. Partch

This Commodore 128 utility allows you to merge two programs into a single file—and resolves any line-number conflicts in a unique way.

If you've been writing BASIC programs for a while, it's quite possible that you've found yourself reusing certain subroutines time and time again. It's also quite possible that you've found yourself retyping those subroutines time and time again. "Merge 128" eliminates all of that retyping by allowing you to combine two BASIC programs into one. It's flexible enough to meet the needs of almost any programmer, and it handles the problem of line-number conflicts in a unique way.

Typing It In

Merge 128 is written entirely in machine language, so you'll need to type it in with the 128 version of COMPUTE!'s "MLX" machine language entry program, found elsewhere in this issue. When you first run MLX, it will ask you for the starting and ending addresses of the data you wish to enter. Here are the addresses for Merge 128:

Starting address: 17E2
Ending address: 1BF9

Remember to save a copy of Merge 128 before you exit MLX. To load Merge 128, use the BASIC 7.0 command BOOT. Assuming that you have saved your copy with the name MERGE 128, here is the syntax to use (the *drive* and *device* parameters are needed only if you have a dual drive or a disk drive with a device number other than 8):

BOOT"MERGE 128", D*drive*, U*device*

When the READY prompt returns, you can activate Merge 128 by pressing the F1 function key. Two files are needed for a merge operation: The first should be loaded into memory before you perform the merge. The second must be located on a disk. Merge 128 will read the second file from disk, merging it with the program in memory. When the process is complete, you can save the merged program as usual.

When you press F1, Merge 128 prints the first part of the merge command on the screen. Here is the full syntax for the command:

MERGE *"filename"*, D*drive*, U*device*, L*line*

Everything up to and including the first quotation mark is printed for you in advance. Everything following the second quotation mark is an optional parameter that may be ignored unless you require it. If you don't use any of the options, the second quotation mark may be ignored, too. To enter the command, press RETURN: Merging will begin. If you change your mind and decide not to perform the command, press SHIFT–RETURN.

The *filename* parameter is, of course, the name of the file that you want to merge. It will be merged with the program currently in memory. The filename must be a legal Commodore name, no longer than 16 characters.

The *drive* parameter is needed only if you own a dual disk drive. This option accepts only the values of 0 and 1 (enter D0 or D1). Since the Commodore 1541 and 1571 drives are always drive number 0, this parameter defaults to 0.

The *device* parameter accepts any value in the range of 8–30. This option is useful if you have more than one single drive. For instance, U9 lets you access a drive that is device 9. The default for this option is 8.

The *line* parameter is explained in the next section. If you wish to change any of the default values for optional parameters, see "Changing the Defaults" at the end of this article. It's important that you enter optional parameters in the order indicated. Each option must include a comma and letter code (D, U, or L) and a legal accompanying value. If you don't need an option, omit both the comma and the letter code.

The Effects Of Merging

Because BASIC expects each program line number to have a unique value, line numbers are of foremost concern in merging. If the programs have two lines with the same number, a merge operation must decide what to do with the duplicate line. Some merge utilities ignore line-number conflicts or delete lines with duplicate numbers. Both of those strategies have disadvantages, since you may garble the program or lose lines unexpectedly. Merge 128 handles line-number conflicts by renumbering the entire appended file with a line-number increment of 1.

Before it merges anything, Merge 128 determines the value of the last line in the current program (the program in memory). It adds this value to the default increment, and the result is used as the first line number for lines from the merged file. (If there isn't any program in memory, this value is set to 0.)

Merge 128 calls the RENUMBER routine of BASIC 7.0 to renumber the merged file. This renumbering differs in one respect from a RENUMBER in direct mode: It changes only those internal references that can be equated to lines within the merged file. If the merged file contains an unresolved reference (for instance, a GOTO command directed to a line not contained in the file) the offending reference is highlighted in reverse and a bell will sound when you list the program.

Renumbering can take a while for large files. To indicate that the program is working, Merge 128 prints periods on the screen while renumbering is in progress.

Line Option

The *line* parameter in the MERGE command lets you specify the initial line number of the merge file. Supply any legal line number after the L letter code. For instance, L1000 begins numbering at line 1000. If the supplied value is larger than the last line number in the current program, renumbering begins with the number you supply.

If you supply a line number that's *smaller* than the last line in the current program, Merge 128 merges the new file in *insert mode*. This mode lets you insert the lines from a merged file somewhere in the middle of the existing program. Insertion begins at the numerically correct position and continues until the entire merge file has been processed. The remainder of the original program is then renumbered as if it were part of the merged file. If the renumbered portion of the program references a line number that now precedes the merged file, an error is flagged when you list the program; this is a harmless error, which you can ignore. If the first block originally referenced a line contained in the renumbered portion, then it will probably be corrupted—but no error is recognized by the RENUMBER routine. Thus, you should use care when inserting text. Insertion is a powerful, but potentially confusing, operation.

Errors And Error Traps

To determine whether errors occurred, you should always list the entire program after merging. Any line that contains an error will show up with a reverse-video error flag. This flag must be removed before the program can run. You can remove the flag by editing the line in any way: Correct the reference or simply press RETURN over the line. (If any line contains more than 160 characters—an unusual situation—the 128's function keys and SHIFT-RETURN become inactive; press RUN/STOP-RESTORE to reset the keyboard.)

Two error conditions will cause Merge 128 to abort operation: a merge operation that creates a file too big to fit in memory, or a renumber operation that creates an illegal line number or line reference. In either case, Merge 128 prints an error message and returns you to direct mode without harming the current program.

Changing The Defaults

It's easy to alter Merge 128 for different default values. To do this, install Merge 128 as usual. You can now change the default device number, drive number, or line increment value by POKEing new values into the following locations:

	Location	Contents
Device number	**$18C5 (6341)**	**numeric value**
Drive number	**$1880 (6272)**	**character code**
Increment	**$1A38 (6712)**	**numeric value**

Use this command to save the modified version of the utility:

BSAVE"*filename*", D*drive#*, U*device#*, P(6144) TO P(7147)

Merge 128

Please refer to the "MLX" article in this issue before entering the following program.

```
17E2:A9 80 20 70 1B A6 FE 10 92
17EA:03 4C 03 40 4C 3F 4D 12 1E
17F2:00 07 1B 58 53 59 53 36 A8
17FA:31 34 32 0D 8D 01 FF AD 04
1802:02 1C A8 F0 25 A0 01 B1 BD
180A:2D F0 14 A0 03 B1 2D 99 6C
1812:FA 00 88 10 F8 A5 FA 85 AB
181A:2D A5 FB 85 2E D0 E6 A4 49
1822:FD A5 FC 18 6D 38 1A 90 EC
182A:01 C8 85 16 84 17 A9 80 73
1832:20 70 1B 20 7D FF 91 1B 1E
183A:51 1B 58 4D 45 52 47 45 01
1842:22 00 A9 00 85 FA 78 A9 6B
184A:1B 8D 3D 03 A9 B4 8D 3C BA
1852:03 58 20 93 4F 78 A9 C6 CD
185A:8D 3D 03 A9 AD 8D 3C 03 BA
1862:AD 15 03 8D 50 1A AD 14 42
186A:03 8D 55 1A 58 86 3D 84 A7
1872:3E A5 FA F0 03 4C E2 17 BF
187A:A9 3A 8D 01 11 A9 30 8D EC
1882:00 11 20 80 03 B1 3D 99 F5
188A:02 11 F0 10 C9 2C F0 0C 0C
1892:C9 22 F0 08 C8 C0 11 90 CA
189A:EC 4C E8 1A 48 98 D0 03 5C
18A2:4C F1 1A 18 65 3D 85 3D A2
18AA:C8 84 FA A9 2C 99 00 E2
18B2:11 A9 50 99 01 11 68 C9 60
18BA:22 D0 03 20 8F 1A A5 FC BF
18C2:D0 04 A9 08 85 FC 8D 1C 69
18CA:01 C9 08 90 04 C9 1F 90 0E
18D2:03 4C EB 1A A9 00 8D 00 1F
18DA:FF AA 20 68 FF A5 FA A0 6D
18E2:11 20 BD FF 20 0F F5 A9 2E
18EA:00 85 7A 85 9D E6 B7 E6 03
18F2:B7 A6 98 E0 0A 90 03 4C AE
18FA:F7 1A A0 02 98 20 59 FF D9
1902:B0 04 A8 C8 D0 F6 A8 A6 89
190A:FC 85 05 20 BA FF 20 C0 95
1912:FF 90 03 4C F4 1A A6 05 EF
191A:20 C6 FF 20 CF FF AA A9 8D
1922:02 24 90 F0 03 4C EE 1A C0
192A:CA F0 03 4C DF 1A 20 CF 9A
1932:FF 20 7D FF 0D 4D 45 52 96
193A:47 49 4E 47 00 A5 16 8D F0
1942:70 11 A5 17 8D 71 11 20 8B
194A:64 50 A5 61 85 18 A5 62 C7
1952:85 19 A9 61 8D B9 02 A2 D2
195A:01 A0 00 8D 01 FF B1 61 DA
1962:8D 03 FF 20 77 FF A4 61 84
196A:A6 62 C8 D0 01 E8 86 62 C9
1972:84 61 C4 AE D0 E1 E4 AF 4A
197A:D0 DD A4 19 84 2E 84 AF 48
1982:A5 18 85 2D 85 AE A0 00 39
198A:8C 00 FF 20 CF FF 24 90 5C
1992:70 1D 8D 01 FF 91 AE A5 4F
199A:41 D0 09 C6 42 D0 05 85 14
19A2:FE 38 B0 0C C6 41 E6 AE F0
19AA:D0 02 E6 AF 4C 88 19 18 6C
19B2:08 A4 AF A6 AE D0 01 88 B5
19BA:CA 28 90 04 A6 18 A4 19 A6
19C2:20 C1 1B 20 01 1B 24 FE 96
19CA:30 1D 20 7D FF 0D 3F 46 31
19D2:49 4C 45 20 54 4F 4F 20 06
19DA:4C 41 52 47 45 20 45 52 C9
19E2:52 4F 52 00 4C E2 17 A6 1F
19EA:AE A4 AF 20 7D FF 1B 4A 02
19F2:4E 55 4D 42 45 52 49 4E C3
19FA:47 20 00 AD 00 03 85 80 4B
1A02:AD 01 03 85 81 78 A9 1A 61
1A0A:8D 15 03 A9 62 8D 14 03 B9
1A12:58 8D 03 FF 8E 10 12 8C 9B
1A1A:11 12 86 AE 84 AF 86 FA 02
1A22:84 FB A9 1B 8D 01 03 A9 9E
1A2A:09 8D 00 03 A0 00 8C 73 08
1A32:11 84 5C 84 5D A9 01 8D 05
1A3A:72 11 20 87 AF A0 00 4C B4
1A42:68 5B A5 81 8D 01 03 A5 6A
1A4A:80 8D 00 03 78 A9 FA 8D 40
1A52:15 03 A9 65 8D 14 03 58 78
1A5A:20 87 AF A5 FE 4C E4 17 DA
1A62:A5 82 D0 05 A9 2E 20 D2 8D
1A6A:FF E6 82 4C 65 FA A2 00 C9
1A72:20 80 03 20 22 8D A6 63 31
1A7A:F0 0B E0 90 F0 07 46 64 A3
1A82:66 65 E8 D0 F5 20 86 03 AD
1A8A:A6 64 A4 65 60 A2 00 20 C3
1A92:80 03 F0 48 C9 2C D0 48 53
1A9A:20 80 03 C9 44 F0 15 C9 D5
1AA2:4C F0 2E C9 55 D0 39 A6 A2
1AAA:FC 20 C6 1A 84 FC 48 68 F0
1AB2:F0 2A D0 E0 20 C6 1A C0 23
1ABA:32 B0 28 48 98 69 30 8D 16
1AC2:00 11 90 EB E0 00 D0 18 CC
1ACA:20 70 1A E0 00 D0 14 E8 D0
1AD2:60 20 70 1A C9 00 D0 08 E6
1ADA:86 17 84 16 60 A9 16 2C 0C
1AE2:A9 0B 2C A9 0E 2C A9 17 5A
1AEA:2C A9 09 2C A9 04 2C A9 E2
1AF2:08 2C A9 05 2C A9 01 48 0E
1AFA:20 01 1B 68 4C E4 17 20 AD
1B02:CC FF A5 05 4C C3 FF 8A 9F
1B0A:30 17 C9 27 F0 16 85 FE B3
1B12:A4 2E A6 2D 84 19 86 18 7B
1B1A:20 C1 1B 8E 11 12 8C 10 17
1B22:12 4C 44 1A A2 F9 9A 8D 5E
1B2A:01 FF AE 01 12 86 FD AE 1C
1B32:00 12 86 FC A0 00 B1 FC F2
1B3A:8D F2 17 A0 00 B1 FA A0 3E
1B42:02 91 FA A6 FA D0 02 C6 8D
1B4A:FB CA 86 FA E4 FC D0 EB 5A
1B52:A6 FB E4 FD D0 E5 A0 02 B8
1B5A:B9 F1 17 91 FA 88 10 F8 F8
1B62:A4 AF A5 AE 18 69 02 90 71
1B6A:01 C8 AA 4C 13 1A 85 FE 78
1B72:24 76 30 03 A9 1C 2C A9 4E
1B7A:40 85 2E A9 01 85 2D AD B8
1B82:10 12 85 AE AD 11 12 85 3C
1B8A:AF 38 AD 07 0A E5 AE 85 97
1B92:41 AD 08 0A E5 AF 85 42 B1
1B9A:A2 00 8E 00 FF 86 FC A9 B1
1BA2:F4 85 80 A9 17 85 81 86 B7
1BAA:82 A2 01 A9 80 A0 0A 4C 6C
1BB2:65 FF 08 C9 8D D0 04 85 76
1BBA:FA A9 0D 28 4C B7 C6 86 52
1BC2:AE 84 AF 8D 03 FF A0 00 99
1BCA:A9 18 A2 01 20 74 FF 8D A0
1BD2:01 FF 91 AE E6 AE D0 02 3C
1BDA:E6 AF A4 18 C8 D0 02 E6 FA
1BE2:19 84 18 C4 61 D0 DC A6 C4
1BEA:19 E4 62 D0 D6 A9 00 8D 2B
1BF2:00 FF 60 00 00 00 00 00 35
```

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Apple's Built-In Music Program

Mike Miyake

Put music into your Applesoft programs the easy way: Apple's own built-in music subroutine features 50 preset pitches, a choice of five timbres (tone colors), and a wide range of note durations—and you can use it from DOS 3.3 or ProDOS.

Unlike some other popular computers, the Apple II series has no built-in firmware for generating musical tones. If you want music in your programs, you must write or otherwise supply your own machine language music subroutine. Unless, that is, you know how to use Apple's own music subroutine. All you need is your DOS 3.3 System Master disk. Insert the master disk in drive 1 and boot the system. Type FP, then enter this program:

```
70 FOR I = 768 TO 777: READ X
   : POKE I,X: NEXT : REM INS
   TALL MUSIC SWITCH
80 DATA 173,128,192,32,23,215
   ,173,129,192,96
90 POKE 765,2: REM SET TIMBRE
100 FOR I = 1 TO 5: GOSUB 140
    : NEXT
110 POKE 765,32: REM CHANGE T
    IMBRE
120 FOR I = 1 TO 9: GOSUB 140
    : NEXT
130 END
140 READ DUR: POKE 766,DUR: R
    EM DURATION
150 READ PITCH: POKE 767,PITC
    H: REM PITCH
160 CALL 768: REM CALL MUSIC
    SWITCH
170 RETURN
180 DATA 96,27,96,29,96,25,96
    ,13,240,20
190 DATA 24,5,24,6,48,8,48,5,
    52,6,52,3,52,5,52,1,130,3
200 REM DUELING PLANETS
210 REM
220 REM DURATION AND PITCH
230 REM ALTERNATE IN DATA
```

Save the program, then run it and sit back to listen. Where did all this music come from? And why did you have to use DOS 3.3? The music subroutine is written by Gary Shannon and is part of Programmer's Aid #1, which makes up part of the INTBASIC file. Since ProDOS doesn't support Integer BASIC, you've got to have DOS 3.3.

Lines 70–80 in the example program install a short routine that calls the music subroutine in Integer BASIC—let's call the music routine MUSIC SWITCH—and returns to Applesoft BASIC without wiping out your Applesoft program. For those interested in assembly language, the example program's ML routine consists of only four instructions:

```
LDA  $C080   ;make Integer BASIC visible
JSR  $D717   ;call the MUSIC subroutine
LDA  $C081   ;make Applesoft BASIC
             visible
RTS          ;return to Applesoft
```

How To Use The Music Subroutine

Here's the procedure for using the music subroutine from Applesoft BASIC.

1. From Applesoft, install MUSIC SWITCH at any location except locations 765–767.

2. POKE values for timbre, duration, and pitch into the following locations:

Value	Location
timbre	765
duration	766
pitch	767

For instance, if T represents the timbre value, the statement POKE 765, T sets the timbre for the music routine. The pitches are numbered from lowest to highest in the range 1–50. These values form a chromatic scale of some four octaves with pitch 20 being approximately middle C. The figure accompanying this article contains more information about pitch.

Durations are numbered from shortest to longest in the range 1–255. Metronome settings may be approximated as *MM* = INT(10200/*MM*) and should be no slower than 40 beats per minute (*MM* = 40). (In this example, *MM* stands for *Maelzel's metronome*.)

Timbres are numbered 2, 8, 16, 32, and 64. They do not sound greatly different. Some of the lowest and highest pitches will not sound true in combination with some timbres. However, timbre 32 may be used with any pitch.

3. Once you've set the pitch, duration, and timbre, call MUSIC SWITCH. Note that you need not POKE all three values (timbre, duration, and pitch) before each CALL to MUSIC SWITCH unless you wish to change all the values.

Easy Installation

Since the music subroutine is part of Integer BASIC, does this mean you must load the entire huge INTBASIC file just to use it? And, since ProDOS doesn't support Integer BASIC, does that mean you can't use the music subroutine under ProDOS? Fortunately, both questions can be answered with no. Under DOS 3.3, you can save and load the music subroutine as a two-sector file.

To save the music routine as a separate file, insert a disk in the drive and enter these lines, pressing RETURN at the end of each line:

```
INT
BSAVE MUSIC,A$D717,L$E5
```

The first statement activates Integer BASIC and the second BSAVEs the music routine to disk. To load the music routine, your program must contain the following statements:

```
20 A = PEEK ( - 16255) + PEEK
    ( - 16255): REM ENABLE LO
   AD INTO HIGH RAM
30 PRINT CHR$ (4)"BLOAD MUSIC
40 A = PEEK ( - 16254): REM N
   OW WRITE-PROTECT MUSIC
```

ProDOS Music

To use the music routine under ProDOS, you must first relocate it to run at a different location. The resulting program can also run under DOS 3.3. Here's how to relocate the music routine with the code relocation program from Programmer's Aid #1. Enter these two commands to activate Integer BASIC and enter the Apple II's built-in machine language monitor (again, don't forget to press RETURN at the end of each of these lines).

```
INT
CALL -151
```

From the monitor, enter this command to set up the code relocation program:

```
*D4D5G
```

Enter this command to define the block to be relocated. In this statement, the characters {**CTRL-Y**} indicate that you should hold down the CTRL key and press the Y key. Do not type the curly brace characters ({}). Don't forget to type the asterisk (*) after pressing CTRL-Y.

```
*9500<D717.D7FB{CTRL-Y}*
```

Pitch Numbers

C	C#	D	E♭/D#	E	F	F#	G	A♭/G#	A	B♭	B
					1	2	3	4	5	6	7
8	9	10	11	12	13	14	15	16	17	18	19
20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43
44	45	46	47	48	49	50					

♭ = flat (one pitch below) # = sharp (one pitch above)

Enter this command to relocate the music routine to location $9500. Again, press CTRL-Y where you see {**CTRL-Y**}.

```
*9500<D717.D7FB{CTRL-Y}
```

Enter this command to move the music routine's data table into place.

```
*957F<D796.D7FBM
```

Finally, this command saves the complete music routine with the filename MUSIC.RELOC.

```
*BSAVE MUSIC.RELOC,A$9500,L$E5
```

At this point, you can reboot the computer and use the ProDOS Convert program to convert the music routine for ProDOS. While you're at it, you might as well convert the example program, too. Whether you use ProDOS or DOS 3.3, the relocated version of the music routine must be protected by a HIMEM: statement before it's loaded. To use the example program under ProDOS, replace line 70 with this line:

```
70 HIMEM: 37120
```

To use the relocated music routine under DOS 3.3, replace lines 70, 80, and 160 in the example program with these lines:

```
70 HIMEM: 38144
80 PRINT CHR$ (4)"BLOAD MUSIC .RELOC"
160 CALL 38144
```

Note that the relocated routine (MUSIC.RELOC) can be BLOADed normally and CALLed directly.

Diatonic scales ascend in a sequence of notes at half-tone (one pitch) or whole-tone (two pitches) intervals. Here's the sequence for a major scale:

whole-whole-half-whole-whole-whole-half

And here's the sequence for a minor scale:

whole-half-whole-whole-half-whole-whole

Thus, you can find the pitch numbers for, say, a C-major scale, even if you don't know the note names. Start with the key note C:

Pitch numbers:	8	10	12	13	15	17	19	20
Note names:	C	D	E	F	G	A	B	C
Tone intervals:		whole	whole	half	whole	whole	whole	half
Offset from C:	0	2	4	5	7	9	11	12

Rhythm

Rhythm is quite easy to implement with the music routine. Here are the steps to follow.

1. Select the desired tempo in beats per minute. For instance, *MM* = 100.
2. The base note duration will equal 10200/*MM* (102 in this case).
3. Divide or multiply this figure to find values for divisions of the beat. For instance, two notes per beat equals a duration of 102/2 or 51 per note. A note two beats long equals 102 * 2 or 204, and so forth.

In many songs, slight deviations from exact division are inevitable. That's not always bad. A little variance from exact mathematical relationships can help keep your tunes from sounding too stiff and mechanical.©

North Of The Border

Jim Butterfield, Associate Editor

Graphics can't appear outside the screen border on a Commodore 64—or can they? This intriguing demonstration shows you how to display text and other shapes in a screen area that's normally blank.

You can do wonderful things on the screen of your Commodore 64, but graphics output is always located inside the screen border. This article describes a technique for displaying graphics outside the usual screen area of the 64. The mechanics are a bit complicated, and you may not care to learn all the technical details. But it's fascinating to see, and the demonstration program takes only a short time to type in.

I first saw this technique demonstrated in West Germany, where it seems to have been developed independently by several persons, including Holger Gehrmann and Holger Krekel. The West German programs are geared toward a European screen format, which differs from the format used in North America. We'll enter a fresh program using the same principles. It will put some machine language in the memory area above location 49152 ($C000); if you have any special programs that reside in that area, remove them now to avoid conflicts.

Type in and save the program, then run it. If the program halts at line 190, check for an error in the DATA statements that follow. When the program works, you'll see a brief request to wait. Watch the top of the screen: In a few moments, a familiar word appears *above* the normal screen boundary. Follow the screen prompts to see additional text printed on the screen. As the screen scrolls, you'll see text disappear as it hits the top border. The extra text, however, sits calmly above the border, not disturbed in the least by this activity.

By this time, the program has stopped. List it if you like: The special text remains undisturbed. It seems we have planted something permanent in a place where graphics shouldn't appear.

Where Does It Come From?

Experienced 64 programmers may have guessed already what the extra text is made of. If you're not sure, type this line as a direct statement and press RETURN:

```
FOR J=28 TO 238: POKE 53249,J: POKE 53251,J: POKE 53253,J: NEXT J
```

The text slides happily to the bottom border area and takes up permanent residence. Again, screen color changes, listings, or similar activities have no effect on these characters. The way that they move should tip you off to their origin—they are sprites, not conventional characters. If you like, slide the message back to the top of the screen by entering this line as a direct statement:

```
FOR J=238 TO 28 STEP -1: POKE 53249,J: POKE 53251,J: POKE 53253,J: NEXT J
```

They're sprites all right; locations 53249, 53251, and 53253 are vertical position registers for sprites 0–2. But how can they appear outside the screen border?

Here's another hint. It may not be too helpful, but it does demonstrate a curious effect of this technique. Try changing the border color with a direct-mode statement like POKE 53280,5. This gives you a nice green border, but with a notable difference. The border has no top or bottom.

Sprite Liberation

These two hints tell you what is being done, but not how it's done. We have "disappeared" the top and bottom borders of the screen, creating a condition where sprites are free to roam into the newly liberated territory. As you've seen already, the sprites can be moved anywhere within the normal screen boundaries, as well.

The message is actually built into three sprites; by modifying line 100 of the program, you can replace those characters with any nine characters of your choice. The sprites don't have to look like characters, of course; if you wish to replace them with three red dragons, or whatever, you're free to do so.

Split-Screen Tricks

This program uses a variation of the split-screen technique which is explained in detail in *COMPUTE!'s First Book of Commodore 64*. The split isn't visible, but it makes the top and bottom borders vanish. Here's how.

First, keep in mind that the 64's screen is normally 25 character rows high, but you can change it to display 24 rows at will. When the video chip displays the screen, it turns on the bottom border when it reaches the end of row 25 (if you have a 25-row screen) or when it reaches the end of row 24 (in the case of a 24-row screen). The border doesn't need to be switched back on for the top of the screen; it simply stays on as the monitor's electron gun "wraps around" from

the bottom of the screen to the top. The border is switched off again when we get to the beginning of the first row of text.

Suppose that we write a split-screen program that changes the screen to a 24-row configuration while the video chip is drawing the twenty-fifth row of the screen. Somewhere near the top of the screen, we'll switch it back, of course. When the electron beam reaches the end of row 24, it's in 25-row mode, not 24-row mode, so the border switch doesn't happen there. And when the beam gets to the end of row 25, the computer is back in 24-row mode, so the border switch can't happen there, either. Since we never allow the border change to take place, the border effectively disappears.

This program works exactly the same on a Commodore 128 running in 64 mode, of course. The same principles can be used to sneak graphics outside the border in 128 mode, but the program would need to be modified. The interrupt routines in this version are tailor-made for the 64.

It's interesting to tamper with the video innards of the video chip. Putting sprites outside the normal display zone may be more a curiosity than anything else, but this program demonstrates yet another of the Commodore 64's amazing capabilities.

North Of The Border

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
RE 100 A$="COMPUTE!!":IF LEN(A
       $)<>9 THEN STOP
MX 110 POKE 53280,0
DB 120 POKE 53281,0
ED 130 PRINT CHR$(5);CHR$(147)
       ;"** NORTH OF THE BORDE
       R **"
PC 140 PRINT "PLEASE WAIT ..."
RJ 150 POKE 53265,27
PD 160 FOR J=49152 TO 49188:RE
       AD X
GR 170 T=T+X:POKE J,X
KC 180 NEXT J
JR 190 IF T<>4203 THEN STOP
JF 200 DATA 169,1,141,25,208,1
       62,248,160,27,173,18,20
       8,16,4
CJ 210 DATA 162,1,160,19,142,1
       8,208,140,17,208,173
KM 220 DATA 13,220,41,1,240,3,
       76,49,234,76,188,254
HD 230 FOR J=832 TO 1022:POKE
       {SPACE}J,0:NEXT J
JX 240 S=871
GD 300 POKE 56333,127
EG 310 POKE 788,0:POKE789,192
JA 320 POKE 1,51
CC 330 FOR J=1 TO LEN(A$):X=AS
       C(MID$(A$,J))
JM 340 IF X>64 THEN X=X AND 31
JB 350 X=X*8
PR 360 FOR K=0 TO 7:Y=PEEK(X+K
       +53248)
BP 370 POKE S+K*3,Y:NEXT K
RS 380 S=S+1:IF J=3 OR J=6 THE
       N S=S+61
DX 390 NEXT J
BJ 400 POKE 1,55
CR 410 POKE 53274,129
PS 420 FOR J=0 TO 2
MQ 430 POKE 2040+J,13+J
QE 440 POKE 53248+J*2,J*24+80
CD 450 POKE 53249+J*2,28
BP 460 POKE 53287+J,1
KE 470 NEXT J
SD 480 POKE 53269,7
SH 490 PRINT
BG 500 PRINT "TO RESTORE YOUR
       {SPACE}MACHINE,"
CD 510 PRINT "{3 SPACES}PRESS
       {SPACE}<RUN/STOP> AND <
       RESTORE> KEYS"
XJ 520 PRINT
FR 530 PRINT "PRESS ANY KEY FO
       R SCROLLING DEMO"
QP 540 GET A$,A$,A$,A$
FJ 550 GET A$:IF A$="" GOTO550
PP 560 FOR J=1 TO 100
GG 570 PRINT "THIS IS LINE";J;
       "OF THE DEMO"
MP 580 NEXT J
```

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IFF Translator For Amiga BASIC

Michael Barron

This program translates IFF image files from programs such as Deluxe Paint *into files which can be used in your own Amiga BASIC programs. It works only in conjunction with a drawing program that creates IFF-format image files (see below).*

Amiga BASIC provides a number of powerful OBJECT commands for animating sprite and bob shapes. In order to use these commands, you must first have an image to animate. The Amiga Extras disk includes an object editor for creating sprite and bob images; however, this simple program has a number of limitations. Commercial drawing programs such as *Deluxe Paint, Aegis Images,* and *Graphicraft* are much more powerful and convenient to use, but the image files which they create can't be used directly in Amiga BASIC.

"IFF Translator" allows you to translate standard IFF Amiga graphics files for use in BASIC programs. (IFF stands for Interchange File Format, a standard file structure developed jointly by Electronic Arts and Commodore-Amiga. Most commercial drawing programs for the Amiga store images according to the IFF standards.)

Creating An Image

Before you can use IFF Translator, you must create an image file with *Deluxe Paint* or any other IFF-compatible program. This article will discuss the procedure to follow with *Deluxe Paint;* other programs use a similar process. Once you have created the image file, you can run IFF Translator to convert the file to a form usable by BASIC.

Before you create the image, set the drawing program to the type of screen which you will need in BASIC. For instance, if you wish the image to be compatible with the default (Workbench) screen, the drawing program should be in medium resolution with two bit planes. In *Deluxe Paint,* the screen setting is determined by the command you use to start the program from the CLI. The table above summarizes the commands used to select different screens in *Deluxe Paint.*

IFF Translator also incorporates the color palette from the original image file. To change the color palette in *Deluxe Paint,* click the right mouse button on the foreground color indicator and adjust the color sliders of the palette window as needed.

After you have drawn the desired image, it must be saved as a brush. To select an image as a brush within *Deluxe Paint,* click the left mouse button on the brush-selection tool and drag a selection box around the image. To save a brush file, select the Save As option from the program's Brush menu.

Exit the drawing program. At this point, the image has been saved as a brush file on disk. To minimize disk-swapping, you may want to copy the brush file to your BASIC work disk. IFF Translator will store the BASIC-compatible files in the same folder as the original brush file.

Deluxe Paint Command Summary

1> DPAINT <resolution> <#planes>

resolution:		#planes:	
LO	320*200	5	5 bit planes, 32 colors (low-res only)
MED	640*200	4	4 bit planes, 16 colors
HI	640*400	3	3 bit planes, 8 colors
		2	2 bit planes, 4 colors
		1	1 bit plane, 2 colors

The default *Deluxe Paint* screen could be entered as:

1> DPAINT LO 5

A Workbench-type screen could be entered as:

1> DPAINT MED 2

Using IFF Translator

Type in and save IFF Translator, then run it. The program asks you to enter the name of an IFF file to translate. Enter the correct name and allow the program to process the file. IFF Translator reads and writes to disk until the translation is complete, so do not disturb the destination disk.

After the translation is complete, the program recreates the same screen that was in effect when you created the original image. Then it displays the image on the screen and permits you to move it around with the mouse pointer for examination. Press any key to exit the program.

IFF Translator creates two new files for BASIC. The first is a file of the same name with the extender _Field. The second has the same name with the extender _Image. For example, if the original file is named FLOWER, IFF Translator creates files named FLOWER_Field and FLOWER_Image.

The _Field file is a BASIC subroutine which recreates the original screen from which the image was saved. This subroutine, named DefinePlayField:,is stored in plain ASCII form and can be merged with an existing program or used as the basis of a new program.

The _Image file is compatible with OBJECT commands in Amiga BASIC. Specifically, it is used with OBJECT.SHAPE to define an image. This image can be used exactly like any image created with the BASIC object editor program. The following code demonstrates how to read and define an image contained in an _Image file:

```
OPEN "filename_Image" FOR INPUT
  AS 1
OBJECT.SHAPE 1,INPUT$(LOF(1),1)
CLOSE 1
```

Of course, you should replace *filename* in the OPEN command with the name used for your file. Once the object has been defined, it can be manipulated like any other object, as explained in the Amiga BASIC manual.

IFF Translator

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
Mainline:
GOSUB Initialize
OPEN FileIFF$ FOR INPUT AS 1
PRINT "Reading from file    : ";
FileIFF$
GOSUB TranslateChunks
CLOSE 1
OPEN FileIFF$+"_Field" FOR OUTPU
T AS 1
PRINT "Writing to file      : ";
FileIFF$+"_Field"
GOSUB CreateFieldFile
CLOSE 1
OPEN FileIFF$+"_Image" FOR OUTPU
T AS 1
PRINT "Writing to file      : ";
FileIFF$+"_Image"
GOSUB CreateImageFile
CLOSE 1
GOSUB DisplayBOB
END

Initialize:
WINDOW 1,"TranslateIFF",(0,136)-
(450,186),15
DEFINT a-z
DIM R!(31),G!(31),B!(31)
True=-1
False=0
INPUT "IFF file to translate: ",
FileIFF$
RETURN

TranslateChunks:
ckID$=INPUT$(4,1)
SkipData$=INPUT$(4,1)
ckType$=INPUT$(4,1)
IF ckID$<>"FORM" OR ckType$<>"IL
BM" THEN
PRINT "File is not a FORM ILBM c
hunk."
STOP
END IF
FoundBMHD=False
FoundCMAP=False
WHILE True
ckID$=INPUT$(4,1)
ckLength&=CVL(INPUT$(4,1))
IF ckID$="BMHD" THEN
GOSUB TranslateBMHD
FoundBMHD=True
ELSEIF ckID$="CMAP" THEN
GOSUB TranslateCMAP
FoundCMAP=True
ELSEIF ckID$="BODY" THEN
IF FoundBMHD AND FoundCMAP THEN
GOSUB TranslateBODY
RETURN
ELSE
PRINT "Context chunks are missin
g."
STOP
END IF
ELSE
SkipData$=INPUT$(ckLength&,1)
SkipData$=""
END IF
IF ckLength& MOD 2 THEN
SkipData$=INPUT$(1,1)
END IF
WEND

TranslateBMHD:
Wide&=CVI(INPUT$(2,1))
Height&=CVI(INPUT$(2,1))
SkipData$=INPUT$(4,1)
Depth&=ASC(INPUT$(1,1))
Masking=ASC(INPUT$(1,1))
Compression=ASC(INPUT$(1,1))
SkipData$=INPUT$(1,1)
TransColor=CVI(INPUT$(2,1))
SkipData$=INPUT$(2,1)
PageWidth=CVI(INPUT$(2,1))
PageHeight=CVI(INPUT$(2,1))
ScnMode=PageWidth/320+2*(PageHei
ght/200-1)
PlanePick=2^Depth&-1
IF Masking<>2 THEN
PRINT "Unknown masking technique
used."
STOP
END IF
IF Compression=0 THEN
FileCompressed=False
ELSEIF Compression=1 THEN
FileCompressed=True
ELSE
PRINT "Unknown compression techn
ique used."
STOP
END IF
IF TransColor<>0 THEN
PRINT "Register zero is not the
transparent color."
STOP
END IF
Header$=MKL$(0)+MKL$(0)+MKL$(Dep
th&)+MKL$(Wide&)+MKL$(Height&)
Header$=Header$+MKI$(24)+MKI$(Pl
anePick)+MKI$(0)
RETURN

TranslateCMAP:
ColorCount=ckLength&/3-1
FOR Register=0 TO ColorCount
R!(Register)=INT(ASC(INPUT$(1,1)
)/12)/20
G!(Register)=INT(ASC(INPUT$(1,1)
)/12)/20
B!(Register)=INT(ASC(INPUT$(1,1)
)/12)/20
NEXT Register
RETURN

TranslateBODY:
BytesPerRow=2*INT((Wide&+15)/16)
BytesPerPlane=BytesPerRow*Height
&
ReqBytes=BytesPerPlane*Depth&
BitMap$=STRING$(ReqBytes,CHR$(0)
)
FOR RowNo=1 TO Height&
Pointer=1+BytesPerRow*(RowNo-1)
FOR PlaneNo=1 TO Depth&
Offset=BytesPerPlane*(PlaneNo-1)
IF FileCompressed THEN
Row$=""
WHILE LEN(Row$)<BytesPerRow
UByte=ASC(INPUT$(1,1))
ControlByte=UByte-2*(UByte AND 1
28)
IF ControlByte<-127 THEN
'No Operation
ELSEIF ControlByte<0 THEN
Row$=Row$+STRING$(-ControlByte+1
,INPUT$(1,1))
ELSEIF ControlByte<128 THEN
Row$=Row$+INPUT$(ControlByte+1,1
)
END IF
WEND
ELSE
Row$=INPUT$(BytesPerRow,1)
END IF
MID$(BitMap$,Pointer+Offset,Byte
sPerRow)=Row$
NEXT PlaneNo
NEXT RowNo
RETURN

CreateFieldFile:
PRINT#1,"DefinePlayField:"
PRINT#1,USING "  SCREEN 1,###,
###,#,#";PageWidth,PageHeight,
Depth&,ScnMode
PRINT#1, "  WINDOW 1,";CHR$(34);
FileIFF$;CHR$(34);",,3,1"
FOR Register=0 TO ColorCount
PRINT #1,USING "  PALETTE ##,#.
##,#.##,#.##";Register,R!(Regis
ter),G!(Register),B!(Register)
NEXT Register
PRINT #1,"  RETURN"
RETURN

CreateImageFile:
PRINT #1,Header$+BitMap$;
RETURN

DisplayBOB:
SCREEN 1,PageWidth,PageHeight,De
pth&,ScnMode
WINDOW 2,"DisplayBOB",,0,1
FOR Register=0 TO ColorCount
PALETTE Register,R!(Register),G!
(Register),B!(Register)
NEXT Register
PRINT "Hit any key to return to
BASIC."
PRINT "Manipulate BOB with mouse
pointer."
OBJECT.SHAPE 1,Header$+BitMap$
OBJECT.X 1,0
OBJECT.Y 1,16
OBJECT.ON
WHILE INKEY$=""
IF MOUSE(0)<>0 THEN
OBJECT.X 1,MOUSE(1)-Wide&
OBJECT.Y 1,MOUSE(2)-Height&
END IF
WEND
OBJECT.OFF
WINDOW 1
SCREEN CLOSE 1
RETURN
```

©

Magazine Indexer

Marc Sugiyama

This program is a must for anyone who reads computer magazines regularly. It indexes articles by date, computer, and subject category. With the sophisticated search capabilities of "Magazine Indexer," you can easily locate groups of related articles as well as individual articles. Versions are included for the IBM PC and PCjr, the Apple II series (DOS 3.3 or ProDOS), and Atari ST.

Has this ever happened to you? While working on a program, you remember a magazine article that contains just the programming information you need to finish the project. But laying your hands on that article is another matter. It may take minutes or even hours of page-flipping before you locate the information you need.

The solution to this problem is simple: Build an index. For a magazine like COMPUTE!, which covers several computers, a good index would allow you to locate articles based on the type of computer as well as on the general subject. "Magazine Indexer" automates this chore, allowing you to build up a comprehensive index month by month. The real payoff comes when you need to search the database, since the computer can locate and pull together information many times faster than the fastest file clerk.

Magazine Indexer is designed specifically for indexing computer magazines; it is not a general-purpose database or filing program, though with some work you could adapt it to other purposes. Since the program is self-prompting, little instruction is needed to use it. Simply select your choices from the on-screen menus and respond to the prompts as indicated. Type in and save the program for your computer. For the Atari ST version, select medium resolution from Preferences before you run the program. Line 430 of the ST version is more than one screen line in length; when typing in this line, be sure that the first character in each screen line is a blank space.

Starting Out

The first time you run Magazine Indexer, it's necessary to create the data file that will hold the information. The IBM and ST versions automatically handle this detail for you by creating a new file if none exists. For the Apple version, answer the question IS THIS A COLD START? by pressing Y for yes. The data file is always named INDEX-1.DAT. The Apple version creates a second index file in addition to the main data file. You may use a disk that contains other files. However, if you plan to catalog a large number of magazines, it's best to start with a completely empty disk.

Your first task, of course, is to enter the data about each magazine article. Note that a date must be entered as a three-letter month abbreviation, followed by a space and a two-digit year number. The first letter of the month abbreviation must be capitalized (except on the Apple version). For instance, Nov 86 represents November, 1986. Jan 85 is the correct entry for January, 1985, and so on. The program is also sensitive to the case of article names. For example, *Paul* is distinguished from *PAUL*, and so forth.

Pressing RETURN (or Enter for IBM) generally returns you to the beginning of a specific operation or to the main menu. There are some exceptions, however. Pressing RETURN at the COMMENT prompt tells the program that you don't want to include a comment. Pressing RETURN at the Applications and Computers SELECT/DESELECT prompt indicates that you're going to accept the setting shown on the screen. Finally, pressing RETURN at any prompt in the editing section means that you do not want to change the current item displayed on the screen.

Once data has been entered, you may search the database by indicating the subjects and computers you wish to search for. You may also search for an article by date or article title. In the IBM and Atari ST versions, a search category is selected by choosing the item highlighted on the screen. In the Apple version, enter the digits that stand for the categories you want to search. For example, to include categories 1, 5, and 7 in the search, enter the number 157 (without any spaces) and press RETURN.

Printer Option

When you've selected the items to search for, you have the option of displaying the information on the screen or sending it to a printer. The IBM and Apple versions allow you to pause either listing by pressing the space bar (press the space bar a second time to resume). If you press RETURN or Enter, the search halts immediately. In the ST version, press RETURN to pause a listing to the screen and press any other key to resume. You cannot pause or interrupt a listing to the printer in the ST version.

Variable Usage (IBM version)

Variable	Purpose
APPLEN	length of application field
APPS$()	names of applications
CAPPS$	current application
CCOL	which column cursor is in
CCOMMENT$	current comment
CCOMPS$	current computer
CDATE$	current date
CNAME$	current name
CNEXTREC$	current pointer
COMMENTLEN	length of comment field
COMPLEN	length of computer field
COMPS$()	names of computers
CPAGE$	current page number
CR$	CHR$(13)
CROW	which row cursor is on
DATELEN	length of date field
INPUTLENGTH	length of input string
INTREC	which record was allocated?
IO$	string to send to disk
LASTENTRY	temp entry pointer
MAINMENU$()	entry names in main menu
MAINOPTION	option selected
MAXINPUTLEN	length of input string to accept
MONTHS$()	months of year
NAMELEN	length of name field
NEXTLEN	length of pointer field
NODATE	was date specified for search?
NOFILE	existing data file
NUMAPPS	number of applications
NUMCOMPS	number of computers
NUMMAINMENU	number of entries in main menu
NUMSEARCH	number of search methods
PAGELEN	length of page number field
PRINTER	printer on/off flag
RAPP$	application field
RCOMMENT$	comment field
RCOMP$	computer field
RDATE$	date field
RECLEN	length of entire record
RNAME$	name field
RNEXTREC$	record variable, pointer field
RPAGE$	page field
SEARCH$()	entry names for search menu
SEARCHOPTION	which search was selected?
SEARCHTITLES$()	screen titles for search menu
SERROR	abort flag
STARTENTRY	temp entry pointer
TITLE$	title to put at top of screen
TITLES$()	screen titles for main menu
Z$	STR$(0)

Program 1: Magazine Indexer for IBM PC/PCjr

For instructions on entering this listing, please refer to "COMPUTEI's Guide to Typing In Programs" in this issue of COMPUTEI.

```
QI 100 FILE$="index1.dat":REM Da
       ta file name
LK 150 REM Title Page
NP 160 :
IG 170 ON ERROR GOTO 2810
KG 180 DEFINT A-Z:OPTION BASE 1
JM 190 CLS:KEY OFF:WIDTH 80:SCRE
       EN 0,0,0,0:LOCATE ,,0
GM 200 LOCATE 3,29:PRINT"The Mag
       azine Indexer"
PB 210 LOCATE 7,31:PRINT"Data Ba
       se Program"
KH 220 LOCATE 11,31:PRINT"One Mo
       ment Please"
NK 230 :
MP 240 REM initialization
NO 250 :
DJ 260 READ NUMMAINMENU:DIM MAIN
       MENU$(NUMMAINMENU),TITLES
       $(NUMMAINMENU):FOR I=1 TO
        NUMMAINMENU:READ MAINMEN
       U$(I):NEXT:DATA 7,"Add","
       Edit","Delete","List","Se
       arch","Printer Mode","Qui
       t"
BC 270 FOR I=1 TO NUMMAINMENU:RE
       AD TITLES$(I):NEXT:DATA "
       Add a Record","Edit a Rec
       ord","Delete a Record","L
       ist Files","Search Record
       s",,"Leave INDEX"
LE 280 READ NUMSEARCH:DIM SEARCH
       $(NUMSEARCH),SEARCHTITLES
       $(NUMSEARCH):FOR I=1 TO N
       UMSEARCH:READ SEARCH$(I):
       NEXT:DATA 6,"computer","c
       lass","computer and class
       ","issue","title","return
       "
GL 290 FOR I=1 TO NUMSEARCH:READ
        SEARCHTITLES$(I):NEXT:DA
       TA "Computer","Class","Co
       mputer and Class","Issue"
       ,"Title",
QL 300 READ NUMCOMPS:IF NUMCOMPS
       >16 THEN PRINT"Error; can
       't have more than 16 comp
       uters":STOP
GG 310 DIM COMPS$(NUMCOMPS):FOR
       I=1 TO NUMCOMPS:READ COMP
       S$(I):NEXT:DATA 15,"Apple
       ","Atari","Macintosh","At
       ari ST","VIC-20","Commodo
       re 64","Commodore 128","C
       ommodore Plus/4","Commodo
       re 16","PET/CBM","Texas I
       nstruments","IBM PC","IBM
        PCjr","Amiga","General"
JK 320 READ NUMAPPS:IF NUMAPPS>1
       6 THEN PRINT"Error: can't
        have more than 16 applic
       ations":STOP
DN 330 DIM APPS$(NUMAPPS):FOR I=
       1 TO NUMAPPS:READ APPS$(I
       ):NEXT:DATA 9,"Game","Uti
       lity","Application","Subr
       outine","Datasort","Machi
       ne Language","Review","La
       nguage","General Interest
       "
OC 340 DIM MONTHS$(12):FOR I=1 T
       O 12:READ MONTHS$(I):NEXT
       :DATA "Jan","Feb","Mar","
       Apr","May","Jun","Jul","A
       ug","Sep","Oct","Nov","De
       c"
JN 350 NEXTLEN=2:NAMELEN=40:COMM
       ENTLEN=40:DATELEN=10:PAGE
       LEN=2:APPLEN=2:COMPLEN=2
HL 360 RECLEN=NEXTLEN+APPLEN+COM
       PLEN+NAMELEN+DATELEN+PAGE
       LEN+COMMENTLEN
MB 370 CR$=CHR$(13):PRINTER=0:NO
       FILE=0
NF 380 :
OB 390 REM find how many records
        there are
MG 400 :
IF 410 OPEN FILE$ FOR INPUT AS #
       1 LEN=RECLEN:CLOSE#1 :REM
        see if the file is there
GJ 420 OPEN FILE$ AS #1 LEN=RECL
       EN :REM assume random acc
       ess
HK 430 FIELD #1,NEXTLEN AS RNEXT
       REC$, APPLEN AS RAPP$, CO
       MPLEN AS RCOMP$, NAMELEN
       AS RNAME$, DATELEN AS RDA
       TE$, PAGELEN AS RPAGE$, C
       OMMENTLEN AS RCOMMENT$
MO 440 :
HF 450 REM build empty record en
       try if no file
MC 460 :
EM 470 IF NOFILE=0 THEN 550
OO 480 LOCATE 22,22:PRINT"Openin
       g data file for the first
        time":FOR U=1 TO 2000:NE
       XT
LP 490 REM RNEXTREC holds the ne
       xt blank record; RPAGE ho
       lds the last record in th
       e file; RDATE holds the d
       ate the file was created;
        other fields are meaning
       less
FF 500 LSET RNEXTREC$=MKI$(0):LS
       ET RNAME$="Dummy Record":
       LSET RDATE$=DATE$:LSET RP
       AGE$=MKI$(1):LSET RCOMMEN
       T$="Null record chain"
NG 510 PUT #1,1
NL 520 :
HO 530 REM main menu
NP 540 :
KB 550 GET#1,1:NOFILE=(RPAGE$=MK
       I$(1)):IF NOFILE THEN MAI
       NOPTION=1:GOTO 590
KE 560 MAINOPTION=0:TITLE$="INDE
       X program":GOSUB 2580:FOR
        I=1 TO NUMMAINMENU:PRINT
        TAB(30);"(";I;") ";MAINM
       ENU$(I):NEXT
ID 570 PRINT:PRINT TAB(30);"Comm
       and: ";:MAXINPUTLENGTH=1:
       GOSUB 1840
JP 580 IF IN<1 OR IN>NUMMAINMENU
        THEN 550 ELSE MAINOPTION
       = IN
BH 590 TITLE$=TITLES$(MAINOPTION
       ):ON MAINOPTION GOSUB 630
       ,810,1000,1140,1200,1760,
       1800:GOTO 550
NI 600 :
DC 610 REM add entry
NM 620 :
MO 630 GOSUB 2580:GOSUB 2350:CDA
       TE$=IN$:IF LEN(CDATE$)=0
       THEN RETURN
PN 640 GOSUB 2580:PRINT"Name:";:
       MAXINPUTLENGTH=NAMELEN:GO
       SUB 1940:CNAME$=IN$:IF IN
       $="" THEN RETURN
AE 650 PRINT"Page:";:MAXINPUTLEN
       GTH=3:GOSUB 1840:CPAGE$=M
       KI$(IN):IF IN$="" THEN 64
       0
DP 660 CAPPS$=MKI$(0):GOSUB 2080
       :IF CVI(CAPPS$)=0 THEN 64
       0
```

```
EE 670 CCOMPS$=MKI$(0):GOSUB 218
       0:IF CVI(CCOMPS$)=0 THEN
       640
PC 680 GOSUB 2580:PRINT"Comment:
       ";:MAXINPUTLENGTH=COMMENT
       LEN:GOSUB 1940:IF IN$="" 
       THEN IN$="None" ELSE CCOM
       MENT$=IN$
JE 690 CNEXTREC$=MKI$(0)
II 700 PRINT:PRINT"Please wait."
BC 710 GET#1,1:IF CVI(RPAGE$)=1
       THEN GOSUB 2690:GOTO 750
       ELSE GET#1,2:IF CNAME$<=R
       NAME$ THEN GOSUB 2690:GET
       #1,2:PUT#1,INTREC:CNEXTRE
       C$=MKI$(INTREC):GOSUB 246
       0:PUT#1,2:GOTO 760
BG 720 GET#1,2:J=2:I=CVI(RNEXTRE
       C$):IF I=0 THEN 740
KC 730 GET#1,I:IF CNAME$<=RNAME$
        THEN 740 ELSE J=I:I=CVI(
       RNEXTREC$):IF I=0 THEN 74
       0 ELSE 730
KD 740 GOSUB 2690:GET#1,J:CNEXTR
       EC$=RNEXTREC$:LSET RNEXTR
       EC$=MKI$(INTREC):PUT#1,J
EP 750 GOSUB 2460:PUT #1,INTREC
IC 760 NOFILE=0
LD 770 IF MAINOPTION=2 THEN RETU
       RN ELSE GOTO 640
OJ 780 :
GA 790 REM edit entry
NK 800 :
KE 810 GOSUB 2580:STARTENTRY=2:L
       ASTENTRY=2:PRINT"Name:";:
       MAXINPUTLENGTH=NAMELEN:GO
       SUB 1940:DNAME$=IN$:IF DN
       AME$="" THEN RETURN
CB 820 PRINT:PRINT"Scanning for
       entry. ";
IG 830 GET #1,STARTENTRY:IF LEFT
       $(RNAME$,LEN(DNAME$))=DNA
       ME$ THEN PRINT"Found.":PR
       INT:GOTO 850 ELSE LASTENT
       RY=STARTENTRY:STARTENTRY=
       CVI(RNEXTREC$):IF STARTEN
       TRY>0 THEN 830
CH 840 PRINT"Not found":PRINT:GO
       TO 2630
EG 850 GET#1,STARTENTRY:GOSUB 24
       20:GOSUB 2500
FE 860 PRINT:PRINT"Make any chan
       ges (y/n)? ";:GOSUB 2040:
       IF IN=1 THEN 880
FB 870 LASTENTRY=STARTENTRY:STAR
       TENTRY=CVI(RNEXTREC$):IF
       STARTENTRY=0 THEN RETURN
       ELSE GOSUB 2580:GOTO 820
JL 880 GOSUB 2580:PRINT:PRINT"Na
       me:";CNAME$
EI 890 PRINT:PRINT"Name:";:MAXIN
       PUTLENGTH=NAMELEN:GOSUB 1
       940:IF IN$<>"" THEN CNAME
       $=IN$
DC 900 GOSUB 2580:PRINT:PRINT"Da
       te:";CDATE$:PRINT:GOSUB 2
       350:IF IN$<>"" THEN CDATE
       $=IN$
CM 910 GOSUB 2580:PRINT:PRINT"Pa
       ge:";CVI(CPAGE$):PRINT:PR
       INT"Page: ";:MAXINPUTLENG
       TH=3:GOSUB 1840:IF IN>0 T
       HEN CPAGE$=MKI$(IN)
HP 920 GOSUB 2580:PRINT:PRINT"Co
       mment:";CCOMMENT$
HK 930 PRINT:PRINT"Comment:";:MA
       XINPUTLENGTH=COMMENTLEN:G
       OSUB 1940:IF IN$<>"" THEN
        CCOMMENT$=IN$
OD 940 GOSUB 2580:GOSUB 2080:GOS
       UB 2580:GOSUB 2180:GOSUB
       2580:GOSUB 2500
GK 950 PRINT:PRINT"Is this corre
       ct (y/n)? ";:GOSUB 2040:I
       F IN=0 THEN 850
PL 960 DELETEENTRY=STARTENTRY:GO
       SUB 1070:GOSUB 690:RETURN
OJ 970 :
OM 980 REM delete entry
ON 990 :
DN 1000 GOSUB 2580:DELETEENTRY=2
       :LASTENTRY=2
NG 1010 PRINT"Name:";:MAXINPUTLE
       NGTH=NAMELEN:GOSUB 1940:
       DNAME$=IN$:IF DNAME$="" 
       THEN RETURN
NG 1020 GET #1,DELETEENTRY:IF LE
       FT$(RNAME$,LEN(DNAME$))=
       DNAME$ THEN 1040 ELSE LA
       STENTRY=DELETEENTRY:DELE
       TEENTRY=CVI(RNEXTREC$):I
       F DELETEENTRY>0 THEN 102
       0
PF 1030 PRINT"No delete performe
       d. ";:IF IN$<>"N" THEN P
       RINT "Entry not found.":
       PRINT:GOTO 2630 ELSE PRI
       NT:GOTO 2630
FD 1040 GOSUB 2420:GOSUB 2500
OI 1050 PRINT:PRINT"Delete this
       entry (y/n)? ";:GOSUB 20
       40
LJ 1060 IF IN=0 THEN LASTENTRY=D
       ELETEENTRY:DELETEENTRY=C
       VI(RNEXTREC$):IF DELETEE
       NTRY>0 THEN 1020 ELSE 10
       30
JF 1065 PRINT:PRINT"Performing D
       elete:";
OI 1070 IF DELETEENTRY<>2 THEN 1
       090 ELSE GET#1,2:J=CVI(R
       NEXTREC$):IF J=0 THEN GE
       T#1,1:LSET RPAGE$=MKI$(1
       ):LSET RNEXTREC$=MKI$(0)
       :PUT #1,1:PRINT"Complete
       .":RETURN
CD 1080 GET#1,J:PUT#1,2:GET#1,1:
       TEMP$=RNEXTREC$:LSET RNE
       XTREC$=MKI$(J):PUT#1,1:G
       ET#1,J:LSET RNEXTREC$=TE
       MP$:PUT#1,J:PRINT"Comple
       te.":RETURN
QM 1090 GET#1,1:TEMP$=RNEXTREC$:
       LSET RNEXTREC$=MKI$(DELE
       TEENTRY):PUT#1,1:GET#1,D
       ELETEENTRY:TEMP2$=RNEXTR
       EC$:LSET RNEXTREC$=TEMP$
       :PUT#1,DELETEENTRY
KI 1100 GET#1,LASTENTRY:LSET RNE
       XTREC$=TEMP2$:PUT#1,LAST
       ENTRY:PRINT"Complete.":R
       ETURN
OC 1110 :
EE 1120 REM list entries
PI 1130 :
MB 1140 GOSUB 2580:STARTENTRY=2
KE 1150 GET#1,STARTENTRY:GOSUB 2
       420:GOSUB 2500:IF PRINTE
       R=1 THEN GOSUB 2680
PK 1160 GOSUB 2280:STARTENTRY=CV
       I(CNEXTREC$):IF STARTENT
       RY<>0 AND SERROR=0 THEN
       1150 ELSE GOSUB 2630:RET
       URN
PE 1170 :
CO 1180 REM search files
QK 1190 :
ME 1200 TITLE$=TITLES$(MAINOPTIO
       N):GOSUB 2580
HC 1210 FOR I=1 TO NUMSEARCH-1:P
       RINT SPC(12);"(";I;") by
        ";SEARCH$(I):NEXT:PRINT
        SPC(12);"(";NUMSEARCH;"
       ) ";SEARCH$(NUMSEARCH)
KA 1220 PRINT:PRINT SPC(12)"Comm
       and:";:MAXINPUTLENGTH=1:
       GOSUB 1840:IF IN=NUMSEAR
       CH OR IN=0 THEN RETURN
QL 1230 IF IN<1 OR IN>NUMSEARCH-
       1 THEN 1200 ELSE SEARCHO
       PTION=IN:TITLE$="Search
       by "+SEARCHTITLES$(SEARC
       HOPTION):ON SEARCHOPTION
        GOSUB 1270,1370,1470,15
       80,1670:GOTO 1200
PN 1240 :
PA 1250 REM :by computer
PD 1260 :
OJ 1270 GOSUB 2580:CCOMPS$=MKI$(
       0):GOSUB 2180:DCOMPS$=CC
       OMPS$:IF CVI(DCOMPS$)=0
       THEN RETURN
EL 1280 PRINT:GOSUB 2350:DDATE$=
       IN$:NODATE=(DDATE$=""):I
       F PRINTER=1 THEN LPRINT
       TITLE$
NC 1290 GOSUB 2580:STARTENTRY=2
IC 1300 GET#1,STARTENTRY:IF (CVI
       (RCOMP$) AND CVI(DCOMPS$
       ))=0 OR NODATE=0 AND DDA
       TE$<>RDATE$ THEN 1330
BH 1310 GOSUB 2420:IF PRINTER TH
       EN GOSUB 2680 ELSE GOSUB
        2500
BP 1320 GOSUB 2280:IF SERROR=1 T
       HEN PRINT:PRINT"Search t
       erminated.":GOSUB 2630:R
       ETURN
IK 1330 STARTENTRY=CVI(RNEXTREC$
       ):IF STARTENTRY<>0 THEN
       1300 ELSE GOSUB 2630:RET
       URN
PP 1340 :
OF 1350 REM by class
PF 1360 :
PF 1370 GOSUB 2580:CAPPS$=MKI$(0
       ):GOSUB 2080:DAPPS$=CAPP
       S$:IF CVI(DAPPS$)=0 THEN
        RETURN
EN 1380 PRINT:GOSUB 2350:DDATE$=
       IN$:NODATE=(DDATE$=""):I
       F PRINTER=1 THEN LPRINT
       TITLE$
NE 1390 GOSUB 2580:STARTENTRY=2
PJ 1400 GET#1,STARTENTRY:IF (CVI
       (RAPP$) AND CVI(DAPPS$))
       =0 OR NODATE=0 AND DDATE
       $<>RDATE$ THEN 1430
CJ 1410 GOSUB 2420:IF PRINTER TH
       EN GOSUB 2680 ELSE GOSUB
        2500
BB 1420 GOSUB 2280:IF SERROR=1 T
       HEN PRINT:PRINT"Search t
       erminated.":GOSUB 2630:R
       ETURN
LD 1430 STARTENTRY=CVI(RNEXTREC$
       ):IF STARTENTRY<>0 THEN
       1400 ELSE GOSUB 2630:RET
       URN
PB 1440 :
GE 1450 REM :by computer and cla
       ss
PH 1460 :
DN 1470 GOSUB 2580:CCOMPS$=MKI$(
       0):GOSUB 2180:DCOMPS$=CC
       OMPS$:IF CVI(DCOMPS$)=0
       THEN RETURN
QK 1480 GOSUB 2580:CAPPS$=MKI$(0
       ):GOSUB 2080:DAPPS$=CAPP
       S$:IF CVI(DAPPS$)=0 THEN
        RETURN
EC 1490 PRINT:GOSUB 2350:DDATE$=
       IN$:NODATE=(DDATE$=""):I
       F PRINTER=1 THEN LPRINT
       TITLE$
MN 1500 GOSUB 2580:STARTENTRY=2
QO 1510 GET#1,STARTENTRY:IF (CVI
       (RAPP$) AND CVI(DAPPS$))
       =0 OR (CVI(DCOMPS$) AND
```

```
        CVI(RCOMP$))=0 OR NODATE
        =0 AND DDATE$<>RDATE$ TH
        EN 1540
CO 1520 GOSUB 2420:IF PRINTER TH
        EN GOSUB 2680 ELSE GOSUB
         2500
BG 1530 GOSUB 2280:IF SERROR=1 T
        HEN PRINT:PRINT"Search t
        erminated.":GOSUB 2630:R
        ETURN
CH 1540 STARTENTRY=CVI(RNEXTREC$
        ):IF STARTENTRY<>0 THEN
        1510 ELSE GOSUB 2630:RET
        URN
PG 1550 :
NG 1560 REM :by date
QM 1570 :
FM 1580 GOSUB 2580:PRINT"Issue "
        ;:GOSUB 2350:DDATE$=IN$:
        IF DDATE$="" THEN RETURN
KE 1590 IF PRINTER THEN LPRINT T
        ITLE$
MP 1600 GOSUB 2580:STARTENTRY=2
EG 1610 GET#1,STARTENTRY:IF RDAT
        E$=DDATE$ THEN GOSUB 242
        0:IF PRINTER THEN GOSUB
        2680 ELSE GOSUB 2500
BF 1620 GOSUB 2280:IF SERROR=1 T
        HEN PRINT:PRINT"Search t
        erminated.":GOSUB 2630:R
        ETURN
GN 1630 STARTENTRY=CVI(RNEXTREC$
        ):IF STARTENTRY<>0 THEN
        1610 ELSE GOSUB 2630:RET
        URN
PF 1640 :
MO 1650 REM :by title
QL 1660 :
AC 1670 GOSUB 2580:PRINT"Name:";
        :MAXINPUTLENGTH=NAMELEN:
        GOSUB 1940:DNAME$=IN$:IF
         DNAME$="" THEN RETURN
FA 1680 GOSUB 2350:DDATE$=IN$:NO
        DATE=(DDATE$="");IF PRIN
        TER THEN LPRINT TITLE$
OK 1690 GOSUB 2580:STARTENTRY=2
LH 1700 GET#1,STARTENTRY:IF LEFT
        $(RNAME$,LEN(DNAME$))=DN
        AME$ AND NODATE OR DDATE
        $=RDATE$ THEN GOSUB 2420
        :IF PRINTER THEN GOSUB 2
        680 ELSE GOSUB 2500
BE 1710 GOSUB 2280:IF SERROR=1 T
        HEN PRINT:PRINT"Search t
        erminated.":GOSUB 2630:R
        ETURN
GL 1720 STARTENTRY=CVI(RNEXTREC$
        ):IF STARTENTRY<>0 THEN
        1700 ELSE GOSUB 2630:RET
        URN
PE 1730 :
NI 1740 REM change printer modes
QK 1750 :
QJ 1760 PRINTER=1-PRINTER:RETURN
AA 1770 :
EP 1780 REM quit
AG 1790 :
FH 1800 CLS:CLOSE#1:END
PA 1810 :
QO 1820 REM input number
PG 1830 :
DE 1840 IN$="":IN=POS(0):PRINT S
        PACE$(79-IN);:LOCATE ,IN
ID 1850 COLOR 0,7:PRINT" ";:COLO
        R 7,0:LOCATE ,POS(0)-1
DL 1860 A$=INKEY$:IF LEN(A$)<>1
        THEN 1860
EC 1870 INPUTLENGTH=LEN(IN$):IF
        A$=CHR$(8) AND INPUTLENG
        TH THEN LOCATE ,POS(0)-1
        :PRINT" ";:LOCATE ,POS(
        0)-2:IN$=LEFT$(IN$,INPUT
        LENGTH-1):GOTO 1850
LA 1880 IF A$=CHR$(13) THEN PRIN
        T" ":IN=VAL(IN$):RETURN
MN 1890 IF A$<"0" OR A$>"9" OR I
        NPUTLENGTH=MAXINPUTLENGT
        H THEN 1860
PE 1900 PRINT A$;:IN$=IN$+A$:GOT
        O 1850
PC 1910 :
MN 1920 REM input alphanumerics
QI 1930 :
DK 1940 IN$="":IN=POS(0):PRINT S
        PACE$(79-IN);:LOCATE, IN
IA 1950 COLOR 0,7:PRINT" ";:COLO
        R 7,0:LOCATE ,POS(0)-1
FB 1960 A$=INKEY$:IF LEN(A$)<>1
        THEN 1960
NC 1970 INPUTLENGTH=LEN(IN$):IF
        A$=CHR$(8) AND INPUTLENG
        TH THEN LOCATE ,POS(0)-1
        :PRINT" ";:LOCATE ,POS(
        0)-2:IN$=LEFT$(IN$,INPUT
        LENGTH-1):GOTO 1950
JG 1980 IF A$=CHR$(13) THEN PRIN
        T" ":RETURN
LB 1990 IF A$<" " OR INPUTLENGTH
        =MAXINPUTLENGTH THEN 196
        0
AE 2000 PRINT A$;:IN$=IN$+A$:GOT
        O 1950
QB 2010 :
KH 2020 REM input yes/no
OH 2030 :
PA 2040 MAXINPUTLENGTH=3:CCOL=PO
        S(0):PRINT:CROW=CSRLIN-1
        :LOCATE CROW,CCOL:GOSUB
        1940:IN$=CHR$(ASC(LEFT$(
        IN$+" ",1)) AND 223):IF
        IN$="Y" OR IN$="N" THEN
        IN=-(IN$="Y"):RETURN ELS
        E LOCATE CROW,CCOL:GOTO
        2040
PN 2050 :
IM 2060 REM input application
PD 2070 :
CA 2080 TEMP=CVI(CAPPS$)
NB 2090 GOSUB 2580:FOR I=1 TO NU
        MAPPS:PRINT TAB(12);I;")
        ";:IF (CVI(CAPPS$) AND
        2^(I-1))>0 THEN COLOR 0,
        7
II 2100 PRINT APPS$(I):COLOR 7,0
        :NEXT
OP 2110 LOCATE 20,12:PRINT"Selec
        t/deselect from the abov
        e:";:MAXINPUTLENGTH=2:GO
        SUB 1840:IF IN$="" THEN
        RETURN
PG 2120 IF IN>NUMAPPS OR IN=0 TH
        EN 2110
DI 2130 IF (2^(IN-1) AND TEMP)>0
         THEN TEMP=TEMP AND NOT(
        2^(IN-1)) ELSE TEMP=TEMP
         OR 2^(IN-1)
FF 2140 CAPPS$=MKI$(TEMP):GOTO 2
        090
PP 2150 :
EH 2160 REM input computer
PF 2170 :
JL 2180 TEMP=CVI(CCOMPS$)
EA 2190 GOSUB 2580:FOR I=1 TO NU
        MCOMPS:PRINT TAB(12);I;"
        ) ";:IF (CVI(CCOMPS$) AN
        D 2^(I-1))>0 THEN COLOR
        0,7
AB 2200 PRINT COMPS$(I):COLOR 7,
        0:NEXT
QB 2210 LOCATE 20,12:PRINT"Selec
        t/deselect from the abov
        e:";:MAXINPUTLENGTH=2:GO
        SUB 1840:IF IN$="" THEN
        RETURN
AB 2220 IF IN>NUMCOMPS OR IN=0 T
        HEN 2210
IG 2230 IF (2^(IN-1) AND TEMP)>0
         THEN TEMP=TEMP AND NOT(
        2^(IN-1)) ELSE TEMP=2^(I
        N-1) OR TEMP
CP 2240 CCOMPS$=MKI$(TEMP):GOTO
        2190
PB 2250 :
HJ 2260 REM check for key press
PH 2270 :
MG 2280 SERROR=0:TEMP$=INKEY$:IF
         TEMP$="" THEN RETURN
PR 2290 IF TEMP$=" " THEN WHILE
        INKEY$<>" ":WEND:RETURN
OA 2300 IF TEMP$=CHR$(13) AND PR
        INTER=0 THEN SERROR=1
IF 2310 RETURN
PK 2320 :
NE 2330 REM input date, store in
         in$
PA 2340 :
HN 2350 PRINT"Date (Mon-YR):";:M
        AXINPUTLENGTH=6:GOSUB 19
        40:IF IN$="" THEN RETURN
JI 2360 F=0:FOR IN=1 TO 12:IF LE
        FT$(IN$,3)=MONTHS$(IN) T
        HEN IN$=MONTHS$(IN)+RIGH
        T$(IN$,3):F=1
PI 2370 NEXT:IF F=1 AND MID$(IN$
        ,4,1)=" " THEN IN$=IN$+S
        PACE$(4):RETURN
IE 2380 PRINT"Date was not the c
        orrect format: use Mon-Y
        R; i.e., Jan 85":PRINT:G
        OTO 2350
QP 2390 :
FD 2400 REM transfer from record
         strings to current stri
        ngs
PJ 2410 :
HK 2420 CNEXTREC$=RNEXTREC$:CAPP
        S$=RAPP$:CCOMPS$=RCOMP$:
        CNAME$=RNAME$:CDATE$=RDA
        TE$:CPAGE$=RPAGE$:CCOMME
        NT$=RCOMMENT$:RETURN
PP 2430 :
OD 2440 REM transfer from curren
        t strings to record stri
        ngs
PF 2450 :
OJ 2460 LSET RNEXTREC$=CNEXTREC$
        :LSET RAPP$=CAPPS$:LSET
        RCOMP$=CCOMPS$:LSET RNAM
        E$=CNAME$:LSET RDATE$=CD
        ATE$:LSET RPAGE$=CPAGE$:
        LSET RCOMMENT$=CCOMMENT$
        :RETURN
QL 2470 :
AG 2480 REM print current data
AB 2490 :
LP 2500 PRINT"Name:";CNAME$:PRIN
        T"Date:";CDATE$;" / page
        ";CVI(CPAGE$):PRINT"Comm
        ent:";CCOMMENT$
OF 2510 PRINT"Class:";:FOR I=1 T
        O NUMAPPS:IF (2^(I-1) AN
        D CVI(CAPPS$))>0 THEN PR
        INT " ";APPS$(I);",";
HE 2520 NEXT:LOCATE ,POS(0)-1:PR
        INT" "
FO 2530 PRINT"Computers:";:FOR I
        =1 TO NUMCOMPS:IF (2^(I-
        1) AND CVI(CCOMPS$))>0 T
        HEN PRINT " ";COMPS$(I);
        ",";
QP 2540 NEXT:LOCATE ,POS(0)-1:PR
        INT" ":PRINT:RETURN
PH 2550 :
BO 2560 REM clear the screen
QN 2570 :
HH 2580 CLS:LOCATE 1,(40-LEN(TIT
        LE$)/2):PRINT TITLE$:LOC
        ATE 1,1:IF PRINTER THEN
        PRINT"Printer on"
```

```
NA 2590 LOCATE 3,1:RETURN
PK 2600 :
HO 2610 REM press return prompt
PA 2620 :
NB 2630 SERROR=0:PRINT"Press ENT
        ER:";:MAXINPUTLENGTH=0:G
        OSUB 1940:IF ASC(LEFT$(I
        N$+" ",1)) AND 223=ASC("
        Q") THEN SERROR=1
JE 2640 RETURN
QJ 2650 :
OL 2660 REM output to printer
QP 2670 :
IN 2680 LPRINT CNAME$;TAB(50);CD
        ATE$;" / page:";CVI(CPAG
        E$):RETURN
AF 2690 :
BJ 2700 REM allocate a new recor
        d
PP 2710 :
GK 2720 GET #1,1:INTREC=CVI(RNEX
        TREC$):IF INTREC<>0 THEN
         2760
DP 2730 INTREC=CVI(RPAGE$):INTRE
        C=INTREC+1:LSET RPAGE$=M
        KI$(INTREC):PUT#1,1
LB 2740 RETURN :REM variable INT
        REC holds the place of t
        he next blank record
FF 2750 REM use this code if the
         there have been deleted
         records
FP 2760 GET#1,INTREC:TEMP$=RNEXT
        REC$:GET#1,1:LSET RNEXTR
        EC$=TEMP$:PUT#1,1
KP 2770 RETURN
AE 2780 :
GP 2790 REM Error handling routi
        nes
PO 2800 :
JB 2810 IF ERR=53 THEN NOFILE=1:
        RESUME 420
MG 2820 ON ERROR GOTO 0:END
```

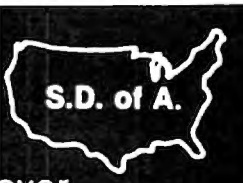
Program 2: Magazine Indexer for Apple II

Version by Todd Koumrian

For instructions on entering this listing, please refer to "COMPUTE!'s Guide to Typing In Programs" in this issue of COMPUTE!.

```
FF 30 :
C2 40 REM TITLE PAGE
03 41 :
4E 50 HOME
0E 60 VTAB 7: HTAB 12: PRINT "TH
      E INDEX PROGRAM"
93 90 VTAB 11: HTAB 12: PRINT "O
      NE MOMENT PLEASE"
18 99 :
C0 100 REM INITIALIZATION
AF 101 :
BE 110 READ N1,N0,NC,NA,NK,NS
24 120 CR$ = CHR$ (13):DL$ = CHR
       $ (8):D$ = CHR$ (4):I$ =
       CHR$ (9):N2 = 13:N3 = N2
       + 41:N6 = N3 + 7:N5 = N6
       + 6:UL$ = CHR$ (95)
60 130 FL = 100:ED = 2:PP = 0:Z$
        = "INDEX1.DAT"
09 140 MN = N3 - N2 - 1:MC = FL
       - N5:ML = 1:LF$ = CHR$ (1
       0)
4E 150 DIM I$(N1),SS$(N0),C$(NC)
       ,A$(NA),TK$(NK),TS$(NS),M
       $(11),L%(1500),GB%(9)
62 160 FOR I = 0 TO N1: READ I$(
       I): NEXT
D3 170 FOR I = 0 TO N0: READ SS$
       (I): NEXT : FOR I = 0 TO
       NC: READ C$(I): NEXT
F9 180 FOR I = 0 TO NA: READ A$(
       I): NEXT : FOR I = 0 TO N
       K: READ TK$(I): NEXT
FE 190 FOR I = 0 TO NS: READ TS$
       (I): NEXT : FOR I = 0 TO
       11: READ M$(I): NEXT
78 191 FOR I = 773 TO 799: READ
       A: POKE I,A: NEXT
4F 198 PRINT : HTAB 10
CF 199 PRINT "IS THIS A COLD STA
       RT? ";:ML = 3: GOSUB 1740
       : IF ID THEN 250
01 200 PRINT D$"OPEN INDEX POINT
       ERS":: PRINT D$"READ INDE
       X POINTERS": INPUT RL,NF
38 210 FOR I = 1 TO NF: INPUT L%
       (I): NEXT : PRINT D$"CLOS
       E INDEX POINTERS"
90 220 PRINT D$"OPEN "Z$",L"FL:
       PRINT D$"CLOSE"
D6 239 :
54 240 REM MAIN MENU
B8 241 :
B0 250 IF NF = 0 THEN IN = 1: GO
       TO 290
F5 260 JK = 0: GOSUB 2270: FOR I
        = 0 TO N1: HTAB 15: PRIN
       T I + 1") "I$(I): NEXT
A8 270 PRINT : HTAB 15: PRINT "C
       OMMAND:";: GOSUB 1570
40 280 IF IN < 1 OR IN > N1 + 1
       THEN 250
F8 290 JK = IN: ON IN GOSUB 310,
       530,850,990,1080,1510,153
       0: GOTO 250
E2 299 :
6F 300 REM ADD DATA
B1 301 :
10 310 GOSUB 2270: GOSUB 2090: P
       RINT :DT$ = F1$: IF S THE
       N RETURN
DE 320 GOSUB 2270: PRINT "NAME:"
       ;:ML = MN: GOSUB 1650:AR$
        = IN$: IF IN$ = "" THEN
       RETURN
17 330 PRINT "PAGE:";:ML = 3: GO
       SUB 1570:PG = IN: IF IN$
       = "" THEN 320
5D 340 GOSUB 2270: GOSUB 1820: I
       F S THEN 320
57 350 GOSUB 2270: GOSUB 1910: I
       F S THEN 320
08 360 GOSUB 2270: PRINT "COMMEN
       T:";:ML = MC: GOSUB 1650:
        IF IN$ = "" THEN IN$ = "
       NONE"
E1 370 CM$ = IN$
77 380 T0$ = STR$ (P1):T1$ = STR
       $ (C1):T6$ = STR$ (PG)
D2 390 GOSUB 2000
50 400 I = 1: PRINT : PRINT "SEA
       RCHING FOR INSERTION POIN
       T"
A8 410 IF L%(I) = 0 THEN 450
9C 420 FP = L%(I):BY = N2: GOSUB
        2
85 425 INPUT A$: IF AR$ > A$ THE
       N I = I + 1: GOTO 410
D7 430 GOSUB 2020: PRINT "CONDUC
       TING INSERT:";
70 440 FOR J = NF + 1 TO I STEP
       - 1:L%(J + 1) = L%(J): NE
       XT : PRINT "COMPLETE"
78 450 GOSUB 2020:L%(I) = RL + 2
F2 460 FP = L%(I): GOSUB 2000: P
       RINT D$"WRITE"Z$",R"FP": P
       RINT T0$CR$T1$CR$;
60 470 PRINT D$"WRITE"Z$",R"FP",
       B"N2: PRINT AR$CR$;
86 480 PRINT D$"WRITE"Z$",R"FP",
       B"N3: PRINT DT$CR$;: PRIN
       T D$"WRITE"Z$",R"FP",B"N6
       : PRINT T6$CR$;
24 490 PRINT D$"WRITE"Z$",R"FP",
       B"N5: PRINT CM$CR$;
61 500 GOSUB 2020:NF = NF + 1:RL
        = RL + 1: IF JK = ED THE
       N RETURN
93 510 GOTO 320
D5 519 :
D1 520 REM EDIT
B7 521 :
81 530 GOSUB 2270:L = 1: PRINT "
       NAME:";:ML = MN: GOSUB 16
       50:T4$ = IN$: IF IN$ = ""
        THEN RETURN
CA 540 VTAB 6: PRINT "SCANNING F
       OR FILE:": GOSUB 2000: FO
       R I = L TO NF:FM = I:FP =
        L%(I)
2A 550 BY = N2: GOSUB 2: INPUT A
       R$
27 560 IF LEFT$ (AR$, LEN (T4$))
       = T4$ THEN I = 1E + 4
D1 570 NEXT : GOSUB 2020: IF I <
        1E + 4 THEN VTAB 6: HTAB
        19: PRINT "NOT FOUND": P
       RINT : GOTO 2320
F8 580 VTAB 6: HTAB 19: PRINT "F
       OUND"
EA 590 I = FM: GOSUB 2000: GOSUB
        2160: GOSUB 2020: PRINT
       : GOSUB 2200
A4 600 PRINT : PRINT "MAKE ANY C
       HANGES? ";: GOSUB 1740: I
       F ID THEN 630
C8 610 IF FM = NF THEN RETURN
3A 620 L = FM + 1: GOSUB 2270: G
       OTO 540
C6 630 GOSUB 2270: PRINT : PRINT
        "NAME:"AR$
1C 640 PRINT : PRINT "NAME:";:ML
        = MN: GOSUB 1650: IF IN$
       = "" THEN IN$ = AR$
D7 650 T4$ = IN$
14 660 GOSUB 2270: PRINT "DATE:"
       DT$: PRINT : GOSUB 2090:T
       5$ = IN$: IF IN$ = "" THE
       N T5$ = DT$
3F 670 GOSUB 2270: PRINT : PRINT
        "PAGE:"PG: PRINT : PRINT
        "PAGE:";:ML = 3: GOSUB 1
       570: IF IN = 0 THEN IN =
       PG
1E 680 T6$ = STR$ (IN)
1B 690 GOSUB 2270: PRINT "COMMEN
       T:"CM$
C5 700 PRINT : PRINT "COMMENT:";
       :ML = MC: GOSUB 1650: IF
       IN$ = "" THEN IN$ = CM$
81 710 T7$ = IN$
C3 720 T8 = T1: GOSUB 2270: GOSU
       B 1820:T8 = 0
83 730 T0$ = STR$ (P1): IF IN$ =
        "" THEN T0$ = STR$ (T1)
F8 740 T1 = VAL (T0$): IF S = 1
       AND IN$ < > "" THEN 720
2D 750 T8 = T2: GOSUB 2270: GOSU
       B 1910:T8 = 0:T1$ = STR$
       (C1)
10 760 IF IN$ = "" THEN T1$ = ST
       R$ (T2)
2F 770 T2 = VAL (T1$): IF S = 1
       AND IN$ < > "" THEN 750
F4 780 GOSUB 2270
0A 790 PRINT "NAME:"T4$: PRINT "
       DATE:"T5$" / PAGE: "T6$:
       PRINT "COMMENT:"T7$:T3 =
       T1
CD 800 GOSUB 2210
EA 810 PRINT : PRINT "IS THIS CO
       RRECT? ";: GOSUB 1740: IF
        ID = 0 THEN 590
EC 820 P1 = VAL (T0$):C1 = VAL (
       T1$):AR$ = T4$:DT$ = T5$:
       PG = VAL (T6$):CM$ = T7$
```

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```
40 830 K = FM: GOSUB 930: GOSUB
       390: RETURN
DC 839 :
1A 840 REM DELETE DATA
BE 841 :
DC 850 GOSUB 2270:K = 0
2A 860 PRINT "NAME:";:ML = MN: G
       OSUB 1650:T4$ = IN$: IF I
       N$ = "" THEN RETURN
25 870 GOSUB 2000: FOR I = 1 TO
       NF:FP = L%(I):J = I:BY =
       N2: GOSUB 2: INPUT AR$
C3 880 IF LEFT$ (AR$, LEN (T4$))
        < > T4$ THEN 920
75 890 PRINT : GOSUB 2160
72 900 GOSUB 2200: GOSUB 2020: P
       RINT : PRINT "DELETE THIS
        FILE? ";: GOSUB 1740: GO
       SUB 2000
07 910 IF ID THEN K = I:I = 1E +
        6
1E 920 NEXT : GOSUB 2020: IF I <
        1E + 6 THEN PRINT : PRIN
       T "NO FILE DELETED": PRIN
       T : GOSUB 2320: RETURN
97 925 PRINT : PRINT "CONDUCTING
        DELETE:";
68 930 IF K = NF - 1 THEN 950
03 940 FOR J = K + 1 TO NF:L%(J
       - 1) = L%(J): NEXT
AA 950 NF = NF - 1
0F 960 PRINT "COMPLETE": IF JK <
       > ED THEN PRINT : GOSUB
       2320
27 970 RETURN
E5 979 :
14 980 REM LIST FILES
C7 981 :
56 990 GOSUB 2270: IF PP = 0 THE
       N 1010
A3 1000 PRINT D$"PR#"SN: PRINT T
       K$(4)LF$CR$
E0 1010 GOSUB 2000: FOR I = 1 TO
        NF: GOSUB 2160: IF S1 T
       HEN I = NF + 1: GOTO 105
       0
C2 1020 IF PP THEN GOSUB 2350: G
       OTO 1040
41 1030 GOSUB 2200
5D 1040 GOSUB 2040
42 1050 NEXT : GOSUB 2020: PRINT
        D$"PR#0": IF S1 THEN HT
       AB 12: PRINT "LIST TERMI
       NATED"
7E 1060 PRINT : GOTO 2320
67 1069 :
19 1070 REM SEARCH FILES
2B 1071 :
80 1080 GOSUB 2270
EA 1090 FOR I = 0 TO N0 - 1: HTA
       B 12: PRINT I + 1") BY "
       SS$(I): NEXT
3B 1100 HTAB 12: PRINT N0 + 1")
       "SS$(N0)
67 1110 PRINT : HTAB 12: PRINT "
       COMMAND:";: GOSUB 1570
5E 1120 IF IN = 6 OR IN = 0 THEN
        RETURN
68 1130 IF IN < 1 OR IN > N0 + 1
        THEN 1080
8F 1140 JS = IN - 1: ON IN GOSUB
       1160,1260,1320,1390,144
       0: PRINT D$"PR#0": GOTO
       1080
61 1149 :
6E 1150 REM :BY COMPUTER
25 1151 :
31 1160 GOSUB 2280: GOSUB 1910:
       IF S = 1 THEN RETURN
80 1170 PRINT : GOSUB 2090:S2 =
       S: IF PP THEN GOSUB 2380
F4 1175 POKE 768,C1 - INT (C1 /
       256) * 256: POKE 769,C1
       / 256
C0 1180 GOSUB 2280: GOSUB 2000:
       FOR I = 1 TO NF: GOSUB 2
       160: POKE 770,T2 - INT (
       T2 / 256) * 256: POKE 77
       1,T2 / 256: CALL 773: IF
        PEEK (772) = 0 THEN 123
       0
D0 1190 IF S2 = 0 AND DT$ < > F1
       $ THEN 1230
AE 1200 IF PP THEN GOSUB 2350: G
       OTO 1220
3D 1210 GOSUB 2200
77 1220 GOSUB 2040: IF S1 THEN I
        = NF + 1
32 1230 NEXT : GOSUB 2020: IF S1
        THEN PRINT : PRINT "SEA
       RCH TERMINATED"
7A 1240 PRINT : GOTO 2320
63 1249 :
A1 1250 REM :BY CLASS
27 1251 :
43 1260 GOSUB 2280: GOSUB 1820:
       IF S = 1 THEN RETURN
8F 1270 PRINT : GOSUB 2090:S2 =
       S: IF PP THEN GOSUB 2380
B6 1275 POKE 768,P1 - INT (P1 /
       256) * 256: POKE 769,P1
       / 256
68 1280 GOSUB 2280: GOSUB 2000:
       FOR I = 1 TO NF: GOSUB 2
       160: POKE 770,T1 - INT (
       T1 / 256) * 256: POKE 77
       1,T1 / 256: CALL 773: IF
        PEEK (772) = 0 THEN 123
       0
D2 1290 IF S2 = 0 AND DT$ < > F1
       $ THEN 1230
54 1300 GOTO 1200
55 1309 :
34 1310 REM :BY COMPUTER AND CLA
       SS
19 1311 :
25 1320 GOSUB 2280: GOSUB 1910:
       IF S = 1 THEN RETURN
2E 1330 GOSUB 2280: GOSUB 1820:
       IF S = 1 THEN GOSUB 2380
85 1340 PRINT : GOSUB 2090:S2 =
       S: IF PP THEN GOSUB 2380
23 1342 GOSUB 2280: GOSUB 2000:
       FOR I = 1 TO NF
EC 1345 POKE 768,C1 - INT (C1 /
       256) * 256: POKE 769,C1
       / 256
E2 1350 GOSUB 2160: POKE 770,T2
       - INT (T2 / 256) * 256:
       POKE 771,T2 / 256: CALL
       773: IF PEEK (772) = 0 T
       HEN 1230
B0 1355 POKE 768,P1 - INT (P1 /
       256) * 256: POKE 769,P1
       / 256
61 1360 GOSUB 2160: POKE 770,T1
       - INT (T1 / 256) * 256:
       POKE 771,T1 / 256: CALL
       773: IF PEEK (772) = 0 O
       R (S2 = 0 AND DT$ < > F1
       $) THEN 1230
70 1370 GOTO 1200
71 1379 :
04 1380 REM :ISSUE
35 1381 :
21 1390 GOSUB 2280: PRINT "ISSUE
       ";: GOSUB 2090:DT$ = F1
       $: IF S THEN RETURN
87 1400 IF PP THEN GOSUB 2380
EB 1410 GOSUB 2280: GOSUB 2000:
       FOR I = 1 TO NF: GOSUB 2
       160: IF DT$ < > IN$ THEN
        1230
5E 1420 GOTO 1200
5F 1429 :
A4 1430 REM :TITLE
23 1431 :
BB 1440 GOSUB 2280: PRINT "TITLE
       :";:ML = MN: GOSUB 1650:
       T1$ = IN$: IF IN$ = "" T
       HEN RETURN
99 1450 GOSUB 2090:S2 = S: IF PP
        THEN GOSUB 2380
34 1460 GOSUB 2280: GOSUB 2000
3A 1470 FOR I = 1 TO NF: GOSUB 2
       160: IF LEFT$ (AR$, LEN
       (T1$)) < > T1$ THEN 1230
D2 1480 IF S2 = 0 AND DT$ < > F1
       $ THEN 1230
7A 1490 GOTO 1200
7B 1499 :
5B 1500 REM CHANGE PRINTER MODES
19 1501 :
78 1510 IF PP = 0 THEN PRINT : P
       RINT "WHAT SLOT FOR PRIN
       TER:";: GOSUB 1560:SN =
       IN: IF IN > 7 OR IN < 1
       THEN RETURN
0F 1515 PP = 1 - PP: RETURN
5D 1519 :
6C 1520 REM QUIT
21 1521 :
4E 1530 HOME
F9 1540 PRINT D$"OPEN INDEX POIN
       TERS ": PRINT D$"WRITE I
       NDEX POINTERS": PRINT RL
       ;CR$;NF;CR$;: FOR I = 1
       TO NF
03 1550 PRINT L%(I)CR$;: NEXT :
       PRINT D$"CLOSE": END
6D 1559 :
12 1560 REM INPUT NUMBER
31 1561 :
E7 1570 IN$ = ""
36 1580 PRINT UL$;: CALL - 868:
       PRINT DL$;
9A 1590 WAIT - 16384,128:A$ = CH
       R$ ( PEEK ( - 16384) - 1
       28): POKE - 16368,0
DA 1600 ZL = LEN (IN$): IF A$ =
       DL$ AND ZL > 1 THEN PRIN
       T A$;:IN$ = LEFT$ (IN$,Z
       L - 1): GOTO 1580
D4 1605 IF A$ = DL$ AND ZL = 1 T
       HEN IN$ = "": PRINT A$;:
        GOTO 1580
0B 1610 IF A$ = CR$ THEN PRINT "
       ":IN = VAL (IN$):ML = 1
       : RETURN
01 1620 IF A$ < "0" OR A$ > "9"
       OR ZL = ML THEN 1590
25 1630 PRINT A$;:IN$ = IN$ + A$
       : GOTO 1580
67 1639 :
E1 1640 REM INPUT LETTERS AND SO
        ON
2B 1641 :
E1 1650 IN$ = ""
36 1660 PRINT UL$;: CALL - 868:
       PRINT DL$;
94 1670 WAIT - 16384,128:A$ = CH
       R$ ( PEEK ( - 16384) - 1
       28): POKE - 16368,0
9A 1680 ZL = LEN (IN$): IF A$ =
       DL$ AND ZL > 1 THEN PRIN
       T A$;:IN$ = LEFT$ (IN$,Z
       L - 1): GOTO 1660
C4 1685 IF A$ = DL$ AND ZL = 1 T
       HEN IN$ = "": PRINT A$;:
        GOTO 1660
F8 1690 IF A$ = CR$ THEN PRINT "
       ":ML = 1: RETURN
E7 1700 IF ZL = ML THEN 1660
1A 1710 IF (A$ < " " OR A$ > "9"
       ) AND (A$ < ";" OR A$ >
       CHR$ (91)) OR A$ = "," O
       R ZL = ML THEN 1670
C2 1720 PRINT A$;:IN$ = IN$ + A$
       : GOTO 1660
```

```
65 1729 :
83 1730 REM INPUT YES/NO
29 1731 :
DF 1740 IN$ = ""
2E 1750 PRINT UL$;: CALL - 868:
        PRINT DL$;
92 1760 WAIT - 16384,128:A$ = CH
        R$ ( PEEK ( - 16384) - 1
        28): POKE - 16368,0
78 1770 ZL = LEN (IN$): IF A$ =
        DL$ AND ZL > 1 THEN PRIN
        T A$;:IN$ = LEFT$ (IN$,Z
        L - 1): GOTO 1750
B2 1775 IF A$ = DL$ AND ZL = 1 T
        HEN IN$ = "": PRINT A$;:
         GOTO 1750
5E 1780 IF A$ = CR$ AND ZL THEN
        PRINT " ":ID = ( LEFT$ (
        IN$,1) = "Y"): RETURN
48 1790 IF A$ < "A" OR A$ > "Y"
        OR ZL = 3 THEN 1760
9C 1800 PRINT A$;:IN$ = IN$ + A$
        : GOTO 1750
5F 1809 :
36 1810 REM INPUT APPLICATION
23 1811 :
9E 1820 S = 1: VTAB 3: FOR I = 0
         TO NA: HTAB 12: PRINT I
         + 1") "A$(I): NEXT : IF
         T8 = 0 THEN 1860
BD 1830 T9 = T8: FOR I = NA TO 0
        STEP - 1: CALL - 998: I
        F T9 - 2 ^ I < 0 THEN 18
        50
0D 1840 INVERSE : HTAB 12: PRINT
         I + 1;:T9 = T9 - 2 ^ I
3C 1850 NEXT : NORMAL
F8 1860 VTAB 14: HTAB 12: PRINT
        "WHICH OF ABOVE:";: CALL
        - 868:ML = NA + 1: GOSU
        B 1570: IF IN$ = "" THEN
         RETURN
41 1865 FOR I = 0 TO 9:GB%(I) =
        1: NEXT
F6 1870 P1 = 0: FOR I = 1 TO LEN
         (IN$):IN = VAL ( MID$ (
        IN$,I,1))
F3 1875 IF GB%(IN - 1) = 0 THEN
        1892
04 1880 IF (IN - 1) > NA OR IN =
         0 THEN VTAB 14: HTAB 12
        : PRINT " ILLEGAL ENTRY"
        : GOTO 1820
D2 1890 P1 = (2 ^ (IN - 1)) + P1
        :GB%(IN - 1) = 0
5D 1892 NEXT :S = 0: RETURN
03 1899 :
59 1900 REM INPUT COMPUTER
21 1901 :
AB 1910 S = 1: VTAB 3: FOR I = 0
         TO NC: HTAB 12: PRINT I
         + 1") "C$(I): NEXT : IF
         T8 = 0 THEN 1950
B5 1920 T9 = T8: FOR I = NC TO 0
        STEP - 1: CALL - 998: I
        F T9 - 2 ^ I < 0 THEN 19
        40
0B 1930 INVERSE : HTAB 12: PRINT
         I + 1;:T9 = T9 - 2 ^ I
3A 1940 NEXT : NORMAL
37 1950 VTAB 14: HTAB 12: PRINT
        "WHICH OF ABOVE:";: CALL
        - 868:ML = NC + 1: GOSU
        B 1570: IF IN$ = "" THEN
         RETURN
27 1952 FOR I = 0 TO 9:GB%(I) =
        1: NEXT
24 1960 C1 = 0: FOR I = 1 TO LEN
        (IN$):IN = VAL ( MID$ (
        IN$,I,1))
81 1970 IF (IN - 1) > NC OR IN =
         0 THEN VTAB 14: HTAB 12
        : PRINT " ILLEGAL ENTRY"
        : GOTO 1910
74 1975 IF GB%(IN) = 0 THEN 1982
CB 1980 C1 = (2 ^ (IN - 1)) + C1
        :GB%(IN - 1) = 0
5B 1982 NEXT :S = 0: RETURN
81 1989 :
48 1990 REM OPEN FILE
45 1991 :
E3 2000 PRINT D$"OPEN "Z$",L"FL:
        RETURN
50 2009 :
38 2010 REM CLOSE FILE(S)
14 2011 :
90 2020 PRINT D$"CLOSE": RETURN
58 2029 :
0B 2030 REM WAIT FOR KEY PRESSIN
        G
1C 2031 :
B5 2040 S1 = 0: IF PEEK ( - 1638
        4) < 128 THEN RETURN
14 2045 A$ = CHR$ ( PEEK ( - 163
        84) - 128): POKE - 16368
        ,0
2D 2050 IF A$ = " " THEN POKE 10
        24,32: WAIT - 16384,128:
         POKE - 16368,0: POKE 10
        24,160: RETURN
7E 2060 IF A$ = CR$ AND PP = 0 T
        HEN S1 = 1
EE 2070 RETURN
6C 2079 :
68 2080 REM INPUT DATE, STORE IN
        F1$
30 2081 :
98 2090 S = 1: PRINT "DATE (MON"
        CHR$ (95)"YR):";:ML = 6
        : GOSUB 1650: IF IN$ = "
        " THEN RETURN
74 2100 FOR IN = 0 TO 11: IF LEF
        T$ (IN$,3) = M$(IN) THEN
         IN = 1E + 3
C6 2110 NEXT : IF IN < 15 THEN 2
        130
14 2120 IF MID$ (IN$,4,1) = " "
        THEN 2140
15 2130 PRINT "NOT CORRECT FORMA
        T": PRINT : GOTO 2090
FB 2140 S = 0:F1$ = IN$: RETURN
62 2149 :
A1 2150 REM GET DISK DATA
26 2151 :
5D 2160 FP = LX%(I):BY = 0: GOSUB
         2
BF 2162 INPUT I1$,I2$:BY = N2: G
        OSUB 2: INPUT AR$
FF 2163 T1 = VAL (I1$):T2 = VAL
        (I2$)
DE 2170 BY = N3: GOSUB 2: INPUT
        DT$:BY = N6: INPUT PG$
63 2171 PG = VAL (PG$)
1F 2180 BY = N5: GOSUB 2: INPUT
        CM$: RETURN
72 2189 :
27 2190 REM PRINT DATA
36 2191 :
24 2200 PRINT "NAME:"AR$: PRINT
        "DATE:"DT$" / PAGE:"PG:
        PRINT "COMMENT:"CM$:T3 =
         T1
AD 2210 PRINT "CLASS:";: FOR J =
         NA TO 0 STEP - 1:M = 2
        ^ J: IF T1 - M = > 0 THE
        N T1 = T1 - M: PRINT A$(
        J)",";
1F 2220 NEXT : PRINT DL$" ":T1 =
        T3
8F 2230 PRINT "COMPUTERS:";:T3 =
        T2
A0 2240 FOR J = NC TO 0 STEP - 1
        :M = 2 ^ J: IF T2 - M =
        > 0 THEN T2 = T2 - M: PR
        INT C$(J);",";
0B 2250 NEXT : PRINT DL$" ":T2 =
        T3: PRINT : RETURN
68 2259 :
5A 2260 REM CLEAR SCREEN
2C 2261 :
95 2270 HOME : PRINT SPC( 20 - L
        EN (TK$(JK)) / 2)TK$(JK)
        : GOTO 2290
9A 2280 HOME : PRINT SPC( 15 - L
        EN (TS$(JS)) / 2)"SEARCH
         BY "TS$(JS)
44 2290 VTAB 1: IF PP THEN INVER
        SE : PRINT "PRINTER";: N
        ORMAL
63 2300 PRINT : PRINT : PRINT :
        RETURN
56 2309 :
EA 2310 REM PRESS RETURN
1A 2311 :
65 2320 S1 = 0: HTAB 13: PRINT "
        PRESS RETURN:";: GOSUB 1
        650: IF LEFT$ (IN$,1) =
        "Q" THEN S1 = 1
E4 2330 RETURN
62 2339 :
68 2340 REM OUTPUT TO PRINTER
26 2341 :
9E 2350 PRINT D$"PR#"SN: PRINT A
        R$;
F9 2360 PRINT TAB( 50)DT$" / PAG
        E:"PG: PRINT : PRINT D$"
        PR#0"
F4 2370 RETURN
CB 2380 PRINT D$"PR#"SN: PRINT "
        SEARCH BY "TS$(JS)LF$CR$
2C 2390 PRINT D$"PR#0": RETURN
7A 2399 :
92 2400 REM DATA
18 2401 :
D6 2410 DATA 6,5,8,8,5,4
2E 2420 DATA "ADD","EDIT","DELET
        E","LIST","SEARCH","PRIN
        TER MODE","QUIT"
A0 2430 DATA "COMPUTER","CLASS",
        "COMPUTER AND CLASS","IS
        SUE","TITLE","RETURN"
46 2440 DATA "COMMODORE64","COMM
        ODORE 128","AMIGA","TI-9
        9/4A","APPLE","ATARI"
42 2450 DATA "IBM PC/PCJR","ATAR
        I ST","GENERAL"
FC 2460 DATA "GAME","UTILITY","A
        PPLICATION","SUBROUTINE"
        ,"DATASORT"
28 2470 DATA "MACHINE LANGUAGE",
        "REVIEW","LANGUAGE","GEN
        ERAL INTEREST"
95 2480 DATA "INDEXER","ADD A RE
        CORD","EDIT A RECORD","D
        ELETE A RECORD"
C4 2490 DATA "LIST FILES","SEARC
        H SYSTEMS"
50 2500 DATA "COMPUTER","CLASS",
        "COMPUTER AND CLASS","IS
        SUE","TITLE"
B8 2510 DATA "JAN","FEB","MAR","
        APR","MAY"
80 2520 DATA "JUN","JUL","AUG","
        SEP","OCT","NOV","DEC"
ED 2530 DATA 169,0,141,4,3,173,0
        ,3,45,2,3,208,8,173,1,3,
        45,3,3,240,5,169,1,141,4
        ,3,96
```

Program 3: Magazine Indexer for Atari ST

Version by Patrick Parrish, Programming Supervisor

```
90      ON ERROR GOTO 2820
95      POKE CONTRL,123:POKE CONT
```

```
      RL+2,0:POKE CONTRL+6,0
97    VDISYS(0):REM TURN OFF MO
      USE CURSOR
100   DIM COL%(16):FOR J=0 TO 1
      5:READ COL%(J):NEXT
110   DATA 1911,1792,96,300,7,8
      0,5,1365,546,119,85,1360,
      1799,1904,1285,0
120   DEFDBL P:PTR=1114:POKE PT
      R,VARPTR(COL%(0))
150   REM Title Page
180   DEFINT A-Z:OPTION BASE 1
190   file$="INDEX1.DAT":FULLW
      2:CLEARW 2:WIDTH 80:COLOR
       1
200   GOTOXY 23,5:PRINT"The Mag
      azine Indexer"
210   GOTOXY 24,7:PRINT"Data Ba
      se Program"
220   GOTOXY 24,11:PRINT"One Mo
      ment Please"
240   REM initialization
260   READ NUMMAINMENU:DIM MAIN
      MENU$(NUMMAINMENU),TITLES
      $(NUMMAINMENU)
265   FOR I=1 TO NUMMAINMENU:RE
      AD MAINMENU$(I):NEXT
266   DATA 7,"Add","Edit","Dele
      te","List","Search","Prin
      ter Mode","Quit"
270   FOR I=1 TO NUMMAINMENU:RE
      AD TITLES$(I):NEXT
275   DATA "Add a Record","Edit
       a Record","Delete a Reco
      rd","List Files"
276   DATA "Search Records",,"L
      eave INDEX"
280   READ NUMSEARCH:DIM SEARCH
      $(NUMSEARCH),SEARCHTITLES
      $(NUMSEARCH)
285   FOR I=1 TO NUMSEARCH:READ
       SEARCH$(I):next i
286   DATA 6,"computer","class"
      ,"computer and class","is
      sue","title","return"
290   FOR I=1 TO NUMSEARCH:READ
       SEARCHTITLES$(I):NEXT
295   DATA "Computer","Class","
      Computer and Class","Issu
      e","Title",
300   READ NUMCOMPS
305   IF NUMCOMPS>16 THEN PRINT
      "Error; can't have >16 co
      mputers":STOP
310   DIM COMPS$(NUMCOMPS):FOR
      I=1 TO NUMCOMPS:READ COMP
      S$(I):NEXT
315   DATA 15,"Apple","Atari","
      Macintosh","Atari ST","VI
      C-20","Commodore 64"
316   DATA "Commodore 128","Com
      modore Plus/4","Commodore
       16","PET/CBM"
317   DATA "Texas Instruments",
      "IBM PC","IBM PCjr","Amig
      a","General"
320   READ NUMAPPS
325   IF NUMAPPS>16 THEN PRINT"
      Error: can't have >16 app
      lications":STOP
330   DIM APPS$(NUMAPPS):FOR I=
      1 TO NUMAPPS:READ APPS$(I
      ):NEXT
335   DATA 9,"Game","Utility","
      Application","Subroutine"
      ,"Datasort"
336   DATA "Machine Language","
      Review","Language","Gener
      al Interest"
340   DIM MONTHS$(12):FOR I=1 T
      O 12:READ MONTHS$(I):NEXT
345   DATA "Jan","Feb","Mar","A
      pr","May","Jun"
346   DATA "Jul","Aug","Sep","O
      ct","Nov","Dec"
350   NEXTLEN=2:NAMELEN=40:COMM
      ENTLEN=40:DATELEN=6
355   PAGELEN=2:APPLEN=2:COMPLE
      N=2
360   RECLEN=NEXTLEN+APPLEN+COM
      PLEN+NAMELEN+DATELEN+PAGE
      LEN+COMMENTLEN
370   CR$=CHR$(13):PRINTER=0:NO
      FILE=0
410   OPEN "R",#1,file$,RECLEN:
      GET#1,1:CLOSE #1
420   OPEN "R",#1,file$,RECLEN:
      REM assume random access
425   REM Put a space at the be
      ginning of the second and
       third lines in 430
430   FIELD #1,NEXTLEN AS RNEXT
      REC$, APPLEN AS RAPP$, CO
      MPLEN AS RCOMP$,
       NAMELEN AS RNAME$, DATEL
      EN AS RDATE$, PAGELEN AS
      RPAGE$,
            COMMENTLEN AS RCOMME
      NT$
450   REM build empty record en
      try if no file
470   IF NOFILE=0 THEN 550
480   GOTOXY 16,16:PRINT"Openin
      g data file for the first
       time"
485   FOR U=1 TO 1000:NEXT
490   REM RNEXTREC holds the ne
      xt blank record, RPAGE ho
      lds the last record
495   REM in the file, RDATE ho
      lds the date the file was
       created,
496   REM other fields are mean
      ingless
500   LSET RNEXTREC$=MKI$(0):LS
      ET RNAME$="Dummy Record":
      LSET RDATE$="Nov 86"
505   LSET RPAGE$=MKI$(1):LSET
      RCOMMENT$="Null record ch
      ain"
510   PUT #1,1
530   REM main menu
550   GET#1,1:NOFILE=(CVI(RPAGE
      $)=CVI(MKI$(1)))
555   IF NOFILE THEN MAINOPTION
      =1:GOTO 590
560   MAINOPTION=0:TITLE$="INDE
      X program":GOSUB 2580:FOR
       I=1 TO NUMMAINMENU
565   PRINT TAB(22);"(";I;") ";
      MAINMENU$(I):NEXT
570   PRINT:PRINT TAB(22);"Comm
      and: ";:INPUT IN
580   IF IN<1 OR IN>NUMMAINMENU
       THEN 550 ELSE MAINOPTION
      =IN
590   TITLE$=TITLES$(MAINOPTION
      )
595   ON MAINOPTION GOSUB 630,8
      10,1000,1140,1200,1760,18
      00:GOTO 550
610   REM add entry
630   GOSUB 2580:GOSUB 2350:PDA
      TE$=IN$:IF LEN(PDATE$)=0
      THEN RETURN
640   GOSUB 2580:PRINT"Name:";:
      INPUT PNAME$:IF LEN(PNAME
      $)>NAMELEN THEN 640
645   IF LEN(PNAME$)=0 THEN RET
      URN
650   PRINT"Page:";:INPUT PAGE$
      :PAGE=VAL(PAGE$)
652   IF LEN(PAGE$)>3 THEN CLEA
      RW 2:goto 650
655   PPAGE$=MKI$(PAGE):IF LEN(
      PAGE$)=0 THEN 640
660   PAPPS$=MKI$(0):GOSUB 2080
      :IF CVI(PAPPS$)=0 THEN 64
      0
670   PCOMPS$=MKI$(0):GOSUB 218
      0:IF CVI(PCOMPS$)=0 THEN
      640
680   GOSUB 2580:PRINT"Comment:
      ";:INPUT PCOMMENT$
682   IF LEN(PCOMMENT$)>COMMENT
      LEN THEN CLEARW 2:GOTO 68
      0
685   IF LEN(PCOMMENT$)=0 THEN
      PCOMMENT$="None"
690   PNEXTREC$=MKI$(0)
700   PRINT:PRINT"Please wait."
710   GET#1,1:IF CVI(RPAGE$)=1
      THEN GOSUB 2720:GOTO 750
715   GET#1,2:IF PNAME$>RNAME$
      THEN 720
716   GOSUB 2720:GET#1,2:PUT #1
      ,INTREC
717   PNEXTREC$=MKI$(INTREC):GO
      SUB 2460:PUT #1,2:GOTO 76
      0
720   GET#1,2:J=2:I=CVI(RNEXTRE
      C$):IF I=0 THEN 740
730   GET#1,I:IF PNAME$<=RNAME$
       THEN 740
735   J=I:I=CVI(RNEXTREC$):IF I
      =0 THEN 740 ELSE 730
740   GOSUB 2720:GET#1,J:PNEXTR
      EC$=RNEXTREC$
745   LSET RNEXTREC$=MKI$(INTRE
      C):PUT #1,J
750   GOSUB 2460:PUT #1,INTREC
760   NOFILE=0
770   IF MAINOPTION=2 THEN RETU
      RN ELSE 640
790   REM edit entry
810   GOSUB 2580:STARTENTRY=2:L
      ASTENTRY=2:PRINT"Name:";
815   INPUT DNAME$:IF LEN(DNAME
      $)>NAMELEN THEN 810
817   IF LEN(DNAME$)=0 THEN RET
      URN
820   PRINT:PRINT"Scanning for
      entry. ";
830   GET #1,STARTENTRY
835   IF LEFT$(RNAME$,LEN(DNAME
      $))=DNAME$ THEN PRINT"Fou
      nd.":PRINT:GOTO 850
836   LASTENTRY=STARTENTRY:STAR
      TENTRY=CVI(RNEXTREC$)
837   IF STARTENTRY>0 THEN 830
840   PRINT"Not found":PRINT:GO
      TO 2630
850   GET#1,STARTENTRY:GOSUB 24
      20:GOSUB 2500
860   PRINT:PRINT"Make any chan
      ges (y/n) ";:GOSUB 2040:I
      F IN=1 THEN 880
870   LASTENTRY=STARTENTRY:STAR
      TENTRY=CVI(RNEXTREC$)
875   IF STARTENTRY=0 THEN RETU
      RN ELSE GOSUB 2580:GOTO 8
      20
880   GOSUB 2580:PRINT:PRINT"Na
      me:";PNAME$
890   PRINT:PRINT"Name:";:INPUT
       IN$:IF LEN(IN$)>NAMELEN
      THEN 880
895   IF LEN(IN$)<>0 THEN PNAME
      $=IN$
900   GOSUB 2580:PRINT:PRINT"Da
      te:";PDATE$:PRINT
905   GOSUB 2350:IF LEN(IN$)<>0
       THEN PDATE$=IN$
910   GOSUB 2580:PRINT:PRINT"Pa
      ge:";CVI(PPAGE$):PRINT:PR
      INT"Page: ";
915   INPUT IN$:IN=VAL(IN$):IF
      LEN(IN$)>3 THEN 910
916   IF LEN(IN$)<>0 THEN PPAGE
```

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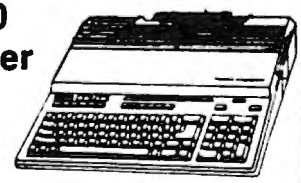
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```
     $=MKI$(IN)
920  GOSUB 2580:PRINT:PRINT"Co
     mment:";PCOMMENT$
930  PRINT:PRINT"Comment:";:IN
     PUT IN$:IF LEN(IN$)>COMME
     NTLEN THEN 920
935  IF LEN(IN$)<>0 THEN PCOMM
     ENT$=IN$
940  GOSUB 2580:GOSUB 2080:GOS
     UB 2580:GOSUB 2180:GOSUB
     2580:GOSUB 2500
950  PRINT:PRINT"Is this corre
     ct (y/n) ";:GOSUB 2040:IF
      IN=0 THEN 850
960  DELETEENTRY=STARTENTRY:GO
     SUB 1070:GOSUB 690:RETURN
980  REM delete entry
1000 GOSUB 2580:DELETEENTRY=2:
     LASTENTRY=2
1010 PRINT"Name:";:INPUT DNAME
     $:IF LEN(DNAME$)>NAMELEN
     THEN 1000
1015 IF LEN(DNAME$)=0 THEN RET
     URN
1020 GET #1,DELETEENTRY:IF LEF
     T$(RNAME$,LEN(DNAME$))=DN
     AME$ THEN 1040
1025 LASTENTRY=DELETEENTRY:DEL
     ETEENTRY=CVI(RNEXTREC$)
1026 IF DELETEENTRY>0 THEN 102
     0
1030 PRINT"No delete performed
     .";:IF IN$="N" THEN PRINT
     :GOTO 2630
1035 PRINT "Entry not found.":
     PRINT:GOTO 2630
1040 GOSUB 2420:GOSUB 2500
1050 PRINT:PRINT"Delete this e
     ntry (y/n) ";:GOSUB 2040
1060 IF IN<>0 THEN 1070
1065 LASTENTRY=DELETEENTRY:DEL
     ETEENTRY=CVI(RNEXTREC$)
1066 IF DELETEENTRY>0 THEN 102
     0 ELSE 1030
1068 PRINT:PRINT "Performing D
     elete:";
1070 IF DELETEENTRY<>2 THEN 10
     90
1075 GET#1,2:J=CVI(RNEXTREC$)
1076 IF J<>0 THEN 1080
1077 GET#1,1:LSET RPAGE$=MKI$(
     1):LSET RNEXTREC$=MKI$(0)

1078 PUT #1,1:PRINT"Complete."
     :RETURN
1080 GET#1,J:PUT #1,2:GET#1,1:
     TEMP$=RNEXTREC$:LSET RNEX
     TREC$=MKI$(J)
1085 PUT #1,1:GET#1,J:LSET RNE
     XTREC$=TEMP$:PUT #1,J:PRI
     NT"Complete.":RETURN
1090 GET#1,1:TEMP$=RNEXTREC$:L
     SET RNEXTREC$=MKI$(DELETE
     ENTRY):PUT #1,1
1095 GET#1,DELETEENTRY:TEMP2$=
     RNEXTREC$:LSET RNEXTREC$=
     TEMP$
1096 PUT #1,DELETEENTRY
1100 GET#1,LASTENTRY:LSET RNEX
     TREC$=TEMP2$:PUT #1,LASTE
     NTRY
1105 PRINT"Complete.":RETURN
1120 REM list entries
1140 GOSUB 2580:STARTENTRY=2
1150 GET#1,STARTENTRY:GOSUB 24
     20:GOSUB 2500:IF PRINTER=
     1 THEN GOSUB 2680
1160 IF PRINTER=0 THEN GOSUB 2
     280
1162 STARTENTRY=CVI(PNEXTREC$)
1165 IF STARTENTRY<>0 AND SERR
     OR=0 THEN 1150 ELSE GOSUB
      2630:RETURN
1180 REM search files
1200 TITLE$=TITLES$(MAINOPTION
     ):GOSUB 2580
1210 FOR I=1 TO NUMSEARCH-1:PR
     INT SPC(12);"(";I;") by "
     ;SEARCH$(I):NEXT
1215 PRINT SPC(12);"(";NUMSEAR
     CH;") ";SEARCH$(NUMSEARCH
     )
1220 PRINT:PRINT SPC(12)"Comma
     nd:";:INPUT IN$:IF LEN(IN
     $)=0 THEN 1200
1225 IN=VAL(IN$):IF IN=NUMSEAR
     CH OR IN=0 THEN RETURN
1230 IF IN<1 OR IN>NUMSEARCH-1
      THEN 1200
1235 SEARCHOPTION=IN:TITLE$="S
     earch by "+SEARCHTITLES$(
     SEARCHOPTION)
1236 ON SEARCHOPTION GOSUB 127
     0,1370,1470,1580,1670:GOT
     O 1200
1250 REM :by computer
1270 PCOMPS$=MKI$(0):GOSUB 218
     0:DCOMPS$=PCOMPS$
1275 IF CVI(DCOMPS$)=0 THEN RE
     TURN
1280 PRINT:GOSUB 2350:DDATE$=I
     N$:NODATE=(LEN(DDATE$)=0)

1285 IF PRINTER=1 THEN LPRINT
     TITLE$
1290 GOSUB 2580:STARTENTRY=2
1300 GET#1,STARTENTRY:IF (CVI(
     RCOMP$) AND CVI(DCOMPS$))
     =0 THEN 1330
1305 IF NODATE=0 AND DDATE$<>R
     DATE$ THEN 1330
1310 GOSUB 2420:IF PRINTER THE
     N GOSUB 2680 ELSE GOSUB 2
     500
1320 IF PRINTER=0 THEN GOSUB 2
     280
1325 IF SERROR=1 THEN PRINT:PR
     INT"Search terminated.":G
     OSUB 2630:RETURN
1330 STARTENTRY=CVI(RNEXTREC$)

1335 IF STARTENTRY<>0 THEN 130
     0 ELSE GOSUB 2630:RETURN
1350 REM by class
1370 PAPPS$=MKI$(0):GOSUB 2080
     :DAPPS$=PAPPS$
1375 IF CVI(DAPPS$)=0 THEN RET
     URN
1380 PRINT:GOSUB 2350:DDATE$=I
     N$:NODATE=(LEN(DDATE$)=0)

1385 IF PRINTER=1 THEN LPRINT
     TITLE$
1390 GOSUB 2580:STARTENTRY=2
1400 GET#1,STARTENTRY:IF (CVI(
     RAPP$) AND CVI(DAPPS$))=0
      THEN 1430
1405 IF NODATE=0 AND DDATE$<>R
     DATE$ THEN 1430
1410 GOSUB 2420:IF PRINTER THE
     N GOSUB 2680 ELSE GOSUB 2
     500
1420 IF PRINTER=0 THEN GOSUB 2
     280
1425 IF SERROR=1 THEN PRINT:PR
     INT"Search terminated.":G
     OSUB 2630:RETURN
1430 STARTENTRY=CVI(RNEXTREC$)
     :IF STARTENTRY<>0 THEN 14
     00
1435 GOSUB 2630:RETURN
1450 REM :by computer and clas
     s
1470 PCOMPS$=MKI$(0):GOSUB 218
     0:DCOMPS$=PCOMPS$
1475 IF CVI(DCOMPS$)=0 THEN RE
     TURN
1480 PAPPS$=MKI$(0):GOSUB 2080
     :DAPPS$=PAPPS$
1485 IF CVI(DAPPS$)=0 THEN RET
     URN
1490 PRINT:GOSUB 2350:DDATE$=I
     N$:NODATE=(LEN(DDATE$)=0)

1495 IF PRINTER=1 THEN LPRINT
     TITLE$
1500 GOSUB 2580:STARTENTRY=2
1510 GET#1,STARTENTRY:IF (CVI(
     RAPP$) AND CVI(DAPPS$))=0
      THEN 1540
1515 IF (CVI(DCOMPS$) AND CVI(
     RCOMP$))=0 THEN 1540
1516 IF NODATE=0 AND DDATE$<>R
     DATE$ THEN 1540
1520 GOSUB 2420:IF PRINTER THE
     N GOSUB 2680 ELSE GOSUB 2
     500
1530 IF PRINTER=0 THEN GOSUB 2
     280
1535 IF SERROR=1 THEN PRINT:PR
     INT"Search terminated.":G
     OSUB 2630:RETURN
1540 STARTENTRY=CVI(RNEXTREC$)
     :IF STARTENTRY<>0 THEN 15
     10
1545 GOSUB 2630:RETURN
1560 REM :by date
1580 GOSUB 2580:PRINT"Issue ";
     :GOSUB 2350:DDATE$=IN$
1585 IF LEN(DDATE$)=0 THEN RET
     URN
1590 IF PRINTER THEN LPRINT TI
     TLE$
1600 GOSUB 2580:STARTENTRY=2
1610 GET#1,STARTENTRY:IF RDATE
     $<>DDATE$ THEN 1620
1612 GOSUB 2420:IF PRINTER THE
     N GOSUB 2680 ELSE GOSUB 2
     500
1620 IF PRINTER=0 THEN GOSUB 2
     280
1625 IF SERROR=1 THEN PRINT:PR
     INT"Search terminated.":G
     OSUB 2630:RETURN
1630 STARTENTRY=CVI(RNEXTREC$)
     :IF STARTENTRY<>0 THEN 16
     10
1635 GOSUB 2630:RETURN
1650 REM :by title
1670 GOSUB 2580:PRINT"Name:";:
     INPUT DNAME$:IF LEN(DNAME
     $)>NAMELEN THEN 1670
1675 IF LEN(DNAME$)=0 THEN RET
     URN
1680 GOSUB 2350:DDATE$=IN$:NOD
     ATE=(LEN(DDATE$)=0)
1685 IF PRINTER THEN LPRINT TI
     TLE$
1690 GOSUB 2580:STARTENTRY=2
1700 GET#1,STARTENTRY
1705 IF LEFT$(RNAME$,LEN(DNAME
     $))<>DNAME$ THEN 1715
1706 IF DDATE$<>RDATE$ AND NOD
     ATE=0 THEN 1715
1707 GOSUB 2420:IF PRINTER THE
     N GOSUB 2680 ELSE GOSUB 2
     500
1710 IF PRINTER=0 THEN GOSUB 2
     280
1715 IF SERROR=1 THEN PRINT:PR
     INT"Search terminated.":G
     OSUB 2630:RETURN

1720 STARTENTRY=CVI(RNEXTREC$)
     :IF STARTENTRY<>0 THEN 17
     00
1725 GOSUB 2630:RETURN
1740 REM change printer modes
1760 PRINTER=1-PRINTER:RETURN
1780 REM quit
```

```
1800  CLEARW 2:CLOSE #1:CLOSEW
      2
1810  POKE CONTRL,122:POKE CONT
      RL+2,0:POKE CONTRL+6,1
1820  POKE INTIN,0:VDISYS(0):EN
      D:REM TURN ON MOUSE CURSO
      R
2020  REM input yes/no
2040  INPUT IN$:IN$=CHR$(ASC(LE
      FT$(IN$+" ",1)) AND 223)
2046  IF IN$="Y" OR IN$="N" THE
      N IN=-(IN$="Y"):RETURN EL
      SE 2040
2060  REM input application
2080  TEMP=CVI(PAPPS$)
2090  GOSUB 2580:FOR I=1 TO NUM
      APPS:PRINT TAB(12);I;") "
      ;
2093  IF (CVI(PAPPS$) AND 2^(I-
      1))>0 THEN COLOR 3
2095  PRINT APPS$(I):COLOR 1:NE
      XT
2110  GOTOXY 12,17:PRINT"Select
      /deselect from the above:
      ";
2115  INPUT IN$:IF LEN(IN$)=0 T
      HEN RETURN
2120  IN=VAL(IN$):IF IN>NUMAPPS
       OR IN=0 THEN 2090
2130  IF (2^(IN-1) AND TEMP)>0
      THEN TEMP=TEMP AND NOT(2^
      (IN-1)):GOTO 2140
2135  TEMP=TEMP OR 2^(IN-1)
2140  PAPPS$=MKI$(TEMP):GOTO 20
      90
2160  REM input computer
2180  TEMP=CVI(PCOMPS$)
2190  GOSUB 2580:FOR I=1 TO NUM
      COMPS:PRINT TAB(12);I;")
      ";
2193  IF (CVI(PCOMPS$) AND 2^(I
      -1))>0 THEN COLOR 3
2200  PRINT COMPS$(I):COLOR 1:N
      EXT
2210  GOTOXY 12,17:PRINT"Select
      /deselect from the above:
      ";
2215  INPUT IN$:IF LEN(IN$)=0 T
      HEN RETURN
2220  IN=VAL(IN$):IF IN>NUMCOMP
      S OR IN=0 THEN 2190
2230  IF (2^(IN-1) AND TEMP)>0
      THEN TEMP=TEMP AND NOT(2^
      (IN-1)):GOTO 2240
2235  TEMP=2^(IN-1) OR TEMP
2240  PCOMPS$=MKI$(TEMP):GOTO 2
      190
2260  REM check for key press
2280  PRINT "Press any key to c
      ontinue, RETURN to termin
      ate."
2285  PRINT:SERROR=0:A=INP(2):T
      EMP$=CHR$(A)
2290  IF TEMP$<>CHR$(13) THEN R
      ETURN ELSE SERROR=1:RETUR
      N
2330  REM input date as in$
2350  PRINT"Date (Mon YR):";:IN
      PUT IN$
2355  IF LEN(IN$)=0 THEN RETURN

2360  F=0:FOR IN=1 TO 12
2365  IF LEFT$(IN$,3)=MONTHS$(I
      N) THEN IN$=MONTHS$(IN)+R
      IGHT$(IN$,3):F=1
2370  NEXT:IF F=1 AND MID$(IN$,
      4,1)=" " THEN IN$=IN$+SPA
      CE$(4):RETURN
2380  print:PRINT"Date was not
      the correct format: use M
      on-YR; i.e., Jan 85"
2385  print:goto 2350
2400  REM transfer from record
      strings to current string
      s
2420  PNEXTREC$=RNEXTREC$:PAPPS
      $=RAPP$:PCOMPS$=RCOMP$:PN
      AME$=RNAME$
2425  PDATE$=RDATE$:PPAGE$=RPAG
      E$:PCOMMENT$=RCOMMENT$:RE
      TURN
2440  REM transfer from current
       strings to record string
      s
2460  LSET RNEXTREC$=PNEXTREC$:
      LSET RAPP$=PAPPS$:LSET RC
      OMP$=PCOMPS$
2465  LSET RNAME$=PNAME$:LSET R
      DATE$=PDATE$:LSET RPAGE$=
      PPAGE$
2466  LSET RCOMMENT$=PCOMMENT$:
      RETURN
2480  REM print current data
2500  PRINT"Name:";PNAME$:PRINT
      "Date:";PDATE$;" / page";
      CVI(PPAGE$)
2505  PRINT"Comment:";PCOMMENT$

2510  PRINT"Class:";:FOR I=1 TO
       NUMAPPS
2515  IF (2^(I-1) AND CVI(PAPPS
      $))>0 THEN PRINT " ";APPS
      $(I);",";
2520  NEXT:PRINT
2530  PRINT"Computers:";:FOR I=
      1 TO NUMCOMPS
2535  IF (2^(I-1) AND CVI(PCOMP
      S$))>0 THEN PRINT " ";COM
      PS$(I);",";
2540  NEXT:PRINT:PRINT:RETURN
2560  REM clear the screen
2580  CLEARW 2:GOTOXY (35-LEN(T
      ITLE$)/2),0:PRINT TITLE$:
      GOTOXY 1,0
2585  IF PRINTER THEN PRINT"Pri
      nter on"
2590  GOTOXY 0,1:RETURN
2610  REM press return prompt
2630  SERROR=0:PRINT"Press RETU
      RN:";:INPUT IN$
2635  IF ASC(LEFT$(IN$+" ",1))
      AND 223=ASC("Q") THEN SER
      ROR=1
2640  RETURN
2660  REM output to printer
2680  LPRINT PNAME$;TAB(49);PDA
      TE$;" / page:";CVI(PPAGE$
      ):RETURN
2700  REM allocate a new record

2720  GET #1,1:INTREC=CVI(RNEXT
      REC$):IF INTREC<>0 THEN 2
      760
2730  INTREC=CVI(RPAGE$):INTREC
      =INTREC+1:LSET RPAGE$=MKI
      $(INTREC):PUT #1,1
2740  RETURN:REM variable INTRE
      C holds the place of the
      next blank record
2750  REM use this code if
      there have been deleted r
      ecords
2760  GET#1,INTREC:TEMP$=RNEXTR
      EC$:GET#1,1:LSET RNEXTREC
      $=TEMP$:PUT #1,1
2770  RETURN
2820  IF ERR=57 THEN NOFILE=1:C
      LOSE #1:RESUME 420
2830  PRINT "Error #"ERR"in lin
      e"ERL".":STOP
```

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News & Products

Robotic Workshop For Apple

Multibotics MB230 Workshop from Access Software is now available for the Apple II and IIe computers as well as the Commodore 64. This robotic construction set contains the B-100 interface which you can use with the Apple interrupt card to turn your Apple into a robotic control system. By controlling the Capsella™ motorized parts, you can perform hundreds of robotic projects and experiments. Designed for beginning and more advanced computer users, the workshop features over 50 educational projects to describe the nature of robotics.

The Apple interrupt card is included.

Retail price for the *Multibotics MB230 Workshop* is $169.95 for the Apple II and IIe version and $149.95 for the Commodore 64/128 version.

Access Software, 2561 S. 1560 West, Woods Cross, UT 84087

Circle Reader Service Number 200.

New Software From Classic Image

Classic Image has introduced a number of new software packages, including the *Classic Compu Card Series*. This series includes an assortment of greeting card collections in tractor-feed, fan-fold form to be used on a variety of personal computers. The collections are available in a number of themes—*Celebrate, Party Time, An Invitation, Thank You, A Short Note, We've Moved, It's An Open House,* and *Season's Greetings*. Each card is colorfully illustrated and designed so you can add personal messages on the inside. The collections are packaged with 50 stationery cards and 40 matching envelopes for $11.95 per collection.

Another package in the series is the *Parchment Paper Series*, which is also in tractor-feed, fan-fold form and is available in brown, gold, and gray parchment tones. Retail price for this package is $7.95.

The third release in Classic Image's new series is the disk and address label package. The labels are one label-width across on continuous tractor-feed, fan-fold form. The disk labels are designed for either 3½-inch or 5¼-inch disks and have a suggested retail price of $4.95 per 100. Labels for only the 3½-inch disk are $8.95 per 100, and those for 5¼-inch disks are $4.95. Bulk prices are also available.

A new game, *Diablo*, runs on the Amiga, Atari ST, and Commodore 64/128. This mazelike, arcade-style game consists of 240 sections of movable track, with a ball and two tracks on each of 120 movable panels. The object is to arrange the convoluted track to keep the ball on a continuous course. After a track has been crossed, it is removed. The game becomes challenging as more and more of the track disappears. The price for this game is $29.95.

The *Disk Library* program is a comprehensive utility for the Atari ST that files, categorizes, and cross-references each disk, folder and file in a library. It automatically updates disks, folders, and files as you add them to your library. You can also add your own comments. Suggested retail price for *Disk Library* is $49.95.

Classic Image, 510 Rhode Island Ave., Cherry Hill, NJ 08002

Circle Reader Service Number 201.

Amiga Drawing Pad

EasyL is a pressure-activated drawing pad that lets you draw directly on the Amiga with a pencil. This new product from Anakin Research works with popular graphics packages such as *Images, Animator, Deluxe Paint,* and *DPaint*. The source code is included and contains instructions to let you customize the system to any application like image processing, frame sequencing, and more. It also provides a self-contained advanced tutorial in Amiga programming.

EASYL is an 8½ × 13–inch drawing surface with 1024 × 1024–pixel resolution and a coordinate capture rate of 250 coordinate pairs per second.

ACME- or OXBERRY-compatible registration pegs for producing frame-by-frame character animation are available.

Price in U.S. funds is $499.

Anakin Research, 100 Westmore Dr., Unit 11C, Rexdale, Ont., Canada M9V 5C3

Circle Reader Service Number 202.

Talking Software For Youngsters

Firebird's new *Talking Teacher* utilizes *Software Speech*™ by Electronic Speech Systems to provide children ages two through eight with three separate learning games. This educational program teaches capital and lowercase letter identification and keyboard location, spatial relationships, and basic vocabulary with initial letter sounds for over 100 words. The graphics, play action, and sound effects are designed to hold the child's attention and promote learning.

Talking Teacher is available for the Commodore 64/128 with Commodore 1541 or 1571 disk drives and requires no special hardware for the computer to talk.

Retail price is $39.95.

Firebird Licensees, P.O. Box 49, Ramsey, NJ 07446

Circle Reader Service Number 203.

Create Your Own Awards

AwardWare from Hi Tech Expressions lets you design and print customized certificates, awards, announcements, stationery, memos, checks, coupons, and tickets. It includes a large selection of graphics, fonts, and borders.

A special feature is the create-an-award-disk option, with which you can design an award, copy it to another disk, and send the disk to a friend. When your friend loads the disk, the award appears on the screen in a flashing marquee. He or she then can print the award for a keepsake.

AwardWare is available for the Commodore 64/128; Atari 400/800, 800XL, 1200XL, 130XE; Apple IIe, IIc, II+ with 64K; and IBM PC, XT, AT, and PCjr with 256K and a color graphics adapter.

The software supports the following dot-matrix printers and interfaces: Writer, Scribe, Star Gemini, Okidata 92/93, Epson, Citizen, Star, Tandy DMP 130, Panasonic 1090/1091, IBM

(except ProPrinter), super serial card, standard serial, Apple IIc standard parallel, and Apple II parallel.

AwardWare retails for $14.95 and contains two flippy disks for the IBM/Apple and Commodore/Atari. *Hi Tech Expressions, 2699 S. Bayshore Dr., Suite 1000A, Coconut Grove, FL 33133.*

Circle Reader Service Number 204.

Talk To Your Computer

Hearsay has released a speech synthesizer/voice recognition peripheral that lets you talk with your Apple, Commodore 64/128, or IBM personal computers. The Hearsay 1000 permits you to verbally command almost any program that requires keyboard input, and it enables off-the-shelf, text-based software to talk back. The purpose of the product is to add a new dimension to educational and entertainment software.

Additionally, Hearsay has introduced a line of educational, voice interactive software for children. *Aqua's Circus, Think Bank,* and *Rhyme and Reason* are all designed to teach children the power of verbal interaction and help make learning more enjoyable.

The Commodore version of Hearsay 1000 has a suggested retail price of $79.95; the Apple and IBM PC versions are $149.95. The Apple version also includes a speaker and microphone. The Commodore version software is available for $29.95 each, and the Apple and IBM versions are $39.95.

Hearsay , 1825 74th St., Brooklyn, NY 11204

Circle Reader Service Number 205.

Maxell Disks

Maxell has introduced a line of lower priced single- and double-sided disks. The new disks meet ANSI specifications and contain fewer subcomponents than higher priced disks from Maxell. The 1S and 2S come with a single rather than replaceable label set and ten write-protect labels. The outer package of each ten-pack has a cross-reference index listing the computers for which the disks are designed. All the disks are fully certified.

A ten-pack of the single-density disks (the 1S) retails for $8.99, and the double-density disks (2S) retail for $10.49 per ten pack.

Maxell Corp. of America, 60 Oxford Dr., Moonachie, NJ 07074

Circle Reader Service Number 206.

New Abacus Software Products

Abacus Software has released two new software packages for the Commodore 64 and 128. *SpeedTerm* is a command-driven terminal communications program that lets you communicate with other computer users via online services such as CompuServ, GEnie, Delphi, The Source, and others. Originally designed for the 128, it now includes both the 64 and 128 versions in one package.

SpeedTerm features a command mode with over 30 commands and user-defined function keys. The program offers a large capture buffer, 24K for the 64 version and 45K for the 128 version. In addition, *SpeedTerm* supports both XMODEM and Punter file-transfer protocols plus partial VT52 terminal emulation, and it works with most popular modems. The 128 version can be used with either a 40- or an 80-column monitor and a 1541 or 1571 disk drive. The complete package includes a 70-page manual with tutorials.

Personal Portfolio Manager has been updated to a include a version for the Commodore 128. The new version contains many of the features of the original 64 version plus additional functions. It can be used by the home or professional user to manage a portfolio, obtain up-to-the-minute quotes and news, and perform analyses.

Other uses include recording taxable or nontaxable dividends and interest income, reconciling brokerage accounts, tailoring reports, and entering quotes manually or automatically through Warner Computer Systems and Dow Jones. The software includes an autorun and timing feature so the system will log on, update quotes, log off, and print reports. Over 1000 open transactions can be retained on a single disk.

Personal Portfolio Manager for the Commodore 128 can be used with either a 40- or an 80-column monitor and a 1541 or 1571 disk drive.

SpeedTerm retails for $39.95; *Personal Portfolio Manager,* $59.95.

Abacus Software, P.O. Box 7219, Grand Rapids, MI 49510

Circle Reader Service Number 207.

Commodore 128 Monochrome Cables

Innovative Computer Accessories has two new cables exclusively for the Commodore 128. The cables allow monochrome 80-column display on any composite monitor with RCA jacks. They are not intended for use with RGB monitors or standard television sets.

The 80-column mono cable connects with either the Commodore 1701 or 1702 monitor with a built-in toggle switch. This cable is also compatible with IBM computers.

The 40/80-column switch cable is for all other monitors with RCA jacks and no toggle switch. With these monitors, the customer must turn off the equipment and change cables in order to toggle between 40 or 80 columns. The 40/80-column switch cable provides the switch to avoid this problem. The 80-column mode is monochrome while the 40-column screen is still in the full 16 colors.

All the cables are manually tested, and there are no exposed wires or PC boards.

Innovative Computer Accessories, 1249 Downing St., P.O. Box 789, Imperial Beach, CA 92032-0837

Circle Reader Service Number 208.

Word Processing On Your Amiga

With *ProWrite,* any document you create will print out exactly as it appears on the screen—including page breaks, line headers, and footers. This word processing program for the Amiga has six pull-down menus with mouse control, or it can accept commands through the keyboard. You can vary the type styles—bold, italic, underline, superscript, or subscript—and even add color for emphasis. Eight windows can be opened at one time so you can cut and paste both text and IFF color graphics among them. Plus, *ProWrite* is compatible with *Flow,* the Amiga idea processor.

Available from New Horizons Software, *ProWrite* requires an Amiga with 512K memory and Kickstart version 1.2. Suggested retail price is $124.95.

New Horizons Software, P.O. Box 43167, Austin, TX 78745

Circle Reader Service Number 209.

New Atari ST Version of *GATO*

GATO, the World War II submarine simulation from Spectrum HoloByte, is now available for the Atari ST. This action game has 20 different missions that you, the captain, must complete before returning to the Allied quadrants. There are ten levels to provide varying degrees of difficulty to even the most accomplished submarine pilot. Your controls to monitor speed, heading, depth, and radar tracking are shown on two screen displays. You hear the torpedoes as they are fired from the tubes, and the explosion of the ships you hit.

The ST version of *GATO* features both forward and aft torpedo tubes, mines, and save/load capability to store games in progress.

GATO is available for the Apple IIe, IIc, IIGS, IBM PC, Commodore 64,

Macintosh, and Atari ST. Suggested retail price for the ST version is $39.95.

Spectrum HoloByte, 1050 Walnut, Suite 325, Boulder, CO 80302

Circle Reader Service Number 210.

Galactic War Games

In the arcade-style game *POWER*, from Accolade, you fight against the hostile Demoid Empire to save Earth from terrorist attack. The Demoids occupy Earth's vital Mitonium conversion plant, Earth's only source of power. To win, you must infiltrate the occupied asteroid and disable the converter. To ward off attacks by the Demoid battle ships, you can fire missiles and light phasors using your joystick. You must also monitor the power consumption of your space vehicle, using your jetpack to get you safely to one of your eight reserve vehicles.

To reach the converter, you must successfully complete seven levels of play. Then you must penetrate the force field to disable the Mitonium power plant.

POWER is being released under Accolade's Avantage brand, which is the mid-priced line of entertainment software.

POWER is available on the Commodore 64/128 for $14.95.

Accolade, 20833 Stevens Creek Blvd., Cupertino, CA 95014

Circle Reader Service Number 211.

Migraph Announces New ST Products

Migraph has released two new products and has updated another one for the Atari ST. *LabelMaster* is an easy-to-use GEM-based label maker and mailing list manager. This package lets you combine bitmapped graphics with a mailing list manager to produce illustrated labels. You can use designs for the graphics library on the disk or create your own designs using the graphic editor. The mailing list manager features search, sort, delete, modify, and the ability to flag a record for personal or business entries. The program is compatible with *PrintMaster*.

Fast is a desktop accessory that operates in all three resolutions with parameters that can be changed to meet individual needs. It includes ST DOS, a utility that lets you perform the most common DOS commands without returning to the desktop; an editor that includes many of the features of more expensive editors such as search and replace and block editing; and Card File, a database that you can set up to use as an address book. This has the ability to print part or all of the database in a variety of formats. *Fast* also includes a calculator, calendar, ASCII table, and a clock.

Migraph has also released version 2.0 of *Easy-Draw* for desktop publishing. This is an object-oriented drawing program used to create graphics, business charts, flow diagrams, and technical illustrations. It can be adapted to desktop publishing because the program allows you to create text and graphics on the same page. Version 2.0 has added several new features such as the ability to load ASCII files, flip or mirror any object, break text blocks, edit polylines, or load up to five fonts. There are two additional font sizes—7 and 28 point—for a total of six fonts. The Arrange commands let you evenly space and center objects. Plus, there are both metric and inch measurements and page sizes. The program has full GEM implementation.

Easy-Draw works with Epson FX80 Graphics-compatible, Atari SMM804, and Gemini 10X printers.

The retail price for *Easy-Draw* is $79.95; an upgrade to the 2.0 version is available for $40.

Suggested retail price for *LabelMaster* is $39.95 and $49.95 for *Fast*.

Migraph, 720 S. 333rd St., Suite 201, Federal Way, WA 98003

Circle Reader Service Number 212.

New Fantasy Role-Playing Game

Sierra On-Line has released a new fantasy role-playing game. *Wrath of Denethenor* is based on a Nordic legend about a prince who sells his soul to the devil. In this version, the player is an adventurer in one of the lands surrounding Denethenor's domain who tries to defeat Denethenor by taking the Prince's illegally obtained treasures. The player can take the form of a sorcerer, thief, or fighter. The game is not copy-protected.

Wrath of Denethenor is available for the Commodore 64/128 and the Apple II series with 64K or more.

Retail price for the Commodore version is $19.95, and the price for the Apple version is $24.95.

Sierra On-Line, P.O. Box 485, Coarsegold, CA 93614

Circle Reader Service Number 213.

Dot-Matrix Printer For Amiga And ST

Commodore Amiga and Atari ST owners who are looking for excellent graphics output and high-volume printing may wish to consider the Seikosha MP-1300AI printer. Its features include standard parallel and serial interfaces; rear and bottom paper feed; IBM/Epson emulation; an 8-million-character-life cartridge ribbon; and optimal speeds of 300 characters per second (cps) in draft mode and 50 cps in near-letter quality (NLQ) mode.

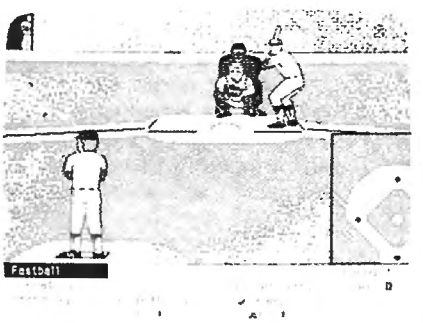
The Seikosha MP-1300AI is backed by a two-year limited warranty, and retails for $699 (monochrome) and $854 (color).

Seikosha America, 1111 Macarthur Blvd., Mahwah, NJ 07430

Circle Reader Service Number 214.

Popular Baseball Simulation Available For Macintosh

Accolade has announced that its sophisticated baseball simulation *Hardball* is now available for the Apple Macintosh.



Accolade's popular baseball simulation, Hardball, *is now available for the Macintosh.*

Hardball features 3-D field perspective, including the center field pitcher/batter view, a behind-the-plate view of right field, and a behind-the-plate view of left field. Up to six different pitches—fast balls, sliders, curve balls, screw balls, change-ups, and sinkers—may be thrown by either a left- or right-handed pitcher. Throughout the game, a variety of managerial decisions can be made. All strategic and physical maneuvers are joystick-controlled. Good animation, natural playability, and ultra-large graphics add to the game's realism.

The Macintosh version of *Hardball* retails for $44.95.

Accolade, 20833 Stevens Creek Blvd., Cupertino, CA 95014

Circle Reader Service Number 215.

From the publishers of *COMPUTE!*



April 1987 *COMPUTE!* Disk

All the exciting programs from the past three issues of *COMPUTE!* are on timesaving, error-free, floppy disks that are ready to load on your IBM PC and PCjr or Commodore 64 and 128. The April 1987 *COMPUTE! Disks* contain the entertaining and useful Commodore or IBM programs from the February, March, and April 1987 issues of *COMPUTE!*.

The April 1987 *COMPUTE! Disk* costs $12.95 plus $2.00 shipping and handling and is available only from COMPUTE! Publications. Please specify whether you need a Commodore or IBM disk.

For added savings and convenience, you may also subscribe to the *COMPUTE! Disk.* At a cost of only $39.95 a year (a $12.00 savings), you'll receive four disks, one every three months. Each disk will contain all the programs for your machine from the previous three issues of *COMPUTE!*. To order a subscription, call toll free 800-247-5470 (in IA 800-532-1272).

This is an excellent way to build your software library while you enjoy the quality programs from *COMPUTE!*.

Disks and subscriptions are available for Apple, Atari, Commodore 64 and 128, and IBM personal computers. Call for details.

For more information or to order individual issues of the April 1987 *COMPUTE! Disk,* call toll free 1-800-346-6767 (in NY 212-887-8525) or write *COMPUTE! Disk*, P.O. Box 5038, F.D.R. Station, New York, NY 10150.

COMPUTE! Publications, Inc. abc

Part of ABC Consumer Magazines, Inc
One of the ABC Publishing Companies
825 7th Avenue, 6th Floor, New York, NY 10019

Publishers of COMPUTE!, COMPUTE!'s Gazette, COMPUTE! Disk, COMPUTE! Books, COMPUTE!'s Apple Applications, and COMPUTE!'s Atari ST Disk & Magazine

COMPUTE!'s Guide To Typing In Programs

Computers are precise—type the program *exactly* as listed, including necessary punctuation and symbols, except for special characters noted below. We have provided a special listing convention as well as a program to check your typing—"The Automatic Proofreader."

Programs for the IBM, TI-99/4A, and Atari ST models should be typed exactly as listed; no special characters are used. Programs for Commodore, Apple, and Atari 400/800/XL/XE computers may contain some hard-to-read special characters, so we have a listing system that indicates these control characters. You will find these Commodore and Atari characters in curly braces; *do not type the braces.* For example, {CLEAR} or {CLR} instructs you to insert the symbol which clears the screen on the Atari or Commodore machines. A complete list of these symbols is shown in the tables below. For Commodore, Apple, and Atari, a single symbol by itself within curly braces is usually a control key or graphics key. If you see {A}, hold down the CONTROL key and press A. This will produce a reverse video character on the Commodore (in quote mode), a graphics character on the Atari, and an invisible control character on the Apple.

Graphics characters entered with the Commodore logo key are enclosed in a special bracket: [<A>]. In this case, you would hold down the Commodore logo key as you type A. Our Commodore listings are in uppercase, so shifted symbols are underlined. A graphics heart symbol (SHIFT-S) would be listed as S. One exception is {SHIFT-SPACE}. When you see this, hold down SHIFT and press the space bar. If a number precedes a symbol, such as {5 RIGHT}, {6 S}, or [<8 Q>], you would enter five cursor rights, six shifted S's, or eight Commodore-Q's. On the Atari, inverse characters (white on black) should be entered with the inverse video

Atari 400/800/XL/XE

When you see	Type	See	
{CLEAR}	ESC SHIFT <		Clear Screen
{UP}	ESC CTRL -		Cursor Up
{DOWN}	ESC CTRL =		Cursor Down
{LEFT}	ESC CTRL +		Cursor Left
{RIGHT}	ESC CTRL *		Cursor Right
{BACK S}	ESC DELETE		Backspace
{DELETE}	ESC CTRL DELETE		Delete character
{INSERT}	ESC CTRL INSERT		Insert character
{DEL LINE}	ESC SHIFT DELETE		Delete line
{INS LINE}	ESC SHIFT INSERT		Insert line
{TAB}	ESC TAB		TAB key
{CLR TAB}	ESC CTRL TAB		Clear tab
{SET TAB}	ESC SHIFT TAB		Set tab stop
{BELL}	ESC CTRL 2		Ring buzzer
{ESC}	ESC ESC		ESCape key

Commodore PET/CBM/VIC/64/128/16/+4

When You Read:	Press:	See:
{CLR}	SHIFT + CLR/HOME	
{HOME}	CLR/HOME	
{UP}	SHIFT + ↑ CRSR ↓	
{DOWN}	↑ CRSR ↓	
{LEFT}	SHIFT + ←CRSR→	
{RIGHT}	←CRSR→	
{RVS}	CTRL + 9	
{OFF}	CTRL + 0	
{BLK}	CTRL + 1	
{WHT}	CTRL + 2	
{RED}	CTRL + 3	
{CYN}	CTRL + 4	
{PUR}	CTRL + 5	
{GRN}	CTRL + 6	
{BLU}	CTRL + 7	
{YEL}	CTRL + 8	

When You Read:	Press:	See:
[<1>]	COMMODORE + 1	
[<2>]	COMMODORE + 2	
[<3>]	COMMODORE + 3	
[<4>]	COMMODORE + 4	
[<5>]	COMMODORE + 5	
[<6>]	COMMODORE + 6	
[<7>]	COMMODORE + 7	
[<8>]	COMMODORE + 8	
{ F1 }	f1	
{ F2 }	SHIFT + f1	
{ F3 }	f3	
{ F4 }	SHIFT + f3	
{ F5 }	f5	
{ F6 }	SHIFT + f5	
{ F7 }	f7	
{ F8 }	SHIFT + f7	
←	←	

key (Atari logo key on 400/800 models).

Whenever more than two spaces appear in a row, they are listed in a special format. For example, {6 SPACES} means press the space bar six times. Our Commodore listings never leave a single space at the end of a line, instead moving it to the next printed line as {SPACE}.

Amiga program listings contain only one special character, the left arrow (←) symbol. This character marks the end of each program line. Wherever you see a left arrow, press RETURN or move the cursor off the line to enter that line into memory. Don't try to type in the left arrow symbol; it's there only as a marker to indicate where each program line ends.

The Automatic Proofreader

Type in the appropriate program listed below, then save it for future use. The Commodore Proofreader works on the Commodore 128, 64, Plus/4, 16, and VIC-20. Don't omit any lines, even if they contain unfamiliar commands or you think they don't apply to your computer. When you run the program, it installs a machine language program in memory and erases its BASIC portion automatically (so be sure to save several copies before running the program for the first time). If you're using a Commodore 128, Plus/4 or 16, do *not* use any GRAPHIC commands while the Proofreader is active. You should disable the Commodore Proofreader before running any other program. To do this, either turn the computer off and on or enter SYS 64738 (for the 64), SYS 65341 (128), SYS 64802 (VIC-20), or SYS 65526 (Plus/4 or 16). To reenable the Proofreader, reload the program and run it as usual. Unlike the original VIC/64 Proofreader, this version works the same with disk or tape.

On the Atari, run the Proofreader to activate it (the Proofreader remains active in memory as a machine language program); you must then enter NEW to erase the BASIC loader. Pressing SYSTEM RESET deactivates the Atari Proofreader; enter PRINT USR(1536) to reenable it.

The Apple Proofreader erases the BASIC portion of itself after you run it, leaving only the machine language portion in memory. It works with either DOS 3.3 or ProDOS. Disable the Apple Proofreader by pressing CTRL-RESET before running another BASIC program.

The IBM Proofreader is a BASIC program that simulates the IBM BASIC line editor, letting you enter, edit, list, save, and load programs that you type. Type RUN to activate. Be sure to leave Caps Lock on, except when typing lowercase characters.

Once the Proofreader is active, try typing in a line. As soon as you press RETURN, either a hexadecimal number (on the Apple) or a pair of letters (on the Commodore, Atari, or IBM) appears. The number or pair of letters is called a *checksum*.

Compare the value displayed on the screen by the Proofreader with the checksum printed in the program listing in the magazine. The checksum is given to the left of each line number. Just type in the program a line at a time (without the printed checksum), press RETURN or Enter, and compare the checksums. If they match, go on to the next line. If not, check your typing; you've made a mistake. Because of the checksum method used, do not type abbreviations, such as ? for PRINT. On the Atari and Apple Proofreaders, spaces are not counted as part of the checksum, so be sure you type the right number of spaces between quote marks. The Atari Proofreader does not check to see that you've typed the characters in the right order, so if characters are transposed, the checksum still matches the listing. The Commodore Proofreader catches transposition errors and ignores spaces unless they're enclosed in quotation marks. The IBM Proofreader detects errors in spacing and transposition.

IBM Proofreader Commands

Since the IBM Proofreader replaces the computer's normal BASIC line editor, it has to include many of the direct-mode IBM BASIC commands. The syntax is identical to IBM BASIC. Commands simulated are LIST, LLIST, NEW, FILES, SAVE, and LOAD. When listing your program, press any key (except Ctrl-Break) to stop the listing. If you enter NEW, the Proofreader prompts you to press Y to be especially sure you mean yes.

Two new commands are BASIC and CHECK. BASIC exits the Proofreader back to IBM BASIC, leaving the Proofreader in memory. CHECK works just like LIST, but shows the checksums along with the listing. After you have typed in a program, save it to disk. Then exit the Proofreader with the BASIC command, and load the program as usual (this replaces the Proofreader in memory). You can now run the program, but you may want to resave it to disk. This will shorten it on disk and make it load faster, but it can no longer be edited with the Proofreader. If you want to convert an existing BASIC program to Proofreader format, save it to disk with SAVE "*filename*",A.

Program 1: Atari Proofreader

By Charles Brannon, Program Editor

```
100 GRAPHICS 0
110 FOR I=1536 TO 1700:REA
    D A:POKE I,A:CK=CK+A:N
    EXT I
120 IF CK<>19072 THEN ? "E
    rror in DATA Statement
    s.  Check Typing.":END

130 A=USR(1536)
140 ? :? "Automatic Proofr
    eader Now Activated."
150 END
160 DATA 104,160,0,185,26,
    3,201,69,240,7
170 DATA 200,200,192,34,20
    8,243,96,200,169,74
180 DATA 153,26,3,200,169,
    6,153,26,3,162
190 DATA 0,189,0,228,157,7
    4,6,232,224,16
200 DATA 208,245,169,93,14
    1,78,6,169,6,141
210 DATA 79,6,24,173,4,228
    ,105,1,141,95
220 DATA 6,173,5,228,105,0
    ,141,96,6,169
230 DATA 0,133,203,96,247,
    238,125,241,93,6
240 DATA 244,241,115,241,1
    24,241,76,205,238
250 DATA 0,0,0,0,0,32,62,2
    46,8,201
260 DATA 155,240,13,201,32
    ,240,7,72,24,101
270 DATA 203,133,203,104,4
    0,96,72,152,72,138
280 DATA 72,160,0,169,128,
    145,88,200,192,40
290 DATA 208,249,165,203,7
    4,74,74,74,24,105
300 DATA 161,160,3,145,88,
    165,203,41,15,24
310 DATA 105,161,200,145,8
    8,169,0,133,203,104
320 DATA 170,104,168,104,4
    0,96
```

Program 2: IBM Proofreader

By Charles Brannon, Program Editor

```
10 'Automatic Proofreader Vers
   ion 3.0 (Lines 205,206 adde
   d/190 deleted/470,490 chang
   ed from V2.0)
100 DIM L$(500),LNUM(500):COLO
    R 0,7,7:KEY OFF:CLS:MAX=0:
    LNUM(0)=65536!
110 ON ERROR GOTO 120:KEY 15,C
    HR$(4)+CHR$(70):ON KEY(15)
     GOSUB 640:KEY (15) ON:GOT
    O 130
120 RESUME 130
130 DEF SEG=&H40:W=PEEK(&H4A)
140 ON ERROR GOTO 650:PRINT:PR
    INT"Proofreader Ready."
150 LINE INPUT L$:Y=CSRLIN-INT
    (LEN(L$)/W)-1:LOCATE Y,1
160 DEF SEG=0:POKE 1050,30:POK
    E 1052,34:POKE 1054,0:POKE
     1055,79:POKE 1056,13:POKE
     1057,28:LINE INPUT L$:DEF
     SEG:IF L$="" THEN 150
170 IF LEFT$(L$,1)=" " THEN L$
    =MID$(L$,2):GOTO 170
```

```
180 IF VAL(LEFT$(L$,2))=0 AND
    MID$(L$,3,1)=" " THEN L$=M
    ID$(L$,4)
200 IF ASC(L$)>57 THEN 260 'no
     line number, therefore co
    mmand
205 BL=INSTR(L$," "):IF BL=0 T
    HEN BL$=L$:GOTO 206 ELSE B
    L$=LEFT$(L$,BL-1)
206 LNUM=VAL(BL$):TEXT$=MID$(L
    $,LEN(STR$(LNUM))+1)
210 IF TEXT$="" THEN GOSUB 540
    :IF LNUM=LNUM(P) THEN GOSU
    B 560:GOTO 150 ELSE 150
220 CKSUM=0:FOR I=1 TO LEN(L$)
    :CKSUM=(CKSUM+ASC(MID$(L$,
    I))*I) AND 255:NEXT:LOCATE
     Y,1:PRINT CHR$(65+CKSUM/1
    6)+CHR$(65+(CKSUM AND 15))
    +" "+L$
230 GOSUB 540:IF LNUM(P)=LNUM
    THEN L$(P)=TEXT$:GOTO 150
    'replace line
240 GOSUB 580:GOTO 150 'insert
     the line
260 TEXT$="":FOR I=1 TO LEN(L$
    ):A=ASC(MID$(L$,I)):TEXT$=
    TEXT$+CHR$(A+32*(A>96 AND
    A<123)):NEXT
270 DELIMITER=INSTR(TEXT$," ")
    :COMMAND$=TEXT$:ARG$="":IF
     DELIMITER THEN COMMAND$=L
    EFT$(TEXT$,DELIMITER-1):AR
    G$=MID$(TEXT$,DELIMITER+1)
     ELSE DELIMITER=INSTR(TEXT
    $,CHR$(34)):IF DELIMITER T
    HEN COMMAND$=LEFT$(TEXT$,D
    ELIMITER-1):ARG$=MID$(TEXT
    $,DELIMITER)
280 IF COMMAND$<>"LIST" THEN 4
    10
290 OPEN "scrn:" FOR OUTPUT AS
     #1
300 IF ARG$="" THEN FIRST=0:P=
    MAX-1:GOTO 340
310 DELIMITER=INSTR(ARG$,"-"):
    IF DELIMITER=0 THEN LNUM=V
    AL(ARG$):GOSUB 540:FIRST=P
    :GOTO 340
320 FIRST=VAL(LEFT$(ARG$,DELIM
    ITER)):LAST=VAL(MID$(ARG$,
    DELIMITER+1))
330 LNUM=FIRST:GOSUB 540:FIRST
    =P:LNUM=LAST:GOSUB 540:IF
    P=0 THEN P=MAX-1
340 FOR X=FIRST TO P:N$=MID$(S
    TR$(LNUM(X)),2)+" "
350 IF CKFLAG=0 THEN A$="":GOT
    O 370
360 CKSUM=0:A$=N$+L$(X):FOR I=
    1 TO LEN(A$):CKSUM=(CKSUM+
    ASC(MID$(A$,I))*I) AND 255
    :NEXT:A$=CHR$(65+CKSUM/16)
    +CHR$(65+(CKSUM AND 15))+"
     "
370 PRINT #1,A$+N$+L$(X)
380 IF INKEY$<>"" THEN X=P
390 NEXT :CLOSE #1:CKFLAG=0
400 GOTO 130
410 IF COMMAND$="LLIST" THEN O
    PEN "lpt1:" FOR OUTPUT AS
    #1:GOTO 300
420 IF COMMAND$="CHECK" THEN C
    KFLAG=1:GOTO 290
430 IF COMMAND$<>"SAVE" THEN 4
    50
440 GOSUB 600:OPEN ARG$ FOR OU
    TPUT AS #1:ARG$="":GOTO 30
    0
450 IF COMMAND$<>"LOAD" THEN 4
    90
460 GOSUB 600:OPEN ARG$ FOR IN
    PUT AS #1:MAX=0:P=0
470 WHILE NOT EOF(1):LINE INPU
    T #1,L$:BL=INSTR(L$," "):B
    L$=LEFT$(L$,BL-1):LNUM(P)=
    VAL(BL$):L$(P)=MID$(L$,LEN
    (STR$(VAL(BL$)))+1):P=P+1:
    WEND
480 MAX=P:CLOSE #1:GOTO 130
490 IF COMMAND$="NEW" THEN INP
    UT "Erase program - Are yo
    u sure";L$:IF LEFT$(L$,1)=
    "y" OR LEFT$(L$,1)="Y" THE
    N MAX=0:LNUM(0)=65536!:GOT
    O 130:ELSE 130
500 IF COMMAND$="BASIC" THEN C
    OLOR 7,0,0:ON ERROR GOTO 0
    :CLS:END
510 IF COMMAND$<>"FILES" THEN
    520
515 IF ARG$="" THEN ARG$="A:"
    ELSE SEL=1:GOSUB 600
517 FILES ARG$:GOTO 130
520 PRINT"Syntax error":GOTO 1
    30
540 P=0:WHILE LNUM>LNUM(P) AND
     P<MAX:P=P+1:WEND:RETURN
560 MAX=MAX-1:FOR X=P TO MAX:L
    NUM(X)=LNUM(X+1):L$(X)=L$(
    X+1):NEXT:RETURN
580 MAX=MAX+1:FOR X=MAX TO P+1
     STEP -1:LNUM(X)=LNUM(X-1)
    :L$(X)=L$(X-1):NEXT:L$(P)=
    TEXT$:LNUM(P)=LNUM:RETURN
600 IF LEFT$(ARG$,1)<>CHR$(34)
     THEN 520 ELSE ARG$=MID$(A
    RG$,2)
610 IF RIGHT$(ARG$,1)=CHR$(34)
     THEN ARG$=LEFT$(ARG$,LEN(
    ARG$)-1)
620 IF SEL=0 AND INSTR(ARG$,".
    ")=0 THEN ARG$=ARG$+".BAS"
630 SEL=0:RETURN
640 CLOSE #1:CKFLAG=0:PRINT"St
    opped.":RETURN 150
650 PRINT "Error #";ERR:RESUME
     150
```

Program 3: Commodore Proofreader

By Philip Nelson, Assistant Editor

```
10 VEC=PEEK(772)+256*PEEK(773)
   :LO=43:HI=44
20 PRINT "AUTOMATIC PROOFREADE
   R FOR ";:IF VEC=42364 THEN
   [SPACE]PRINT "C-64"
30 IF VEC=50556 THEN PRINT "VI
   C-20"
40 IF VEC=35158 THEN GRAPHIC C
   LR:PRINT "PLUS/4 & 16"
50 IF VEC=17165 THEN LO=45:HI=
   46:GRAPHIC CLR:PRINT"128"
60 SA=(PEEK(LO)+256*PEEK(HI))+
   6:ADR=SA
70 FOR J=0 TO 166:READ BYT:POK
   E ADR,BYT:ADR=ADR+1:CHK=CHK
   +BYT:NEXT
80 IF CHK<>20570 THEN PRINT "*
    ERROR* CHECK TYPING IN DATA
    STATEMENTS":END
90 FOR J=1 TO 5:READ RF,LF,HF:
   RS=SA+RF:HB=INT(RS/256):LB=
   RS-(256*HB)
100 CHK=CHK+RF+LF+HF:POKE SA+L
   F,LB:POKE SA+HF,HB:NEXT
110 IF CHK<>22054 THEN PRINT "
   *ERROR* RELOAD PROGRAM AND
   [SPACE]CHECK FINAL LINE":EN
   D
120 POKE SA+149,PEEK(772):POKE
    SA+150,PEEK(773)
130 IF VEC=17165 THEN POKE SA+
    14,22:POKE SA+18,23:POKESA+
    29,224:POKESA+139,224
140 PRINT CHR$(147);CHR$(17);"
    PROOFREADER ACTIVE":SYS SA
150 POKE HI,PEEK(HI)+1:POKE (P
    EEK(LO)+256*PEEK(HI))-1,0:N
    EW
160 DATA 120,169,73,141,4,3,16
    9,3,141,5,3
170 DATA 88,96,165,20,133,167,
    165,21,133,168,169
180 DATA 0,141,0,255,162,31,18
    1,199,157,227,3
190 DATA 202,16,248,169,19,32,
    210,255,169,18,32
200 DATA 210,255,160,0,132,180
    ,132,176,136,230,180
210 DATA 200,185,0,2,240,46,20
    1,34,208,8,72
220 DATA 165,176,73,255,133,17
    6,104,72,201,32,208
230 DATA 7,165,176,208,3,104,2
    08,226,104,166,180
240 DATA 24,165,167,121,0,2,13
    3,167,165,168,105
250 DATA 0,133,168,202,208,239
    ,240,202,165,167,69
260 DATA 168,72,41,15,168,185,
    211,3,32,210,255
270 DATA 104,74,74,74,74,168,1
    85,211,3,32,210
280 DATA 255,162,31,189,227,3,
    149,199,202,16,248
290 DATA 169,146,32,210,255,76
    ,86,137,65,66,67
300 DATA 68,69,70,71,72,74,75,
    77,80,81,82,83,88
310 DATA 13,2,7,167,31,32,151,
    116,117,151,128,129,167,136
    ,137
```

Program 4: Apple Proofreader

By Tim Victor, Editorial Programmer

```
10 C = 0: FOR I = 768 TO 768 +
   68: READ A:C = C + A: POKE I
   ,A: NEXT
20 IF C < > 7258 THEN PRINT "ER
   ROR IN PROOFREADER DATA STAT
   EMENTS": END
30 IF PEEK (190 * 256) < > 76 T
   HEN POKE 56,0: POKE 57,3: CA
   LL 1002: GOTO 50
40 PRINT CHR$ (4);"IN#A$300"
50 POKE 34,0: HOME : POKE 34,1:
    VTAB 2: PRINT "PROOFREADER
   INSTALLED"
60 NEW
100 DATA 216,32,27,253,201,141
110 DATA 208,60,138,72,169,0
120 DATA 72,189,255,1,201,160
130 DATA 240,8,104,10,125,255
140 DATA 1,105,0,72,202,208
150 DATA 238,104,170,41,15,9
160 DATA 48,201,58,144,2,233
170 DATA 57,141,1,4,138,74
180 DATA 74,74,74,41,15,9
190 DATA 48,201,58,144,2,233
200 DATA 57,141,0,4,104,170
210 DATA 169,141,96
```

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MLX Machine Language Entry Program For Commodore 64 And 128

Ottis Cowper, Technical Editor

"MLX" is a labor-saving utility that allows almost fail-safe entry of machine language programs. Included are versions for the Commodore 64 and 128.

Type in and save some copies of whichever version of MLX is appropriate for your computer (you'll want to use it to enter future ML programs from COMPUTE!). Program 1 is for the Commodore 64, and Program 2 is for the 128 (128 MLX can also be used to enter Commodore 64 ML programs for use in 64 mode). When you're ready to enter an ML program, load and run MLX. It asks you for a starting address and an ending address. These addresses appear in the article accompanying the MLX-format program listing you're typing.

If you're unfamiliar with machine language, the addresses (and all other values you enter in MLX) may appear strange. Instead of the usual decimal numbers you're accustomed to, these numbers are in *hexadecimal*—a base 16 numbering system commonly used by ML programmers. Hexadecimal—hex for short—includes the numerals 0–9 and the letters A–F. But don't worry—even if you know nothing about ML or hex, you should have no trouble using MLX.

After you enter the starting and ending addresses, you'll be offered the option of clearing the workspace. Choose this option if you're starting to enter a new listing. If you're continuing a listing that's partially typed from a previous session, don't choose this option.

A functions menu will appear. The first option in the menu is ENTER DATA. If you're just starting to type in a program, pick this. Press the E key, and type the first number in the first line of the program listing. If you've already typed in part of a program, type the line number where you left off typing at the end of the previous session (be sure to load the partially completed program before you resume entry). In any case, make sure the address you enter corresponds to the address of a line in the listing you are entering. Otherwise, you'll be unable to enter the data correctly. If you pressed E by mistake, you can return to the command menu by pressing RETURN alone when asked for the address. (You can get back to the menu from most options by pressing RETURN with no other input.)

Entering A Listing

Once you're in Enter mode, MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight data bytes and a checksum. Although an MLX-format listing appears similar to the "hex dump" listings from a machine language monitor program, the extra checksum number on the end allows MLX to check your typing. (Commodore 128 users *can* enter the data from an MLX listing using the built-in monitor if the rightmost column of data is omitted, but we recommend against it. It's much easier to let MLX do the proofreading and error checking for you.)

Figure 1: 64 MLX Keypad

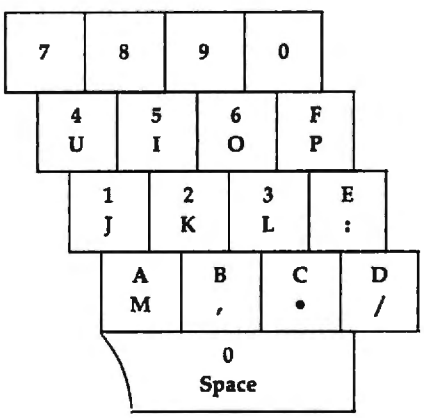
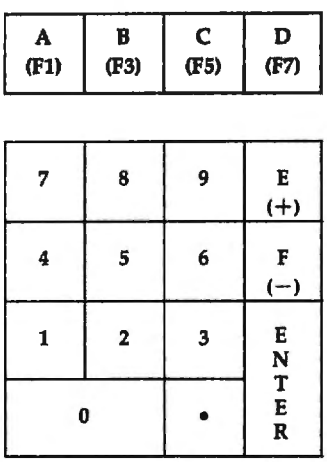


Figure 2: 128 MLX Keypad



When you enter a line, MLX recalculates the checksum from the eight bytes and the address and compares this value to the number from the ninth column. If the values match, you'll hear a bell tone, the data will be added to the workspace area, and the prompt for the next line of data will appear. But if MLX detects a typing error, you'll hear a low buzz and see an error message. The line will then be redisplayed for editing.

Invalid Characters Banned

Only a few keys are active while you're entering data, so you may have to unlearn some habits. You *do not* type spaces between the columns; MLX automatically inserts these for you. You *do not* press RETURN after typing the last number in a line; MLX automatically enters and checks the line after you type the last digit.

Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), you'll hear a warning buzz. To simplify typing, 128 MLX redefines the function keys and + and − keys on the numeric keypad so that you can enter data one-handed. In either case, the keypad is active only while entering data. Addresses must be entered with the normal letter and number keys. The figures below show the keypad configurations for each version.

MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, MLX will catch your mistake. There is one error that can slip past MLX: Because of the checksum formula used, MLX won't notice if you accidentally type FF in place of 00, and vice versa. And there's a very slim chance that you could garble a line and still end up with a combination of characters that adds up to the proper checksum. However, these mistakes should not occur if you take reasonable care while entering data.

Editing Features

To correct typing mistakes before finishing a line, use the INST/DEL key to delete the character to the left of the cursor. (The cursor-left key also deletes.) If you mess up a line really badly, press CLR/HOME to start the line over. The RETURN key is also active, but only before any data is typed on a line. Pressing RETURN at this point returns you to the command menu. After you

type a character of data, MLX disables RETURN until the cursor returns to the start of a line. Remember, you can press CLR/HOME to quickly get to a line number prompt.

More editing features are available when correcting lines in which MLX has detected an error. To make corrections in a line that MLX has redisplayed for editing, compare the line on the screen with the one printed in the listing, then move the cursor to the mistake and type the correct key. The cursor left and right keys provide the normal cursor controls. (The INST/DEL key now works as an alternative cursor-left key.) You cannot move left beyond the first character in the line. If you try to move beyond the rightmost character, you'll reenter the line. During editing, RETURN is active; pressing it tells MLX to recheck the line. You can press the CLR/HOME key to clear the entire line if you want to start from scratch, or if you want to get to a line number prompt to use RETURN to get back to the menu.

Display Data

The second menu choice, DISPLAY DATA, examines memory and shows the contents in the same format as the program listing (including the checksum). When you press D, MLX asks you for a starting address. Be sure that the starting address you give corresponds to a line number in the listing. Otherwise, the checksum display will be meaningless. MLX displays program lines until it reaches the end of the program, at which point the menu is redisplayed. You can pause the display by pressing the space bar. (MLX finishes printing the current line before halting.) Press space again to restart the display. To break out of the display and get back to the menu before the ending address is reached, press RETURN.

Other Menu Options

Two more menu selections let you save programs and load them back into the computer. These are SAVE FILE and LOAD FILE; their operation is quite straightforward. When you press S or L, MLX asks you for the filename. You'll then be asked to press either D or T to select disk or tape.

You'll notice the disk drive starting and stopping several times during a load or save (save only for the 128 version). Don't panic; this is normal behavior. MLX opens and reads from or writes to the file instead of using the usual LOAD and SAVE commands (128 MLX makes use of BLOAD). Disk users should also note that the drive prefix 0: is automatically added to the filename (line 750 in 64 MLX), so this should *not* be included when entering the name. This also precludes the use of @ for Save-with-Replace, so remember to give each version you save a different name. The 128 version makes up for this by giving you the option of scratching the existing file if you want to reuse a filename.

Remember that MLX saves the entire workspace area from the starting address to the ending address, so the save or load may take longer than you might expect if you've entered only a small amount of data from a long listing. When saving a partially completed listing, make sure to note the address where you stopped typing so you'll know where to resume entry when you reload.

MLX reports the standard disk or tape error messages if any problems are detected during the save or load. (Tape users should bear in mind that Commodore computers are never able to detect errors during a save to tape.) MLX also has three special load error messages: INCORRECT STARTING ADDRESS, which means the file you're trying to load does not have the starting address you specified when you ran MLX; LOAD ENDED AT *address*, which means the file you're trying to load ends before the ending address you specified when you started MLX; and TRUNCATED AT ENDING ADDRESS, which means the file you're trying to load extends beyond the ending address you specified when you started MLX. If you see one of these messages and feel certain that you've loaded the right file, exit and rerun MLX, being careful to enter the correct starting and ending addresses.

The 128 version also has a CATALOG DISK option so you can view the contents of the disk directory before saving or loading.

The QUIT menu option has the obvious effect—it stops MLX and enters BASIC. The RUN/STOP key is disabled, so the Q option lets you exit the program without turning off the computer. (Of course, RUN/STOP-RESTORE also gets you out.) You'll be asked for verification; press Y to exit to BASIC, or any other key to return to the menu. After quitting, you can type RUN again and reenter MLX without losing your data, as long as you don't use the clear workspace option.

The Finished Product

When you've finished typing all the data for an ML program and saved your work, you're ready to see the results. The instructions for loading and using the finished product vary from program to program. Some ML programs are designed to be loaded and run like BASIC programs, so all you need to type is LOAD *"filename"*,8 for disk (DLOAD *"filename"* on the 128) or LOAD *"filename"* for tape, and then RUN. Such programs will usually have a starting address of 0801 for the 64 or 1C01 for the 128. Other programs must be reloaded to specific addresses with a command such as LOAD *"filename"*,8,1 for disk (BLOAD *"filename"* on the 128) or LOAD *"filename"*,1,1 for tape, then started with a SYS to a particular memory address. On the Commodore 64, the most common starting address for such programs is 49152, which corresponds to MLX address C000. In either case, you should always refer to the article which accompanies the ML listing for information on loading and running the program.

An Ounce Of Prevention

By the time you finish typing in the data for a long ML program, you may have several hours invested in the project. Don't take chances—use our "Automatic Proofreader" to type the new MLX, and then test your copy *thoroughly* before first using it to enter any significant amount of data. Make sure all the menu options work as they should. Enter fragments of the program starting at several different addresses, then use the Display option to verify that the data has been entered correctly. And be sure to test the Save and Load options several times to insure that you can recall your work from disk or tape. Don't let a simple typing error in the new MLX cost you several nights of hard work.

Program 1: MLX For Commodore 64

```
SS 10 REM VERSION 1.1: LINES 8
      30,950 MODIFIED, LINES 4
      85-487 ADDED
EK 100 POKE 56,50:CLR:DIM IN$,
      I,J,A,B,A$,B$,A(7),N$
DM 110 C4=48:C6=16:C7=7:Z2=2:Z
      4=254:Z5=255:Z6=256:Z7=
      127
CJ 120 FA=PEEK(45)+Z6*PEEK(46)
      :BS=PEEK(55)+Z6*PEEK(56
      ):H$="0123456789ABCDEF"
SB 130 R$=CHR$(13):L$="{LEFT}"
      :S$=" ":D$=CHR$(20):Z$=
      CHR$(0):T$="{13 RIGHT}"
CQ 140 SD=54272:FOR I=SD TO SD
      +23:POKE I,0:NEXT:POKE
      {SPACE}SD+24,15:POKE 78
      8,52
FC 150 PRINT"{CLR}"CHR$(142)CH
      R$(8):POKE 53280,15:POK
      E 53281,15
EJ 160 PRINT T$" {RED}{RVS}
      {2 SPACES}[8 @]
      {2 SPACES}"SPC(28)"
      {2 SPACES}{OFF}{BLU} ML
      X II {RED}{RVS}
      {2 SPACES}"SPC(28)"
      {12 SPACES}{BLU}"
FR 170 PRINT"{3 DOWN}
      {3 SPACES}COMPUTE!'S MA
```

```
      CHINE LANGUAGE EDITOR
      {3 DOWN}"
JB 180 PRINT"{BLK}STARTING ADD
      RESS[43]";:GOSUB300:SA=A
      D:GOSUB1040:IF F THEN18
      0
GF 190 PRINT"{BLK}{2 SPACES}EN
      DING ADDRESS[43]";:GOSUB
      300:EA=AD:GOSUB1030:IF
      {SPACE}F THEN190
KR 200 INPUT"{3 DOWN}{BLK}CLEA
      R WORKSPACE [Y/N][43]";A
      $:IF LEFT$(A$,1)<>"Y"TH
      EN220
PG 210 PRINT"{2 DOWN}{BLU}WORK
      ING...";:FORI=BS TO BS+
      EA-SA+7:POKE I,0:NEXT:P
      RINT"DONE"
DR 220 PRINTTAB(10)"{2 DOWN}
      {BLK}{RVS} MLX COMMAND
      {SPACE}MENU {DOWN}[43]":
      PRINT T$"{RVS}E{OFF}NTE
      R DATA"
BD 230 PRINT T$"{RVS}D{OFF}ISP
      LAY DATA":PRINT T$"
      {RVS}L{OFF}OAD FILE"
JS 240 PRINT T$"{RVS}S{OFF}AVE
       FILE":PRINT T$"{RVS}Q
      {OFF}UIT{2 DOWN}{BLK}"
JH 250 GET A$:IF A$=N$ THEN250
HK 260 A=0:FOR I=1 TO 5:IF A$=
      MID$("EDLSQ",I,1)THEN A
      =I:I=5
FD 270 NEXT:ON A GOTO420,610,6
      90,700,280:GOSUB1060:GO
      TO250
EJ 280 PRINT"{RVS} QUIT ":INPU
      T"{DOWN}[43]ARE YOU SURE
       [Y/N]";A$:IF LEFT$(A$,
      1)<>"Y"THEN220
EM 290 POKE SD+24,0:END
JX 300 IN$=N$:AD=0:INPUTIN$:IF
      LEN(IN$)<>4THENRETURN
KF 310 B$=IN$:GOSUB320:AD=A:B$
      =MID$(IN$,3):GOSUB320:A
      D=AD*256+A:RETURN
PP 320 A=0:FOR J=1 TO 2:A$=MID
      $(B$,J,1):B=ASC(A$)-C4+
      (A$>"@")*C7:A=A*C6+B
JA 330 IF B<0 OR B>15 THEN AD=
      0:A=-1:J=2
GX 340 NEXT:RETURN
CH 350 B=INT(A/C6):PRINT MID$(
      H$,B+1,1);:B=A-B*C6:PRI
      NT MID$(H$,B+1,1);:RETU
      RN
RR 360 A=INT(AD/Z6):GOSUB350:A
      =AD-A*Z6:GOSUB350:PRINT
      ":";
BE 370 CK=INT(AD/Z6):CK=AD-Z4*
      CK+Z5*(CK>Z7):GOTO390
PX 380 CK=CK*Z2+Z5*(CK>Z7)+A
JC 390 CK=CK+Z5*(CK>Z5):RETURN
QS 400 PRINT"{DOWN}STARTING AT
      [43]";:GOSUB300:IF IN$<>
      N$ THEN GOSUB1030:IF F
      {SPACE}THEN400
EX 410 RETURN
HD 420 PRINT"{RVS} ENTER DATA
      {SPACE}":GOSUB400:IF IN
      $=N$ THEN220
JK 430 OPEN3,3:PRINT
SK 440 POKE198,0:GOSUB360:IF F
       THEN PRINT IN$:PRINT"
      {UP}{5 RIGHT}";
GC 450 FOR I=0 TO 24 STEP 3:B$
      =S$:FOR J=1 TO 2:IF F T
      HEN B$=MID$(IN$,I+J,1)
HA 460 PRINT"{RVS}"B$L$;:IF I<
      24THEN PRINT"{OFF}";
HD 470 GET A$:IF AS=N$ THEN470
FK 480 IF(A$>"/"ANDA$<":")OR(A
      $>"@"ANDA$<"G")THEN540
GS 485 A=-(A$="M")-2*(A$=",")-
      3*(A$=".")-4*(A$="/")-5
      *(A$="J")-6*(A$="K")
FX 486 A=A-7*(A$="L")-8*(A$=":
      ")-9*(A$="U")-10*(A$="I
      ")-11*(A$="O")-12*(A$="
      P")
CM 487 A=A-13*(A$=S$):IF A THE
      N A$=MID$("ABCD123E456F
      0",A,1):GOTO 540
MP 490 IF A$=R$ AND((I=0)AND(J
      =1)OR F)THEN PRINT B$;:
      J=2:NEXT:I=24:GOTO550
KC 500 IF A$="{HOME}" THEN PRI
      NT B$:J=2:NEXT:I=24:NEX
      T:F=0:GOTO440
MX 510 IF(A$="{RIGHT}")ANDF TH
      ENPRINT B$L$;:GOTO540
GK 520 IF A$<>L$ AND A$<>D$ OR
      ((I=0)AND(J=1))THEN GOS
      UB1060:GOTO470
HG 530 A$=L$+S$+L$:PRINT B$L$;
      :J=2-J:IF J THEN PRINT
      {SPACE}L$;:I=I-3
QS 540 PRINT A$;:NEXT J:PRINT
      {SPACE}S$;
PM 550 NEXT I:PRINT:PRINT"{UP}
      {5 RIGHT}";:INPUT#3,IN$
      :IF IN$=N$ THEN CLOSE3:
      GOTO220
QC 560 FOR I=1 TO 25 STEP3:B$=
      MID$(IN$,I):GOSUB320:IF
       I<25 THEN GOSUB380:A(I
      /3)=A
PK 570 NEXT:IF A<>CK THEN GOSU
      B1060:PRINT"{BLK}{RVS}
      {SPACE}ERROR: REENTER L
      INE [43]":F=1:GOTO440
HJ 580 GOSUB1080:B=BS+AD-SA:FO
      R I=0 TO 7:POKE B+I,A(I
      ):NEXT
QQ 590 AD=AD+8:IF AD>EA THEN C
      LOSE3:PRINT"{DOWN}{BLU}
      ** END OF ENTRY **{BLK}
      {2 DOWN}":GOTO700
GQ 600 F=0:GOTO440
QA 610 PRINT"{CLR}{DOWN}{RVS}
      {SPACE}DISPLAY DATA ":G
      OSUB400:IF IN$=N$ THEN2
      20
RJ 620 PRINT"{DOWN}{BLU}PRESS:
       {RVS}SPACE{OFF} TO PAU
      SE, {RVS}RETURN{OFF} TO
       BREAK[43]{DOWN}"
KS 630 GOSUB360:B=BS+AD-SA:FOR
      I=BTO B+7:A=PEEK(I):GOS
      UB350:GOSUB380:PRINT S$
      ;
CC 640 NEXT:PRINT"{RVS}";:A=CK
      :GOSUB350:PRINT
KH 650 F=1:AD=AD+8:IF AD>EA TH
      ENPRINT"{DOWN}{BLU}** E
      ND OF DATA **":GOTO220
KC 660 GET A$:IF A$=R$ THEN GO
      SUB1080:GOTO220
EQ 670 IF A$=S$ THEN F=F+1:GOS
      UB1080
AD 680 ONFGOTO630,660,630
CM 690 PRINT"{DOWN}{RVS} LOAD
      {SPACE}DATA ":OP=1:GOTO
      710
PC 700 PRINT"{DOWN}{RVS} SAVE
      {SPACE}FILE ":OP=0
RX 710 IN$=N$:INPUT"{DOWN}FILE
      NAME[43]";IN$:IF IN$=N$
      {SPACE}THEN220
PR 720 F=0:PRINT"{DOWN}{BLK}
      {RVS}T{OFF}APE OR {RVS}
      D{OFF}ISK: [43]";
FP 730 GET A$:IF A$="T"THEN PR
      INT"T{DOWN}":GOTO880
HQ 740 IF A$<>"D"THEN730
HH 750 PRINT"D{DOWN}":OPEN15,8
      ,15,"I0:":B=EA-SA:IN$="
      0:"+IN$:IF OP THEN810
SQ 760 OPEN 1,8,8,IN$+",P,W":G
      OSUB860:IF A THEN220
FJ 770 AH=INT(SA/256):AL=SA-(A
      H*256):PRINT#1,CHR$(AL)
      ;CHR$(AH);
PE 780 FOR I=0 TO B:PRINT#1,CH
      R$(PEEK(BS+I));:IF ST T
      HEN800
FC 790 NEXT:CLOSE1:CLOSE15:GOT
      O940
GS 800 GOSUB1060:PRINT"{DOWN}
      {BLK}ERROR DURING SAVE:
      [43]":GOSUB860:GOTO220
MA 810 OPEN 1,8,8,IN$+",P,R":G
      OSUB860:IF A THEN220
GE 820 GET#1,A$,B$:AD=ASC(A$+Z
      $)+256*ASC(B$+Z$):IF AD
      <>SA THEN F=1:GOTO850
RX 830 FOR I=0 TO B:GET#1,A$:P
      OKE BS+I,ASC(A$+Z$):IF(
      I<>B)AND ST THEN F=2:AD
      =I:I=B
FA 840 NEXT:IF ST<>64 THEN F=3
FQ 850 CLOSE1:CLOSE15:ON ABS(F
      >0)+1 GOTO960,970
SA 860 INPUT#15,A,A$:IF A THEN
       CLOSE1:CLOSE15:GOSUB10
      60:PRINT"{RVS}ERROR: "A
      $
GQ 870 RETURN
EJ 880 POKE183,PEEK(FA+2):POKE
      187,PEEK(FA+3):POKE188,
      PEEK(FA+4):IFOP=0THEN92
      0
HJ 890 SYS 63466:IF(PEEK(783)A
      ND1)THEN GOSUB1060:PRIN
      T"{DOWN}{RVS} FILE NOT
      {SPACE}FOUND ":GOTO690
CS 900 AD=PEEK(829)+256*PEEK(8
      30):IF AD<>SA THEN F=1:
      GOTO970
SC 910 A=PEEK(831)+256*PEEK(83
      2)-1:F=F-2*(A<EA)-3*(A>
      EA):AD=A-AD:GOTO930
KM 920 A=SA:B=EA+1:GOSUB1010:P
      OKE780,3:SYS 63338
JF 930 A=BS:B=BS+(EA-SA)+1:GOS
      UB1010:ON OP GOTO950:SY
      S 63591
AE 940 GOSUB1080:PRINT"{BLU}**
       SAVE COMPLETED **":GOT
      O220
XP 950 POKE147,0:SYS 63562:IF
      {SPACE}ST>0 THEN970
FR 960 GOSUB1080:PRINT"{BLU}**
       LOAD COMPLETED **":GOT
      O220
DP 970 GOSUB1060:PRINT"{BLK}
      {RVS}ERROR DURING LOAD:
      {DOWN}[43]":ON F GOSUB98
      0,990,1000:GOTO220
PP 980 PRINT"INCORRECT STARTIN
      G ADDRESS (";:GOSUB360:
      PRINT")":RETURN
GR 990 PRINT"LOAD ENDED AT ";:
      AD=SA+AD:GOSUB360:PRINT
       D$:RETURN
FD 1000 PRINT"TRUNCATED AT END
      ING ADDRESS":RETURN
RX 1010 AH=INT(A/256):AL=A-(AH
      *256):POKE193,AL:POKE1
      94,AH
FF 1020 AH=INT(B/256):AL=B-(AH
      *256):POKE174,AL:POKE1
      75,AH:RETURN
```

```
FX 1030 IF AD<SA OR AD>EA THEN
        1050
HA 1040 IF(AD>511 AND AD<40960
        )OR(AD>49151 AND AD<53
        248)THEN GOSUB1080:F=0
        :RETURN
HC 1050 GOSUB1060:PRINT"{RVS}
        {SPACE}INVALID ADDRESS
         {DOWN}{BLK}":F=1:RETU
        RN
AR 1060 POKE SD+5,31:POKE SD+6
        ,208:POKE SD,240:POKE
        {SPACE}SD+1,4:POKE SD+
        4,33
DX 1070 FOR S=1 TO 100:NEXT:GO
        TO1090
PF 1080 POKE SD+5,8:POKE SD+6,
        240:POKE SD,0:POKE SD+
        1,90:POKE SD+4,17
AC 1090 FOR S=1 TO 100:NEXT:PO
        KE SD+4,0:POKE SD,0:PO
        KE SD+1,0:RETURN
```

Program 2: MLX For Commodore 128

```
AE 100 TRAP 960:POKE 4627,128:
       DIM NL$,A(7)
XP 110 Z2=2:Z4=254:Z5=255:Z6=2
       56:Z7=127:BS=256*PEEK(4
       627):EA=65280
FB 120 BE$=CHR$(7):RT$=CHR$(13
       ):DL$=CHR$(20):SP$=CHR$
       (32):LF$=CHR$(157)
KE 130 DEF FNHB(A)=INT(A/256):
       DEF FNLB(A)=A-FNHB(A)*2
       56:DEF FNAD(A)=PEEK(A)+
       256*PEEK(A+1)
JB 140 KEY 1,"A":KEY 3,"B":KEY
        5,"C":KEY 7,"D":VOL 15
       :IF RGR(0)=5 THEN FAST
FJ 150 PRINT"{CLR}"CHR$(142);C
       HR$(8):COLOR 0,15:COLOR
        4,15:COLOR 6,15
GQ 160 PRINT TAB(12)"{RED}
       {RVS}{2 SPACES}[9 @3
       {2 SPACES}"RT$;TAB(12)"
       {RVS}{2 SPACES}{OFF}
       {BLU} 128 MLX {RED}
       {RVS}{2 SPACES}"RT$;TAB
       (12)"{RVS}{13 SPACES}
       {BLU}"
FE 170 PRINT"{2 DOWN}
       {3 SPACES}COMPUTE!'S MA
       CHINE LANGUAGE EDITOR
       {2 DOWN}"
DK 180 PRINT"{BLK}STARTING ADD
       RESS[4]";:GOSUB 260:IF
       {SPACE}AD THEN SA=AD:EL
       SE 180
FH 190 PRINT"{BLK}{2 SPACES}EN
       DING ADDRESS[4]";:GOSUB
        260:IF AD THEN EA=AD:E
       LSE 190
MF 200 PRINT"{DOWN}{BLK}CLEAR
       {SPACE}WORKSPACE [Y/N]?
       [4]":GETKEY A$:IF A$<>"
       Y" THEN 220
QH 210 PRINT"{DOWN}{BLU}WORKIN
       G...";:BANK 0:FOR A=BS
       {SPACE}TO BS+(EA-SA)+7:
       POKE A,0:NEXT A:PRINT"D
       ONE"
DC 220 PRINT TAB(10)"{DOWN}
       {BLK}{RVS} MLX COMMAND
       {SPACE}MENU [4]{DOWN}":
       PRINT TAB(13)"{RVS}E
       {OFF}NTER DATA"RT$;TAB(
       13)"{RVS}D{OFF}ISPLAY D
       ATA"RT$;TAB(13)"{RVS}L
       {OFF}OAD FILE"
HB 230 PRINT TAB(13)"{RVS}S
       {OFF}AVE FILE"RT$;TAB(1
       3)"{RVS}C{OFF}ATALOG DI
       SK"RT$;TAB(13)"{RVS}Q
       {OFF}UIT{DOWN}{BLK}"
AP 240 GETKEY A$:A=INSTR("EDLS
       CQ",A$):ON A GOTO 340,5
       50,640,650,930,940:GOSU
       B 950:GOTO 240
SX 250 PRINT"STARTING AT";:GOS
       UB 260:IF(AD<>0)OR(A$=N
       L$)THEN RETURN:ELSE 250
BG 260 A$=NL$:INPUT A$:IF LEN(
       A$)=4 THEN AD=DEC(A$)
PP 270 IF AD=0 THEN BEGIN:IF A
       $<>NL$ THEN 300:ELSE RE
       TURN:BEND
MA 280 IF AD<SA OR AD>EA THEN
       {SPACE}300
PM 290 IF AD>511 AND AD<65280
       {SPACE}THEN PRINT BE$;:
       RETURN
SQ 300 GOSUB 950:PRINT"{RVS} I
       NVALID ADDRESS {DOWN}
       {BLK}":AD=0:RETURN
RD 310 CK=FNHB(AD):CK=AD-Z4*CK
       +Z5*(CK>Z7):GOTO 330
DD 320 CK=CK*Z2+Z5*(CK>Z7)+A
AH 330 CK=CK+Z5*(CK>Z5):RETURN
QD 340 PRINT BE$;"{RVS} ENTER
       {SPACE}DATA ":GOSUB 250
       :IF A$=NL$ THEN 220
JA 350 BANK 0:PRINT:F=0:OPEN 3
       ,3
BR 360 GOSUB 310:PRINT HEX$(AD
       )+":";:IF F THEN PRINT
       {SPACE}L$:PRINT"{UP}
       {5 RIGHT}";
QA 370 FOR I=0 TO 24 STEP 3:B$
       =SP$:FOR J=1 TO 2:IF F
       {SPACE}THEN B$=MID$(L$,
       I+J,1)
PS 380 PRINT"{RVS}"B$+LF$;:IF
       {SPACE}I<24 THEN PRINT"
       {OFF}";
RC 390 GETKEY A$:IF (A$>"/" AN
       D A$<":") OR(A$>"@" AND
        A$<"G") THEN 470
AC 400 IF A$="+" THEN A$="E":G
       OTO 470
QB 410 IF A$="-" THEN A$="F":G
       OTO 470
FB 420 IF A$=RT$ AND ((I=0) AN
       D (J=1) OR F) THEN PRIN
       T B$;:J=2:NEXT:I=24:GOT
       O 480
RD 430 IF A$="{HOME}" THEN PRI
       NT B$:J=2:NEXT:I=24:NEX
       T:F=0:GOTO 360
XB 440 IF (A$="{RIGHT}") AND F
        THEN PRINT B$+LF$;:GOT
       O 470
JP 450 IF A$<>LF$ AND A$<>DL$
       {SPACE}OR ((I=0) AND (J
       =1)) THEN GOSUB 950:GOT
       O 390
PS 460 A$=LF$+SP$+LF$:PRINT B$
       +LF$;:J=2-J:IF J THEN P
       RINT LF$;:I=I-3
GB 470 PRINT A$;:NEXT J:PRINT
       {SPACE}SP$;
HA 480 NEXT I:PRINT:PRINT"{UP}
       {5 RIGHT}";:L$="
       {27 SPACES}"
DP 490 FOR I=1 TO 25 STEP 3:GE
       T#3,A$,B$:IF A$=SP$ THE
       N I=25:NEXT:CLOSE 3:GOT
       O 220
BA 500 A$=A$+B$:A=DEC(A$):MID$
       (L$,I,2)=A$:IF I<25 THE
       N GOSUB 320:A(I/3)=A:GE
       T#3,A$
AR 510 NEXT I:IF A<>CK THEN GO
       SUB 950:PRINT:PRINT"
       {RVS} ERROR: REENTER LI
       NE ":F=1:GOTO 360
DX 520 PRINT BE$:B=BS+AD-SA:FO
       R I=0 TO 7:POKE B+I,A(I
       ):NEXT I
XB 530 F=0:AD=AD+8:IF AD<=EA T
       HEN 360
CA 540 CLOSE 3:PRINT"{DOWN}
       {BLU}** END OF ENTRY **
       {BLK}{2 DOWN}":GOTO 650
MC 550 PRINT BE$;"{CLR}{DOWN}
       {RVS} DISPLAY DATA ":GO
       SUB 250:IF A$=NL$ THEN
       {SPACE}220
JF 560 BANK 0:PRINT"{DOWN}
       {BLU}PRESS: {RVS}SPACE
       {OFF} TO PAUSE, {RVS}RE
       TURN{OFF} TO BREAK[4]
       {DOWN}"
XA 570 PRINT HEX$(AD)+":";:GOS
       UB 310:B=BS+AD-SA
DJ 580 FOR I=B TO B+7:A=PEEK(I
       ):PRINT RIGHT$(HEX$(A),
       2);SP$;:GOSUB 320:NEXT
       {SPACE}I
XB 590 PRINT"{RVS}";RIGHT$(HEX
       $(CK),2)
GR 600 F=1:AD=AD+8:IF AD>EA TH
       EN PRINT"{BLU}** END OF
        DATA **":GOTO 220
EB 610 GET A$:IF A$=RT$ THEN P
       RINT BE$:GOTO 220
QK 620 IF A$=SP$ THEN F=F+1:PR
       INT BE$;
XS 630 ON F GOTO 570,610,570
RF 640 PRINT BE$"{DOWN}{RVS} L
       OAD DATA ":OP=1:GOTO 66
       0
BP 650 PRINT BE$"{DOWN}{RVS} S
       AVE FILE ":OP=0
DM 660 F=0:F$=NL$:INPUT"FILENA
       ME[4]";F$:IF F$=NL$ THE
       N 220
RF 670 PRINT"{DOWN}{BLK}{RVS}T
       {OFF}APE OR {RVS}D{OFF}
       ISK: [4]";
SQ 680 GETKEY A$:IF A$="T" THE
       N 850:ELSE IF A$<>"D" T
       HEN 680
SP 690 PRINT"DISK{DOWN}":IF OP
        THEN 760
EH 700 DOPEN#1,(F$+",P"),W:IF
       {SPACE}DS THEN A$=D$:GO
       TO 740
JH 710 BANK 0:POKE BS-2,FNLB(S
       A):POKE BS-1,FNHB(SA):P
       RINT"SAVING ";F$:PRINT
MC 720 FOR A=BS-2 TO BS+EA-SA:
       PRINT#1,CHR$(PEEK(A));:
       IF ST THEN A$="DISK WRI
       TE ERROR":GOTO 750
GC 730 NEXT A:CLOSE 1:PRINT"
       {BLU}** SAVE COMPLETED
       {SPACE}WITHOUT ERRORS *
       *":GOTO 220
RA 740 IF DS=63 THEN BEGIN:CLO
       SE 1:INPUT"{BLK}REPLACE
        EXISTING FILE [Y/N][4]
       ";A$:IF A$="Y" THEN SCR
       ATCH(F$):PRINT:GOTO 700
       :ELSE PRINT"{BLK}":GOTO
        660:BEND
GA 750 CLOSE 1:GOSUB 950:PRINT
       "{BLK}{RVS} ERROR DURIN
       G SAVE: [4]":PRINT A$:G
       OTO 220
FD 760 DOPEN#1,(F$+",P"):IF DS
        THEN A$=DS$:F=4:CLOSE
       {SPACE}1:GOTO 790
```

```
PX 770 GET#1,A$,B$:CLOSE 1:AD=
       ASC(A$)+256*ASC(B$):IF
       {SPACE}AD<>SA THEN F=1:
       GOTO 790
KB 780 PRINT"LOADING ";F$:PRIN
       T:BLOAD(F$),B0,P(BS):AD
       =SA+FNAD(174)-BS-1:F=-2
       *(AD<EA)-3*(AD>EA)
RQ 790 IF F THEN 800:ELSE PRIN
       T"{BLU}** LOAD COMPLETE
       D WITHOUT ERRORS **":GO
       TO 220
ER 800 GOSUB 950:PRINT"{BLK}
       {RVS} ERROR DURING LOAD
       : {4}":ON F GOSUB 810,8
       20,830,840:GOTO220
QJ 810 PRINT"INCORRECT STARTIN
       G ADDRESS (";HEX$(AD);"
       )":RETURN
DP 820 PRINT"LOAD ENDED AT ";H
       EX$(AD):RETURN
EB 830 PRINT"TRUNCATED AT ENDI
       NG ADDRESS ("HEX$(EA)")
       ":RETURN
FP 840 PRINT"DISK ERROR ";A$:R
       ETURN
KS 850 PRINT"TAPE":AD=POINTER(
       F$):BANK 1:A=PEEK(AD):A
       L=PEEK(AD+1):AH=PEEK(AD
       +2)
XX 860 BANK 15:SYS DEC("FF68")
       ,0,1:SYS DEC("FFBA"),1,
       1,0:SYS DEC("FFBD"),A,A
       L,AH:SYS DEC("FF90"),12
       8:IF OP THEN 890
FG 870 PRINT:A=SA:B=EA+1:GOSUB
        920:SYS DEC("E919"),3:
       PRINT"SAVING ";F$
AB 880 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("EA18"):
       PRINT"{DOWN}{BLU}** TAP
       E SAVE COMPLETED **":GO
       TO 220
CP 890 SYS DEC("E99A"):PRINT:I
       F PEEK(2816)=5 THEN GOS
       UB 950:PRINT"{DOWN}
       {BLK}{RVS} FILE NOT FOU
       ND ":GOTO 220
GQ 900 PRINT"LOADING ...{DOWN}
       ":AD=FNAD(2817):IF AD<>
       SA THEN F=1:GOTO 800:EL
       SE AD=FNAD(2819)-1:F=-2
       *(AD<EA)-3*(AD>EA)
JD 910 A=BS:B=BS+(EA-SA)+1:GOS
       UB 920:SYS DEC("E9FB"):
       IF ST>0 THEN 800:ELSE 7
       90
XB 920 POKE193,FNLB(A):POKE194
       ,FNHB(A):POKE 174,FNLB(
       B):POKE 175,FNHB(B):RET
       URN
CP 930 CATALOG:PRINT"{DOWN}
       {BLU}** PRESS ANY KEY F
       OR MENU **":GETKEY A$:G
       OTO 220
MM 940 PRINT BE$"{RVS} QUIT
       {4}";RT$;"ARE YOU SURE
       {SPACE}[Y/N]?":GETKEY A
       $:IF A$<>"Y" THEN 220:E
       LSE PRINT"{CLR}":BANK 1
       5:END
JE 950 SOUND 1,500,10:RETURN
AF 960 IF ER=14 AND EL=260 THE
       N RESUME 300
MK 970 IF ER=14 AND EL=500 THE
       N RESUME NEXT
KJ 980 IF ER=4 AND EL=780 THEN
        F=4:A$=DS$:RESUME 800
DQ 990 IF ER=30 THEN RESUME:EL
       SE PRINT ERR$(ER);" ERR
       OR IN LINE";EL
```

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MLX Machine Language Entry Program For Apple

Tim Victor, Editorial Programmer

To make it easier to enter machine language programs into your computer without typos, COMPUTE! is introducing its "MLX" entry program for the Apple II series. It's our best MLX yet. It runs on the II, II+, IIe, and IIc, and with either DOS 3.3 or ProDOS.

A machine language (ML) program is usually listed as a long series of numbers. It's hard to keep your place and even harder to avoid making mistakes as you type in the listing, since an incorrect line looks almost identical to a correct one. To make error-free entry easier, COMPUTE! generally lists ML programs for Commodore and Atari computers in a format designed to be typed in with a utility called "MLX." The MLX program uses a checksum system to catch typing errors almost as soon as they happen.

Apple MLX checks your typing on a line-by-line basis. It won't let you enter invalid characters or let you continue if there's a mistake in a line. It won't even let you enter a line or digit out of sequence. Best of all, you don't have to know anything about machine language to enter ML programs with MLX. Apple MLX makes typing ML programs almost foolproof.

Using Apple MLX

Type in and save some copies of Apple MLX on disk (you'll want to use MLX to enter future ML programs in COMPUTE!). It doesn't matter whether you type it in on a disk formatted for DOS 3.3 or ProDOS. Programs entered with Apple MLX, however, must be saved to a disk formatted with the same operating system as Apple MLX itself.

If you have an Apple IIe or IIc, make sure that the key marked CAPS LOCK is in the down position. Type RUN. You'll be asked for the starting and ending addresses of the ML program. These values vary for each program, so they're given at the beginning of the ML program listing and in the program's accompanying article. Find them and type them in.

Invalid Characters Banned

Apple MLX is fairly flexible about how you type in the numbers. You can put extra spaces between numbers or leave the spaces out entirely, compressing a line into 18 keypresses. Be careful not to put a space between two digits in the middle of a number. Apple MLX will read two single-digit numbers instead of one two-digit number (F 6 means F and 6, not F6).

You can't enter an invalid character with Apple MLX. Only the numerals 0–9 and the letters A–F can be typed in. If you press any other key (with some exceptions noted below), nothing happens. This safeguards against entering extraneous characters. Even better, Apple MLX checks for transposed characters. If you're supposed to type in A0 and instead enter 0A, Apple MLX will catch your mistake.

The next thing you'll see is a menu asking you to select a function. The first is (E)NTER DATA. If you're just starting to type in a program, pick this. Press the E key, and the program asks for the address where you want to begin entering data. Type the first number in the first line of the program listing if you're just starting, or the line number where you left off if you've already typed in part of a program. Hit the RETURN key and begin entering the data.

Once you're in Enter mode, Apple MLX prints the address for each program line for you. You then type in all nine numbers on that line, beginning with the first two-digit number after the colon (:). Each line represents eight bytes and a checksum. When you enter a line and hit RETURN, Apple MLX recalculates the checksum from the eight bytes and the address. If you enter more or less than nine numbers, or the checksum doesn't exactly match, Apple MLX erases the line you just entered and prompts you again for the same line.

Apple MLX also checks to make sure you're typing in the right line. The address (the number to the left of the colon) is part of the checksum recalculation. If you accidentally skip a line and try to enter incorrect values, Apple MLX won't let you continue. Just make sure you enter the correct starting address; if you don't, you won't be able to enter any of the following lines. Apple MLX will stop you.

Editing Features

Apple MLX also includes some editing features. The left- and right-arrow keys allow you to back up and go forward on the line that you are entering, so you can retype data. Pressing the CONTROL (CTRL) and D keys at the same time (*delete*) removes the character under the

cursor, shortening the line by one character. Pressing CTRL-I (*insert*) puts a space under the cursor and shifts the rest of the line to the right, making the line one character longer. If the cursor is at the right end of the line, neither CTRL-D nor CTRL-I has any effect.

When you've entered the entire listing (up to the ending address that you specified earlier), Apple MLX automatically leaves Enter mode and redisplays the functions menu. If you want to leave Enter mode before then, press the RETURN key when Apple MLX prompts you with a new line address. (For instance, you may want to leave Enter mode to enter a program listing in more than one sitting; see below.)

Display Data

The second menu choice, (D)ISPLAY DATA, examines memory and shows the contents in the same format as the program listing. You can use it to check your work or to see how far you've gotten. When you press D, Apple MLX asks you for a starting address. Type in the address of the first line you want to see and hit RETURN. Apple MLX displays program lines until you press any key or until it reaches the end of the program.

Save And Load

Two more menu selections let you save programs on disk and load them back into the computer. These are (S)AVE FILE and (L)OAD FILE. When you press S or L, Apple MLX asks you for the filename. The first time you save an ML program, the name you assign will be the program's filename on the disk. If you press L and specify a filename that doesn't exist on the disk, you'll see a disk error message.

If you're not sure why a disk error has occurred, check the drive. Make sure there's a formatted disk in the drive and that it was formatted by the same operating system you're using for Apple MLX (ProDOS or DOS 3.3). If you're trying to save a file and see an error message, the disk might be full. Either save the file on another disk or quit Apple MLX (by pressing the Q key), delete an old file or two, then run Apple MLX again. Your typing should still be safe in memory.

Apple MLX: Machine Language Entry Program

For instructions on entering this program, please refer to "COMPUTE!'s Guide to Typing In Programs" elsewhere in this issue.

```
8F 100 N = 9: HOME : NORMAL : PR
       INT "APPLE MLX": POKE 34,
       2: ONERR GOTO 610
CC 110 VTAB 1: HTAB 20: PRINT "S
       TART ADDRESS";: GOSUB 530
       : IF A = 0 THEN PRINT CHR
       $ (7): GOTO 110
8C 120 S = A
EJ 130 VTAB 2: HTAB 20: PRINT "E
       ND ADDRESS ";: GOSUB 530
       : IF S > = A OR A = 0 THE
       N PRINT CHR$ (7): GOTO 13
       0
2B 140 E = A
B5 150 PRINT : PRINT "CHOOSE:(E)
       NTER DATA";: HTAB 22: PRI
       NT "(D)ISPLAY DATA": HTAB
        8: PRINT "(L)OAD FILE  (
       S)AVE FILE  (Q)UIT": PRIN
       T
AE 160 GET A$: FOR I = 1 TO 5: I
       F A$ < > MID$ ("EDLSQ",I,
       1) THEN NEXT : GOTO 160
93 170 ON I GOTO 270,220,180,200
       : POKE 34,0: END
AF 180 INPUT "FILENAME: ";A$: IF
        A$ < > "" THEN PRINT CHR
       $ (4);"BLOAD";A$;",A";S
A1 190 GOTO 150
3B 200 INPUT "FILENAME: ";A$: IF
        A$ < > "" THEN PRINT CHR
       $ (4);"BSAVE";A$;",A";S;"
       ,L";(E - S) + 1
92 210 GOTO 150
C2 220 GOSUB 590: IF B = 0 THEN
       150
9E 230 FOR B = B TO E STEP 8:L =
        4:A = B: GOSUB 580: PRIN
       T A$;": ";:L = 2
85 240 FOR F = 0 TO 7:V(F + 1) =
        PEEK (B + F): NEXT : GOS
       UB 560:V(9) = C
F2 250 FOR F = 1 TO N:A = V(F):
       GOSUB 580: PRINT A$" ";:
       NEXT : PRINT : IF PEEK (4
       9152) < 128 THEN NEXT
94 260 POKE 49168,0: GOTO 150
CC 270 GOSUB 590: IF B = 0 THEN
       150
4B 280 FOR B = B TO E STEP 8
A6 290 HTAB 1:A = B:L = 4: GOSUB
        580: PRINT A$;": ";: CAL
       L 64668:A$ = "":P = 0: GO
       SUB 330: IF L = 0 THEN 15
       0
F9 300 GOSUB 470: IF F < > N THE
       N PRINT CHR$ (7);: GOTO 2
       90
27 310 IF N = 9 THEN GOSUB 560:
       IF C < > V(9) THEN PRINT
       CHR$ (7);: GOTO 290
72 320 FOR F = 1 TO 8: POKE B +
       F - 1,V(F): NEXT : PRINT
       : NEXT : GOTO 150
8E 330 IF LEN (A$) = 33 THEN A$
       = O$:P = O: PRINT CHR$ (7
       );
22 340 L = LEN (A$):O$ = A$:O =
       P:L$ = "": IF P > 0 THEN
       L$ = LEFT$ (A$,P)
E0 350 R$ = "": IF P < L - 1 THE
       N R$ = RIGHT$ (A$,L - P -
        1)
55 360 HTAB 7: PRINT L$;: FLASH
       : IF P < L THEN PRINT MID
       $ (A$,P + 1,1);: NORMAL :
        PRINT R$;
7B 370 PRINT " ";: NORMAL
E6 380 K = PEEK (49152): IF K <
       128 THEN 380
C1 390 POKE 49168,0:K = K - 128
5B 400 IF K = 13 THEN HTAB 7: PR
       INT A$;" ";: RETURN
8A 410 IF K = 32 OR K > 47 AND K
        < 58 OR K > 64 AND K < 7
       1 THEN A$ = L$ + CHR$ (K)
        + R$:P = P + 1
C1 420 IF K = 4 THEN A$ = L$ + R
       $
5F 430 IF K = 9 THEN A$ = L$ + "
        " + MID$ (A$,P + 1,1) +
       R$
8A 440 IF K = 8 THEN P = P - (P
       > 0)
93 450 IF K = 21 THEN P = P + (P
       < L)
9D 460 GOTO 330
37 470 F = 1:D = 0: FOR P = 1 TO
        LEN (A$):C$ = MID$ (A$,P
       ,1): IF F > N AND C$ < >
       " " THEN RETURN
BB 480 IF C$ < > " " THEN GOSUB
       520:V(F) = J + 16 * (D =
       1) * V(F):D = D + 1
5F 490 IF D > 0 AND C$ = " " OR
       D = 2 THEN D = 0:F = F +
       1
88 500 NEXT : IF D = 0 THEN F =
       F - 1
17 510 RETURN
B5 520 J = ASC (C$):J = J - 48 -
        7 * (J > 64): RETURN
AB 530 A = 0: INPUT A$:A$ = LEFT
       $ (A$,4): IF LEN (A$) = 0
        THEN RETURN
6F 540 FOR P = 1 TO LEN (A$):C$
       = MID$ (A$,P,1): IF C$ <
       "0" OR C$ > "9" AND C$ <
       "A" OR C$ > "Z" THEN A =
       0: RETURN
2D 550 GOSUB 520:A = A * 16 + J:
        NEXT : RETURN
28 560 C = INT (B / 256):C = B -
        254 * C - 255 * (C > 127
       ):C = C - 255 * (C > 255)
2B 570 FOR F = 1 TO 8:C = C * 2
       - 255 * (C > 127) + V(F):
       C = C - 255 * (C > 255):
       NEXT : RETURN
DA 580 I = FRE (0):A$ = "": FOR
       I = 1 TO L:T = INT (A / 1
       6):A$ = MID$ ("0123456789
       ABCDEF",A - 16 * T + 1,1)
        + A$:A = T: NEXT : RETUR
       N
1F 590 PRINT "FROM ADDRESS ";: G
       OSUB 530: IF S > A OR E <
        A OR A = 0 THEN B = 0: R
       ETURN
0D 600 B = S + 8 * INT ((A - S)
       / 8): RETURN
B6 610 PRINT "DISK ERROR": GOTO
       150
```

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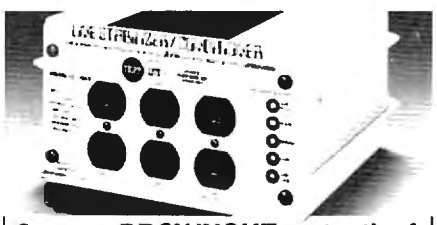
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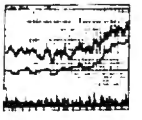
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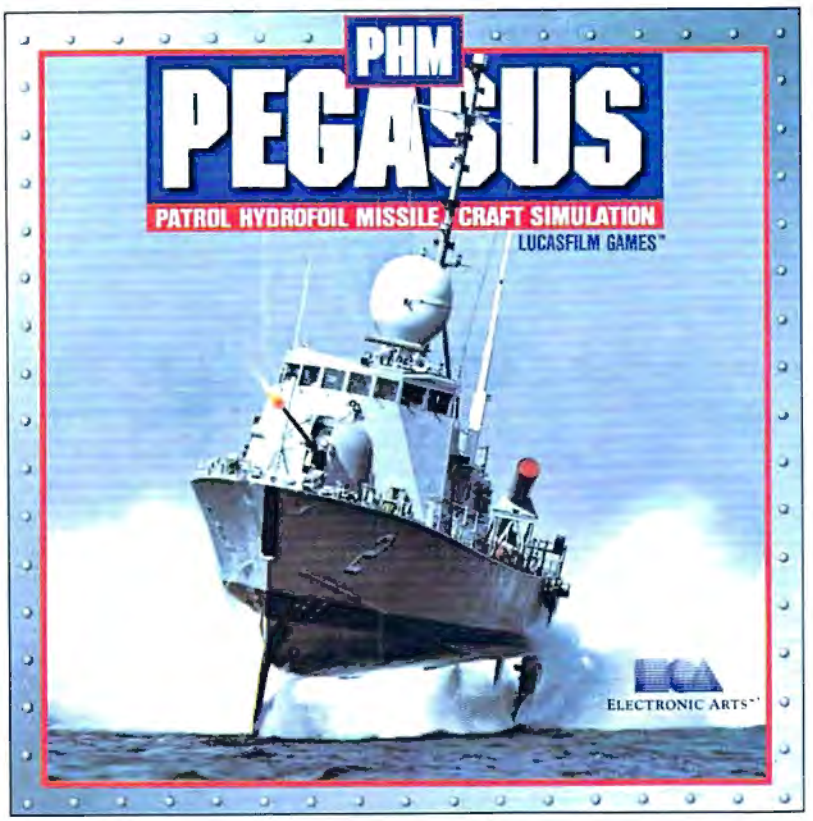
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