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July 1985 A CWC/I Publication

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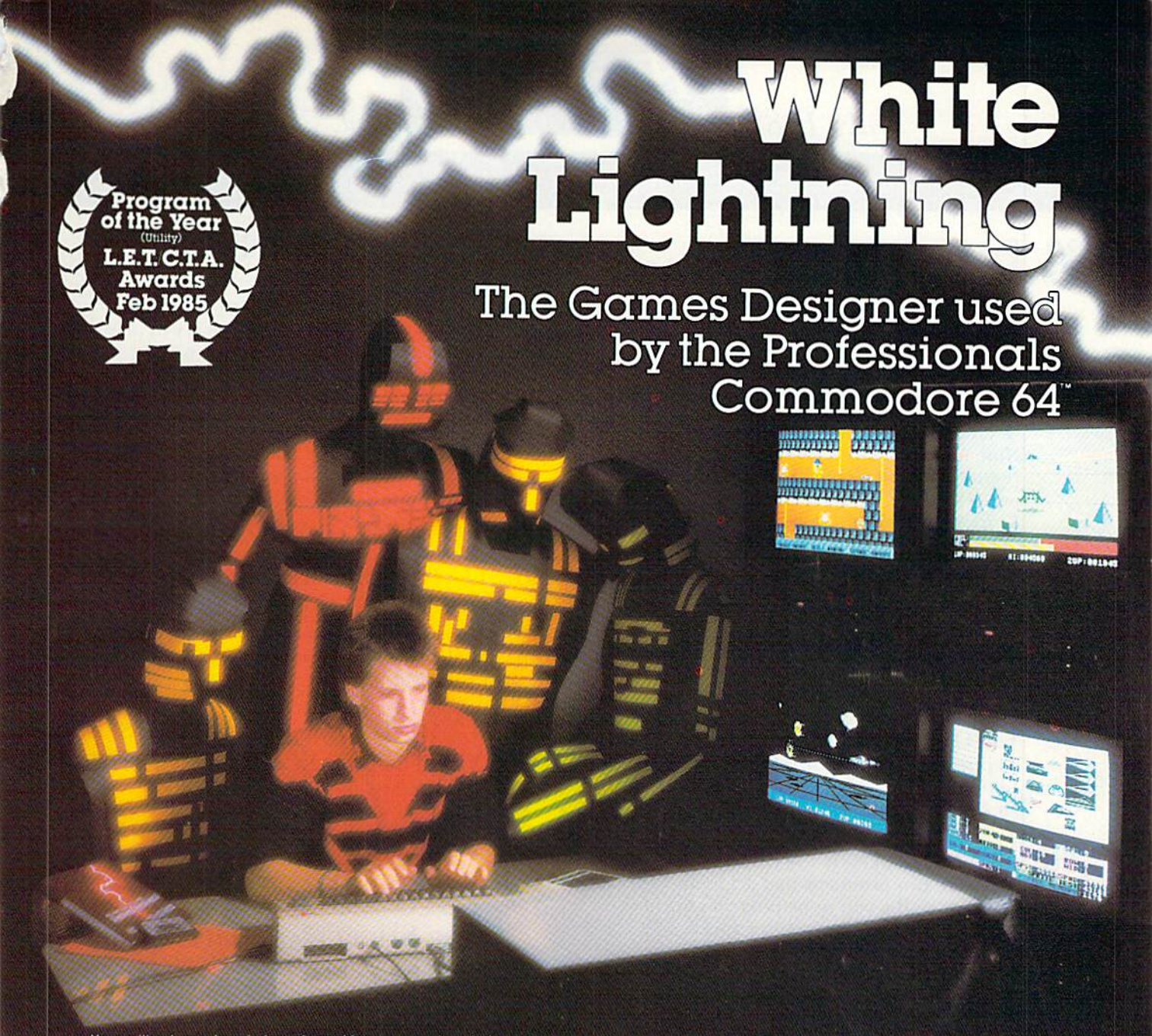

Now, without any knowledge of machine code, you can write fast, smooth, professional, totally original games and market them without paying royalties.

Even if you have already mastered machine code, we believe that the time and problems saved by writing in White Lightning's **FORTH**-based high level language could revolutionise commercial games writing for years to come.

IDEAL IDEAL is an Interrupt Driven Extendible Animation sub-Language. Once you have mastered IDEAL's easy to learn set of over 100 commands and just a little FORTH, you will be ready to produce arcade-quality games even if you don't know machine code. Up to 255 software sprites, each with its own user-defined dimensions, can be moved around the screen (or memory), scrolled, spun, reflected, enlarged or inverted with amazing speed and smoothness. Operations are possible between screen windows, sprites and sprite windows. Software sprites can even stretch across several screens, so those difficult scrolling landscapes that form the basis of so many games are easy to achieve. White Lightning also adds PLOT, DRAW, POLY and CIRCLE as well as fully supporting the Commodore's own excellent hardware sprites and sound facilities. The IDEAL routines operate in hi-res or 4-color modes.

MULTI-TASKING Because White Lightning uses interrupts, you can effectively run two programs at once. This means, of course, that games like Space Invaders and Defender can be written without complex timing calculations. So while one program smoothly scrolls the landscape, the second amimates the other characters. This is undoubtedly one of White Lightning's most powerful features.

MARKETING AND PORTABILITY Although White Lightning uses an integer FORTH as its host language, programs can be written in a combination of Commodore BASIC, FORTH, IDEAL and machine language. The final program will run independently of White Lightning and absolutely no marketing restrictions are imposed.

BASIC LIGHTNING In addition to the White Lightning program itself, the package also includes an extended BASIC. This BASIC adds more than **200** reserved words including all the IDEAL commands, procedures and a full set of **structured programming commands.** Up to five tasks can be run simultaneously. BASIC Lightning is also available separately.

SPRITE DESIGN White Lightning comes complete with a separate sprite designing program. Two libraries of sprites are included and up to 255 sprites can be designed with loading and saving facilities between sessions.

The package comes complete with two 100-page manuals and a free demonstration program is included to show off the potential of the system.

If your local dealer doesn't stock White Lightning, just send off this order form for our rapid despatch service. All checks in $US please.

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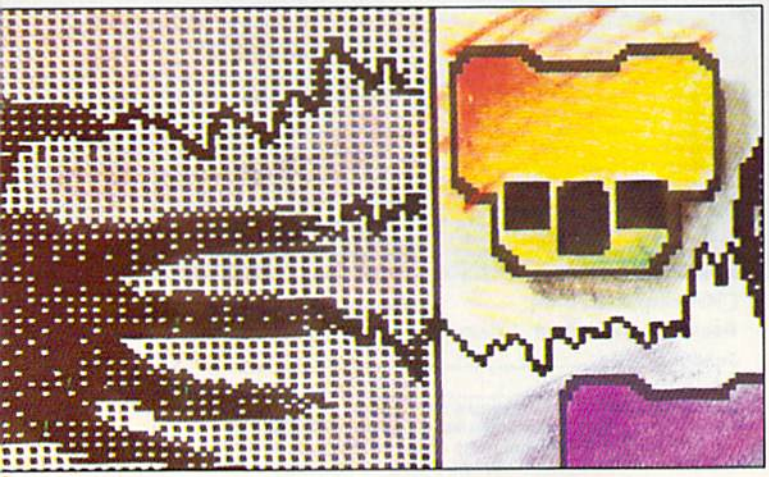

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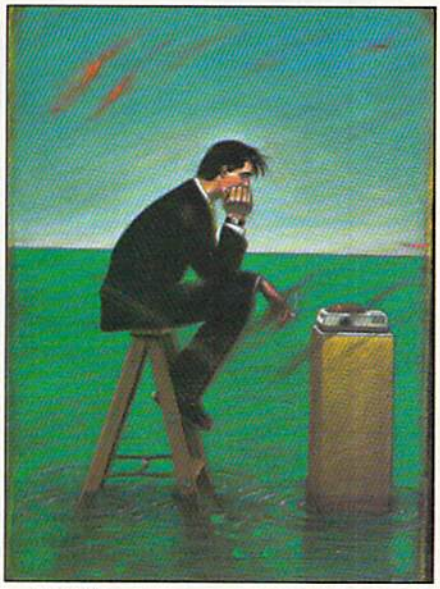

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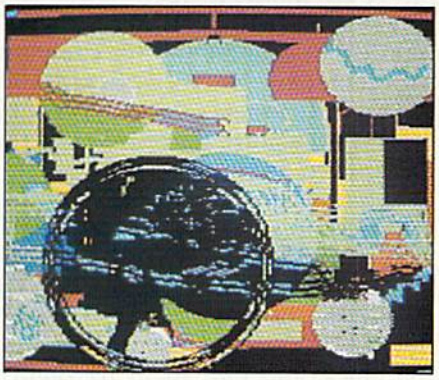

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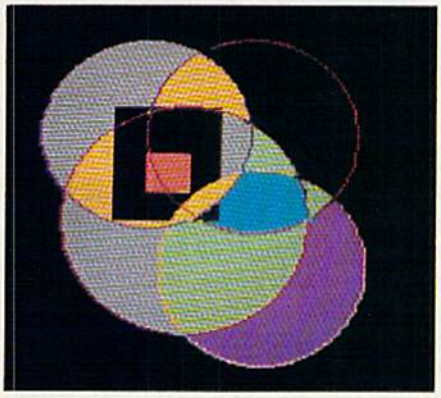

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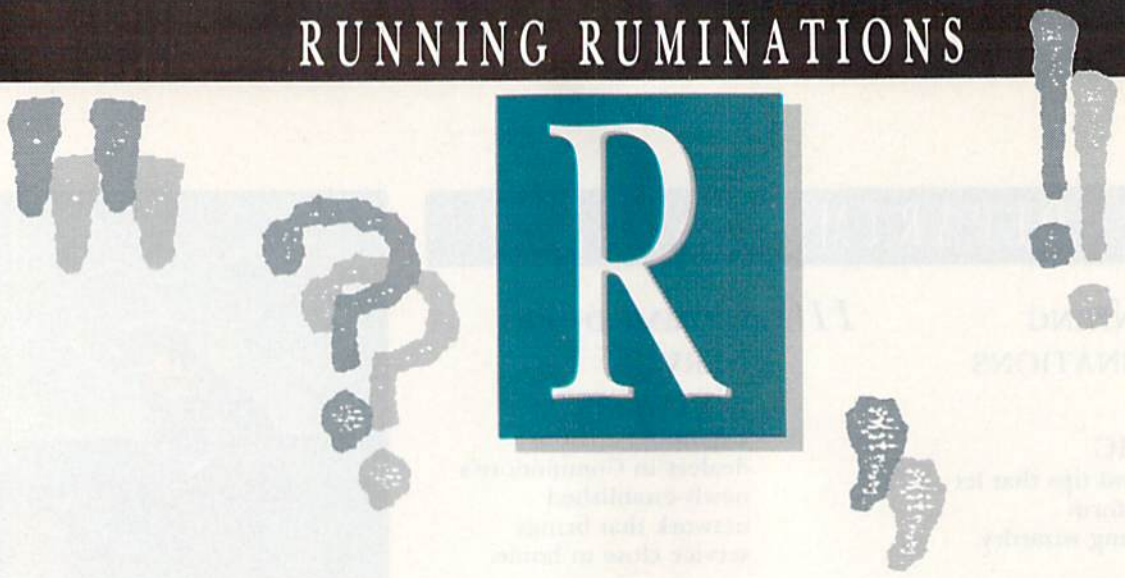

Rally Round CES!

The personal computer market desperately needs a shot in the arm. Will June's Consumer Electronics Show in Chicago provide the prescription for an ailing industry?

CES has traditionally been *the* occasion for manufacturers to showcase their latest computer products. It comes at a particularly critical time this year for the industry in general and for Commodore in particular.

Commodore has recently taken a sound thrashing in the press. It appears that industry analysts are anxious to erect a premature gravestone for the company that revolutionized home computing.

At a time characterized by a declining interest in computers, sagging sales and a general malaise in the industry, CES is an opportunity for Commodore to spark new interest in its products and generate some excitement with innovative applications. Commodore must disprove the pundits' assessment that the company came out of the blocks too fast, spent its vitality and now lacks the stamina to go the distance.

Before gleefully predicting the demise of Commodore, the analysts and doomsayers should take a closer look at Commodore's latest offerings, the C-128 and the Amiga. After all, to the majority of people, that's how the company is known and judged—by its products that are available.

While the Amiga is still under wraps (the public unveiling is slated for mid-July), the *RUN* staff has been putting the C-128 through its paces since early April. The general consensus is, "The C-128 has the potential to be a big seller." According to our tests, the new machine can lay claim to 100 percent C-64 software compatibility. The special help keys, the help commands and the enhanced Basic 7.0 are a programmer's delight. The C-128 features the capability to run CP/M software; a versatile, faster disk drive; and an improved monitor. These features, together with a low Commodore price, make the C-128 a winner.

Only someone with antifreeze in his veins would fail to be moved by the prospects of this machine. It is definitely an improvement over Commodore's C-64, the best-selling microcomputer to date. Apple has nothing like it. Neither has IBM nor Atari.

As the release date for the machine—together with its new monitor and disk drive—approaches, and as developers begin to introduce C-128 software, I expect to see a great deal of excitement generated about the new machine at CES.

Commodore predicts sales of a million units by the end of fiscal 1986. This may be a little optimistic, but Commodore definitely has the product; now it's up to marketing.

Surely, Commodore cannot be charged with lacking innovation in its product-marketing scheme. Just five short years ago, the VIC-20 (with only 5K, remember?) was introduced for $300. Today, for the same price, you can get a machine (the C-128) with 75 times the capability and 100 times the potential. Not bad.

Next month I'll report on my impressions of the CES show, together with reactions and comments from developers and show-goers. **db**

Reader Cooperation

RUN is the only Commodore-specific publication that includes the names and complete addresses of its authors with each article published. We provide this information as a service for readers who want to contact the authors to request further information or comment upon the articles. (Fan letters are welcomed.)

We feel that both readers and authors benefit as a result of this exchange. Reader feedback can be very gratifying, but it has come to our attention that many readers are taking advantage of this service offered by *RUN* and its authors.

If you expect a response to a query, please include a self-addressed, stamped envelope. If you're responding to an author's offer to provide a copy of his published program, be sure to include a cassette or disk and a mailer with the proper postage, as well as the requested fee to cover the copying costs.

RUN magazine boasts a very active readership, so a published article will generate hundreds of responses. Most authors are not equipped to handle such a volume. To make their lives a little easier, please follow the directions contained in the article.

Also, since some of our authors have several articles in print, specify what article you're talking about. If you're having problems with a particular program, include enough details to help the author isolate the problem.

RUN's authors are more than willing to help their fellow computerists get the most out of their Commodores, but your cooperation would greatly help them to help you. I know that you'll appreciate the same courtesy when you've published your first article in *RUN*.

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BELIEVE IT OR NOT!

- A neutrino has neither mass nor a charge, but travels at the speed of light!
- A 1950 study predicted all computing in the U.S. through 1999 could be done by 5000 computers!
- An integrated program with the power of Lotus 1-2-3 is available on the C64!

Until now, while useful programs existed for the C64, you had to use different commands for each. Even worse, they couldn't share data. Now there *is* one integrated program with the power of Lotus 1-2-3: **VIZASTAR.** It has a spreadsheet, a database and graphics. It took Kelvin Lacy, who wrote the acclaimed "Omniwriter" for Hesware, 15 months to develop Vizastar. It is totally menu-driven and written 100% in 6502 machine code. You can go instantly from spreadsheet to database or graphics and data is shared by all. It is compatible with virtually all word processors and printers. All Vizastar commands can be automated, so you can create your own applications and run them with one keystroke. Bet you think, with integration must come compromises. Nope. Read on and decide for yourself.

Actual Screen Dump Printed by VIZASTAR

The VIZASTAR Spreadsheet

It is a full-featured spreadsheet, as powerful as Multiplan. But much faster — faster than many on the IBM-PC! Remarkably, 10K of memory is available for spreadsheet use. Below VIZASTAR is compared against the other leading spreadsheets.

	CALC RESULT	MULTI-PLAN	VIZA STAR
No. of Rows	254	255	1000
No. of Columns	63	63	64
Vary Indiv. Columns	NO	YES	YES
Date Calculations	NO	NO	YES
No. of Windows	2	8	9
Built-in Functions	21	39	33
Link Spreadsheets	NO	YES	NO
Sort	NO	YES	YES
Program Mode	NO	NO	YES
Money-back Guarantee	NO	NO	YES
Retail Price	99.95	99.95	119.97

The VIZASTAR Database

It is a fast, random-access database, with file size limited only by available disk space. Create file layouts by simply painting a picture of the layout on up to 9 screens, showing where each field starts and ends. Vizastar does the rest. You can modify the layout at any time. To process the data, you use the familiar environment of the spreadsheet.

The VIZASTAR Graphics

Open a window anywhere and display a high-resolution bar or line graph of spreadsheet or database data. Or display the data as a pie chart or spectacular, 3-D multibar graph.

"I have been using Vizastar daily. I find it is the most powerful spreadsheet on the market for the C64 and the only spreadsheet that I will personally recommend for serious use."

Richard Tsukiji, President,
U.S. Commodore Users Group

"The power and design of Vizastar is spectacular. One of the "Best 5" software for the C64 of the 1000s I've seen."

Mike Hayes, Commodore Dealer

[Vizastar is] a phenomenal piece of programming which could turn the home computer market on its head."

California Magazine 2/85

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VIZASTAR comes with a cartridge, a 1541 diskette with a backup, reference and tutorial manuals. The 50 page tutorial manual is full of examples and pictures, to guide you step-by-step. Vizastar is priced at *ONLY* $119.97. The power of Vizastar may be hard to believe, but its value is hard to beat. We are so positive you will be delighted with it that we offer a hard-to-believe 15 day Money-Back Guarantee. Try it Risk-Free. Call us today or send a check or Money Order. VISA/MC accepted.

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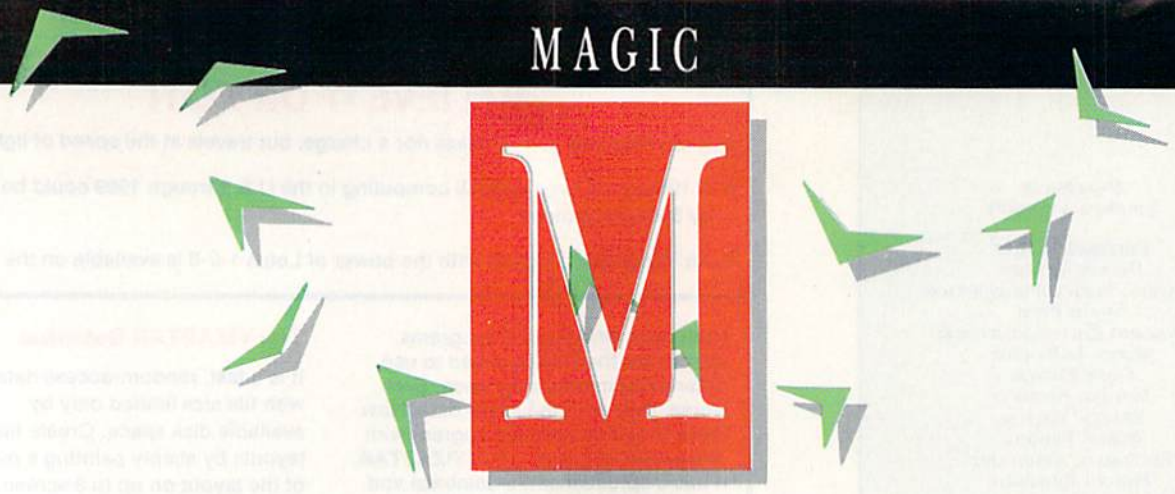

Compiled by LOUIS F. SANDER

MAGIC is tricks, MAGIC is fun.
MAGIC is doing what cannot be done.

In addition to two dynamite screen programs, this month's assortilege emphasizes disk drives and hints for using commercial software. Next month—printers and programming tips.

**$211 Plus/4 and C-16 Super Palette**—This program elegantly displays all the Basic 3.5 colors, at all luminance levels. Instructions appear in lines 3 and 4. When entering C$ in line 100, hold down the control, or CTRL, key, then press each number key from 1–8. Release the control key and hold down the Commodore key, then press 1–8 again. You should end up with 16 reverse-field characters between the quotes.

```
1 REM SUPER PALETTE-LOUIS F. SANDER
2 REM
3 REM COLOR KEYS CHANGE BKGD COLOR
4 REM NUMBERS 0-7 CHANGE BKGD LUM
5 :
100 C$=" - SEE TEXT - ":N$="01234567"
110 C=2:GRAPHIC3,1:TRAP250
120 COLOR0,C:COLOR2,1:COLOR3,C:COLOR4,C
130 BOX3,0,0,10,23,0,1
140 CIRCLE2,4,10,3,8:PAINT2,+0,+1
150 SSHAPEA$,0,0,10,23
160 FORX=0TO15:FORY=0TO7:COLOR2,X+1,7-Y
170 GSHAPEA$,(X*10),(Y*24),0
180 NEXT:NEXT:PAINT3,159,199
190 GETKEYA$
200 FORJ=1TO16
210 IFASC(A$)=ASC(MID$(C$,J))THENC=J
220 NEXT:FORJ=1TO8
230 IFA$=MID$(N$,J,1)THENL=VAL(A$)
240 NEXT:COLOR3,C,L:COLOR4,C,L:GOTO190
250 COLOR0,2:COLOR1,1:GRAPHIC0
```

Louis F. Sander
Pittsburgh, PA

$212 Split screen—The following short routine, using what's called a raster interrupt, splits the C-64 screen into two different-colored sections. Lines 1–3 will detect typing errors in your Data statements; you should delete them when the program asks you to, then save the remaining lines as your master routine. It will be compatible with most Basic programs, especially the ones not involving machine language.

Delete lines 1–3 and run your program. Anytime after doing this, you can split the screen by executing SYS 40800. The split will remain until stop/restore cancels it; it can be recalled by repeating the SYS 40800.

You can change the top color by changing the sixth item (002) in line 21, or, after running the program, by entering POKE 40877,c (where c is the number for the color you want). You can change the bottom color by changing the eighth item (007) in line 18 or by POKE 40855,c. The screen split can be after any line, and its location is controlled by the fifth item in line 13 (010 = split occurs after tenth line). To change the split location on an already-split screen, enter POKE 40812,n:SYS40800 (where n is the number of lines to appear above the split).

```
Ø REM SPLIT SCREEN - RICHARD RAPPACH
1 FORJ=1TO89:READA:B=B+A:NEXT
2 IFB<>9955THENPRINT"DATA ERROR":STOP
3 PRINT"DATA OK. DELETE LINES 1-3.":END
1Ø POKE56,159:POKE52,159
11 FORJ=4Ø8ØØTO4Ø888:READA:POKEJ,A:NEXT
12 DATA 12Ø,169,127,141,Ø13,22Ø,169,ØØ1
13 DATA 141,Ø26,2Ø8,169,Ø1Ø,Ø42,Ø42,Ø42
14 DATA 1Ø5,Ø5Ø,141,Ø95,159,141,Ø18,2Ø8
15 DATA 169,Ø27,141,Ø17,2Ø8,169,137,141
16 DATA Ø2Ø,ØØ3,169,159,141,Ø21,ØØ3,Ø88
17 DATA Ø96,173,Ø18,2Ø8,2Ø5,Ø95,159,2Ø8
18 DATA Ø21,169,ØØØ,141,Ø18,2Ø8,169,ØØ7
19 DATA 141,Ø33,2Ø8,169,ØØ1,141,Ø25,2Ø8
2Ø DATA 1Ø4,168,1Ø4,17Ø,1Ø4,Ø64,173,Ø95
21 DATA 159,141,Ø18,2Ø8,169,ØØ2,141,Ø33
22 DATA 2Ø8,169,ØØ1,141,Ø25,2Ø8,Ø76,Ø49
23 DATA 234
```

Richard Rappach
Youngstown, OH

$213 ESP program—This little program gives the impression that your computer has ESP, or extrasen-

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sory perception. You tell your friends that your computer "knows" you and will not cooperate with anyone else. Then you load ESP, type RUN and press the return key. The program runs fine. (It also disables List, to protect our little joke.)

The fun starts when you ask someone to run the program. Your friend types RUN and presses the return key, but the computer refuses to obey and instead disables the keyboard! You miraculously enable it again and run the program effortlessly; anyone else who tries it will fail. The computer appears to respond only to your mystical presence.

Here's how it works. After typing RUN, you hold your finger on the return key a little longer than normal (line 30 checks for this). When your friends fail to do this, lines 80–110 cause an apparent crash. To enable the keyboard, you discreetly press the back-arrow key, which gets you out of the loop.

If your friends suspect your slow action with the return key, mislead them by pressing it normally and immediately holding down the N key. This is easy, because you just had your finger on it from typing the word RUN. When they have been mystified long enough, you press the back-arrow key while the program is running, and List is re-enabled.

This ESP trick is easy to perform, and, with a little practice and showmanship, you can baffle even the most knowledgeable computerists.

```
10 REM ESP - DON THORPE
20 POKE808,234:FORJ=1TO250:NEXT
30 IFPEEK(197)<>1ANDPEEK(197)<>39THEN80
40 POKE808,237:POKE775,200
50 PRINT"HELLO, FRIEND.{2 SPACEs}SEE ME RUN
   !"
60 IFPEEK(197)=57THENPOKE775,167
70 GOTO50
80 PRINT:PRINT
90 PRINT"BEGONE! I DO NOT KNOW YOU."
100 PRINT:PRINT"READY.":POKE204,0
110 IFPEEK(197)<>57THEN110
120 WAIT207,1,1:PRINT"{3 CRSR UPs}"
130 POKE808,237:POKE198,0
```

Don Thorpe
Glenunga, South Australia

$214 Ghostfreezers—In Activision's Ghostbusters game, one screen requires you to maneuver a ghost into a trap using laser beams. A simpler way is to align your men so they totally overlap one another, appearing to be only one man. When the ghost flies over you, press the fire-button, and the ghost will stop. Press it again and he's history.

Maurice Arkinstall
Houston, British Columbia

$215 Doodle and Print Shop combined—If you own these excellent programs, you might like to put some Print Shop lettering on the screen, then decorate the display with Doodle's superior drawing options. If you have a machine language monitor, you can do it with ease. Let's say you wrote something with Print Shop and saved it as TEXT. Just enter your monitor and do this:

```
.L "TEXT",08 (load from monitor)
.T 4000 5F3F 6000 (transfer Print Shop screen to Doodle area)
.F 5C00 5FE7 01 (add color: black)
.S "DDTEXT",08,5C00,7F3F (save, adding "DD")
```

Then, from Doodle, load TEXT and doodle to your heart's content. Of course, you can substitute any name for TEXT, as long as you add the DD when saving it as a Doodle file.

Erik Francois
Vienne, France

$216 Wolfenzauberei—When your Beyond Castle Wolfenstein man is killed, the computer asks you to press the space bar to restart the game. If you remove the disk before pressing the space bar, what follows is sheer magic (in German, *Zauber*); the game will restart in the position right before you died or got caught. After restarting, reinsert the disk and resume where you left off.

Darius Hatami
Mystic Islands, NJ

$217 Star Wars trickery—If you own Star Wars the Arcade Game for the C-64, and would like a fast way to the death star, try this: Start the game and press the restore key and the space bar simultaneously. This should stop most of the fighters in their tracks and cause the rest to move in a straight line. Repeat the procedure, and all fighters should stop. Now, with the enemy disabled, kill his forces off and you should appear at the trench.

Jared Groth
Detroit, MI

$218 Datassette audio—If your video monitor has sound capability, you can use it to listen to your Datassette tapes. Such listening is most informative and often helps diagnose difficulties with the tape system. To do the magic, enter POKE 54296,15 then turn your volume up to max. When you load, save or verify, you should hear the tape loud and clear.

Dan Kennedy
Gearhart, OR

$219 Dead Datassette—If your Datassette suddenly stops operating, but everything else works fine, the chances are good that part of your power supply has blown. The power supply provides both 5 volts dc and 9 volts ac, with the latter used for the tape deck. You can use a Radio Shack #273-1515 transformer, 18 volts center-tapped, to bypass a defective 9-volt supply. Unless you're qualified in electronics, you should get a knowledgeable friend to help you.

Strip the round power supply cord and identify the red and blue wires, plus two black ones. Cut the black wires and connect them to the 9-volt ac from your new transformer, and you should be back in business. If you

Continued on p. 100.

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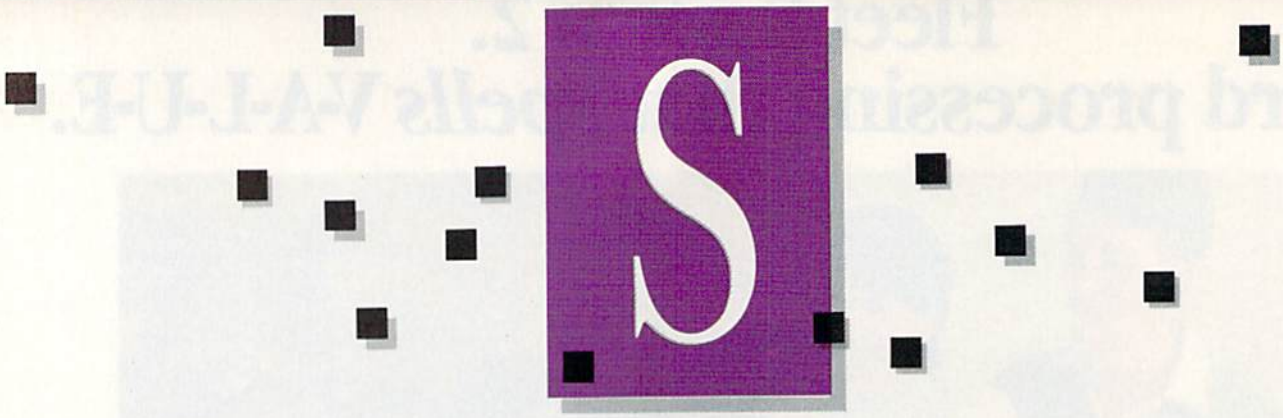

Compiled by SUSAN TANONA

Power 64

A

A Utility to Help Strengthen and Increase Your Programming Power

Commodore Basic as implemented on the C-64 is an adequate programming language. Even the improvements made for the Plus/4's Basic 3.5 leave a lot to be desired for the serious Basic programmer.

Commodore 64 owners can remedy many of these limitations with a package called Power 64, a programming utility from Pro-Line Software. It is written by superstar programmer Brad Templeton, and the documentation was composed by Jim Butterfield, whose light and matter-of-fact style makes it fun to learn almost anything.

Power 64 does use up some of the C-64's available memory, and although this has never caused me any problems, you should keep it in mind when developing lengthy programs.

The features of Power 64 have been broken into two sections. The More Power program contains additional functions not available in the main program; it can be loaded whenever you wish.

What can you do with this program? Here are some of Power 64's features: automatic line-numbering, an option to delete a specific range of lines, a command to dump active Basic variables, a Renumber command, a trace feature for program debugging, and a Why command that helps you locate the specific cause of a program error.

These options are just the beginning. You can search for certain patterns (lines containing NQ$, for example), and perform a search-and-replace, which is very helpful when you discover that you've used the same variable for two different quantities.

One of the features I often use is the Test option. This allows you to try out a subroutine before you actually put it into a program. Power 64 also allows you to scroll forward and backward through a program listing—no more having to jump from one segment of a program to another.

You can program instant keywords, which saves the time it takes to type in commands and strings each time you use them. Many of the more common commands are programmed for you, but you can redefine them as you wish.

True program merging is not only possible with Power 64, but it becomes so simple that you will wonder how you ever lived without it.

Several additional features of Power 64 go beyond the scope of this quick overview. The program's author has even left hooks in the program so that additional commands can be added at a later date.

What is missing from Power 64 are graphics and sound commands. Other Basic extenders, such as Simons' Basic, do offer these commands. For pure programming ability, however, they do not necessarily provide the ease and versatility of Power 64.

If you do a lot of programming, you will find that Power 64 restores the enjoyment of programming that might have been lost as your home projects became more complicated. I wouldn't be without it! *(Pro-Line Software, 755 The Queensway East, Unit 8, Mississauga, Ontario, Canada L4Y 4C5. C-64/$49.95 disk.)*

Jim Grubbs
Springfield, IL

Report Card

A ***Superb!*** An exceptional program that outshines all others.

B ***Very Good.*** One of the better programs available in its category. A worthy addition to your software library.

C ***Good.*** Lives up to its billing. No hassles, headaches or disappointments here.

D ***Mediocre.*** There are some problems with this program. There are better on the market.

E ***Poor.*** Substandard, with many problems. Should be deepsixed!

Mindshadow

B

A Buzzard is Your Guide as You Enter the Unknown

A decadent bird, named Condor, is your guide through your first moves of Mindshadow, a

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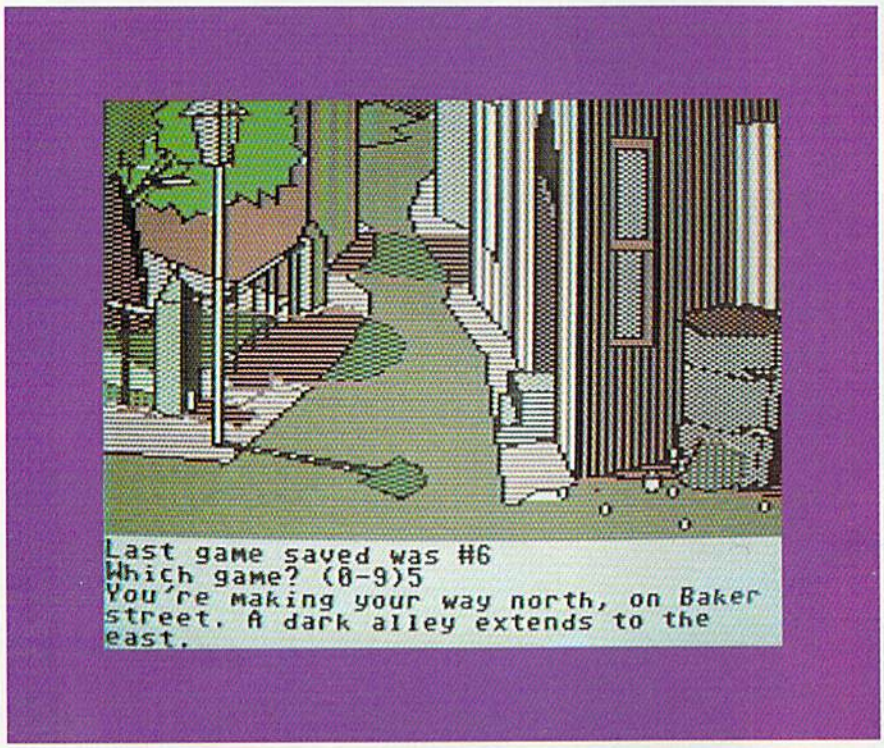

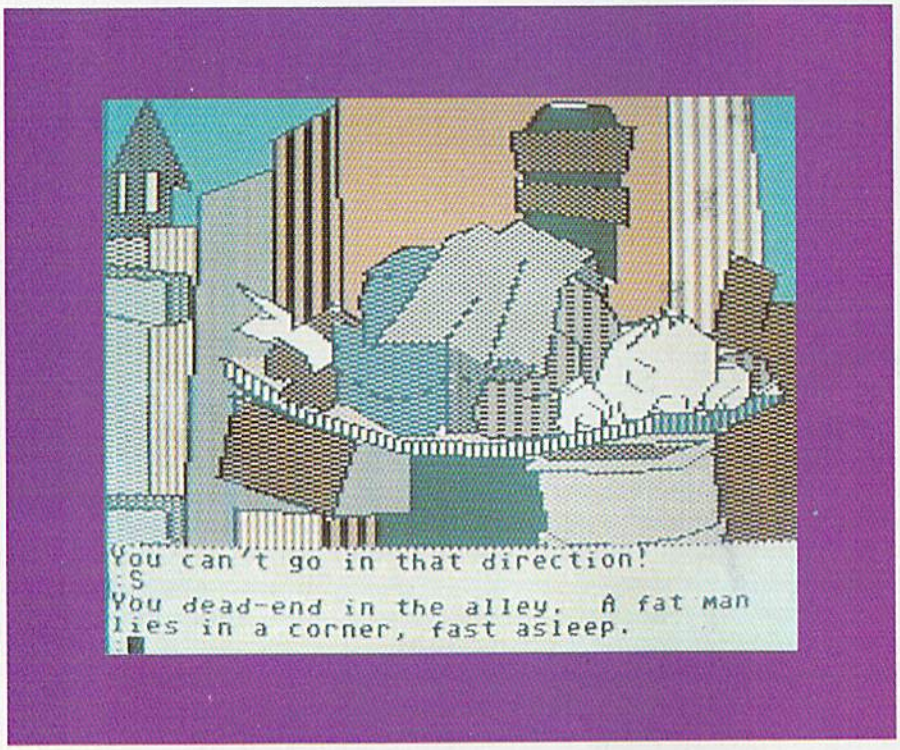

text and graphics adventure game from Activision.

You begin on a desert island, a victim of amnesia and abandonment. Unlike the Zork class of game, your purpose is not to explore, but rather to escape. Since you accumulate no points, the only way for you to tell a bad move from a worthwhile move is to notice whether or not it results in your death.

There are virtually no clues to the game, other than those you might decipher from the game description and screen shots on the back of the box. That's as it should be, for too many clues would spoil the fun.

To escape from the island, you must solve logical puzzles. And you must find your way out of other areas of the game until you reach your final destination and discover your true identity. There is a certain amount of realism here, as you can solve the puzzles by doing what a desperate person would do under the same circumstances.

The quality of the graphics is excellent, aside from the one or two times that the color of an important object blended so much into the background that, were it not for the accompanying text, I might never have seen it.

More than 80 screens make up the game, each displayed through the eyes of your character. Some of the screens are animated, and I found that I awaited each with great anticipation.

You may call on the buzzard for help a maximum of three times during the game. After that, instead of the usual cryptic clue, you'll be told to think for yourself.

On the flip side of the disk is an introduction to text adventures, and instructions on how to word your commands and use logic. There is also an introduction to Condor, the buzzard.

Should you find yourself in a real bind, Activision will (for $1 to cover postage and handling) send you a book of clues. Or, if you keep walking into that hotel room only to be shot by the man in the bed, and if the mail is too slow, and if you can't stand the mystery for another minute, you may call the Mindshadow hotline.

Mindshadow represents a giant step for Activision. The former video-game people are continuing to offer innovative software for the home computer market. I recommend Mindshadow. It's definitely worth your time and your money. *(Activision, Inc., 2350 Bayshore Frontage Road, Mountain View, CA 94043. C-64/$29.95 disk.)*

Ervin Bobo
St. Peters, MO

Continued on p. 102.

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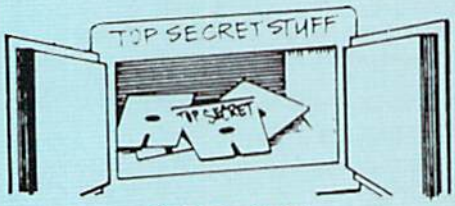

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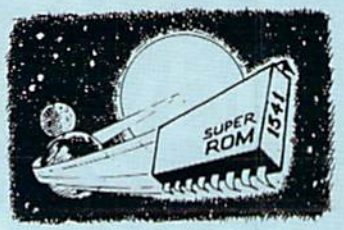

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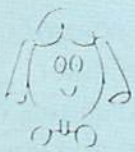

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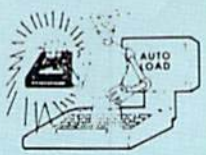

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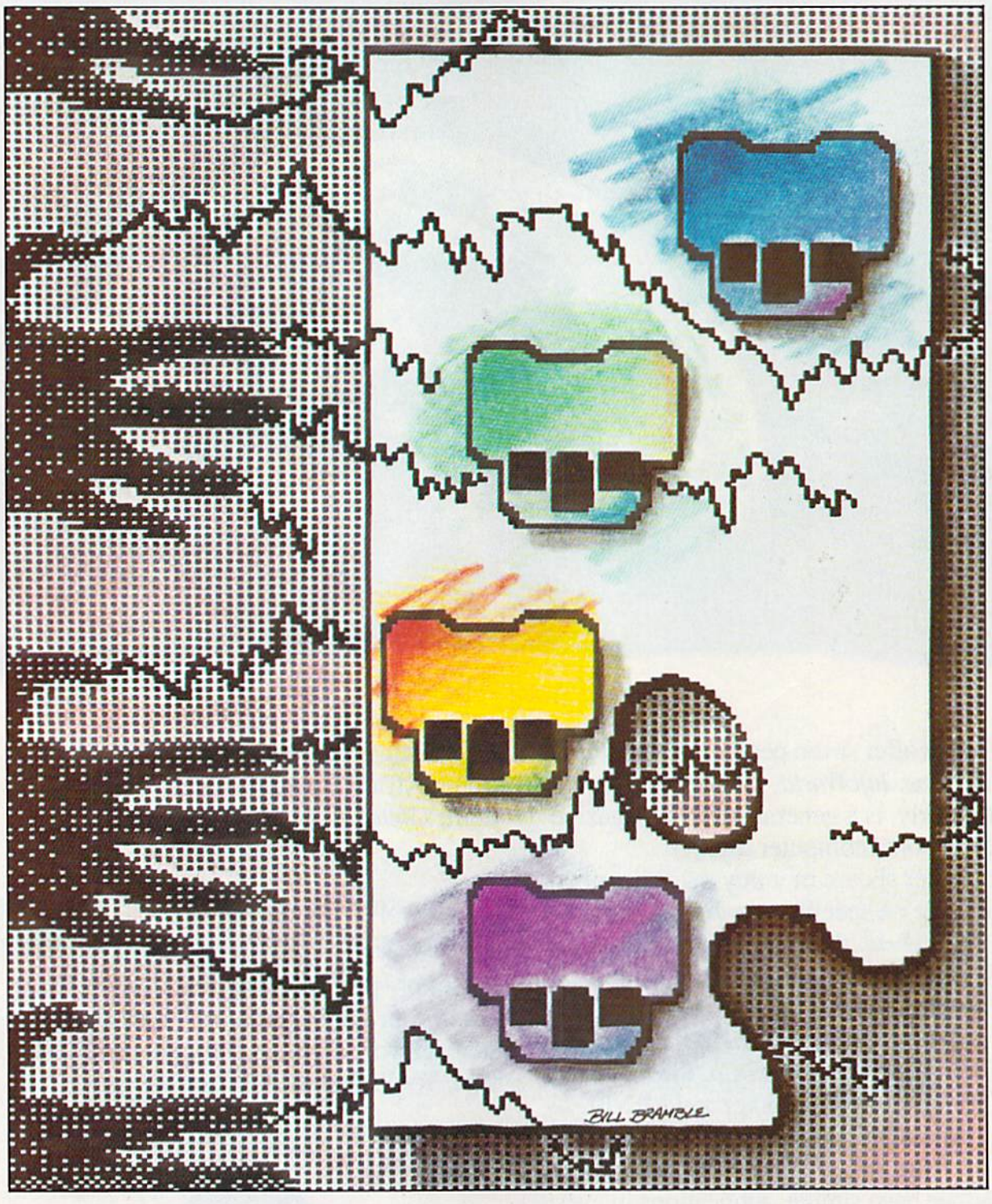

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Program Painter

By ART PARADIS

While the KoalaPainter program lets you create colorful pictures that you can save on disk, it doesn't enable you to use those pictures with ease in your own programs. But now there's a program that does. The K-PIC-Converter program loads a Koala picture file, then outputs the file to disk in a usable format.

Also, you can easily modify K-PIC-Converter to perform the same task on picture files of other graphics programs. You need only change the addressing information in lines 1220–1240 to accommodate the format of the other picture files and replace lines 400–490 with a command to load them. This assumes that they load into an accessible place in memory, not under the Kernal or Basic ROM.

Using the Program

The format of the Koala filename presented a bit of a problem in that the filename is always 15 characters in length, and the first character is always a nonprinting reverse character (called up by the command CHR$(129)). This made entering the Koala filename into K-PIC-Converter a bit tedious, what with having to pad the filename with spaces and count the characters. Therefore, I developed a short machine language routine that takes care of the nonprinting character and the padding of the filename.

When the program requests the Koala filename, you enter the alphabetic characters only—no reverse symbol and no extra spaces.

When you run the program, you'll be asked to enter a Koala picture filename and reminded not to enter the reverse symbol or trailing spaces. At this time you should have in your drive the disk containing the Koala picture file you wish to convert.

The Koala file will then be loaded into memory, and you'll be asked to insert the disk on which you wish to save the new picture file. Next, you'll be asked to enter a filename for the new picture file and a background color number (0–15).

The new picture file will then be recorded on your disk in a usable format and loaded back into memory in a usable location. A message will be displayed, asking you to press a key to view the picture. This is done to verify a successful operation.

New Files

Your new picture file will actually be three separate sequential files. I decided to break the Koala file into three segments for easier handling. Since they're sequential files, you may load them into any proper location for multicolor hi-res graphics. I chose to load them into high memory (bank 3) in order to keep them out of your Basic program area.

When you list the disk directory, you'll see that the filenames consist of identifiers in addition to the filename you specified. They will be: CM, for color memory; TBS, for video matrix; and BIT, for bit-map information. This avoids trying to save three files with three different names.

Pictures in Your Program

Listing 2 is an example program that allows you to view your new picture files by using subroutines. You may include the subroutines in your programs to call your pictures from disk as they are needed. This lets you use as many pictures in your program as you have room for on your disk(s), without using up any Basic program space (great for an adventure game).

To call a Koala file from within your program, you have to assign a filename to F$, set the background color and then use the Gosub statement to load the Koala file. For instance:

```
10 F$ = "FILENAME"
20 A$ = "0:CM" + F$:B$ = "0:TBS" + F$:C$ =
   "0:BIT" + F$
30 BG = NUMBER
40 GOSUB 9000: GOSUB 9110
```

Lines 10–40 are similar to lines 140–200 in Listing 2. Be sure to include lines 9000–9240 in your program. Incidentally, assigning the background color in this way allows you to use the same picture with different backgrounds (a day and night scene, for example).

RUN It Right

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Program Operation

The operation of the main program is fairly straightforward. It accepts a Koala filename input and Pokes it into memory at a location that is then accessed by the machine language routine to load the Koala file.

Next, it asks you to enter certain information and then outputs the new files to disk. This is done by putting addressing information, in low-byte/high-byte format, in the A, X and Y registers of the microprocessor, via memory locations 780, 781 and 782. It then calls the Kernal Save routine with a SYS 65496 command. A similar process is used to reload the files into memory.

The program then switches to high memory (bank 3) and relocates the screen to allow viewing of the picture after a key is pressed. When you press a key again, the program switches back to normal low memory (bank 0).

This process is a little slow because the top line of color memory is saved in an array when switching from the picture screen in high memory to the text screen in low memory, and it's restored when switching back again. If this weren't done, the text screen might mess up color memory for the picture.

You needn't save color memory if you switch to the picture screen before loading a picture. Also, if you switch to the picture screen first (bank 3, in this case), you'll be able to see the picture take form as it loads. I find this much more interesting than watching a blank screen while the picture loads. This is the procedure I used in Listing 2.

The bit-map information loads at 57344, under the Kernal. This is the only space available in high memory for an 8000-byte segment. Color memory loads at 55296 because it cannot be used anyplace else.

Video matrix loads at 49152. I chose this location so I could include sprite information for a specific picture and save it with the video-matrix file. If you choose to do this, you may include many sprite configurations in your programs in the same manner that you include pictures, without using Basic program space to Poke them into memory. Multicolor sprites seem to work best with multicolor pictures.

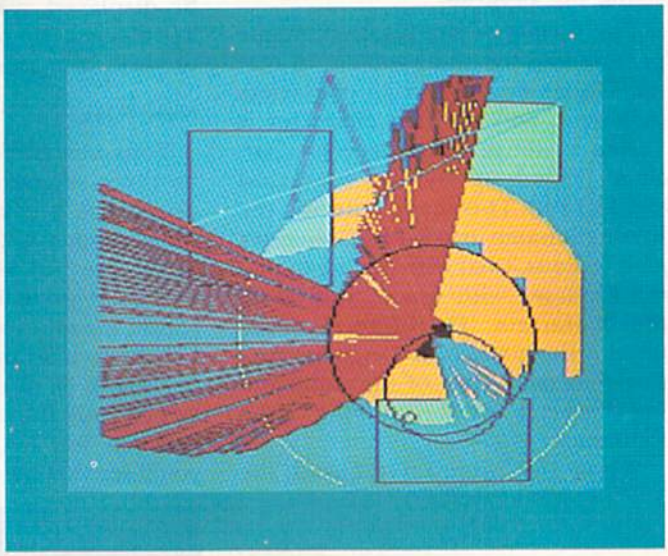
To quit the program, press Q. The files generated by K-PIC-Converter can be used by any language that can read C-64 Basic sequential files.

If you don't want to type in the listings, just send me your name and address and $7, and I'll send you a disk, postage paid, containing K-PIC-Converter and the example program. R

Address all author correspondence to Art Paradis, 2147 W. Romneya Drive, Anaheim, CA 92801.

Listing 1. *K-PIC-Converter program.*

```
100 REM K-PIC-CONVERTER
110 REM VERSION 5
140 REM ART PARADIS
150 REM 2147 W. ROMNEYA DR.
160 REM ANAHEIM, CA 92801
190 POKE 56,64:CLR
200 PRINT"{SHFT CLR}"
210 POKE 53281,1:POKE 53280,1
220 PRINT SPC(200);SPC(94)"K-PIC-MAKER"
230 PRINT
240 PRINT SPC(18)"BY"
250 PRINT
260 PRINT SPC(14)"ART PARADIS"
270 GOSUB1270
280 :
290 PRINT"{SHFT CLR}"
300 PRINT
310 PRINT"INSERT KOALA PICTURE DISK INTO DR
    IVE,"
320 PRINT
330 PRINT"ENTER KOALA FILENAME, THEN PRESS
    RETURN"
340 PRINT
350 PRINT"1. DO NOT ENTER THE REVERSE SYMBO
    L"
360 PRINT
370 PRINT"2. DO NOT ENTER TRAILING SPACES"
380 PRINT
390 INPUT Z$:IF Z$=""THEN 390
400 FOR I=0 TO 14
410 POKE 820+I,32
420 NEXT
430 POKE 820,129
440 FOR I=1 TO LEN(Z$)
450 POKE 820+I,ASC(MID$(Z$,I,1))
460 NEXT
470 SYS 850
480 S=ST:IF(S=66)THENPRINT"FILE NOT FOUND":
    CLOSE8:END
490 S=ST:IF (S<>64) THEN CLOSE 8:PRINT"FILE
     ERROR":END
500 CLR
510 :
520 PRINT"{SHFT CLR}"
530 PRINT
540 PRINT"{SHFT CLR}{CRSR DN}INSERT THE DIS
    K ON WHICH YOU WISH TO{4 SPACEs}SAVE TH
    E NEW FILES, ";
550 PRINT"THEN PRESS ANY KEY."
560 GETA$:IFA$=""THEN560
570 PRINT
580 PRINT"{SHFT CLR}"
590 PRINT"ENTER NEW FILENAME FOR THE NEW FI
    LES"
600 INPUT F$:IF F$=""THEN590
610 A$="0:CM"+F$:B$="0:TBS"+F$:C$="0:BIT"+F
    $
620 PRINT
630 PRINT"{SHFT CLR}"
640 PRINT"ENTER A BACKGROUND COLOR NUMBER (
    0-15)
650 PRINT
660 PRINT"(THE SCREEN WILL BLANK WHILE RECO
    RDING{2 SPACEs}THE NEW FILES.)"
670 INPUT BG
```



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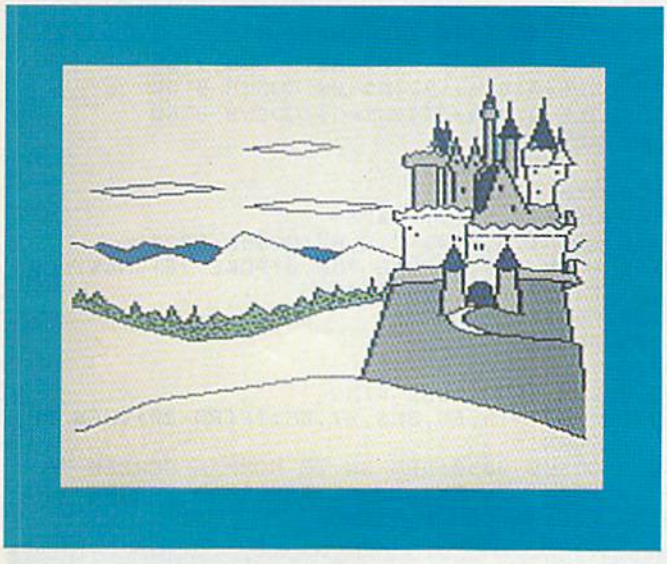
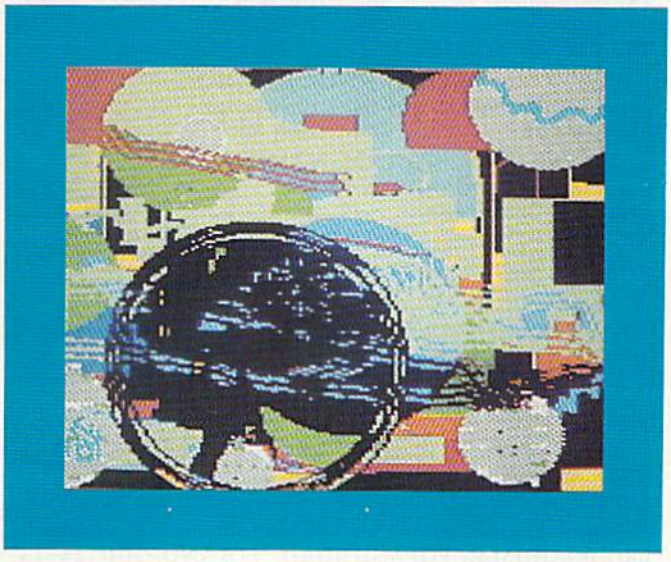
```
68Ø IF(BG<Ø)OR(BG>15)THENBG=Ø:PRINT"YOU ARE
    N'T LISTENING. TRY AGAIN !":GOTO 67Ø
69Ø PRINT"{SHFT CLR}"
7ØØ GOSUB 121Ø
71Ø :
72Ø DIM X1%(39)
73Ø GOSUB 84Ø:GOSUB 83Ø
74Ø PRINT"PRESS 'Q' TO QUIT OR ANY KEY TO V
    IEW PIC"
75Ø GET A$:IF A$=""THEN 75Ø
76Ø IF A$="Q"THEN END
77Ø GOSUB 85Ø:GOSUB 86Ø
78Ø GET A$:IF A$=""THEN 78Ø
79Ø IF A$="Q" THEN GOSUB 92Ø:END
8ØØ GOSUB 92Ø
81Ø GOTO 73Ø
82Ø :
83Ø PRINT"{HOME}";:FOR I =1 TO 4Ø:PRINT" ";
    :NEXT:PRINT"{HOME}";:RETURN
84Ø CM=55296:FORX=CM TO CM+39:X1%(X-CM)=PEE
    K(X):NEXT:RETURN
85Ø CM=55296:FORX=CM TO CM+39:POKE X,X1%(X-
    CM):NEXT:RETURN
86Ø POKE 53272,8:POKE 53265,PEEK(53265)OR 3
    2
87Ø POKE 5327Ø,PEEK(5327Ø)OR 16
88Ø POKE 53281,BG:POKE 5328Ø,BG
89Ø POKE 56578,PEEK(56578)OR3:POKE 56576,(P
    EEK(56576)AND252)OR Ø
9ØØ RETURN
91Ø :
92Ø POKE 53272,21:POKE 53265,PEEK(53265)AND
     223
93Ø POKE 5327Ø,PEEK(5327Ø)AND 239
94Ø POKE 53281,1:POKE 5328Ø,1
95Ø POKE 56578,PEEK(56578)OR3:POKE 56576,(P
    EEK(56576)AND252)OR 3
96Ø RETURN
97Ø :
98Ø OPEN 15,8,15
99Ø OPEN 1,8,1,N$+",S,W":GOSUB 118Ø
1ØØØ POKE 251,SL%:POKE 252,SH%
1Ø1Ø POKE 78Ø,251:POKE 781,EL%:POKE 782,EH%
    :SYS 65496
1Ø2Ø CLOSE 1:CLOSE 15
1Ø3Ø RETURN
1Ø4Ø :
1Ø5Ø SL=Ø:SH=216:GOSUB 112Ø
1Ø6Ø RETURN
1Ø7Ø SL=Ø:SH=192:GOSUB 112Ø
1Ø8Ø RETURN
1Ø9Ø SL=Ø:SH=224:GOSUB 112Ø
11ØØ RETURN
111Ø :
112Ø OPEN 15,8,15
113Ø OPEN 1,8,Ø,N$+",S,R":GOSUB 118Ø
114Ø POKE 185,Ø:POKE 78Ø,Ø:POKE 781,SL:POKE
     782,SH:SYS 65493
115Ø CLOSE 1:CLOSE 15
116Ø RETURN
117Ø :
118Ø INPUT#15,EN,EM$,ET,ES:IF(EN<2Ø)THEN RE
    TURN
119Ø PRINT EN;EM$;ET;ES
12ØØ CLOSE 1:CLOSE 15:END
12Ø5 :
121Ø OPEN 15,8,15,"IØ":CLOSE15
122Ø SL%=4Ø:SH%=131:EL%=15:EH%=135:N$=A$:GO
    SUB98Ø:GOSUB1Ø5Ø
123Ø SL%=64:SH%=127:EL%=39:EH%=131:N$=B$:GO
    SUB98Ø:GOSUB1Ø7Ø
124Ø SL%=Ø:SH%=96:EL%=63:EH%=127:N$=C$:GOSU
    B98Ø:GOSUB1Ø9Ø
125Ø RETURN
126Ø :
127Ø FOR X=Ø TO 31:READ A:POKE 85Ø+X,A:NEXT
128Ø DATA 169,8,17Ø,16Ø,255,32,186,255
129Ø DATA 169,15,162,52,16Ø,3,32,189
13ØØ DATA 255,169,Ø,162,255,16Ø,255,32
131Ø DATA 213,255,169,8,32,195,255,96
132Ø RETURN
```

Listing 2. *K-PIC-Converter example program.*

```
1ØØ REM EXAMPLE OF HOW TO USE K-PIC-CONVERT
    ER PICTURE FILES
1Ø1 :
1Ø2 REM ART PARADIS
1Ø3 REM 2147 W. ROMNEYA DR.
1Ø4 REM ANAHEIM, CA 928Ø1
1Ø5 :
1Ø6 POKE 53281,1:POKE 5328Ø,1
11Ø PRINT"{SHFT CLR}"
115 PRINT
12Ø PRINT"ENTER THE UNIQUE LETTERS OF THE F
    ILENAME"
13Ø PRINT
14Ø INPUT F$:IF F$=""THEN 14Ø
145 A$="Ø:CM"+F$:B$="Ø:TBS"+F$:C$="Ø:BIT"+F
    $
146 :
147 PRINT
15Ø PRINT"ENTER BACKGROUND COLOR (Ø-15)
16Ø INPUT BG
```





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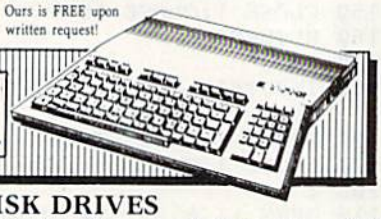

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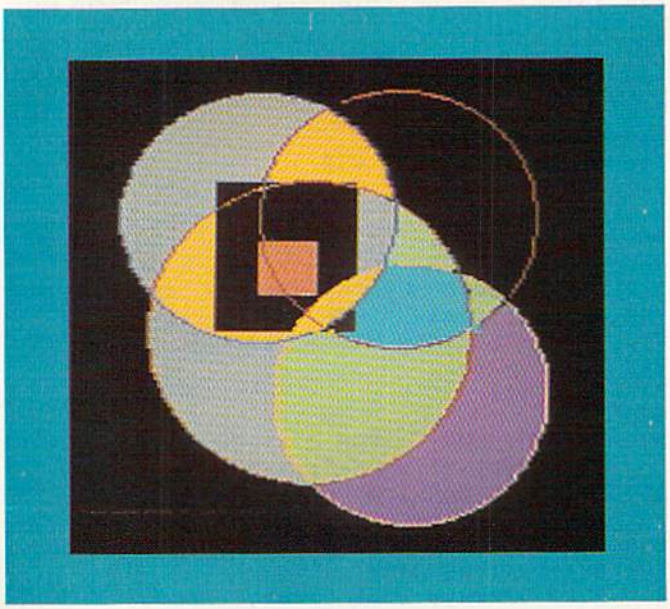

Listing 2 continued.

```
17Ø PRINT"{SHFT CLR}"
18Ø GOSUB 9ØØØ:GOSUB 911Ø:REM SW TO PICTURE
    SCREEN & LOAD FILES
19Ø GETA$:IFA$=""THEN 19Ø:REM VIEW PICTURE
2ØØ GOSUB 9Ø5Ø:REM GO BACK TO NORMAL SCREEN
21Ø END
219 :
22Ø REM PICTURE SCREEN
9ØØØ POKE 53272,8:POKE 53265,PEEK(53265)OR3
    2:REM SET SCREEN-TURN ON BIT MAP
9Ø1Ø POKE 5327Ø,PEEK(5327Ø)OR16:REM TURN ON
     MULTI-COLOR MODE
9Ø2Ø POKE 53281,BG:POKE 5328Ø,BG:REM SET SC
    REEN & BORDER TO BACKGROUND COLOR
9Ø3Ø POKE56578,PEEK(56578)OR3:POKE56576,(PE
    EK(56576)AND252)ORØ:REM SW TO BANK 3
9Ø4Ø RETURN
9Ø41 :
9Ø45 REM NORMAL SCREEN
9Ø5Ø POKE53272,21:POKE53265,PEEK(53265)AND2
    23:REM NORM. SCREEN-TURN OFF BIT MAP
9Ø6Ø POKE 5327Ø,PEEK(5327Ø)AND239:REM TURN
    OFF MULTI-COLOR
9Ø7Ø POKE 53281,1:POKE 5328Ø,1:REM SET SCRE
    EN & BORDER TO WHATEVER
9Ø8Ø POKE56578,PEEK(56578)OR3:POKE56576,(PE
    EK(56576)AND252)OR3:REM SW TO BANK Ø
9Ø9Ø RETURN
9Ø95 :
91ØØ REM ADDRESS INFORMATION
911Ø SL%=Ø:SH%=216:N$=A$:GOSUB 916Ø
912Ø SL%=Ø:SH%=192:N$=B$:GOSUB 916Ø
913Ø SL%=Ø:SH%=224:N$=C$:GOSUB 916Ø
914Ø RETURN
9145 :
915Ø REM LOAD
916Ø OPEN15,8,15,"IØ"
917Ø OPEN1,8,Ø,N$+",S,R":GOSUB 922Ø
918Ø POKE 185,Ø:POKE 78Ø,Ø:POKE 781,SL%:POK
    E 782,SH%:SYS 65493
919Ø CLOSE1:CLOSE15
92ØØ RETURN
9205 :
921Ø REM ERROR CHECKING
922Ø INPUT#15,EN,EM$,ET,ES:IF(EN<2Ø)THEN RE
    TURN
9225 GOSUB 9Ø5Ø:REM SW TO NORMAL SCREEN TO
923Ø PRINT EN,EM$,ET,ES:REM READ ERRORS
924Ø CLOSE1:CLOSE15:END
```


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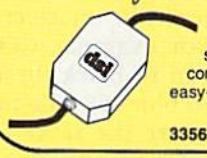

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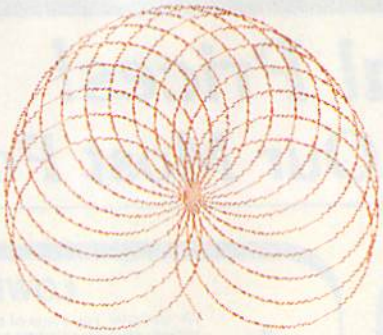

A High-Performance Turtle

By RICHARD HOLLERAN

Slow and steady will win the race every time. Just type in this Basic program to add nine new commands for using high-resolution turtle graphics on your C-64 or C-128.

The accompanying turtle graphics routines (see Listing 1) add nine new commands to Basic. You can use these commands in a program as easily as any other Basic command. Listing 1 will activate the commands for you, and Listing 2 will give you an idea of how to use them in your own programs. The routines are written in machine language and do, indeed, execute quickly.

The Commands

A short explanation of each new keyword follows. For a fuller illustration of their use, type in Listing 2.

RESET is the initialization command; it centers the imaginary turtle on the hi-res screen and clears and turns on the hi-res screen.

HIRES allows you to switch directly to the hi-res screen without clearing it or repositioning the turtle.

TEXT switches you from the hi-res to the text (normal) screen.

COLR allows you to select the hi-res colors. For example, COLR 0,6 sets the screen to black (0) and the turtle lines to blue (6). The numbers of the colors are the same as those found in the C-64's owner's manual. (It's unfortunate that this command cannot be spelled COLOR, but the embedded OR keyword prevents it.)

LEFT X alters the turtle's heading in the counterclockwise direction. X is any number or numeric expression and is measured in degrees.

RIGHT X alters the turtle's heading in the clockwise direction. X is any number or numeric expression and is measured in degrees.

MOVE X is the command that propels the turtle, causing it to draw a line on the screen. X is any number or numeric expression. However, if X is negative, no move will take place.

TAILUP causes the turtle to lift its tail, allowing it to move without drawing.

TAILDOWN sets the turtle's tail down so that it will leave a line when it's moved. The tail is always set down by RESET.

PLOT plots any specified X,Y point on the hi-res screen. X values are limited to the range 0–319, Y values to 0–199.

If the turtle's travel takes it off the screen, no harm is done. The point or line is simply not Poked into memory. However, in the case of the PLOT command, a Y value greater than 255 will cause an Out Of Range error.

Shaping Up Your Pixels

On many computers, the shape of an individual pixel (picture element) is rectangular rather than square. On the 64, in particular, the pixels are taller than they are wide. As a result, a line that is 100 pixels long horizontally appears shorter than a 100-pixel line plotted vertically.

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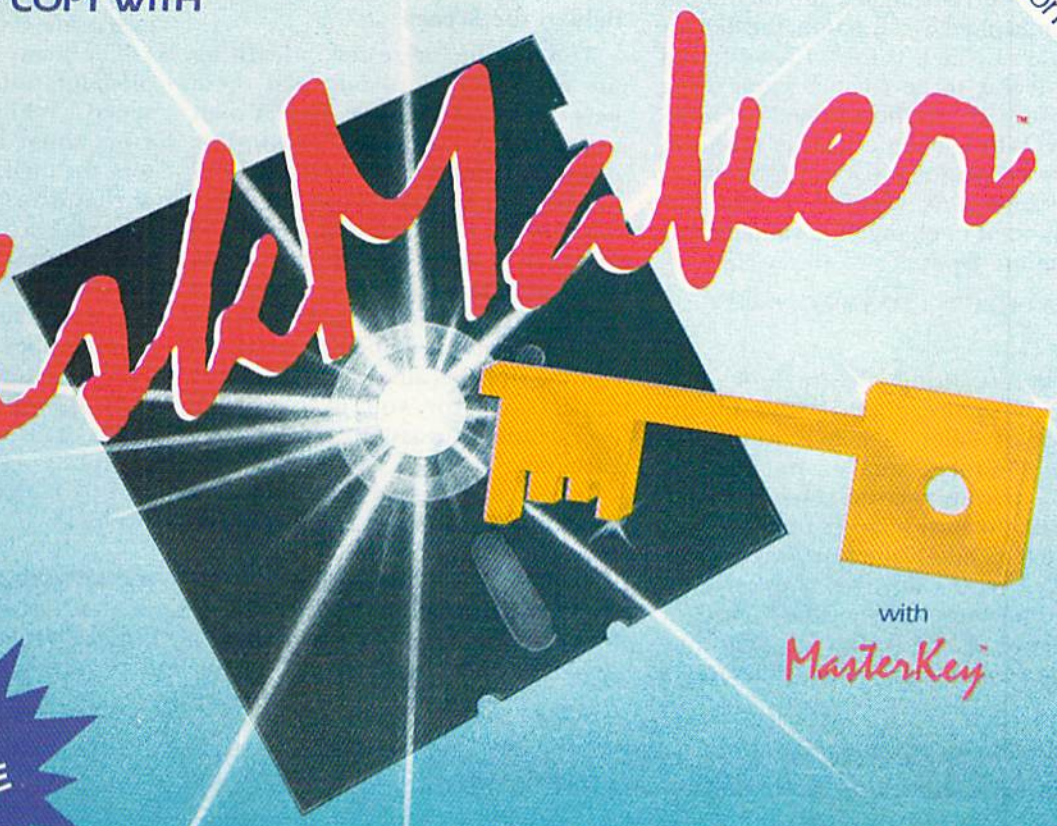

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when the program computes the increment in the Y direction (the sine of the current angle), the increment is multiplied by a fraction, the default value of which is 0.75. I have found this value to be correct when using the 64 with a Commodore 1701 monitor. While using a Gorilla monitor, I have found that 0.8 is a good value. To determine whether or not you may want to change the value of this fraction, type:

```
RESET:FOR T = 1 TO 4:MOVE 90:LEFT
90:NEXT
```

If the resulting picture looks very nearly square, fine. If your picture appears taller than it is wide, then you'll want a smaller fraction, say 0.65. If your picture is wider than it is tall, then use a larger fraction, such as 0.8. (These values are suggestions only.) With a little bit of experimentation, you should be able to find the fraction that best suits your monitor. In order to test a value, substitute it for Z in A = USR(Z) and enter it on your 64. For example, A = USR(0.8).

Behind the Scenes

You may be interested in learning the method I've used to add these new commands to Basic. Rather than use a wedge (as far as I know, this program is compatible with the DOS wedge), I delved deep into the Basic interpreter to see how it tokenized keywords. I discovered that when Basic is unable to tokenize a word, it assumes that it is looking at a variable name and jumps to the LET keyword routine (it is because of this that it is unnecessary for you to type LET every time you assign a value to a variable).

It is possible, as this program illustrates, to move Basic into RAM and redirect this particular jump to a routine that checks for additional keywords. If the program is still unable to tokenize the word, then the jump to LET is belatedly made. (Note that this program does not convert a token to a corresponding number as Basic does. As a result, a token must be converted every time it is encountered.)

The main advantage that this implementation has over the wedge is speed. While a wedge intercepts every single character Basic encounters, the method used here looks only at characters Basic can't resolve into tokens. The only thing that is slowed as a result is the assumed LET. The slowdown is imperceptible, and, if you were really interested in getting as much speed as possible, an explicit LET is faster, anyway.

I hope you have fun with this program. If at any point you find the computer rejecting the turtle commands, POKE 1,54 should correct the problem. R

Address all author correspondence to Richard Holleran, 252 Laurel St., Apt. 303, Hartford, CT 06105.

Listing 1. *Turtle Graphics program.*

```
10 REM{3 SPACEs}TURTLE GRAPHIC ROUTINES
20 REM{5 SPACEs}BY RICHARD HOLLERAN
30 B=0:S=32793:E=S+191:T=24272:GOSUB80
40 S=E+1:E=S+191:T=22492:GOSUB80
50 S=E+1:E=S+179:T=22229:GOSUB80
60 POKE1,55:SYS33299:POKE1,54:COLR6,14
70 END
80 B=B+1:CK=0:FORA=STOE:READD:POKEA,D
90 CK=CK+D:NEXT:IFT=CKTHENRETURN
95 PRINT"{SHFT CLR}"SPC(210)"ERROR IN BLOCK
   #";B:END
99 REM{3 SPACEs}BLOCK #1
100 DATA 136,31,0,0,0,135,70,0,0,0,131,22,2
   03,227,248,123
110 DATA 14,250,53,18,128,64,0,0,0,160,15,1
   32,151,185,24,128
120 DATA 153,9,128,136,208,247,132,251,169,
   96,133,252,152,145,251,200
130 DATA 208,251,230,252,16,247,32,145,179,
   32,155,128,169,59,160,198
140 DATA 162,125,141,17,208,140,0,221,142,2
   4,208,96,169,27,160,199
150 DATA 162,21,208,238,32,235,183,138,10,1
   0,10,10,5,20,162,92
160 DATA 134,252,162,95,160,0,132,251,145,2
   51,200,208,251,230,252,228
170 DATA 252,176,245,96,32,158,173,165,102,
   73,255,133,102,80,3,32
180 DATA 158,173,169,40,160,128,32,40,186,1
   69,20,160,128,32,103,184
190 DATA 162,20,160,128,32,215,187,32,100,2
   26,162,0,160,128,32,215
200 DATA 187,169,20,160,128,32,162,187,32,1
   07,226,169,45,160,128,32
210 DATA 40,186,162,5,160,128,76,215,187,32
   ,235,183,134,2,169,199
219 REM{3 SPACEs}BLOCK #2
220 DATA 229,2,201,200,176,66,170,41,7,168,
   165,21,240,9,74,208
230 DATA 55,165,20,201,64,176,49,169,12,133
   ,252,138,41,248,170,42
240 DATA 38,252,42,38,252,42,38,252,101,20,
   41,248,133,251,165,21
250 DATA 101,252,133,252,138,74,74,74,101,2
   52,133,252,165,20,41,7
260 DATA 170,177,251,29,209,129,145,251,96,
   133,251,160,128,32,162,187
270 DATA 165,251,73,10,160,128,32,103,184,1
   66,251,160,128,32,215,187
280 DATA 32,155,188,165,101,166,100,96,32,1
   58,173,165,102,48,46,32
290 DATA 57,129,134,26,56,176,26,169,10,32,
   34,129,133,20,134,21
300 DATA 169,15,32,34,129,208,7,166,151,240
   ,3,32,219,128,165,25
310 DATA 56,233,1,133,25,165,26,233,0,133,2
   6,16,218,96,233,85
320 DATA 133,151,32,115,0,208,251,96,162,45
   ,76,181,128,138,48,8
330 DATA 72,32,101,128,104,76,59,164,76,116
   ,164,162,0,160,0,189
339 REM{3 SPACEs}BLOCK #3
340 DATA 217,129,209,122,208,4,232,200,16,2
   45,41,127,209,122,208,24
350 DATA 189,218,129,72,189,219,129,72,152,
   24,101,122,133,122,165,123
360 DATA 105,0,133,123,76,115,0,232,189,217
   ,129,16,250,232,232,232
370 DATA 189,217,129,16,200,76,165,169,128,
   64,32,16,8,4,2,1
380 DATA 82,69,83,69,212,128,49,72,73,82,69
   ,211,128,84,84,69
390 DATA 88,212,128,100,67,79,76,210,128,10
   8,76,69,70,212,128,140
400 DATA 82,73,71,72,212,128,151,80,76,79,2
   12,128,209,77,79,86
410 DATA 197,129,64,84,65,73,204,129,118,25
   5,169,160,133,252,160,0
420 DATA 132,251,177,251,145,251,200,208,24
   9,230,252,36,252,80,243,169
430 DATA 129,141,1,3,141,18,3,141,6,168,169
   ,134,141,0,3,169
440 DATA 129,141,17,3,169,148,141,5,168,162
   ,0,160,92,24,32,153
450 DATA 255,76,2,228
```


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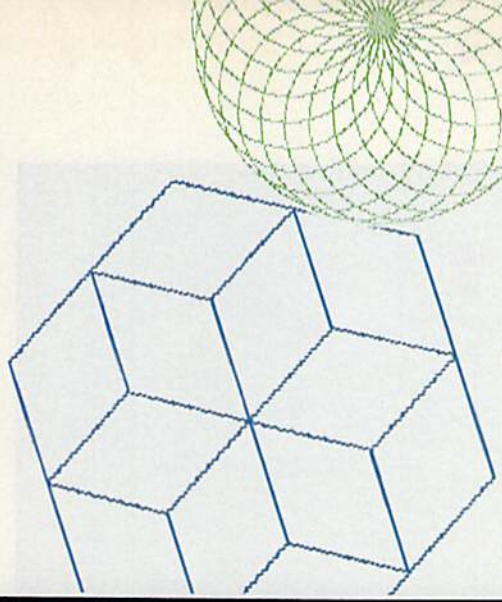

Listing 2. *Turtle Graphics Demonstration program.*

```
1 REM{3 SPACEs}TURTLE DEMO
1Ø RESET:COLR14,6:TAILUP:RIGHT15Ø:MOVE127:L
   EFT15Ø:TAILDOWN
2Ø FORG=1TO36:FORT=1TO2:FORR=1TO8:MOVE9:LEF
   T1Ø:NEXT
3Ø FORR=1TO6:MOVE9:RIGHT1Ø:NEXTR,T:RIGHT17Ø
   :NEXT:GOSUB3ØØ
4Ø COLR6,14:FORT=4TO8STEP2:A=36Ø/T
5Ø FORR=1TOT:FORG=1TOT:MOVEA:LEFTA:NEXT:RIG
   HTA:NEXT
6Ø GOSUB3ØØ:NEXT
7Ø POKE5328Ø,Ø:COLRØ,2:A=16Ø:FORT=1TO2ØØ:MO
   VET:LEFTA:NEXT:GOSUB3ØØ
8Ø COLR6,14:POKE5328Ø,14:FORT=13TO15STEP2:A
   =72Ø/T
9Ø FORR=1TOT:FORG=1TOT:TAILDOWN:IFG/2=INT(G
   /2)THENTAILUP
1ØØ MOVEA:LEFTA:NEXT:RIGHTA:NEXT
11Ø GOSUB3ØØ:NEXT
12Ø POKE5328Ø,Ø:COLRØ,6:FORT=1TO24:FORR=1TO
   36
13Ø MOVE1Ø:LEFT1Ø:NEXT:RIGHT15:NEXT:GOSUB3Ø
   Ø
14Ø COLR6,8:POKE5328Ø,14:A=89.5:FORT=1TO23Ø
   STEP1.5:MOVET:LEFTA:NEXT:GOSUB3ØØ
299 TEXT:END
3ØØ FORY=1TO12ØØ:NEXT:RESET:RETURN
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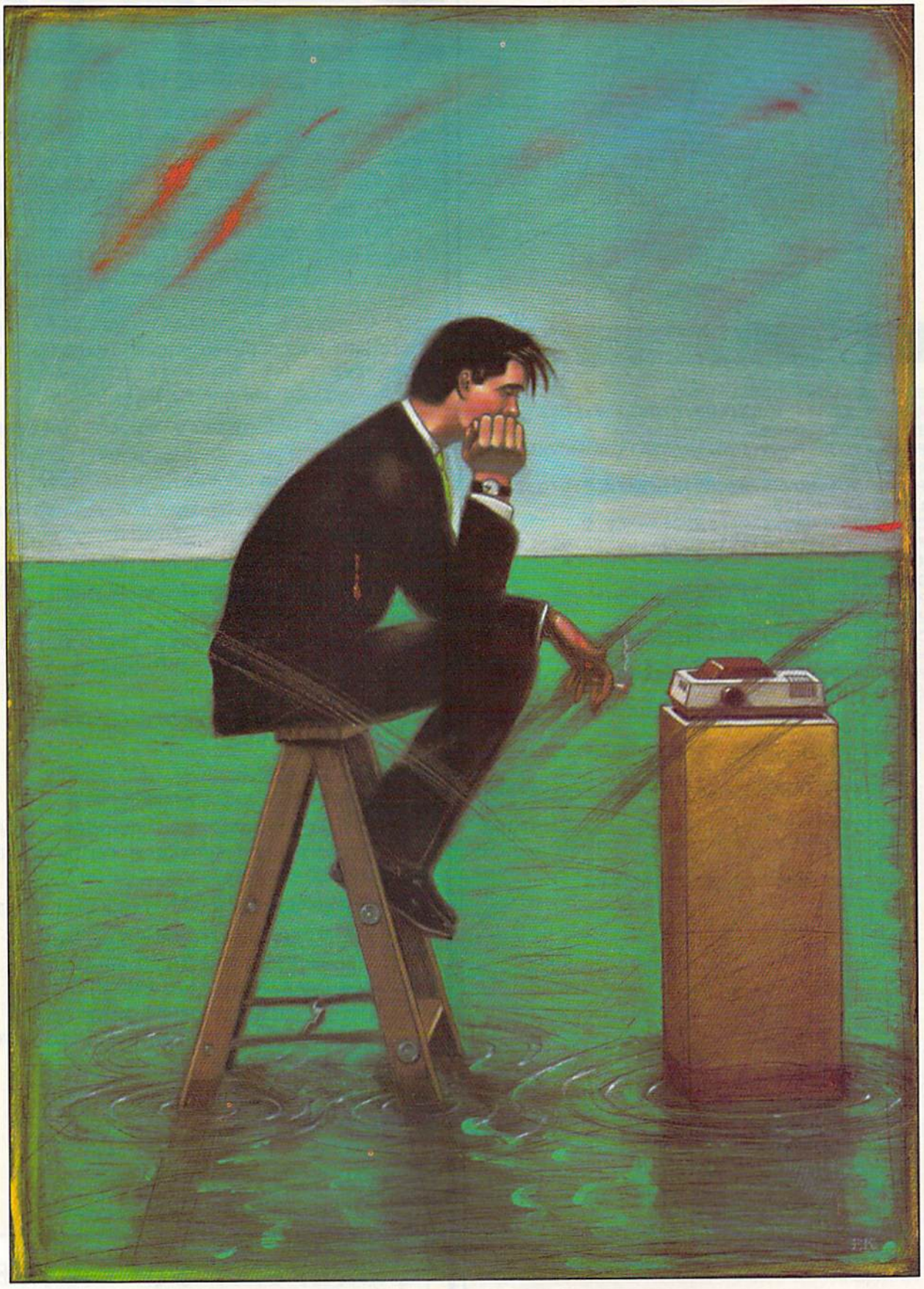

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Datafile Fast Print

By MIKE KONSHAK

By now, probably several thousand readers of *RUN* are using my database management system, Datafile (November and December 1984), which was published with two companion programs called DFReport and DFMail. This article is an addendum to Datafile; it introduces a program that significantly improves Datafile's performance.

Before I describe this new addition, however, let me first review Datafile, then address an important issue.

A Brief Look at Datafile

Datafile provides a quick and easy way for you to create a custom database that you can store in sequential files. You may add, delete, modify, sort and view records, as well as format a disk, scratch and rename files.

Once you've created a datafile and accumulated records, you may transfer program control to either DFReport or DFMail. These programs allow you to print custom-formatted reports and labels. After you define the printouts, the formats are written to the disk into special format files alongside the datafiles.

During printing, you may choose from options that allow you to print all the records in a file, individual records (by record number) or only those records with common fields. After you print something, you may continue printing, transfer to another program or quit.

I've just given a very brief description of Datafile (you will have to read the back issues for more information). My goal was to introduce Datafile to those folks out there who are new to *RUN*. That way, the rest of this article will make some sense.

A Problem and its Solution

One factor that makes Datafile nice to use is its speed in bringing up records in your datafile. This is possible because the entire datafile is held in memory in string arrays.

One drawback of a memory-based database is the limited number of records possible. Databases are flexible in that you may define the number of fields per record, as well as their length. Obviously, many long fields per record will result in fewer records. On the other hand, the fewer and shorter your fields, the more records you can store.

Another drawback, which I find particularly annoying, is garbage collecting, which my wife, Becky, describes as "the lights are on, but nobody's home."

In order for the computer to ensure that you have room to run your program, Basic will allocate, on a continual basis, any memory space that may be available. Assume, for example, that the variable A$ is set to equal

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which takes up 33 bytes of memory (each character and space uses one byte). Now, also assume that right behind A$ is B$, which is equal to

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Counting the number of characters and spaces in B$, you see that B$ takes up 21 bytes.

Now do as follows: C$ = A$:A$ = B$:B$ = "". It appears that A$ is now 21 bytes instead of 33; B$ is now a null string, or 0 bytes, instead of 21; and C$, which wasn't even in existence before, is now 33 bytes. (B$ is still addressable in a memory location, even though it does not carry any significant value.)

But, believe it or not, B$ still takes up 21 bytes because of its initial value. A$, although it now only has 12 significant bytes, is still 33 bytes long for the same reason. The total number of bytes used by A$, B$ and C$ is then 75 (33 + 21 + 21), even though those variables only contain a total of 54 characters and spaces.

After a while, Basic realizes that the changes to the variables are wasting too much space. The operating system then takes over, interrupting whatever the program happens to be doing in order to free up memory space.

When it finishes, A$, B$ and C$ will only be using up 54 bytes of memory. The time that this takes is strictly dependent upon the number

RUN It Right

C-64; C-128 (in C-64 mode); 1541 disk drive
Any ASCII or Commodore printer

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of variables you use and the size of your program. (If you have many variables and a large program, your computer will appear to lock up.) You may perform the same memory-freeing operation yourself by using the Basic token FRE(0).

What does all this have to do with Datafile? The records stored in memory are kept in large arrays, which do not take up much space when empty. If a datafile accumulates a large number of records (around 75% full), garbage collecting may become a severe nuisance.

Since strings are never moved in the Datafile program, you may not notice it very much, unless you delete or modify records. But, in the printing programs (DFReport and DFMail), variables are reassigned continually (because there was no way around it), and the garbage collector raises its nasty head.

I use a sample datafile of 450 records to test Datafile. It takes 3½ hours to print out the entire file. Every 25 records or so, the computer goes bye-bye for around 12 minutes. I'm sure many of you have experienced this tedium.

Well, the wait is over—Datafile Fast Print (DFPrint) has arrived! It cures the garbage-collection problem simply by never giving the operating system a chance to get involved.

DFPrint is an independent program that reads your datafile directly from the disk drive and, using your predefined format files, prints your reports or labels without interruption. My 450-record datafile now only takes 12 minutes to print out!

All About DFPrint

The rest of this article will be devoted to describing the operation and use of DFPrint. If you're already familiar with using DFReport or DFMail, you'll notice many similarities in the menus and sequence of operation. Both report and label functions are combined in DFPrint, with one additional feature—DFPrint lets you send printer commands without exiting the program. (More about this later.)

DFPrint Instructions

To load DFPrint, type LOAD"DF PRINT",8<return>, then RUN <return>.

The following menu appears. Note that reversed screen characters are enclosed in brackets in the text. Keys to be pressed are surrounded by inequality signs (< >).

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The wait is over—Datafile Fast Print has arrived! It cures the garbage-collection problem simply by never giving the operating system a chance to get involved.

```
[      DATAFILE FAST PRINT      ]
[    BY MIKE KONSHAK (C)1985    ]

THIS PROGRAM WILL PRINT A SEQUEN
TIAL FILE, WHICH WAS PREVIOUSLY
WRITTEN AND FORMATTED BY [DATA
FILE], DIRECTLY TO THE PRINTER. THE
ORDER OF THE RECORDS WILL BE THE
SAME AS THE MOST RECENT SORT AS
WRITTEN IN THE CURRENT FILE.

        [O]PEN FILE ON DISK
        [$] DISK DIRECTORY
        [Q] QUIT PROGRAM

[    PRESS THE APPROPRIATE KEY    ]
```

Insert the disk containing the sequential datafiles created by Datafile. Pressing $ will display the disk directory, so you may view the files on the disk. Pressing Q obviously terminates the DFPrint program. Pressing O will initiate a prompt, asking for the name of the datafile that you want printed. Enter the name of the file (MAIL LIST, for example), then press the return key.

Note: Do not enter the special characters as displayed on the directory. These characters (DF], RP] and ML]) keep related datafiles and format files together without a conflict in duplicate names.

If you entered a filename that isn't present on the disk, you'll receive an error message and must try again. Having successfully opened an existing datafile, you will be presented with the following menu:

```
[      RECORD PRINTOUT MENU      ]

        [L]IST UNFORMATTED
        [R]EPORT FORMAT
        [M]AILING LABELS
        [C]HANGE LABEL SIZE
        [S]END PRINTER COMMANDS
        [E]XIT TO RESTART

[    PRESS THE APPROPRIATE KEY    ]
```

List Unformatted

This option lets you print your datafile without a predefined format. The records will be numbered and printed in rows, one field after another. Review the article on DFReport for more information.

Pressing L will immediately start the disk drive, turning on the red light, and the screen will display the following:

```
[      PRINT OPTIONS MENU       ]

        [A]LL RECORDS IN FILE
        [F]IND RECORDS WITH COMMON
           FIELDS
        [E]XIT BACK TO START

[    PRESS THE APPROPRIATE KEY    ]
```

Pressing E closes the current file, turning off the drive light, and sends you back to the beginning of the program.

Pressing A starts the drive spinning and the printer printing. Because the printer is slower than the drive, you'll notice the drive's motor turning on and off during the printing operation as it waits for the printer to catch up. If your printer has a 2K or larger buffer, the drive will not cycle as often.

Pressing F displays the following. (Note: For demonstration purposes, the sample file, MAIL LIST, will be used to demonstrate the operation.)

```
[FIND RECORDS WITH COMMON ITEMS]

[1] LAST NAME
[2] FIRST NAME
[3] CODE
[4] STREET
[5] CITY
[6] STATE
[7] ZIP
[8] PHONE

WHICH FIELD IS TO BE SEARCHED? <1>
<return>

ENTER [COMMON ITEM]
(THE ENTIRE STRING IS NOT REQUIRED)
[LAST NAME] ? <K> <return>

SEARCHING RECORD 1
```

The above screen shows the names of the fields of the current datafile. You must first enter a field num-

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ber (in the above example, field #1), then press the return key. The next prompt asks for a common item in the field entitled LAST NAME. When you press K and the return key, the disk drive starts spinning.

As the program searches, it displays the record number currently being processed. Every time it finds a "K" as the first character in field #1, it causes the printer to print the record. If there aren't any records that match your entry, nothing is printed. Again, review the earlier articles for an expanded explanation.

CAUTION: Once the printing operation has started and the sequential file is being read, no interruptions will be permitted. Any situation that causes the operation to cease will force you to restart the entire process.

After the program finishes reading and printing files, you'll be returned to the beginning of the program. There will be a new option that states:

[R]EPEAT FILE: [MAIL LIST]

This allows you to continue working on the file you originally opened (in this case, MAIL LIST). Pressing R sends you directly to the Record Printout menu as before, where you choose one of the various options. The explanation of the options continues.

Report Format

Pressing R at the Record Printout menu initiates a prompt for the name of the report format file you'll be using for your report. The name of the datafile you originally opened will be shown (MAIL LIST). If this is the name of the format file you want to use, press the return key. Otherwise, enter an alternate name.

The disk drive will load the format into memory. The Print Options menu will be displayed as previously described under LIST UNFORMATTED, with a note that says "Position Paper In Printer At Top of Page."

The report heading will then be printed, followed by the spinning of the disk drive and the printing of the records. Automatic paging will occur every 60 lines, with the titles of columns printed at the top of each page. If you have Datafile 2.9, the summation, or totaling, of the last column will perform as usual, if formatted accordingly.

Mailing Labels

Pressing M at the Record Printout menu will again prompt a request for the name of the mailing label format to be used. Press the return key or alter the displayed name accordingly.

The Print Options menu will also display an option not found in the report sequences:

[T]EST LABEL(S)

Every time you press T, the printer prints a series of numerals based upon the selected label size. The default size is the standard label. Use this function to align your labels before you start printing records. Remember, once you start printing, there's no turning back!

This program's Printer Command routines give you many options for utilizing the capabilities of your printer, depending, of course, on its flexibility.

Change Label Size

Pressing C at the Report Printout menu allows you to change the size of the labels you're printing. (The format of the labels is still defined by your format file.) One use of this feature is that you might obtain a batch of odd-sized labels that you'll want to use with an existing format. Another possibility is to print out an address file, previously formatted for labels, on tractor-feed postcards. You should see the following screen:

```
[              LABEL SIZE                ]

   [S]TANDARD - 5 ROWS PER LABEL
     1⅞ BY 3½ INCHES
   [L]ARGE - 8 ROWS PER LABEL
     1⅞ BY 3½ INCHES
   [O]THER - CUSTOM LABEL SIZE OR
     NUMBER OF CHARACTERS PER ROW
NOTE: LABELS ARE SEPARATED BY
ONE ROW
32 CHARACTERS PER ROW IS STANDARD

[     PRESS THE APPROPRIATE KEY     ]
```

Measure your labels and compare them with a short printout of your file. If you have a label or special form that does not meet the first two choices, S or L, then press O. You will be given the following prompts:

```
ENTER NUMBER OF ROWS ON LABEL? 5
ENTER # OF CHARACTERS PER ROW? 32
```

Enter the dimensions that will perform best for you. A few trials may be necessary.

Send Printer Commands

This routine, obtained when you press S at the Report Printout menu, allows you to utilize the various capabilities of your printer. The screen displays:

```
[          PRINTER COMMAND          ]

THIS ROUTINE WILL SEND CHARACTER
STRING [CHR$( )] COMMANDS TO AN
ASCII PRINTER. COMMANDS MUST BE
ENTERED IN THE FORM OF INTEGERS
SUCH AS:
        ? 27    (ESCAPE CODE)
        ? 66    (PITCH CODE)
        ? 2     (COMPRESSED MODE)
        ? *     (END THE SEQUENCE)
THIS WILL BE SENT TO THE PRINTER AS:
PRINT#4,CHR$(27)CHR$(66)CHR$(2)
UP TO FOUR (4) NUMBERS MAY BE
SENT, THE FIRST NORMALLY BEING
[27], THE ESCAPE CHARACTER. END
THE SEQUENCE BY PRESSING [RETURN]
WHEN THE ASTERISK IS SHOWING.
PRINTERS WILL VARY, SO CHECK YOUR
MANUAL FOR THE CODES.

[ANY KEY] TO CONTINUE OR [E]XIT?
```

The above screen displays an example of a series of codes that force a Gemini 10X printer to print in 12 characters per inch (cpi), which provides a 96-character-wide report. Since DFReport defines a report up to 132 characters wide, this is a handy feature if your printer only has a nine-inch carriage. You might use this routine to print labels in italics at 10 cpi, then to print reports in pica type at 15 cpi. Many options are possible, depending on the flexibility of your printer. If you choose to continue, the result is:

```
[       SEND PRINTER COMMAND       ]

ENTER CODE, THEN PRESS [RETURN]
[RETURN] ONLY TO QUIT

? 27
? 66
? 2
?*

        [A]NOTHER CODE
        [T]EST CHANGE
        [E]XIT TO PRINT

[     PRESS THE APPROPRIATE KEY     ]
```


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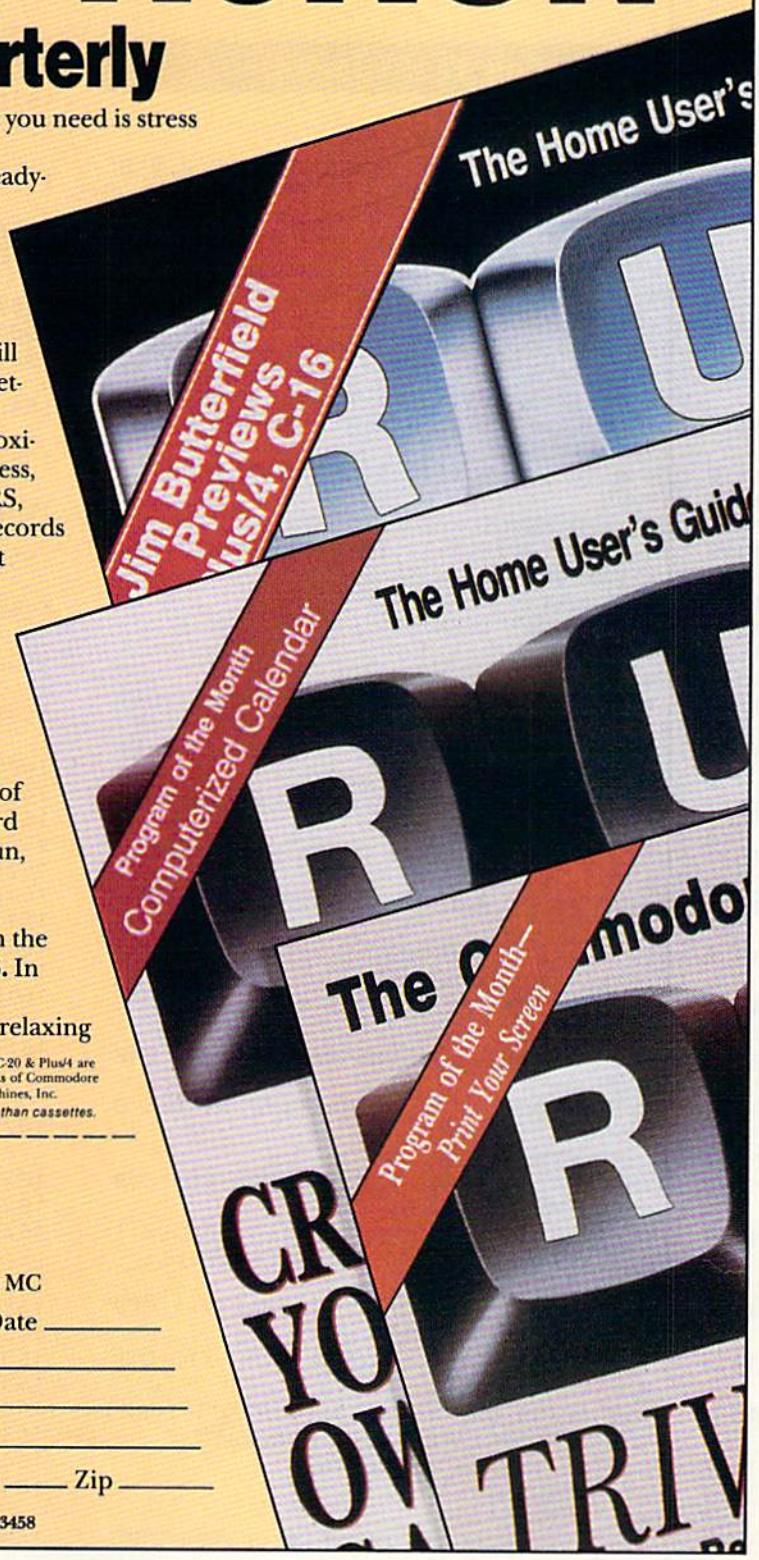

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Pressing the return key when the asterisk (*) is showing, without entering a number, displays the options shown above at the bottom of your screen. If you press E, you'll return to the Report Printout menu. No printer codes will have been sent.

Pressing T prints the alphabet on your printer in order for you to see what effect your command had on the printout. Pressing A lets you send another series of codes, either to cancel the current modification or to send new or additional codes (you might want compressed print in a Double-Strike mode). Press T each time to check the changes.

Note: Do not send commands that will skip over the perforations of the paper, since the report part of both DFReport and DFPrint take care of this task.

If you missed the earlier issues or do not wish to type in the listings, send me $8, and I'll supply you with a disk containing the current revisions of Datafile (2.9), DFReport, DFMail and DFPrint, along with several sample datafiles and format files.

If you have any problems or suggestions that need a reply, send me a self-addressed stamped envelope and I'll try to respond as soon as possible. Also, let *RUN*'s editors know how you like the programs. R

Address all author correspondence to Mike Konshak, 4821 Harvest Court, Colorado Springs, CO 80917.

Listing 1. *DFPrint program.*

```
15ØØ REM DFPRINT PROGRAM FOR DATAFILE 2.9 B
     Y MIKE KONSHAK (C)1985
15Ø2 CLR:FL=Ø:PRINT"{SHFT CLR}{CTRL 8}":POK
     E53281,11:POKE5328Ø,6:GOTO153Ø
15Ø4 D$=CHR$(Ø):MR$=D$:DR$=D$:S=Ø:B1$=D$:PW
     =8Ø:CW=Ø:B$=CHR$(32):RW=5:LW=32
15Ø6 NC=Ø:NL=Ø:PG=Ø:F1=Ø:F2=Ø:F3=Ø:L$=D$:RL
     =Ø:SB$=D$:CR$=CHR$(13):HN$=D$:ID$=D$
15Ø8 A$=D$:C$=D$:T%=6:I$=D$:CK=Ø:I=Ø:J=Ø:K=
     Ø:L=Ø:M=Ø:N=Ø:RW=5:SF=Ø:Z=Ø:E$="EOF"
151Ø EN=Ø:EM$=D$:ET=Ø:ES=Ø:A1$=D$:A2$=D$:A3
     $=D$:S1$=D$
1512 DIM ML$(9,4),PC(1Ø),TT$(5),HC$(9)
1514 RETURN
1516 REM----DIMENSION BUFFER ARRAYS
1518 DIM F$(F+1),T%(F+1),L%(F+1),REC$(F+1):
     FL=1:RETURN
152Ø REM----GET
1522 GETA$:IFA$=""THEN1522
1524 RETURN
1526 REM----START MENU
1528 PRINT"{SHFT CLR} {CTRL 9}{9 SPACEs}DAT
     AFILE FAST PRINT{1Ø SPACEs}":GOTO1548
153Ø PRINT"{SHFT CLR} {CTRL 9}{9 SPACEs}DAT
     AFILE FAST PRINT{1Ø SPACEs}"
1532 PRINT" {CTRL 9}{8 SPACEs}BY MIKE KONSH
     AK (C)1985{7 SPACEs}"
1534 PRINT"{CRSR DN} THIS PROGRAM WILL PRIN
     T A SEQUENTIAL"
1536 PRINT" FILE, WHICH WAS PREVIOUSLY WRIT
     TEN"
1538 PRINT" AND FORMATTED BY {CTRL 9}DATAFI
     LE{CTRL Ø}, DIRECTLY"
154Ø PRINT" TO THE PRINTER.{2 SPACEs}THE OR
     DER OF THE"
1542 PRINT" RECORDS WILL BE THE SAME AS THE
      MOST"
1544 PRINT" RECENT SORT AS WRITTEN IN THE C
     URRENT"
1546 PRINT" FILE.{CRSR UP}"
1548 PRINT"{CRSR DN}{7 SPACEs}{CTRL 9}O{CTR
     L Ø}PEN FILE ON DISK"
155Ø IFFL<>ØTHEN:PRINT"{CRSR DN}{7 SPACEs}{
     CTRL 9}R{CTRL Ø}EPEAT{2 SPACEs}FILE: {
     CTRL 9}";NF$
1552 PRINT"{CRSR DN}{7 SPACEs}{CTRL 9}${CTR
     L Ø} DISK DIRECTORY"
1554 PRINT"{CRSR DN}{7 SPACEs}{CTRL 9}Q{CTR
     L Ø}UIT PROGRAM"
1556 PRINT"{CRSR DN} {CTRL 9}{6 SPACEs}PRES
     S THE APPROPRIATE KEY{7 SPACEs}"
1558 GOSUB1522:IFA$="$"THEN1628
156Ø IFA$="O"THEN1568
1562 IFA$="R"THEN1584
1564 IFA$="Q"THENCLOSE5:CLOSE15:CLOSE4:END
1566 GOTO1558
1568 REM --INPUT FILE NAME
157Ø CLR:GOSUB15Ø4:OPEN4,4
1572 PRINT"{CRSR DN} ENTER NAME OF DATAFILE
      TO BE READ"
1574 PRINT" {CRSR DN}{2 SPACEs}";NF$:INPUT"
     {CRSR UP} ";NF$:IFNF$=""THEN1528
1576 OPEN15,8,15
1578 OPEN5,8,5,"Ø:DF] "+NF$+",S,R":GOSUB161
     8:IFEN=62THENGOSUB162Ø:GOTO1528
158Ø CLOSE5:CLOSE15
1582 REM----PRINT RECORDS MENU
1584 PRINT"{SHFT CLR} {CTRL 9}{8 SPACEs}REC
     ORD PRINTOUT MENU{1Ø SPACEs}"
1586 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}L{CTR
     L Ø}IST UNFORMATTED"
1588 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}R{CTR
     L Ø}EPORT FORMAT"
159Ø PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}M{CTR
     L Ø}AILING LABELS"
1592 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}C{CTR
     L Ø}HANGE LABEL SIZE"
1594 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}S{CTR
     L Ø}END PRINTER COMMANDS"
1596 PRINT"{CRSR DN}{6 SPACEs}{CTRL 9}E{CTR
     L Ø}XIT TO RESTART"
1598 PRINT"{CRSR DN} {CTRL 9}{6 SPACEs}PRES
     S THE APPROPRIATE KEY{7 SPACEs}"
16ØØ GOSUB1522:IFA$="" THEN16ØØ
16Ø2 IFA$="L"THENK=1:GOTO173Ø
16Ø4 IFA$="R"THENK=2:GOTO1668
16Ø6 IFA$="E"THEN1528
16Ø8 IFA$="M"THENK=3:GOTO17Ø4
161Ø IFA$="C"THEN194Ø
1612 IFA$="S"THEN1978
1614 GOTO16ØØ
1616 REM--DISK ERROR
1618 INPUT#15,EN,EM$,ET,ES:IF(EN<2Ø)OR(EN=6
     2)THENET=Ø:RETURN
162Ø PRINT"{CRSR DN} {CTRL 9}{COMD 3}DISK E
     RROR{CTRL Ø}"EN"{CRSR LF}, "EM$","ET"{
     CRSR LF},"ES"{CTRL 8}":ET=8
1622 PRINT"{CRSR DN} PRESS {CTRL 9}ANY KEY{
     CTRL Ø} TO RESTART PROGRAM"
1624 GOSUB1522:CLOSE5:CLOSE15:RETURN
1626 REM--DIRECTORY
1628 OPEN15,8,15:OPEN5,8,Ø,"$Ø":PRINT"{SHFT
      CLR}":GOSUB1618:IFET=8THEN1528
163Ø GET#5,A1$,A2$
1632 GET#5,A1$,A2$
1634 GET#5,A1$,A2$
1636 IFA1$<>""THENAØ=ASC(A1$)
1638 IFA2$<>""THENAØ=AØ+ASC(A2$)*256
164Ø PRINTMID$(STR$(AØ),2);TAB(3);
1642 GET#5,A2$:IFST<>ØTHEN166Ø
1644 IFA2$<>CHR$(34)THEN1642
1646 GET#5,A2$:IFA2$<>CHR$(34)THENPRINT"{CT
     RL 9}"A2$"{CTRL Ø}";:GOTO1646
1648 GET#5,A2$:IFA2$=CHR$(32)THEN1648 →
```


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Listing 1 continued.

```
165Ø PRINTTAB(2Ø);:A3$=""
1652 A3$=A3$+A2$:GET#5,A2$:IFA2$<>""THEN165
     2
1654 PRINTLEFT$(A3$,3)
1656 GETA$:IFA$<>""THENGOSUB1664
1658 IFST=ØTHEN1632
166Ø PRINT" BLOCKS FREE";:AØ=Ø
1662 CLOSE5:CLOSE15:PRINTTAB(25)"PRESS {CTR
     L 9}ANY KEY{CTRL Ø}":GOSUB1522:GOTO152
     8
1664 GOSUB1522:RETURN
1666 REM----LOAD REPORT FORMAT
1668 PRINT"{2 CRSR DNs} NAME OF REPORT FORM
     AT FILE?"
167Ø PRINT" {CRSR DN}{2 SPACEs}";NF$:INPUT"
     {CRSR UP} ";RF$:IFRF$=""THEN1528
1672 OPEN15,8,15:OPEN5,8,5,"Ø:RP] "+RF$+",S
     ,R":GOSUB1618:IFET=8THEN1528
1674 IFEN=62THENGOSUB1618:GOTO1528
1676 INPUT#5,PW,NL,NC:GOSUB1618:IFET=8THEN1
     528
1678 FORJ=1TONL
168Ø INPUT#5,TT$(J):GOSUB1618:IFET=8THEN152
     8
1682 NEXTJ
1684 FORI=1TONC
1686 INPUT#5,PC(I),HC$(I):GOSUB1618:IFET=8T
     HEN1528
1688 FORN=1TO3
169Ø INPUT#5,ML$(I,N):GOSUB1618:IFET=8THEN1
     528
1692 NEXTN:NEXTI:INPUT#5,A1$:Z=VAL(A1$)
1694 S=ST:IFS<>ØTHEN1698
1696 INPUT#5,E$
1698 CLOSE5:CLOSE15
17ØØ GOTO173Ø
17Ø2 REM-----LOAD MAILING LABEL FORMAT
17Ø4 PRINT"{2 CRSR DNs} NAME OF MAILING LAB
     EL FORMAT FILE?"
17Ø6 PRINT" {CRSR DN}{2 SPACEs}";NF$:INPUT"
     {CRSR UP} ";MF$:IFMF$=""THEN1528
17Ø8 OPEN15,8,15:OPEN5,8,5,"Ø:ML] "+MF$+",S
     ,R":GOSUB1618:IFET=8THEN1528
171Ø IFEN=62THENGOSUB162Ø:GOTO1528
1712 INPUT#5,RW
1714 FORI=1TORW:FORN=1TO3
1716 INPUT#5,ML$(I,N):GOSUB1618:IFET=8THEN1
     528
1718 NEXTN
172Ø NEXTI
1722 S=ST:IFS<>ØTHEN1726
1724 INPUT#5,E$
1726 CLOSE5:CLOSE15
1728 REM--OPEN DATAFILE CHANNEL
173Ø OPEN15,8,15:OPEN5,8,5,"Ø:DF] "+NF$+",S
     ,R":GOSUB1618:IFET=8THEN1528
1732 IFEN=62THENGOSUB162Ø:GOTO1528
1734 INPUT#5,R,F,X:GOSUB1618:IFET=8THEN1528
1736 IFFL=ØTHENGOSUB1518:REM DIMENSION ARRA
     YS AND BUFFER
1738 FORN=1TOF:INPUT#5,F$(N),L%(N):NEXTN:GO
     SUB1618:IFET=8THEN1528
174Ø REM----SEARCH ROUTINES MENU
1742 AØ=Ø:PRINT"{SHFT CLR} {CTRL 9}{11 SPAC
     Es}PRINT OPTIONS MENU{8 SPACEs}"
1744 PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}A{CTR
     L Ø}LL RECORDS IN FILE
1746 PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}F{CTR
     L Ø}IND RECORDS WITH COMMON FIELDS
1748 IFK=3THENPRINT"{CRSR DN}{4 SPACEs}{CTR
     L 9}T{CTRL Ø}EST LABEL(S)"
175Ø PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}E{CTR
     L Ø}XIT BACK TO START"
1752 IFK=2THENPRINT"{CRSR DN}POSITION PAPER
      IN PRINTER AT TOP OF PAGE"
1754 PRINT"{CRSR DN} {CTRL 9}{6 SPACEs}PRES
     S THE APPROPRIATE KEY{7 SPACEs}"
1756 GETC$:IFC$="" THEN1756
1758 IFC$="A"THEN18Ø6
1762 IFC$="T"THEN1918
1764 IFC$="F"THEN1772
1766 IFC$="E"THENCLOSE5:CLOSE15:GOTO1528
1768 GOTO1756
177Ø REM----FIND RECORD (SEARCH)
1772 PRINT"{SHFT CLR} {CTRL 9}{4 SPACEs}FIN
     D RECORDS WITH COMMON ITEMS{4 SPACEs}{
     CRSR DN}"
1774 FOR N=1TOF:PRINT" {CTRL 9}";N;"{CTRL Ø
     } ";F$(N):NEXTN
1776 INPUT"{CRSR DN} WHICH FIELD IS TO BE S
     EARCHED";SF
1778 IFSF<ØORSF>FTHENPRINT"{3 CRSR UPs}":GO
     TO1776
178Ø PRINT" ENTER {CTRL 9}COMMON ITEM{CTRL
     Ø} ":PRINT" (THE ENTIRE STRING IS NOT
     REQUIRED)"
1782 PRINT" {CTRL 9}";F$(SF);"{CTRL Ø} ";:I
     NPUTT$
1784 IFK=2THENGOSUB1838:GOSUB1852
1786 FORI=1TOX
1788 PRINT" {CRSR DN}SEARCHING RECORD";I;"{
     2 CRSR UPs}"
179Ø FORN=1TOF:INPUT#5,REC$(N):NEXTN:GOSUB1
     618:IFET=8THEN1528
1792 IFT$=LEFT$(REC$(SF),LEN(T$))THENONKGOS
     UB1826,187Ø,1928
1794 IFK=2THENGOSUB19Ø4
1796 NEXTI
1798 CLOSE5:CLOSE15
18ØØ IFK=2THEN19Ø6
18Ø2 GOTO1528
18Ø4 REM----PRINT ALL RECORDS
18Ø6 PRINT"{CRSR DN} PRINTING HEADING":IFK=
     2THENGOSUB1838:GOSUB1852
18Ø8 FORI=1TOX:PRINT"{CRSR UP} READING RECO
     RD #";I
181Ø FORN=1TOF:INPUT#5,REC$(N):NEXTN:GOSUB1
     618:IFET=8THEN1528
1812 ONKGOSUB1826,187Ø,1928
1814 IFK=2THENGOSUB19Ø4
1816 NEXTI
1818 CLOSE5:CLOSE15
182Ø IFK=2THEN19Ø6
1822 GOTO1528
1824 REM----PRINT NONFORMATTED LISTING
1826 PRINT#4,"[ RECORD #";I;"{3 SPACEs}]";:
     FORJ=1TO62:PRINT#4,"-";:NEXTJ:PRINT#4,
     B1$
1828 FORN=1TOF
183Ø PRINT#4,F$(N);:FORJ=1TO2Ø-LEN(F$(N)):P
     RINT#4,".";:NEXTJ
1832 PRINT#4,REC$(N)
1834 NEXTN:PRINT#4,B1$:RETURN
1836 REM----PRINT REPORT
1838 PG=Ø:S$="":FORJ=1TOPW:S$=S$+B$:NEXTJ
184Ø FORJ=1TONL:IFTT$(J)<>">"THENGOSUB1846
1842 NEXTJ:RETURN
1844 REM----CENTER TITLE
1846 B=INT((PW-LEN(TT$(J)))/2)
1848 PRINT#4,LEFT$(S$,B)+TT$(J);B1$:PG=PG+1
     :RETURN
185Ø REM----POSITION HEADINGS
1852 GOSUB1866:PC(NC+1)=PW+3:CW=PC(2)-2-PC(
     1):IFPC(1)>1THEN1856
1854 PRINT#4,LEFT$(HC$(1),CW);:GOTO1858
1856 PRINT#4,LEFT$(S$,PC(1)-1)+LEFT$(HC$(1)
     ,CW);
1858 FORJ=2TONC:M=PC(J)-LEN(LEFT$(HC$(J-1),
     PC(J)-2-PC(J-1)))-PC(J-1)
186Ø PRINT#4,LEFT$(S$,M)+LEFT$(HC$(J),PC(J+
     1)-2-PC(J));
```

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Listing 1 continued.

```
1862 NEXTJ:PRINT#4,B1$:GOSUB1866:PG=PG+3:RE
     TURN
1864 REM----PRINT DASHED LINE
1866 FORJ=1TOPW:PRINT#4,"-";:NEXTJ:PRINT#4,
     B1$:RETURN
1868 REM----PRINT REPORT FILE DATA
187Ø F1=VAL(ML$(1,1)):F2=VAL(ML$(1,2)):F3=V
     AL(ML$(1,3)):CW=PC(2)-2-PC(1)
1872 IFPC(1)>1THEN1878
1874 PRINT#4,LEFT$(REC$(F1)+B$+REC$(F2)+B$+
     REC$(F3),CW);
1876 GOTO1882
1878 PRINT#4,LEFT$(S$,PC(1)-1);
188Ø PRINT#4,LEFT$(REC$(F1)+B$+REC$(F2)+B$+
     REC$(F3),CW);
1882 FORJ=2TONC:CW=PC(J)-2-PC(J-1)
1884 F1=VAL(ML$(J-1,1)):F2=VAL(ML$(J-1,2)):
     F3=VAL(ML$(J-1,3))
1886 M=LEN(LEFT$(REC$(F1)+B$+REC$(F2)+B$+RE
     C$(F3),CW))
1888 M=PC(J)-M-PC(J-1):CW=PC(J+1)-2-PC(J)
189Ø PRINT#4,LEFT$(S$,M);
1892 F1=VAL(ML$(J,1)):F2=VAL(ML$(J,2)):F3=V
     AL(ML$(J,3))
1894 PRINT#4,LEFT$(REC$(F1)+B$+REC$(F2)+B$+
     REC$(F3),CW);
1896 NEXTJ:PRINT#4,B1$:PG=PG+1
1898 IFPG=6ØTHENFORJ=1TO6:PRINT#4,B1$:NEXTJ
     :PG=Ø:GOSUB1852
19ØØ RETURN
19Ø2 REM----SUM LAST COLUMN
19Ø4 IF Z<>1 THEN RETURN
19Ø5 AØ=AØ+VAL(REC$(VAL(ML$(NC,1)))):RETURN
19Ø6 IFZ<>1THENPRINT#4,B1$:GOTO1528
19Ø8 PRINT#4,LEFT$(S$,PC(NC)-1);
191Ø FORI=1TOPW-PC(NC)+1:PRINT#4,"-";:NEXTI
     :PRINT#4,B1$
1912 PRINT#4,LEFT$(S$,PC(NC)-9)+"TOTAL= "+S
     TR$(AØ)
1914 PRINT#4,B1$:GOTO1528
1916 REM-----PRINT SAMPLE LABELS
1918 PRINT"{CRSR DN} PRINTING TEST LABEL"
192Ø FORI=1TORW:FORJ=1TOLW:PRINT#4,RIGHT$(S
     TR$(J),1);:NEXTJ:PRINT#4,B1$:NEXTI
1922 FORI=1TOT%-RW:PRINT#4,B1$:NEXTI
1924 GOTO1742
1926 REM----PRINT LABELS
1928 FORJ=1TORW:F1=VAL(ML$(J,1)):F2=VAL(ML$
     (J,2)):F3=VAL(ML$(J,3))
193Ø PRINT#4,LEFT$(REC$(F1)+B$+REC$(F2)+B$+
     REC$(F3),LW)
1932 NEXTJ
1934 FORS=1TOT%-RW:PRINT#4,B1$:NEXTS
1936 RETURN
1938 REM----CHOOSE LABEL SIZE
194Ø PRINT"{SHFT CLR} {CTRL 9}{12 SPACEs}LA
     BEL SIZE{15 SPACEs}{CTRL Ø}"
1942 PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}S{CTR
     L Ø}TANDARD - 5 ROWS PER LABEL"
1944 PRINT"{6 SPACEs}15/16 INCH BY 3 1/2 IN
     CHES"
1946 PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}L{CTR
     L Ø}ARGE{4 SPACEs}- 8 ROWS PER LABEL"
1948 PRINT"{6 SPACEs}1 7/16 INCH BY 3 1/2 I
     NCHES"
195Ø PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}O{CTR
     L Ø}THER{4 SPACEs}- CUSTOM LABEL SIZE
     OR"
1952 PRINT"{6 SPACEs}NUMBER OF CHARACTERS P
     ER ROW"
1954 PRINT"{2 CRSR DNs} NOTE: LABELS ARE SE
     PARATED BY ONE ROW"
1956 PRINT" 32 CHARACTERS PER ROW IS STANDA
     RD"
1958 PRINT"{CRSR DN} {CTRL 9}{6 SPACEs}PRES
     S THE APPROPRIATE KEY{7 SPACEs}"
196Ø GETC$:IFC$=""THEN196Ø
1962 IFC$="S"THENT%=6:RW=5:LW=32:GOTO1584
1964 IFC$="L"THENT%=9:RW=8:LW=32:GOTO1584
1966 IFC$="O"THEN197Ø
1968 GOTO196Ø
197Ø INPUT"{CRSR DN} ENTER NUMBER OF ROWS O
     N LABEL";RW:T%=RW+1
1972 INPUT" ENTER # OF CHARACTERS PER ROW";
     LW
1974 GOTO1584
1976 REM-----SEND PRINTER CODES
1978 PRINT"{SHFT CLR} {CTRL 9}{11 SPACEs}PR
     INTER COMMAND{12 SPACEs}{CTRL Ø}"
198Ø PRINT"{CRSR DN} THIS ROUTINE WILL SEND
      CHARACTER"
1982 PRINT" STRING [CHR$()] COMMANDS TO AN
     ASCII"
1984 PRINT" PRINTER.{2 SPACEs}COMMANDS MUST
      BE ENTERED IN"
1986 PRINT" THE FORM OF INTEGERS SUCH AS:"
1988 PRINT"{CRSR DN} ? 27{5 SPACEs}(ESCAPE
     CODE)"
199Ø PRINT" ? 66{5 SPACEs}(PITCH CODE)"
1992 PRINT" ? 2{6 SPACEs}(COMPRESSED MODE)"
1994 PRINT" ? *{6 SPACEs}(END THE SEQUENCE)
     "
1996 PRINT"{CRSR DN} THIS WILL BE SENT TO T
     HE PRINTER AS:"
1998 PRINT"{CRSR DN}{3 SPACEs}PRINT#4,CHR$(
     27)CHR$(66)CHR$(2)"
2ØØØ PRINT"{CRSR DN} UP TO FOUR(4) NUMBERS
     MAY BE SENT,"
2ØØ2 PRINT" THE FIRST NORMALLY BEING {CTRL
     9}27{CTRL Ø}, THE"
2ØØ4 PRINT" ESCAPE CHARACTER.{2 SPACEs}END
     THE SEQUENCE"
2ØØ6 PRINT" BY PRESSING {CTRL 9}RETURN{CTRL
      Ø} WHEN THE ASTERISK"
2ØØ8 PRINT" IS SHOWING.{2 SPACEs}PRINTERS W
     ILL VARY, SO"
2Ø1Ø PRINT" CHECK YOUR MANUAL FOR THE CODES
     ."
2Ø12 PRINT"{CRSR DN}{4 SPACEs}{CTRL 9}ANY K
     EY{CTRL Ø} TO CONTINUE OR {CTRL 9}E{CT
     RL Ø}XIT?"
2Ø14 GOSUB1522:IFA$="E"THEN1584
2Ø16 PRINT"{SHFT CLR} {CTRL 9}{8 SPACEs}SEN
     D PRINTER COMMAND{1Ø SPACEs}{CTRL Ø}"
2Ø18 PRINT"{CRSR DN} ENTER CODE, THEN PRESS
      {CTRL 9}RETURN{CTRL Ø}"
2Ø2Ø PRINT"{CRSR DN} {CTRL 9}RETURN{CTRL Ø}
      ONLY TO QUIT{2 CRSR DNs}"
2Ø22 FORI=1TO4:PRINT"CODE";I;" ? * {4 CRSR
     LFs}";:INPUTI$(I)
2Ø24 IFI$(I)="*"THEN2Ø28
2Ø26 NEXTI
2Ø28 ONIGOTO2Ø3Ø,2Ø32,2Ø34,2Ø36
2Ø3Ø PRINT#4,CHR$(VAL(I$(1))):GOTO2Ø38
2Ø32 PRINT#4,CHR$(VAL(I$(1)))CHR$(VAL(I$(2)
     )):GOTO2Ø38
2Ø34 PRINT#4,CHR$(VAL(I$(1)))CHR$(VAL(I$(2)
     ))CHR$(VAL(I$(3))):GOTO2Ø38
2Ø36 PRINT#4,CHR$(VAL(I$(1)))CHR$(VAL(I$(2)
     ))CHR$(VAL(I$(3)))CHR$(VAL(I$(4)))
2Ø38 PRINT"{2 CRSR DNs}{1Ø SPACEs}{CTRL 9}A
     {CTRL Ø}NOTHER CODE"
2Ø4Ø PRINT"{CRSR DN}{1Ø SPACEs}{CTRL 9}T{CT
     RL Ø}EST CHANGE"
2Ø42 PRINT"{CRSR DN}{1Ø SPACEs}{CTRL 9}E{CT
     RL Ø}XIT TO PRINT"
2Ø44 PRINT"{CRSR DN} {CTRL 9}{6 SPACEs}PRES
     S THE APPROPRIATE KEY{7 SPACEs}"
2Ø46 GOSUB1522:IFA$="A"THEN2Ø16
2Ø48 IFA$="T"THENPRINT#4,"ABCDEFGHIJKLMNOPQ
     RSTUVWXYZ":GOTO2Ø46
2Ø5Ø IFA$="E"THEN1584
2Ø52 GOTO2Ø46
```


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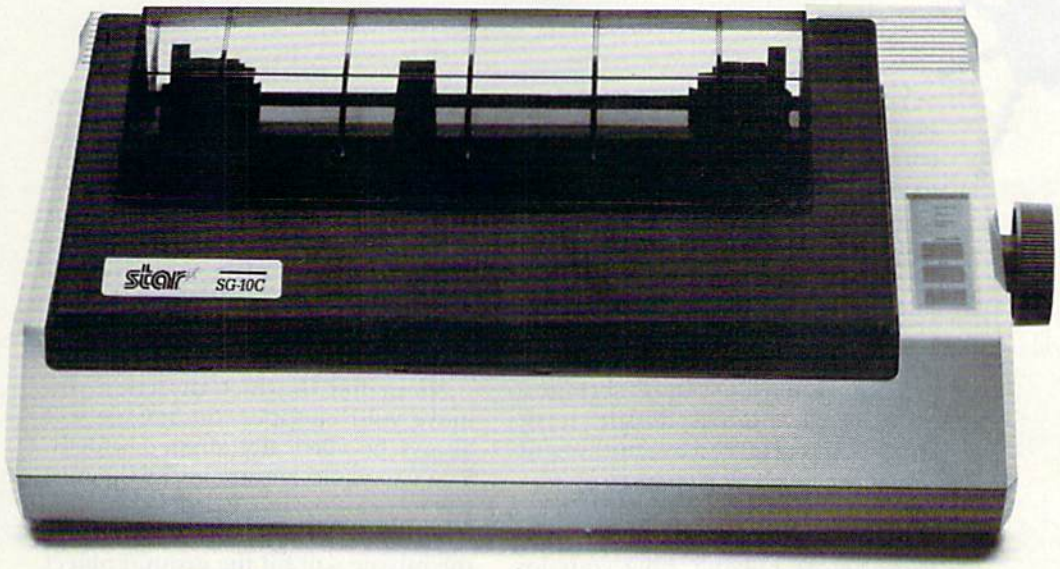

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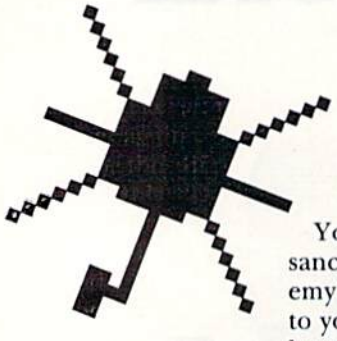
Flying your helicopter low to the ground, you must use lightning-fast reflexes to evade ground obstacles and merciless attacks by heat-seeking missiles.

Chopper Run



By HOWARD CAMPBELL

You are the pilot of a reconnaissance helicopter trapped within enemy territory. In an effort to return to your home base, you must cross a heavily defended mountain region. You must fly low to the ground in an attempt to evade a heat-seeking missile that is trying to destroy your chopper. You must destroy the missile first, by forcing it to strike the ground obstacles you're trying to avoid. Each time a missile is destroyed, it is replaced by another one.

Preparing for Fight or Flight

This is the scenario for Chopper Run. Before playing, plug your joystick into control port 2. Your helicopter will move in the direction in which you push your stick.

After loading and running the program, the computer will ask if you wish to read the details about the game. Press the Y key to read the details or the N key to continue to the game.

Next, you will be asked to choose a skill level from 0 (hardest) to 5 (easiest). The more difficult the skill level, the faster the missile speeds towards your helicopter. After you've chosen a skill level, press the return key. On the screen you will see that you are in enemy territory.

At the beginning of the game, your helicopter is at the bottom center of the screen. The ground objects scroll down the screen, creating the illusion that you are flying above the ground. Push your joystick forward to advance your chopper up the screen. If you don't do this, the heat-seeking missile will smash into your chopper, and you'll have to start the game over.

Move your chopper in any direction to avoid ground objects and the approaching missile, but don't advance too far up the screen. You won't be able to react soon enough to swerve away from ground objects.

Chopper Strategy

No matter in which direction you move your chopper, the missile will always be vertically aligned with it. You can avoid getting hit by the missile by positioning your helicopter in front of a ground object. This way, the missile will hit the ground object and destroy itself. A new missile will then appear at the bottom of the screen and begin advancing.

The screen continuously displays your score and the highest score in the game so far. There is no maximum score. The game ends when either your chopper crashes or is hit by a missile.

That's all there is to it. But don't let Chopper Run's simplicity fool you; it takes a lot of practice just to evade the ground objects and missiles, and it takes an even greater skill to destroy the missiles.

If you don't want to type in this program yourself, send me a self-addressed stamped mailer, a blank cassette and $3, and I'll send you a copy of the program on tape. R

Address all author correspondence to Howard Campbell, 3463 Piper Drive, Northwood, OH 43619.

RUN It Right

C-64; C-128 (in C-64 mode)

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Listing 1. *Chopper Run program for the C-64.*

```
100 REM ****************************
110 REM *{6 SPACEs}CHOPPER RUN{11 SPACEs}*
115 REM *{28 SPACEs}*
120 REM *{3 SPACEs}WRITTEN BY H. CAMPBELL{3
     SPACEs}*
130 REM *{28 SPACEs}*
140 REM ****************************
150 :
160 :
165 POKE53281,0 :POKE53280,0
170 GOSUB20000
200 V=53248{2 SPACEs}: REM V=VICII STARTING
     ADDRESS
202 S=54272 : REM S=SID STARTING ADDRESS
204 DN$="{23 CRSR DNs}{COMD 8}{UP ARROW}":S
    R$="{HOME}{24 CRSR DNs}"
210 FORI=STOS+24:POKEI,0:NEXT : REM CLEAR S
    ID
220 MX=0
230 FORI=10009TO10013:READA:POKEI,A:NEXT
235 DATA0,0,3,1,2
242 ::FORI=828TO991:READA:POKEI,A:NEXTI : R
    EM POKE ML JOYSTICK READER
243 ::FORI=0TO319
244 ::READA: REM GET SPRITE DATA
245 ::POKEI+12288,A : REM PLACE DATA AT 122
    88 ON
246 ::NEXTI
247 PRINT"{SHFT CLR}{5 CRSR DNs}{CTRL 8}DO
    YOU WANT INSTRUCTIONS? {CTRL 9}Y{CTRL 0
    }ES OR {CTRL 9}N{CTRL 0}O":POKE198,0
248 GETA$:IFA$<>"Y"ANDA$<>"N"THEN248
249 IFA$="Y"THENGOSUB30000
250 POKE2040,192 : REM POINT SPRITE 0 DATA
    POINTER TO 12288
251 GOSUB 1000
252 SC=0:CH=0:CT=0:DI=0:HI=0
254 POKES+1,8 : POKES+6,128 : POKES+24,15
270 POKEV+39,6 : REM SET SPRITE 0 COLOR
272 POKEV+37,1{2 SPACEs}: REM MULTI-COLOR 1
273 POKEV+38,15 : REM MULTI-COLOR 2
275 POKE53276,3 : REM SET MOBS TO MULTI-COL
    OR
280 POKEV+1,200 : POKEV,155 : POKEV+16,0
281 POKEV+2,120 : POKEV+3,255
282 POKE2041,196 : REM POINT SPRITE 1 DATA
    POINTER
283 POKEV+40,10 : REM SET SPRITE 1 COLOR
284 A=PEEK(V+31) : REM CLEAR SPR/CHR COLLIS
    ION REGISTER
285 A=PEEK(V+30) : REM CLEAR SPR/SPR COLLIS
    ION REGISTER
286 POKEV+21,3 : REM TURN ON SPRITES
288 SYS 937
294 PRINT"{SHFT CLR}";:GOSUB500
295 POKES+24,0 : POKEV+21,0
300 PRINT"{SHFT CLR}{CTRL 2}DISTANCE{CTRL 8
    }"DI
302 IFDI>MXTHENMX=DI
305 PRINTSPC(20)"{CRSR UP}{CTRL 2}MAX. DIST
    {CTRL 8}"MX
310 PRINT"{6 CRSR DNs}{CTRL 2}WOULD YOU LIK
    E TO PLAY AGAIN?"
320 INPUT"{2 SPACEs}Y{3 CRSR LFs}";A$
330 IFA$="Y"THEN250
340 PRINT"{SHFT CLR}";:END
400 RUN
410 :
420 :
500 REM ////////////////
510 REM / MAIN ROUTINE /
520 REM ////////////////
530 :
534 IC=.005
535 S1=129:S0=128:PO=218:PE=143:F=2
536 DI$="{HOME}{CTRL 2}DISTANCE{CTRL 8}":SC
    $="{HOME}{CRSR DN}{CRSR LF}{SHFT INST}"
540 PRINT"{SHFT CLR}{CRSR DN}{COMD 2}{2 SHF
    T Qs}{CRSR DN} {SHFT Q}{CRSR UP} {2 SHF
    T Qs}{4 SPACEs}{3 SHFT Qs}{4 SPACEs}{2
    SHFT Qs}{6 SPACEs}{2 SHFT Qs}{2 CRSR DN
    s}{SHFT Q}{2 CRSR UPs}{2 SHFT Qs}{2 SPA
    CEs}{3 CRSR DNs} {SHFT Q}{CRSR DN}{SHFT
     Q}{CRSR UP}{SHFT Q} {3 CRSR UPs}{2 SHF
    T Qs}"
542 PRINT"{21 SPACEs}{3 CRSR DNs}{SHFT Q}{2
     CRSR UPs}"
545 PRINT"{SHFT Q}{8 CRSR DNs}{3 SPACEs}{SH
    FT Q}{4 SPACEs}{6 CRSR UPs}{SHFT Q}{5 S
    PACEs}{CRSR DN}{SHFT Q}{4 SPACEs}{8 CRS
    R DNs}{SHFT Q}{5 SPACEs}{6 CRSR UPs}{SH
    FT Q}{9 SPACEs}{SHFT Q}"
550 POKES+4,S1:DI=DI+SP
560 FORI=1TOSK:NEXT
575 IFPEEK(V+30)THENGOSUB940:RETURN
580 POKES+4,S0:PRINTDI$;DI;SC$:POKEPO,PE
610 CL=PEEK(V+31):IF(CLAND1)=1THENGOSUB900:
    RETURN
615 IFCLTHENPOKE2041,0:POKEV+3,255:POKE2041
    ,196
635 POKEV+3,PEEK(V+3)-F:F=F+IC:IFPEEK(V+3)<
    25THENPOKEV+3,255
638 IFPEEK(V+1)<55THENGOSUB940:RETURN
640 GOTO 550
650 :
900 REM ////////////////////////////
910 REM / MOB/MOB COLLISION RESPONSE /
920 REM ////////////////////////////
930 :
940 POKE985,0
950 POKES+1,2:POKES+4,129
955 FORI=1TO300:NEXTI
958 POKE985,192
960 RETURN
970 :
1000 REM ///////////////
1010 REM / SKILL LEVEL /
1020 REM ///////////////
1030 :
1040 PRINT"{SHFT CLR}{CTRL 2}PRESS THE DESI
     RED SKILL LEVEL NUMBER."
1050 PRINT"0 = HARDEST ; 5 = EASIEST" : POK
     E198,0
1060 GETA$:IFA$=""THEN1060
1070 SK=VAL(A$):IFSK>5THEN1060
1075 SP=6-SK
1080 SK=SK*10
1090 RETURN
1100 :
2000 REM ////////////////////////////
2010 REM / ML JOYSTICK READER DATA /
2020 REM ////////////////////////////
2030 :
2040 DATA173,0,220,74,176,3,206,1,208,74
2041 DATA176,3,238,1,208,74,176,42,173,0,20
     8,208
2042 DATA31,173,16,208,41,1,208,16,173,16
2043 DATA208,9,1,141,16,208,169,80,141,0,20
     8,76
2044 DATA182,3,173,16,208,41,252,141,16,208
     ,206
2045 DATA0,208,76,182,3,74,176,32,238,0,208
2046 DATA240,30,169,80,205,0,208,208,20,173
2047 DATA16,208,41,1,240,13,173,16,208,41,2
     52
2048 DATA141,16,208,169,0,141,0,208,76,182,
     3
```

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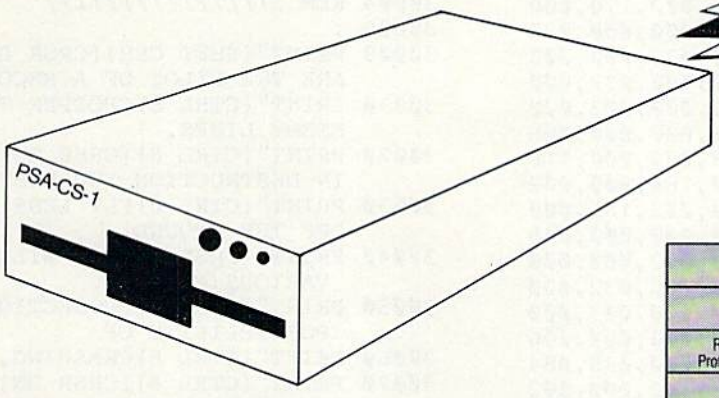

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1541 DOS Compatible	YES	YES	YES	YES
Runs all Copy Protected Software	YES	YES	NO	YES
Format Time	16 sec.	90 sec.	18 sec.	90 sec.
@ Save	YES	NO	YES	NO
Data Error Detection & Correction	YES	NO	NO	NO
Switchable Device #	YES	NO	NO	YES
Reset Button	YES	NO	NO	NO
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Listing 1 continued.

```
2Ø49 DATA173,16,2Ø8,9,1,141,16,2Ø8,76,182,3
     ,12Ø
2Ø5Ø DATA169,6Ø,141,2Ø,3,169,3,141,21,3,88,
     96,173
2Ø51 DATA16,2Ø8,41,1,24Ø,5,9,2,141,16,2Ø8
2Ø52 DATA173,Ø,2Ø8,141,2,2Ø8,173,241,3,24,1
     Ø5
2Ø53 DATA1,41,3,141,241,3,17Ø,189,242,3,24,
     1Ø5
2Ø54 DATA192,141,248,7,76,49,234
212Ø :
9ØØØ REM ///////////////
9Ø1Ø REM / SPRITE DATA /
9Ø2Ø REM ///////////////
9Ø3Ø :
9Ø31 DATAØØØ,ØØØ,ØØØ,ØØØ,Ø16,ØØØ,ØØØ,Ø84
9Ø32 DATAØØØ,ØØØ,Ø84,ØØØ,ØØØ,168,ØØØ,ØØ2
9Ø33 DATA17Ø,ØØØ,255,255,252,ØØ2,17Ø,ØØØ
9Ø34 DATAØØ2,17Ø,ØØØ,ØØØ,168,ØØØ,ØØØ,Ø32
9Ø35 DATAØØØ,ØØØ,Ø32,ØØØ,ØØØ,Ø32,ØØØ,ØØØ
9Ø36 DATAØ32,ØØØ,ØØØ,Ø32,ØØØ,ØØØ,Ø32,ØØØ
9Ø37 DATAØØ3,Ø32,ØØØ,ØØ3,16Ø,ØØØ,ØØ3,ØØØ
9Ø38 DATAØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØ6
9Ø39 DATAØØØ,ØØØ,ØØØ,ØØØ,Ø48,ØØØ,ØØØ,116
9Ø4Ø DATAØØØ,ØØØ,116,ØØØ,ØØØ,184,ØØØ,ØØ2
9Ø41 DATA186,ØØØ,ØØ2,186,ØØØ,ØØ2,186,ØØØ
9Ø42 DATAØØ2,186,ØØØ,ØØØ,184,ØØØ,ØØØ,Ø48
9Ø43 DATAØØØ,ØØØ,Ø48,ØØØ,ØØØ,Ø32,ØØØ,ØØØ
9Ø44 DATAØ32,ØØØ,ØØØ,Ø32,ØØØ,ØØØ,Ø32,ØØØ
9Ø45 DATAØØ3,Ø32,ØØØ,ØØ3,16Ø,ØØØ,ØØ3,ØØØ
9Ø46 DATAØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØ6
9Ø47 DATAØØØ,ØØØ,ØØØ,192,Ø16,ØØØ,Ø48,Ø84
9Ø48 DATAØØØ,Ø12,Ø84,ØØØ,ØØ3,168,ØØØ,ØØ2
9Ø49 DATA234,ØØØ,ØØ2,186,ØØØ,ØØ2,174,ØØØ
9Ø5Ø DATAØØ2,171,ØØØ,ØØØ,168,192,ØØØ,Ø32
9Ø51 DATAØ48,ØØØ,Ø32,Ø12,ØØØ,Ø32,ØØØ,ØØØ
9Ø52 DATAØ32,ØØØ,ØØØ,Ø32,ØØØ,ØØØ,Ø32,ØØØ
9Ø53 DATAØØ3,Ø32,ØØØ,ØØ3,16Ø,ØØØ,ØØ3,ØØØ
9Ø54 DATAØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØ6
9Ø63 DATAØØØ,ØØØ,ØØØ,ØØØ,Ø16,Ø12,ØØØ,Ø84
9Ø64 DATAØ48,ØØØ,Ø84,192,ØØØ,171,ØØØ,ØØ2
9Ø65 DATA174,ØØØ,ØØ2,186,ØØØ,ØØ2,234,ØØØ
9Ø66 DATAØØ3,168,ØØØ,Ø12,168,ØØØ,Ø48,Ø32
9Ø67 DATAØØØ,192,Ø32,ØØØ,ØØØ,Ø32,ØØØ,ØØØ
9Ø68 DATAØ32,ØØØ,ØØØ,Ø32,ØØØ,ØØØ,Ø32,ØØØ
9Ø69 DATAØØ3,Ø32,ØØØ,ØØ3,16Ø,ØØØ,ØØ3,ØØØ
9Ø7Ø DATAØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØ6
9Ø71 DATAØ32,ØØØ,ØØØ,168,ØØØ,ØØØ,168,ØØØ
9Ø72 DATAØØØ,Ø32,ØØØ,ØØØ,Ø32,ØØØ,ØØØ,Ø32
9Ø73 DATAØØØ,ØØØ,Ø32,ØØØ,ØØØ,168,ØØØ,ØØØ
9Ø74 DATA168,ØØØ,ØØØ,136,ØØØ,ØØØ,184,ØØØ
9Ø75 DATAØØØ,Ø48,ØØØ,ØØØ,Ø48,ØØØ,ØØØ,Ø48
9Ø76 DATAØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ
9Ø77 DATAØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ
9Ø78 DATAØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,ØØØ,255
2ØØØØ REM ///////////////
2ØØØ5 REM / TITLE PAGE /
2ØØ1Ø REM ///////////////
2ØØ15 :
2ØØ2Ø PRINT"{SHFT CLR}{3 CRSR DNs}"SPC(13)"
     {CTRL 8}CHOPPER RUN"
2ØØ3Ø PRINTSPC(1Ø)"{6 CRSR DNs}BY HOWARD CA
     MPBELL"
2ØØ4Ø RETURN
2ØØ5Ø :
3ØØØØ REM ////////////////
3ØØØ2 REM / INSTRUCTIONS /
3ØØØ4 REM ////////////////
3ØØØ5 :
3ØØØ9 PRINT"{SHFT CLR}{CRSR DN}{CTRL 8}YOU
     ARE THE PILOT OF A RECONNAISSANCE
3ØØ1Ø PRINT"{CTRL 8}CHOPPER TRAPPED BEHIND
     ENEMY LINES.
3ØØ2Ø PRINT"{CTRL 8}{CRSR DN}TO EVADE CERTA
     IN DESTRUCTION YOU MUST
3ØØ3Ø PRINT"{CTRL 8}FLY LESS THAN TEN FEET
     OFF THE GROUND.
3ØØ4Ø PRINT"{CRSR DN}YOU WILL HAVE TO AVOID
      VARIOUS GROUND
3ØØ5Ø PRINT"{CTRL 8}PROJECTIONS OR FACE THE
      POSSIBLILITY OF
3ØØ6Ø PRINT"{CTRL 8}CRASHING.
3ØØ7Ø PRINT"{CTRL 8}{CRSR DN}ALSO YOU MUST
     EVADE HEAT-SEEKING MISSLES";
3ØØ8Ø PRINT"{CTRL 8}WHICH ARE CONSTANTLY LA
     UNCHED TO INTER-
3ØØ9Ø PRINT"{CTRL 8}CEPT YOU.{2 SPACEs}THE
     ONLY CERTAIN WAY TO SHAKE";
3Ø1ØØ PRINT"{CTRL 8}THESE MISSLES OFF YOUR
     TAIL IS TO FORCE
3Ø11Ø PRINT"{CTRL 8}THEM TO STRIKE A GROUND
      PROJECTION.
3Ø14Ø PRINT"{4 CRSR DNs}{13 SPACEs}{COMD 6}
     {CTRL 9}GOOD LUCK!!!{CTRL Ø}
3Ø15Ø PRINT"{3 CRSR DNs}{7 SPACEs}{CTRL 8}{
     CTRL 9}PRESS <SPACE> TO CONTINUE{CTRL
      Ø}{HOME}";
3Ø16Ø GETA$:IFA$=""THEN3Ø16Ø
3Ø17Ø RETURN
```


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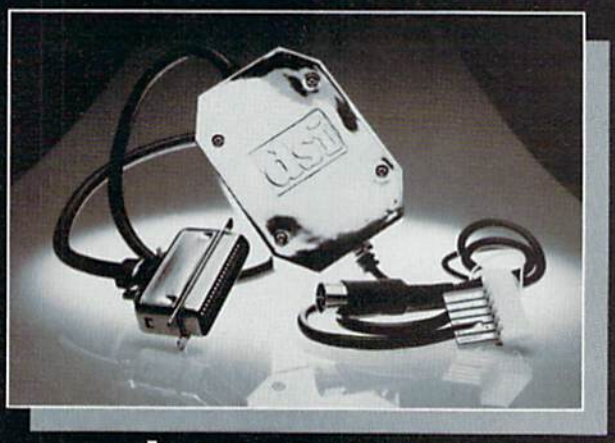

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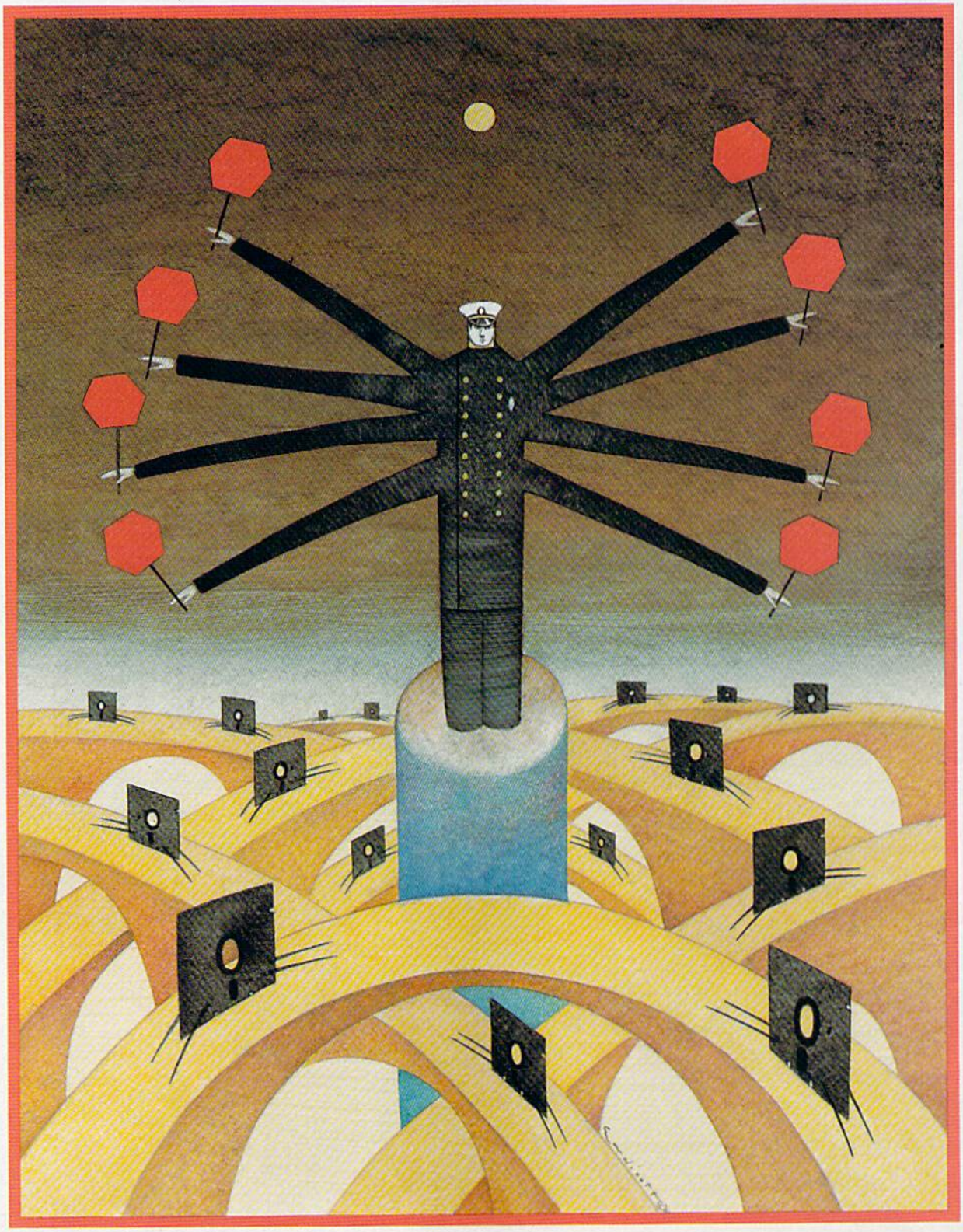

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Watch Your Speed!

By JOSEPH J. SHAUGHNESSY

Is your disk drive just puttering along, or is it breaking the speed limit? Whichever, these two programs act as an efficient traffic cop in helping you to check and adjust your drive's motor speed.

One source of disk drive problems, though not as common as misalignment, is incorrect rotational speed. The disk drive is designed to rotate the disk at a preset rpm. With the passage of time and use, the drive speed can change (usually increasing).

This does no harm up to a point, but eventually the speed may deviate enough that you will start to experience errors in loading and saving programs. (You might mistake this for an alignment problem.) With the following two programs, you can remedy this problem yourself.

Listing 1, Disk Spinner, starts your disk spinning and keeps it going as long as you want. This is useful for one method of adjusting the motor speed on either the VIC-20 or the C-64. It can also be used with disk-head cleaners to keep the drive operating for the recommended 60 seconds.

Listing 2, the 1541 Motor Speed Check, lets you check the motor speed without disassembling your disk drive; you can also use this program to adjust the motor speed. This second program can only be used with the C-64; I could not develop a similar program for the VIC-20, due to differences in the real-time clocks built into the two computers.

Motor Speed Problems

If you have a C-64, run Listing 2 before disassembling your disk drive to see if your motor speed is within the acceptable limits. A word of caution here: If your disk drive is out of alignment, or the motor speed is too far off the mark, this program may not work. Since motor speed is a less frequent problem, you should always suspect misalignment first. If you are doing a realignment on your disk drive, you should check the motor speed at the same time, while you have your disk drive disassembled.

If you need to adjust the motor speed, you must completely remove the plastic case from the disk drive and place the drive upside down on your work area. (For disassembly instructions, see the companion article, "Keep Your Disk Drive in Line.") To make the adjustment, you will need a small flat-head (regular) jeweler's screwdriver, or other similar thin flat metal instrument.

With the disk drive upside down and the front door facing you, you will see a small hole on the left-hand side, about one inch from the front of the drive. Look inside the hole. You should see a very tiny screw. There should be, but may not be, some gradation marks next to the screw.

This little screw is what is used to adjust the disk motor speed. It is very sensitive, so you needn't turn it much. By following the instructions in Listing 2, C-64 owners can quickly adjust the drive's motor speed.

For VIC-20 and C-64 Owners

Both VIC-20 and C-64 owners can use the following method. With the disk drive disassembled and upside down, notice that there is, in the center, near the front of the drive, a small wheel with a striped pattern on it. This is the drive motor. The striped pattern is used to adjust the motor speed.

You must work in a room with fluorescent lights or have a desktop fluorescent lamp to illuminate the disk drive. Notice that the striped pattern is marked with a 60 on the outer ring and a 50 on the inner ring. This refers to the type of power you are using. In North America, we use 60-cycle power, and therefore use the outer ring for adjustment. Most other parts of the world use 50-cycle power; hence the inner ring.

Turn on the computer and disk drive (be careful around the exposed parts). Load in the Disk Spinner program and run it. Observe that under the fluorescent lighting, the pattern on the motor seems to stand still or slowly rotate. Try turning the adjustment screw slightly. Notice that the apparent rotation of the pattern changes. Your motor speed is in adjustment when, by turning the adjustment screw, you can make the pattern appear to stand still.

After you have made the adjustment, press the space bar to stop the program and drive. When finished, reassemble your disk drive (with power off, please!).

These short programs are included in the disk-duplicating offer at the end of my companion article, "Keep Your Disk Drive in Line." R

Address all author correspondence to Joseph J. Shaughnessy, 8438 Lynda Sue Lane W., Jacksonville, FL 32217.

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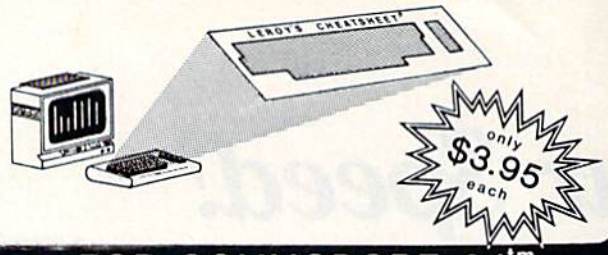

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Listing 1. *Disk Spinner program for the VIC-20 or C-64.*

```
10 PRINT"{SHFT CLR}{CRSR DN}THE DISK SPINNE
   R"
20 PRINT"{CRSR DN}SPACE BAR TO QUIT{3 CRSR
   DNs}"
30 OPEN15,8,15:OPEN2,8,2,"#"
35 PRINT#15,"M-W"CHR$(106)CHR$(0)CHR$(1)CHR
   $(133)
40 PRINT#15,"U1:"2;0;Y;0
50 GETA$:IFA$=CHR$(32)THEN80
60 PRINT"X";:Y=Y+1:IFY>35THENY=1
70 GOTO40
80 CLOSE1:CLOSE15:END
```

Listing 2. *1541 Motor Speed Check program for the C-64.*

```
10 REM*********************************
20 REM*{4 SPACEs}1541 MOTOR SPEED CHECK{5 S
   PACEs}*
30 REM*{12 SPACEs}BY{17 SPACEs}*
40 REM*{5 SPACEs}JOSEPH SHAUGHNESSY{8 SPACE
   s}*
50 REM*{4 SPACEs}FOR THE COMMODORE 64{7 SPA
   CEs}*
60 REM* PORTIONS TAKEN FROM A PUBLIC{2 SPAC
   Es}*
70 REM* DOMAIN PRGM & UNKNOWN AUTHOR{2 SPAC
   Es}*
80 REM*********************************
90 PRINT"{SHFT CLR}"
100 POKE53280,1:POKE53281,1:PRINTCHR$(28):P
    RINTCHR$(142):REM SET UP SCREEN
110 PRINT"{5 CRSR DNs}PLEASE WAIT, LOADING
    MACH. LANG. PORTION"
120 RESTORE:REM SET UP ML ROUTINES
130 FORI=11776TO11937:READA:POKEI,A:NEXT:RE
    M $2E00
140 FORI=12032TO12210:READA:POKEI,A:NEXT:RE
    M $2F00
150 O0$=CHR$(0):O1$=CHR$(1):O3$=CHR$(3):FF$
    =CHR$(255)
160 CC$(1)="{CTRL 4}":CC$(2)="{CTRL 6}":CC$
    (3)="{CTRL 7}":CC$(4)="{CTRL 8}"
170 ML=12032:REM DWNLODR AT $2F00
180 GOSUB420
190 PRINTTAB(12)"MOTOR SPEED TEST"
200 PRINT"{2 CRSR DNs}{5 SPACEs}INPUT THE D
    EVICE NUMBER OF THE"
210 PRINT"{CRSR DN}{6 SPACEs}DISK DRIVE YOU
     WANT TO CHECK"
220 INPUT"{CRSR DN}{18 SPACEs}8{3 CRSR LFs}
    ";CH
230 GOSUB330
240 GOSUB700
250 GOSUB470:REM MTR SPEED
260 PRINT"{SHFT CLR}{6 CRSR DNs}{8 SPACEs}E
    ND OF MOTOR SPEED TEST{5 CRSR DNs}":CLO
    SE15:END
270 POKE198,0
280 GETA$:IFA$=""THEN280
290 IFA$=" "THENGOTO320
300 IFR=1ANDA$="R"THENCLR:GOTO150
310 GOTO270
320 RETURN
330 PRINT"{CRSR DN}{5 SPACEs}{CTRL 9} INSER
    T A FORMATTED, BLANK OR "
340 PRINT"{5 SPACEs}{CTRL 9} SCRATCH DISK F
    OR THIS TEST!{2 SPACEs}"
350 PRINT"{CRSR DN}{8 SPACEs}PRESS 'SPACE'
    WHEN READY":GOTO 270
```


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Listing 2 continued.

```
36Ø TK=1:JB=12:REM BUMP
37Ø PRINT#15,"M-W"CHR$(TJ)CHR$(HJ)CHR$(2)CH
    R$(TK)OØ$
38Ø PRINT#15,"M-W"CHR$(LJ)CHR$(HJ)O1$CHR$(J
    B*16)
39Ø PRINT#15,"M-R"CHR$(LJ)CHR$(HJ):GET#15,D
    $:D=ASC(D$+OØ$):IFD>127THEN39Ø
4ØØ IFJB=12THENFORI=1TO25ØØ:NEXT
41Ø RETURN
42Ø PRINT"{SHFT CLR}{11 SPACEs}{CTRL 9}{CTR
    L 6}{3 SPACEs}TEST PROGRAM{3 SPACEs}{CT
    RL 3}{CRSR DN}"
43Ø PRINT"{CRSR DN}{13 SPACEs}1541 DISK DRI
    VE {CRSR DN}"
44Ø RETURN
45Ø PRINT"{CRSR DN}{3 SPACEs}PRESS SPACE TO
     QUIT, 'R' TO REPEAT"
46Ø R=1:GOSUB27Ø:RETURN
47Ø GOSUB42Ø:PRINTTAB(9)"MOTOR SPEED ADJUST
    MENT"
48Ø GOSUB67Ø:REMSPD @$2EØØ TO $3ØØ
49Ø GOSUB36Ø
5ØØ PRINT"{CRSR DN}{7 SPACEs}DOING SPEED CH
    ECK ON DRIVE"
51Ø PRINT"{CRSR DN}{5 SPACEs}ADJUST SPEED D
    EVIATION TO Ø MS"
52Ø PRINT"{2 CRSR DNs}{3 SPACEs}PRESS 'SPAC
    E' WHEN SPEED ADJUSTED{2 CRSR DNs}"
53Ø PRINT#15,"M-W"CHR$(5)O3$O1$CHR$(11):REM
     WR MD
54Ø TK=TV:JB=14:GOSUB37Ø:REM START
55Ø FORI=1TO4:PRINT#15,"M-R"CHR$(6+I)O3$:GE
    T#15,B$:SV(I)=ASC(B$+OØ$):NEXT
56Ø IFSV(3)=ØORSV(4)=ØTHEN66Ø
57Ø SA=(256*SV(4)+SV(2)+2-2ØØØ):SB=(256*SV(
    3)+SV(1)+2-2ØØØ)
58Ø SD=INT((SA+SB)/2Ø+.5):SP=ABS(SD)
59Ø N=N+1:IFN>4THENN=Ø
6ØØ PRINT"{CRSR UP}{5 SPACEs}"CC$(N)"{CTRL
    9}{2 SPACEs}SPEED DEVIATION IS "SD "{CR
    SR LF} MS{2 SPACEs}{CTRL 3}"
61Ø IFFP=ØANDSP<1THENPRINT"{2 CRSR DNs}{13
    SPACEs}SPEED OK AS IS":GOTO65Ø
62Ø FP=1:GETA$:IFA$=" "THENPRINT"{SHFT CLR}
    {CTRL 3}":GOTO65Ø
63Ø IFSP>5THEN53Ø
64Ø PRINT#15,"M-W"CHR$(5)O3$O1$CHR$(78):GOT
    O54Ø:REM RD MODE
65Ø GOSUB36Ø:GOSUB45Ø:IFRTHEN26Ø
66Ø PRINT"{CRSR DN}{CTRL 9}{7 SPACEs}TEST F
    AILED--CHECK DISK":FORI=1TO1ØØØ:NEXT:GO
    TO47Ø
67Ø POKEML+8,CH:SYSML:REM DOWNLOADER
68Ø IFSTTHENPRINT"{CRSR DN}{CTRL 9}{12 SPAC
    Es}DOWNLOAD FAILED":CLOSE15:END
69Ø RETURN
7ØØ SY=Ø:CLOSE15:OPEN15,CH,15
71Ø PRINT#15,"M-R"FF$FF$:GET#15,A$:A=ASC(A$
    +OØ$)
72Ø PRINT#15,"M-R"CHR$(254)FF$:GET#15,B$:B=
    ASC(B$+OØ$)
73Ø IFA=254ANDB=1Ø3THENSY=15:TV=36:BF=3:LJ=
    Ø:HJ=Ø:TJ=6:RETURN
74Ø PRINT"{2 CRSR DNs}{8 SPACEs}SYSTEM NOT
    IDENTIFIABLE":CLOSE15:END
75Ø REM $2EØØ
76Ø DATA169,Ø,133,Ø,76,11,3,Ø,Ø,Ø,Ø,Ø,12Ø,173
    ,12,28,41,31
77Ø DATA9,192,141,12,28,169,255,141,3,28,16
    2,85,142,1,28,162,5Ø
78Ø DATA16Ø,Ø,8Ø,254,184,136,2Ø8,25Ø,2Ø2,2Ø
    8,247,8Ø,254,184,141,1,28
79Ø DATA169,224,13,12,28,162,4,8Ø,254,184,2
    Ø2,2Ø8,25Ø,141,12,28,142
8ØØ DATA3,28,162,3,8Ø,254,184,2Ø2,2Ø8,25Ø,1
    2Ø,173,11,24,9,64,141
81Ø DATA11,24,162,1,169,98,141,4,24,16Ø,Ø,1
    4Ø,8,3,14Ø,1Ø,3
82Ø DATA14Ø,7,3,14Ø,9,3,44,Ø,28,48,251,14Ø,
    5,24,44,Ø,28
83Ø DATA16,251,44,Ø,28,16,19,173,13,24,1Ø,1
    6,245,173,4,24,254
84Ø DATA7,3,2Ø8,237,254,9,3,2Ø8,232,2Ø2,24Ø
    ,224,169,191,45,11,24
85Ø DATA141,11,24,169,1,88,1Ø8,232,255
86Ø REM $2FØØ
87Ø DATA76,1Ø,47,Ø,46,Ø,3,1,8,38,173,3,47,1
    33,63,173,4
88Ø DATA47,133,64,173,5,47,141,61,3,173,6,4
    7,141,62,3,173,7
89Ø DATA47,141,6Ø,3,173,9,47,141,142,47,32,
    152,47,169,77,141,63
9ØØ DATA3,169,45,141,64,3,169,87,141,65,3,1
    73,61,3,141,66,3
91Ø DATA173,62,3,141,67,3,173,61,3,24,1Ø5,3
    2,141,61,3,144,3
92Ø DATA238,62,3,169,32,141,68,3,16Ø,Ø,177,
    63,153,69,3,2ØØ,192
93Ø DATA32,2Ø8,246,32,125,47,165,63,24,1Ø5,
    32,133,63,144,2Ø1,23Ø,64
94Ø DATA2Ø6,6Ø,3,2Ø8,176,96,32,168,47,16Ø,Ø
    ,185,63,3,32,221,237
95Ø DATA165,144,2Ø8,9,2ØØ,192,38,2Ø8,241,32
    ,254,237,96,1Ø4,1Ø4,96,169
96Ø DATAØ,133,183,169,111,133,185,173,8,47,
    133,186,32,213,243,165,186
97Ø DATA32,12,237,165,185,32,185,237,96,
```


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Keep It Clean

By MARGARET MORABITO

Learn this simple procedure for cleaning your disk drive head, and you may prevent serious equipment damage.

The maintenance of computer hardware has had little emphasis in user manuals and computer literature in general. For example, the *1541 Disk Drive User's Manual* fails even to mention that your drive's head will need cleaning periodically. The upkeep of the mechanical internal workings of computer equipment should not remain a mystery, as this void in your knowledge can lead to unnecessary equipment failure and costly repairs.

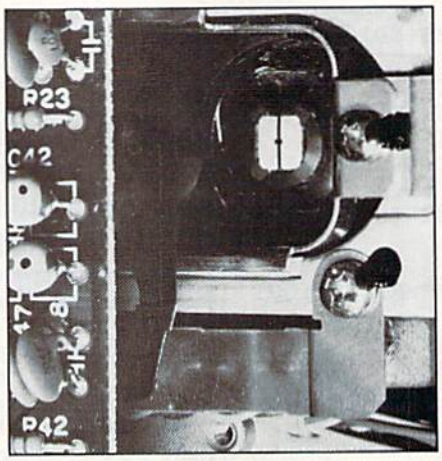
This article will help to clear up the mystery and will answer some questions you may not yet have asked, but inevitably will when your drive starts making mistakes when loading and saving programs. Specifically, you'll learn the how-to's of using a universal disk-drive head-cleaning kit to clean your 1541 disk drive.

Think of your disk drive as similar to an eight-track or cassette tape deck. They each have a head mechanism that presses against a moving surface in order to interpret information held on the magnetic tape or disk. After prolonged use, the head mechanism begins to collect foreign matter, such as dust and grime.

This collected matter impairs the head's ability to accurately transfer information. When your disk drive starts making loading and saving mistakes, your first act should be to clean the head, not go to the computer repairman.

How Your Drive Works

Here's a brief description of your Commodore disk drive. The 1541 is a single-head disk drive that handles single-sided disks. This means that the drive has only one read-write head and that only one side of your disk can be read. Because you insert your disk with the label upward, many people believe that the information is on the upper side of the disk and the head is also on the top. This is logical, but incorrect.



The read-write head in your 1541 disk drive is underneath the disk and reads the bottom surface, not the top. So if you *must* throw your disks on grubby tables, throw them upside down. This will help deter damage to the information-bearing side of your disk. The best way to handle your disk is, of course, always to place it inside the protective envelope before putting it down.

Take a brief look at the top side of your disk. The large hole in the center is where the drive grabs the disk to spin it. The elongated opening beneath this hole is used as a pressure point. The flip side is the important side; it allows the drive head to touch the magnetic surface of the disk for reading and writing information.

If you peer inside the open door of your drive, you can see a white sectioned plastic disk on the top center and a gray plastic disk on the bottom center. These sandwich the central disk hole and cause the disk to spin when the drive is engaged. The drive head is about two inches beyond the hub mechanism and can't be seen without disassembling the drive (see Photo 1). But you don't have to see the head to clean it, so disassembly is not needed.

However, knowing the location of the head and what part of your disk needs to touch it is important when you try to use a universal cleaning kit with no machine-specific instructions.

Cleaning the Head

In order to clean the drive head, you'll need a 5¼-inch head-cleaning kit. You don't need to use a Commodore head-cleaning kit; the stores that sell Commodore computers also sell the universal kits under many brand names. As long as the kit has the correct size of disk, it will work.

Prices vary, but you should expect to pay around $15. These kits will have a couple of floppies containing cleaning disks made of a white material. They also include a bottle of cleaning solution. Some kits may offer additional equipment for cleaning other parts of your computer.

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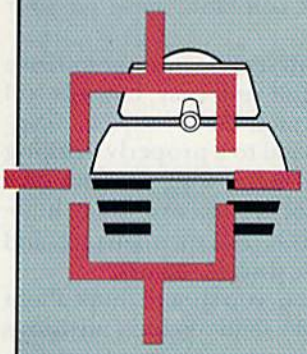

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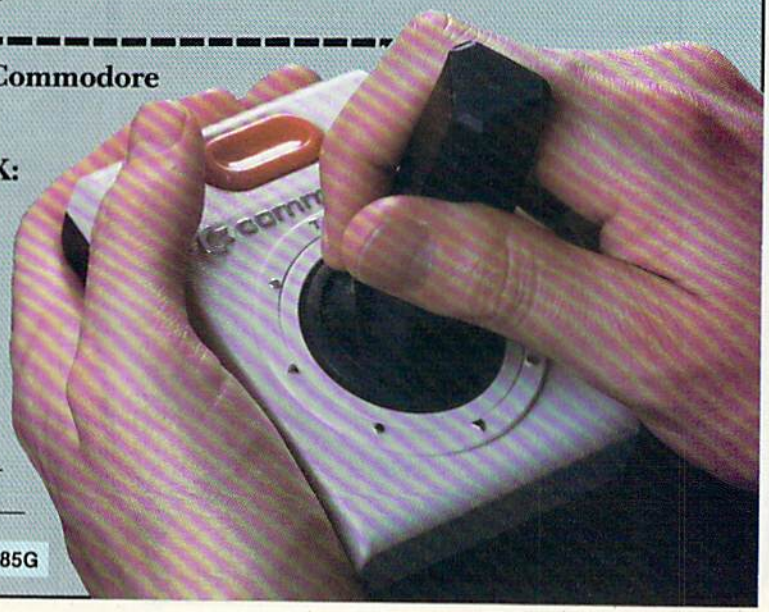

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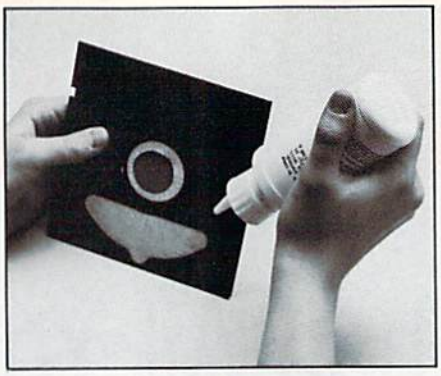
Instructions accompanying most kits are scanty. They often fail to show you explicitly which side of the cleaning disk should be up or down. You could damage your drive's head if you run a single-sided cleaning disk wrong side down.

A standard cleaning disk is shown in Photo 2. To use the disk, pour cleaning fluid onto the exposed white material seen through the large cutout section. This area corresponds to the exposed enlongated opening on the bottom side of your disk, where the read-write head touches it. Insert the cleaning disk into your drive with the large cutout on the bottom side. The kit instructions will tell you to run the drive with the cleaning disk inside for 30 seconds.

For Commodore users, this is quite a feat, as there is no command for engaging the drive for such a long period of time. You could issue a series of dummy load commands, which would eventually add up to the 30 seconds, but this is cumbersome. For a short program that you can use to accomplish the 30-second drive action, see Joe Shaughnessy's article,



"Watch Your Speed," elsewhere in this issue.

Once the drive has been engaged for 30 seconds, the procedure is complete. Each cleaning disk has a multi-blocked label for you to check off the cleaning session you have just performed using that particular disk. Most disks can handle 13 sessions, but this will vary according to how dirty your drive is each time you use the kit. If the white material looks dirty, throw the disk away.

That you should clean your drive head is not debatable. How often you do this varies, however. Some kits recommend cleaning once a week, but it actually depends on how often you use your drive. If your computer is being used eight hours a day, five days a week, then definitely clean it once a week. If you only use it in the evenings for an hour or so, you probably only have to clean it every month. Let common sense be your guide.

As you can see, cleaning your drive head is simple and easy, but it is still very important. Do-it-yourself maintenance is vital to a properly working computer system. You also can save lots of money by avoiding high-priced professional maintenance and even higher-priced repairs.

In addition, you should think about other simple maintenance measures that you can take to avoid future repairs—for example, keeping a dust-cover on your keyboard when not in use. Just don't take it for granted that your equipment will work forever without regular maintenance. R

Address all author correspondence to Margaret Morabito, c/o RUN *editorial, 80 Pine St., Peterborough, NH 03458.*

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Keep Your Disk Drive in Line

By JOSEPH J. SHAUGHNESSY

Here's a do-it-yourself project that will save you costly repairs due to disk drive misalignment. Knowing how to use a Phillips-head screwdriver is the only prerequisite.

This article provides you with tips that might save you enough to pay for your subscription to *RUN* magazine for many years to come. I wish someone else had written it two years ago. I would have saved about $100 in technician fees for service on my disk drive.

There are several million of you Commodore owners who have the 1540 or 1541 disk drive, and almost every one of you has needed, or will someday need, to have your disk drive realigned. Some of you probably need it right now and may or may not know it. Misalignment is the most common cause of failure in this disk drive.

Most of this article will consist of giving you step-by-step instructions for a do-it-yourself project, realigning the read/write head on your 1540 or 1541 disk drive.

Caution: Because you will be working with an electrical device, there is always the danger of electric shock or injury. Children and others unwilling or unable to follow directions and observe safety precautions should not attempt this project. Neither *RUN* magazine nor the author will assume liability for damage or injury to yourself or your equipment. Performing this work will also void your warranty, so make sure that you have owned your disk drive for at least 91 days.

The only tool required is a small (size 1) Phillips-head screwdriver. An optional tool is a pair of needle-nose pliers for replacing some of the screws during reassembly. If you want to drill two holes in the bottom of your plastic case, you will also need an electric drill with an appropriate-sized bit (more about this in the reassembly section).

Preliminary Information

First, I'll discuss how programs and files are stored on disk. Each disk has 35 tracks, arranged concentrically, with track number 1 being the outermost and track 35 the innermost. Each track has from 17 to 21 blocks (the inner tracks have fewer blocks). Each block can store 256 bytes (or characters) of data. The middle track is track 18, which is special.

The first block (block 0) of track 18 is used to store the name and I.D. number that you gave the disk, a few other special codes and the BAM (block availability map). The disk drive uses the BAM to determine which blocks are available for storing

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data and which blocks have already been used. The remaining blocks (1 to 18) of track 18 are used to store your disk directory.

The disk directory contains the names of your programs and files and also information on the type of file, its length and where the starting point is on the disk. Your actual programs and files are stored on the disk's remaining blocks. (664 blocks are usable on a brand new disk.) Storage of your programs and files begins on tracks 17 and 19 and proceeds both inward and outward from the center track, with 1 and 35 being the last tracks used.

When your disk drive begins to go out of alignment, the first tracks to become unreadable are on these outermost tracks (1 and 35). You'll find that you can load in programs near the beginning of your directory, while programs near the end will load with difficulty, if at all.

Ordinarily, programs near the beginning of the directory are stored near the center of the disk, since they were saved first, and later programs are stored farther out from the center. The last thing you will lose, as the alignment gets worse, is the ability to read the directory.

You can also tell that you are losing alignment when program loads start taking an exceptionally long time, and your red disk drive light flutters and blinks and the drive seems to chug and makes awful sounds (which are caused by the read/write head resetting itself against its stop when the first attempt to read a block is unsuccessful).

On a perfectly aligned disk drive, the red light will come on and remain steady throughout the load, with one major exception. Some companies copy-protect programs by deliberately "bad sectoring" certain blocks on the disk. During or after the program load, these "bad" blocks are checked by the program. If the disk drive can't read the bad block, the program knows that it is probably not dealing with a pirated disk. If it can read the block, the program will usually shut itself down.

It is suspected that the most probable cause of disk-drive misalignment is using commercial software with this "bad sectoring" type of copy protection. The repeated hammering of the read/write head against its stop may eventually knock the drive out of alignment.

Another reason for the red light blinking during the loading of commercial software is that some companies load programs in sections, and the red light goes off between these sections. Other possible causes would be transporting your drive to another location, mishandling, long usage or, perhaps, gremlins.

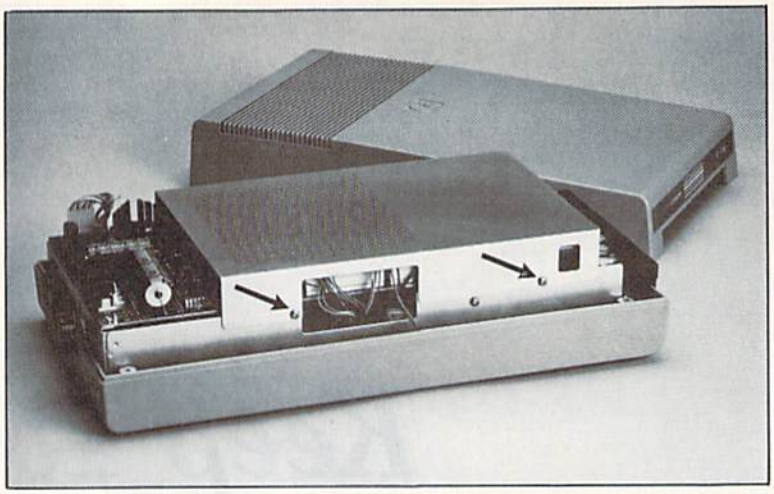

Photo 1. Drive with cover removed.

The simplest test for disk-drive misalignment is to run the performance test program (using a disk you don't need anymore) or the short program found later in this article (using any disk—the program won't hurt it). Neither of these programs, however, will check for perfect alignment, since I've had disk drives that I know are not in perfect alignment pass these tests. The best way to test your drive is to use my Safe and Fast Disk Checker program (published last month in *RUN*), which runs both quickly and smoothly (see step #15 in the alignment procedure).

Once you've determined that your disk drive needs realignment, you're ready to advance to the actual alignment procedure.

In brief, you will first check the alignment of track 18 by loading in a long directory. You'll next check the alignment of the outermost and innermost tracks by running the short program in this article. Finally, you will check every track and sector for perfect alignment by running my Safe and Fast Disk Checker program.

We are now ready to begin. *Please* think and practice safety while doing this!

Disassembly Instructions

1. Turn off the disk drive power switch and disconnect all cables from the rear of the disk drive.

2. Place the drive upside down on a flat surface and remove the four Phillips-head screws.

3. Gently lift the disk drive off of the top cover and place right side up on a flat surface. Put aside the top plastic cover until reassembly time.

4. Photo 1 shows the top metal cover, which is held in place by two Phillips-head screws. Remove these screws and the top metal cover.

5. The green power light located on the lower front of the drive's plastic case is connected to the now-exposed circuit board by two wires and a plug. Note the orientation of this plug and remove it. This will disconnect the green power light.

6. Replace the top metal cover over the circuit board using two Phillips-head screws.

7. Remove the disk drive from the lower plastic case by removing the six screws and lifting it out.

8. Place the disk drive upside down on a flat surface next to your computer. At this point, you should notice the stepper motor and the two screws that hold it in position (Photos 2 and 3). These screws pass through slotted holes in the stepper motor mounting, thereby allowing the stepper motor to be rotated by a small amount when these screws are loosened.

9. Plug the connecting cord from the computer into the disk drive. Plug in the power cord to the disk drive. *Warning*: from this point on, *do not* touch any of the exposed electrical components in the rear of the disk drive. It is all right to touch the power switch to turn the drive off and on, but don't touch anything else back there. It is also all right to touch

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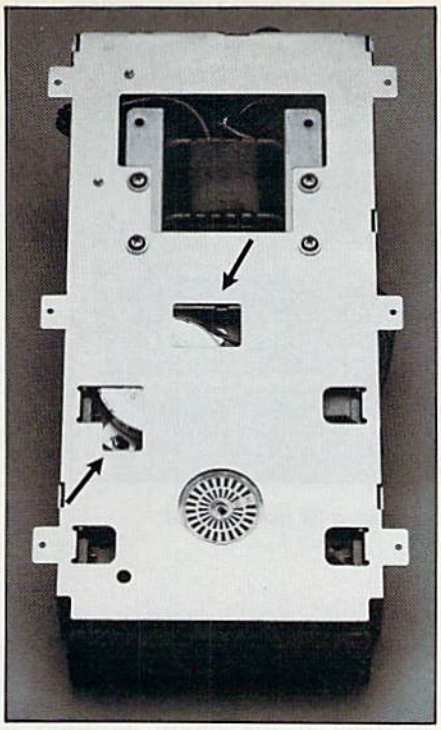

Photo 2. Location of stepper motor.

the protective metal case that is built around your disk drive.

If, for any reason, you were to get a shock from your metal case, immediately unplug the disk drive and take it in for professional service—you have a dangerous short circuit and more problems than just misalignment. (I have never heard of this happening, but anything is possible. It is not required in the alignment process to touch any of the electrical devices in the rear of the disk drive, so why take chances? Stay away!)

Alignment Procedure

1. Turn on your disk drive, TV or monitor and your computer. Note that your green power-on light for the disk drive will not work, since it is disconnected.

2. Type in POKE 53281,1 {return}. Next, hold down the CTRL key and push the 1 key. This will give you black characters on a white screen. (This step is optional, but I like it.)

3. Hold down the shift key and push the CLR/home key. This clears the screen and leaves your cursor in the upper-left corner.

4. Place a disk in the drive. Note that you will have to put the disk in upside down (disk notch to the right), since your drive is upside down. Preferably, the disk you select should have a long directory (lots of programs) in order to make it more difficult for the disk drive to load the directory.

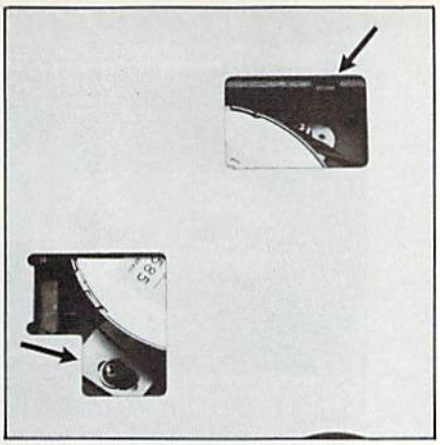

Photo 3. Close-up of stepper motor.

5. You will now begin typing in instructions and a short program that will make life simpler while aligning the disk drive. Do not get ahead of me on this, since any deviation from the following instructions will mean extra typing and work for you.

6. Type in LOAD "$",8 {return}. The disk drive light will come on and the message Searching For $ will appear. Next will appear the Loading message or, if your drive is badly out of alignment, you will get the File Not Found message. Then the Ready message will appear, along with the blinking cursor.

In some cases, the disk drive will find the directory ($) and attempt to load it, unsuccessfully. In this case, your disk drive may "hang up" (your cursor does not come back to the screen). For this condition, turn your computer off, then on again, thereby resetting it, and try a different disk.

7. During the directory load, observe your drive's red light. If it comes on and remains steady, with no flickering or blinking, then proceed to step 9. If it flutters and pauses or if you get the File Not Found message, continue on to step 8.

8. You must get the disk drive sufficiently operational to read the disk directory. First, press the CLR/home key (without the shift key). Your cursor will now be flashing in the upper-left corner, on the "L" of LOAD"$",8.

With your Phillips-head screwdriver, *loosen* (not remove) the two screws on the stepper motor (they may be hard to unscrew the first time). It is not necessary to turn off the disk drive or remove the disk during this procedure.

Rotate the stepper motor about 1/16 of an inch in either direction. Retighten the screws until they are snug. Hit the return key on your computer. The directory will again attempt to load. Repeat step 7.

If the directory still will not load properly, rotate the stepper motor in the other direction and try again. You may have to readjust several times in order to get a good load of the directory. If, no matter where you adjust the stepper motor position within the range of the slotted holes, you cannot get a good directory load, go to the section in this article entitled "Other Troubleshooting Tips."

9. At this point, you should have had a good directory load. This indicates that track 18 is sufficiently in alignment and can be read by the disk drive. This is the easiest track to align and seems to have a wider tolerance for alignment. Tracks 1 and 35 are a little more critical.

Returning to the screen display, after loading the directory, the cursor should be flashing under the Ready message. Do not list the directory! Type in the New command and press the return key. The Ready message will again appear, with the cursor flashing underneath.

10. Next, type in the following short program beneath the latest Ready message, using carriage returns at the end of each program line.

```
10 OPEN 15,8,15:OPEN 5,8,5,"#"
20 PRINT#15,"U1:"5;0;1;1:GOSUB 60
30 PRINT#15,"U1:"5;0;35;1:GOSUB 60
40 CLOSE 5:CLOSE 15
50 END
60 INPUT#15,A,A$,B,C:PRINT A;A$;B;C
70 RETURN
```

Immediately after line 70, type RUN and hit the return key.

11. The short program you have just entered will begin executing and will check to see if block 1 of tracks 1 and 35 are readable. Two messages will appear under your last Run command. If the disk drive is in fairly good alignment, both messages will say 0 OK 0 0 and you can jump to step 14. If not, you will get an error message, such as 21 READ ERROR 1 1 or 27 READ ERROR 35 1 or something similar. The last two numbers in the error message refer to the track and block that was unreadable.

12. If you received an error message in step 11, you must further "tune" your disk-drive alignment. Loosen the two stepper-motor screws and rotate the stepper motor by a

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very small amount, in one direction. Retighten the screws.

On your second or third time through this step, you may be rotating the stepper motor by a small amount in the opposite direction. You are looking for that "just right" position and will find it by trial and error.

13. Here is where you are rewarded for following directions. You don't have to type everything in again on the retest. First, push the CLR/home key (do not use shift), then hit the return key. Since your cursor was once again on the "L" of LOAD "$",8, the directory will begin loading. Once again, observe your red light during the program load, as in step 7. If everything is all right, proceed. Otherwise, readjust the stepper motor in the opposite direction and try again.

After the load, your cursor will be flashing on the "N" of NEW. Hit the return key again. Now your cursor will be blinking on the "1" of program line 10. Press the return key eight more times and your short program will be reentered in the computer and will begin running. You must reenter the program this way, because every time you load in the directory, you write over whatever else might be in the computer's memory. (The format of this screen makes it easy to keep testing the disk drive without a lot of typing.)

Once again, you will get two messages. (The new messages will write over the old ones, but there's no harm in that; if it bothers you, use your cursor controls and the space bar to erase the old messages prior to hitting the CLR/home key.) Repeat steps 11, 12 and 13 as often as necessary, until, by trial and error, you get two messages that say 0 OK 0 0.

14. Basically, you have fiddled with the orientation of the stepper motor until the disk drive loads well enough for you to be able to read both tracks 1 and 35. At this point, your disk drive is in fair, but probably not optimal, alignment. There is one final "supertuning" check for optimal results.

15. As I mentioned earlier, my Safe and Fast Disk Checker program is in last month's *RUN*. Originally, this program was only meant to check for bad sections on your disk. However, in developing this article and the procedures herein, I found that this program was an invaluable alignment tool. In just a few minutes, the S & F Disk Checker checks every single track and block on the disk, whereas the program in step 10 above checks only the first block of tracks 1 and 35.

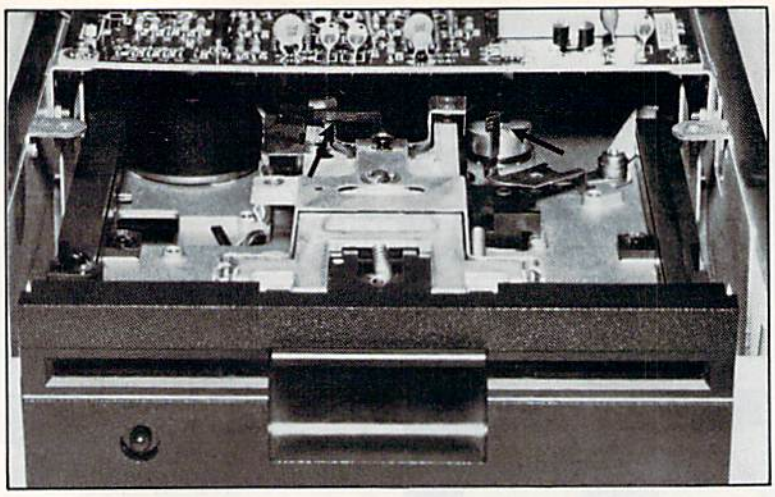

Photo 4. Front-top view of the drive, showing the location of the read/write head and the capstan.

The final step in your alignment procedure is to load in the S & F Disk Checker and run it. Since you are working with a disk drive that may not be in perfect alignment, cover the disk's write-protect notch with a piece of tape. If your drive is in perfect alignment, the S & F Disk Checker program will run both quickly and at a uniform rate of speed.

If the rate of checking slows down or falters, or if the disk drive must reset itself, it is not perfectly aligned. Do not turn off your computer or disk drive. After the S & F Disk Checker program stops (or you stop it by hitting the run/stop and restore keys), once again loosen the stepper-motor screws and readjust the stepper motor by rotating it a very tiny amount. Retighten the screws and run the S & F Disk Checker program again.

Continue this final adjustment process until the program runs all the way through without pausing or slowing down. Then run the program with several different disks to make sure that you can read them all. Some of your latest disks may have been formatted when your disk drive was in the process of going out of alignment; these disks may be difficult to read. Salvage what you can from them and put their contents on other disks.

As a final test, I run the S & F Disk Checker program on the test/demo disk that came with my Commodore drive, since I'm fairly sure this disk was prepared on a properly aligned drive.

From my experience, there is only one "perfect-alignment" position for the stepper motor. The disk can still be read if the motor position is slightly to either side of "perfect," but the drive hesitates and pauses. The S & F Disk Checker will help you go from this workable position to the perfect position.

Other Troubleshooting Tips

Photo 4 shows the top of the mechanical portion of the disk drive from the front. Sometimes, no matter what you do with rotating the stepper motor, you are unable to get a directory to load. I know of three possible solutions, and there may be more:

1. Electronic failure. This is beyond the scope of this article. Take your disk drive in for repair.

2. The left arrow in Photo 4 points to a black lever, which is attached to a pressure pad holding the disk against the read/write head after the disk is inserted. If you lift this lever just slightly, you will see the pressure pad and the read/write head underneath. I know of a few cases where this black lever has become stuck while people have been working with the stepper motor. A few jiggles should free it up.

3. The right arrow in Photo 4 points to the cylinder-shaped capstan, which is mounted on the shaft of the stepper motor. The rotation of this capstan, with the motion transferred through a strap and pulley arrangement, is what moves the read/write head over the disk during use.

Directly above this capstan is a small trapezoid-shaped flat plate, which is held in place by one Phillips-

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head screw. That flat plate is the stop for the capstan's rotation. This stop occasionally will be knocked askew and must be repositioned. To get at the stop plate and its holding screw, it is necessary to remove the top circuit board. If you try this, remember to have the disk drive unplugged (no power), and remember where all the wires go for reassembly.

Reassembly Instructions

1. Turn off the disk drive and remove all cables from its rear.

2. One helpful hint at this point. I drilled two ⅞-inch diameter holes in the bottom of my disk drive's plastic case, so I would never again have to disassemble the drive to get at the adjusting screws for the stepper motor. Now I just turn the disk drive over and begin the realignment, with no disassembly required.

3. Make sure that the stepper-motor screws are *tight*!

4. Place the disk drive in its lower case and install the six screws. I find that the needle-nosed pliers are helpful in placing these screws in their holes.

5. Remove the top metal cover and plug in the green power light. Remember which way the plug faces.

6. Replace the top metal cover.

7. Replace the top plastic cover with the four screws.

8. Reconnect the cables in the back of the disk drive.

I hope you have enjoyed this article and will find it useful.

The Safe and Fast Disk Checker for the Commodore 64 is available from me, in both the original Basic version and in a compiled version (twice as fast). For VIC-20 owners, I have a functional but simplified version, which can also be used in the alignment process.

I will provide all three versions on the same disk, with mailer and postage included, if you'll send me your name, address and $8. R

Joseph J. Shaughnessy is a professional engineer who works with Reynolds, Smith & Hills, Inc., in Jacksonville, Florida. Address correspondence to him at 8438 Lynda Sue Lane W., Jacksonville, FL 32217.

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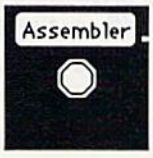

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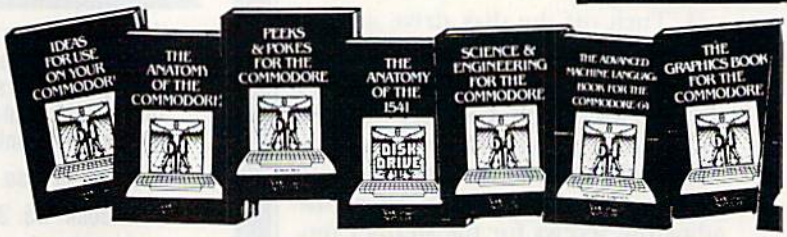

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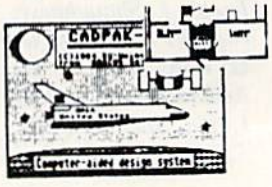

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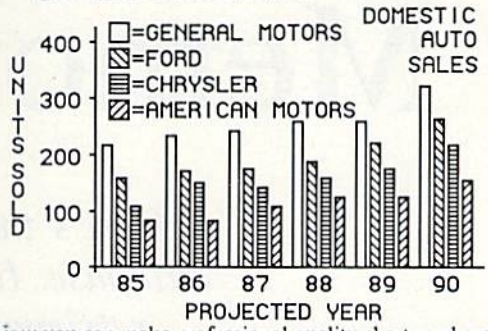

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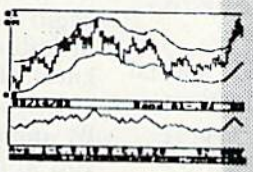

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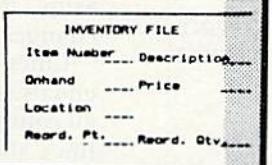

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Run 7/85

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Memory Jogger

Here's the world's simplest database. It makes information retrieval quick and easy.

By BLAINE JOHNSON, JR.

Memory Jogger isn't the most complex database around, but it gets the job done. There are only two "working" lines in this program: 20 and 30! The rest is just window dressing. You can use the program for birthdays or anniversaries, for club or church manpower, or for any type of cross reference you wish.

The program is set up for the C-64's 40-line screen, but will run as is on the VIC-20 (just leave out the first line, which sets the screen background and letter colors). Actually, it should run on any machine that uses the Get and If. . . Then commands.

My program is set up for hams (amateur radio operators). If I hear someone on the radio and can't recall his name, I wait for him to identify, then type the first letter of his suffix, and, *voila!*—I get a listing of his name, telephone number and any other pertinent information I had included about him. Also, if I am talking to a ham and forget his call, I type the first letter of his name and get the same information.

If you would like to build a program for your church group, to jog your memory as to which members are handy at what, you might start your lines like this:

```
101 IFH$="E"ORH$="J"THEN
    PRINT"555-1234*HARRY JOHNSON*
    ELECTRICIAN*101
102 IFH$="P"ORH$="B"THENPRINT
    "889-9876*JOE BROWN*PLUMBER*102
103 IFH$="E"ORH$="T"THEN
    PRINT"544-1212*BILL THOMPSON*
    ELECTRICIAN*103
```

For birthdays or other special dates, you might use this format:

```
101 IFH$="M"ORH$="H"THENPRINT
    "1/5/55*MARY*(HENRY'S GRAND-
    DAUGHTER)*101
102 IFH$="B"ORH$="J"THENPRINT
    "6/22/48*BOBBY*(JANE'S OLDEST
    BOY)*102
```

Helpful Hints

A few helpful hints:

- Don't leave any spaces (your Commodore will put them in where they're necessary).
- Use abbreviations at all times (T {shift}H for THEN and ? for PRINT).
- Don't use the ending quotation marks (the return key takes care of that).
- Always include the line number at the end of your Data statement. That way, the line number will print out on the screen, making it easier to make corrections later, should your facts change.

Line 31 will clear your screen. (Without it, as you continue to use the program, the screen will fill and begin to scroll.) Type my program, including the REM lines, so you will know what to expect. Starting at line 101, type in your own information. By including the REM statements, you won't have to refer to the magazine to remember how to make changes and additions.

Lines 11 and 12 both contain 40 equals signs (=) to match the C-64's 40-column screen. Note that these lines should be shortened, and the title in line 10 should be shifted left for the VIC-20. Memory requirements will depend upon how long and inclusive a cross-reference program you wish to make. R

Address all author correspondence to Blaine Johnson, Jr., Rt. 2, #5 Shoo Fly Circle, Ridgeville, SC 29472.

RUN It Right

C-64; VIC-20; Plus/4; C-16; C-128 (in C-64 mode)

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Listing 1. *Memory Jogger program.*

```
9 POKE53281,1:POKE5328Ø,11:PRINT"{COMD 5}"
1Ø PRINT"{SHFT CLR}{5 CRSR DNs}{7 SPACEs}=*
   = SIMPLEST DATABASE =*="
11 PRINT"=================================
   ======"
12 PRINT"{4 CRSR UPs}====================
   ================="
15 PRINT:PRINT
19 GETH$
2Ø REM -------------------------------
21 REM+++THIS IS A SAMPLE PROGRAM+++
22 REM USE THE LAST FEW SPACES OF EACH{9 SP
   ACEs}LINE TO DISPLAY LINE NUMBER.
23 REM THIS IDENTIFIES THE LINE # FOR{1Ø SP
   ACEs}CORRECTIONS, ETC.
24 REM INCLUDE COMMENTS FOR REFERENCE.
27 REM (H$) IS THE LETTER AFTER THE CALL{7
   SPACEs}SIGN NUMBER.
28 REM THE NEXT (H$) IS THE FIRST LETTER{7
   SPACEs}OF EACH NAME.
29 REM -------------------------------
3Ø IFH$=" "THEN19
31 IFH$="*"THEN1Ø
1Ø1 IFH$="U"ORH$="G"THENPRINT" 884-XXX2 * K
    E4UG * GARY(LINDA) *'ALLEY CAT'*1Ø1
1Ø2 IFH$="V"ORH$="C"THENPRINT" 55X-XX22 * W
    A4VAL * CAL (CAROL) * 'EYE EXAM'*1Ø2
1Ø3 IFH$="A"ORH$="M"THENPRINT" 1-899-XXX9 *
     K4AQB * MERT (VIRGIE) * 1Ø3
1Ø4 IFH$="C"ORH$="V"THENPRINT" XXX-1218 * W
    C4C * VERN (BETTY/N4DSE) * 1Ø4
1Ø5 IFH$="C"ORH$="S"THENPRINT" 871-5XXX * N
    4CLQ * SID ({5 SPACEs}) *{3 SPACEs}1Ø5
1Ø6 IFH$="A"THENPRINT" 747-5XXX * N4ATZ * A
    LLEN ({4 SPACEs}) * NAVY/INSTR. REPAIR
    *
1Ø7 IFH$="A"ORH$="H"THENPRINT" XXX-223Ø * W
    4ANK * HUNTER * 'NITE-OWL' * 1Ø7
1Ø8 IFH$="A"ORH$="D"THENPRINT" 572-XXX4 * K
    B4ADE * DAVID ({3 SPACEs}) * 1Ø8
1Ø9 IFH$="B"ORH$="T"THENPRINT" 744-X5XX * N
    4BCD * TOMMY ({2 SPACEs}) * 'LAW DEGREE
    ' 1Ø9
11Ø IFH$="B"ORH$="W"THENPRINT" 886-XXX1 * K
    B4BSP * WANDA (TOM/N4DRU) * 11Ø
111 IFH$="C"ORH$="B"THENPRINT" 747-7318 * N
    4CII * BUBBA (KAY/KB4HHX) * 111
112 IFH$="M"ORH$="G"THENPRINT" 87X-X9X5 * W
    A4MDP * GARY ({4 SPACEs}) * 112
113 IFH$="I"ORH$="R"THENPRINT" X8X-X239 * N
    4ILT * ROGER ({4 SPACEs}) 113
114 IFH$="B"ORH$="S"THENPRINT" 55X-XX44 * N
    4BCI * SCOTT * 114
115 IFH$="L"ORH$="J"THENPRINT" 797-3XXX * W
    B4LET * JOHN ({4 SPACEs}) * 115
116 IFH$="C"ORH$="K"THENPRINT" XXX-16Ø4 * K
    E4CT * KEN * 116
1ØØØ GOTO2Ø
```


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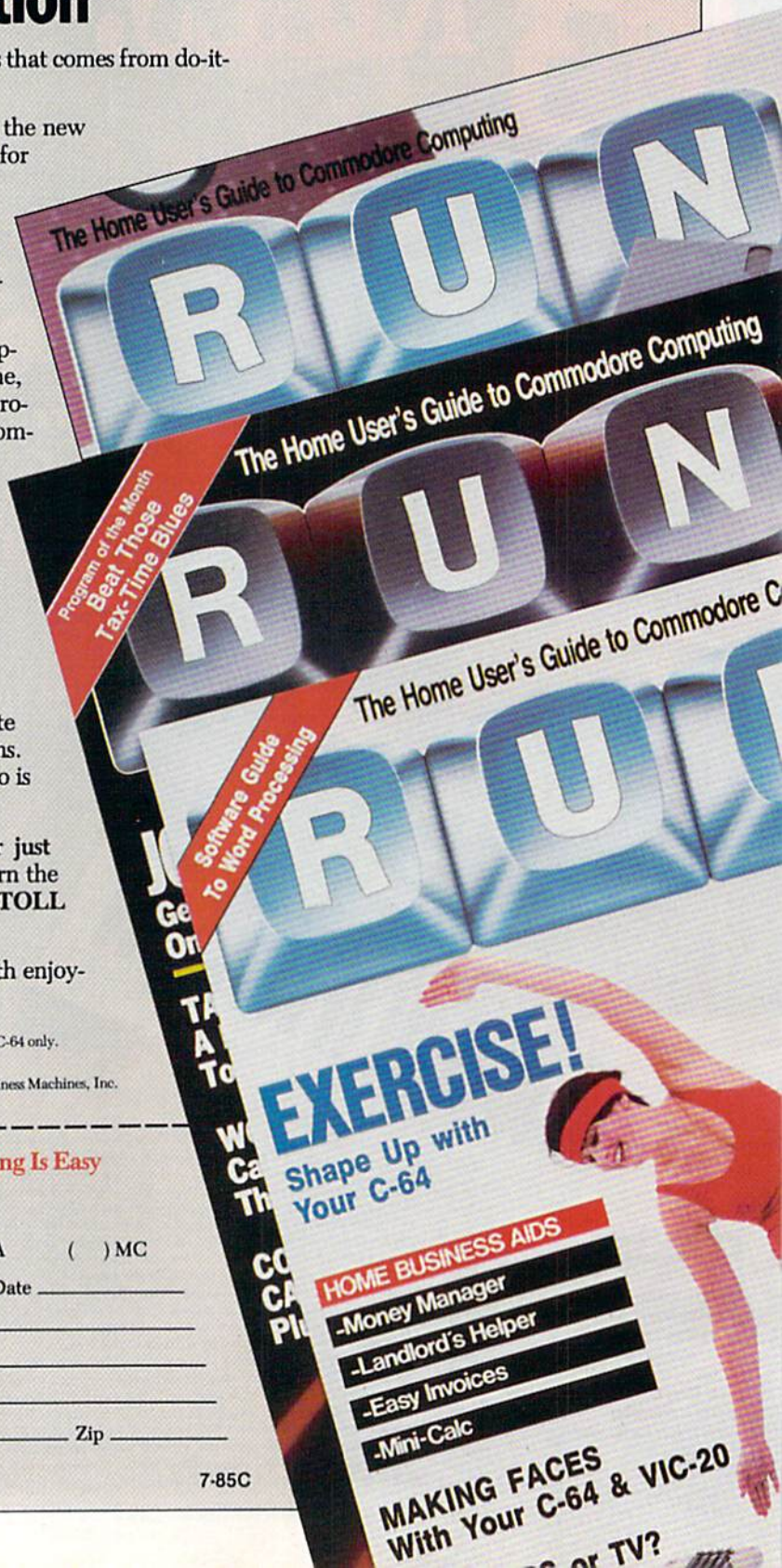

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PROGRAM ENHANCEMENTS

From time to time, RUN *publishes interesting reader additions or modifications to programs that have appeared in previous issues.*

VIC-20 Datafile Enhancement

If you own a 40-column expanded VIC-20, the Datafile programs published in the November and December 1984 issues (p. 74 and p. 80, respectively) will run without any problems if you make two minor changes in lines 12 and 22 of the original program.

The changes are as follows:

```
12 POKE 36879,X:PRINT"CHR$(X)":
   GOSUB16:IFX = 0 THEN GOTO 66
```

Change the X in the Poke and Print statements to whatever color codes you wish.

```
22 MEM = X:EN = 0:EM$ = D$:ET = 0:ES = 0:
   A1$ = D$:A2$ = D$:A#$ = D$:RETURN
```

Change the X in the MEM statement to the amount of memory available after loading the program.

Dennis R. Paquette
5748 Gross Drive
Dayton, OH 45431

Gemini10 Printer Enhancements

The Lister-Filter program (p. 82, September 1984) is one of the best you have yet published. The best feature is the part of the listing (lines 1010–1350) that allows you to customize the program to your Gemini10 printer.

On the Gemini printer, the code for the pi sign is CHR$(187). To produce this sign, insert the following line:

```
1347 C = 187:C$ = CHR$(187):GOSUB4000
```

To produce the pound sign (£), substitute 195 for 187. To produce the up- and left-arrow characters, substitute 164 and 166, respectively.

To change square brackets ([,]) to curly brackets ({, }), change the 93 in line 5140 to 125 and the 91 in line 5280 to 123. (Don't forget to change the checksum—the last number in the line—by adding the difference between each of these pairs of numbers.)

Another modification allows you to end the program and recall it, instead of reloading it, as the article suggests. Add lines 153, 6000 and 6010 to the program listing.

```
153 FORQZ = 700TO723:READA:
    POKEQZ,A:NEXTQZ
6000 DATA165,55,141,38,3,169,157,
     141,39,3,96,165,56,169,202,141,38,3,
     169,241
6010 DATA141,39,3,96
```

Now you can end the Lister-Filter program by typing SYS 713 or recall it by typing SYS 700 and then pressing the run/stop and restore keys.

Michael Quigley
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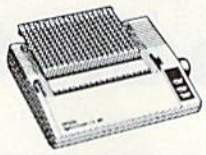

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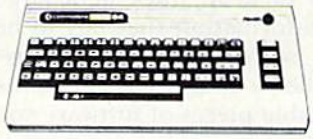

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Database Management On the C-64

By BOB GUERRA

Who needs a database? Maybe you. These powerful productivity tools can help you put your business (or your life) in order, and there's a package available to fit every need and budget.

So, you've decided to buy a database program. Well, before you start worrying about which package is right for you, the first question you should ask yourself is, "Do I really need one?"

If all you want is to keep a small list of the people you send Christmas cards to every year, then the answer is probably no. Short lists can be kept perfectly well in address books or on index cards. If, on the other hand, you need to keep track of a large body of information that has to be searched, sorted and updated frequently, then a database is one of the most valuable pieces of software you can own.

More than an Electronic File Cabinet

Although databases are often compared to file cabinets, with each record stored on your data disk corresponding to a page or folder in a file drawer, this analogy tends to underemphasize the usefulness of special database features, such as multiple-field sorting and automatic tabulation of numeric fields.

Furthermore, while large mailing lists, catalogued with a database, can be easily sorted and printed on individual mailing labels, you'd be hard pressed to get a shoebox full of 3″×5″ cards to be so cooperative. The idea of a database being an electronic substitute for a file cabinet is a bit like describing an advanced word processing system as an electronic pencil.

This isn't to say that a good database will solve all of your record-keeping problems or instantly create order out of chaos. Technology has a long way to go before we see a database system that boots itself and updates your files every time you arrive home with a new stamp for your collection or meet someone you feel compelled to add to your address file.

Assess Your Needs

Although most people purchase database programs to create computerized address lists or to keep track of a growing collection (coins, books, records, stamps, etc.), the number of possible applications for databases is virtually limitless. Likewise, although all database programs function similarly, a tremendous variety of database programs is available to fit all needs and budgets.

At the low end, about $30 will buy you a no-frills program that will allow you to maintain small files in predesigned formats and perform simple searches and sorts with basic printing functions. Such a system may be all you need to help you organize your personal records or catalogue your favorite collection.

A small business, on the other hand, may need to spend around $100 for a state-of-the-art information management system that will allow it to create large files, perform extensive numeric calculations, design and print custom reports and, finally, protect valuable data by establishing security levels that limit access to functions and information to holders of specific passwords.

Since database systems vary so much in both price and available features, the first order of business is to assess your needs. Once you've decided the types of files you want to create and the ways in which you want to control your information, you can then select a database system that will handle your record-keeping needs without providing unnecessary features you'll never use.

The Home Cataloger

The Home Cataloger is a moderately-priced database with some useful features, including automatic totaling of numeric fields, multiple-field searches and sorts and one-key command entry. Perhaps the best feature, especially for first-time users, is the inclusion of ten pre-designed record formats that can be copied onto your data disk and used immediately. These database templates are designed to help you keep track of such things as coin collections, books, home inventory and travel expenses, to name a few.

If none of the available templates meets your record-keeping needs, or if you want to create a totally new format unlike any of those provided, it's a simple matter to create your own custom-designed format using one of the templates as a starting point. It is also easy to create report formats to your exact specifications for printing.

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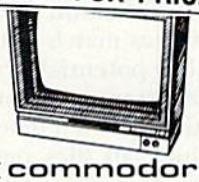

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out a few limitations, however. For example, although you can search your files for specific matches in one field or several, you cannot use conditional statements as matching criteria. This means that, while you can search your coin collection file for every coin struck in 1956, there's no way to search for all coins minted between 1920 and 1930. Only specific information within a field can be used as match criteria.

Other potential problems include limited storage capacity (see chart) and the rigid ten-field screen format to which all files must conform. If you have no real need for conditional matching or free-form file design and don't mind dividing files containing over 750 records among two or more data disks, then The Home Cataloger is an easy-to-operate alternative to some of the more advanced databases. *(Arrays Inc./Continental Software, 11223 S. Hindry Ave., Los Angeles, CA 90045.)*

Database 64

Database 64 is easy to operate, interfaces with some popular word processors (WordPro 3 Plus/64, PaperClip and others) and comes with a clearly written, though not particularly fancy, instruction booklet.

The program even allows you to search your file for information that falls within a specified range (such as all recipes with cooking times between 45 minutes and an hour). In fact, except for one major flaw, Database 64 would be a good choice for first-time users or people who need to keep simple files and don't require a lot of advanced features.

The problem, however, is cost. At $59.95, Database 64 is simply overpriced. Compared to other database systems reviewed here, Database 64 is between $10 and $20 more expensive than comparable packages from other manufacturers. This is unfortunate because, as a no-frills package, this program has a lot going for it.

In addition to features already mentioned, Database 64 lets you search using only partial information as match criteria (wildcard search). Using this option, you can look for a name in an address file, even if you've forgotten the exact spelling, simply by entering as many characters as you can recall, followed by @.

Database 64 even lets you create custom label and report formats that you can save on your data disk. Be warned, however. You can probably find the same features in a less expensive program and use the difference to buy some blank disks. *(Entech Software, PO Box 881, Sun Valley, CA 91353.)*

Pro-Data

Like Database 64, Nanosec's Pro-Data isn't packed with special features. It is an attractive program, however, that encourages users to create unique screen formats with few restrictions.

Rather than being locked into a rigid format, you are allowed to roam freely around the format screen, creating fields of up to 80 characters wherever you want. In addition, all C-64 graphics symbols can be used to draw boxes around specific sections of your form for emphasis or just to make the file format more attractive.

The only problem with using graphics characters in your screen formats is that if you only have a letter-quality printer, you will get some odd characters generated in place of graphics symbols when you use the built-in Screen Print function. Fortunately, flawless labels and reports can be produced no matter what type of compatible printer you own.

Pro-Data is a reasonably priced program that can handle basic record-keeping tasks in the home. The loose-leaf manual is well organized, and beginners should have no problems in following the step-by-step instructions.

Despite Pro-Data's user-friendliness, however, it is hard to call it a true database-management system because of its severely limited sorting ability. Although you can restrict lists by specifying a range for a particular field, there are no provisions for either alphabetizing lists or putting them in numeric order. Without these basic features, Pro-Data is simply an interesting but incomplete piece of software with limited potential. *(Nanosec Corp. Lincoln Plaza, 3544 Lincoln Ave., Ogden, UT 84401.)*

Datamat 64

When releasing a new product, most companies examine the competition and price their product accordingly. Fortunately for us, Abacus didn't. Any other software company might charge at least $20 more for a database as good as Datamat 64.

With the exception of extensive calculating functions and the ability to limit data access to password holders, Datamat 64 does everything some of the more expensive databases do, and it actually outshines a few costing 30% more.

For starters, Datamat is easy to use. Simply highlight the desired menu item by pressing the space bar or cursor key and hit the return key to select. Next, the free-form format design lets you create files that look the way you want them to.

Even the task of entering records into the file is made less tedious. Instead of returning you to a blank form for each new record, Datamat retains the information from the last entry, so that when several records share information in specific fields, those fields can be skipped after the first record in the series has been entered.

Everything about Datamat 64, from its large file capacity and acceptance of conditional search criteria to its easy-to-follow user's manual and free customer-support line, makes it the perfect database for most home applications. If you can find a copy, grab it before Abacus realizes its mistake and raises the price! *(Abacus Software, PO Box 7211, Grand Rapids, MI 49510.)*

Busidata and Flex File

Both Busidata, from Skyles Electric works, and Flex File, from Cardinal Software, are powerful databases originally designed by Michael Riley.

The two programs are virtually identical. Both allow you to create files with up to 20 fields per record and up to 70 characters per field. Files created with either program can be searched quickly for any record or group of records by specifying the information to be found in special, predesignated key fields. As new records are entered using the Direct File Maintenance portion of the program, they are automatically sorted according to the key field you've chosen.

In addition, you can select from a menu of conditional statements to narrow your searches down to very specific groups of records. Some available conditionals include Greater Than and Less Than, Equals and Not Equal To (used on numeric fields), Precedes and Follows (alphabetically) and Pattern Matches.

Both programs let you design custom-label and report formats and allow you to perform extensive calculations to create special reports with several levels of subtotals, or directly within the files themselves.

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Finally, both can be used with some word processors to produce form letters and other useful documents.

So, which of the two programs should you buy? Busidata. The manual, though largely the same as Flex File's, uses larger print, making it easier to read. Also, Busidata has been compiled by Skyles, so that some portions may run faster. Finally, Busidata costs $10 less than Flex File, and when two programs are so close in features, I'd pocket the sawbuck any day. *(Skyles Electric Works, 231 E. South Whisman Road, Mountain View, CA 94041* and *Cardinal Software, 13646 Jefferson Davis Highway, Woodbridge, VA 22191.)*

Data Manager 2

At first glance, Timeworks' Data Manager 2 seems like just another inexpensive database system with a few handy features. It allows you to search and sort your files on several fields; confidential files can be protected with passwords of up to eight characters; and other Timeworks programs, such as Word Writer and SwiftCalc, can be interfaced with Data Manager 2 to create customized reports using information from all three. Where Data Manager 2 really shines, however, is in its ability to provide you with an instant statistical analysis of your files.

Let's say, for example, that you know what every stamp in your collection is worth, but you'd like some information about the value of the whole collection. As long as you've created a record for each stamp with a field for current value, you can simply use the statistical analysis option to give you a mini-report containing the total value of your collection, the average value of your stamps, the value of your most and least valuable stamps and the standard deviation as well.

In addition, by requesting the Frequency Bar Charts option, you'll be treated to a full-color graphics display of the statistical breakdown. Even if you have trouble using a calculator to find a percentage, Data Manager 2's statistical analysis options will let you generate impressive stats on every file you create. *(Timeworks, Inc., 444 Lake Cook Road, Deerfield, IL 60015.)*

Compufile

If nothing else, ABS Software's Compufile wins the award for the least expensive program of the group. At $29.95 retail, however, don't expect a lot of "bells and whistles"—it's just a bare-bones data-management program with most of the basics and little else.

A brief perusal of the 50-page user's manual will tell you everything there is to know about Compufile. The first thing you may notice is that there are no instructions for creating a data disk. That's because you may store your records directly on the program disk.

If you want to set up a separate data disk to allow larger files, the current version of Compufile (1.34) includes a Utilities menu that lets you easily format new data disks, erase files, display a directory of your databases, or change to another disk.

No matter where you decide to store your files, you can create a new database for your records, or use one of Compufile's four built-in database templates. These include Mail List, Card Catalog, Coin Collection and Inventory. Before you create a large mailing-list file, however, you should be aware that Compufile has no specific option for printing mailing labels.

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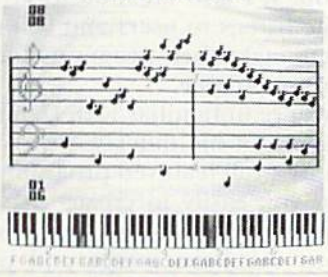

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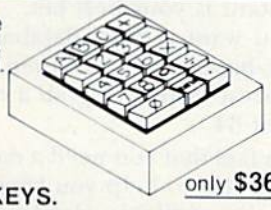

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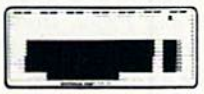

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powerful as some of the more expensive databases, but if you want a program that you can boot and use immediately without first wading through a user's manual the size of *War and Peace*, then Compufile may be a good buy. *((ABS)olute Software, 1780 Austin Highway, San Antonio, TX 78218.)*

The Consultant

Not only does The Consultant allow you to create the largest records of any database management system reviewed here (up to nine screen pages with 877 characters each), but the program also features six well-designed templates to keep track of home inventory, mailing lists, recipes, auto expenses, computer software and your favorite books.

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What sets The Consultant apart from some of the other programs in its price range ($99.95) is that it lets you establish a number of security levels to protect the information in your files. You can assign one password to users who are allowed to view only certain fields, another to those who may view or print all fields, but aren't allowed to alter the files in any way, and a master code password that you may keep for yourself or pass along to anyone you wish to have total access to all fields and functions.

Although the use of multiple security levels has conventionally been associated with the protection of business data, it's nice to know that, with The Consultant, you'll be able to keep your secret cookie recipes as safe as your tax records. *(Batteries Included, 30 Mural St., Richmond Hill, Ontario L4B 1B5 Canada.)*

Superbase

What would you say about a database management system that does everything you'd expect a premium-priced program to do, plus a few things you never even dreamed possible? You'd probably say it must be complicated to learn and that you don't want to spend the next month trying to make sense of the manual.

Fortunately, Superbase is not only one of the fastest and most powerful database programs available for your C-64, but its audio learning cassette and beautifully-organized user's manual make it one of the easiest to operate as well. By listening to the instructional tape while following along in the manual, you will be able to create files and start getting your records in order the first time you boot the disk.

Admittedly, the Superbase user's manual is a lot to read through in one sitting, but it is organized so all the basic functions you need to know to get started are in the first tutorial, with advanced features described in detail later on. To make Superbase even easier to use, there's a reference section immediately following the manual's three tutorials that succinctly summarizes all menus, options, commands and functions.

Some of Superbase's superb features include special date fields that automatically fill in the day of the week for any date entered, a built-in calculator, individual help screens, memo screens to remind you of upcoming appointments, and, finally, "batch" calculations that allow you to modify every record in your file by keying in a calculation just once. You can, for example, use this last option to lower the price of every item in an inventory file by 10%.

Finally, Superbase comes with its own program editor and database programming language, which can be used to design powerful applications programs for controlling complex sequences of Superbase operations. Even without the programming options, Superbase has enough going for it to make it one of the best database packages you can buy. *(Precision Software, Inc., 3003 Summer St., Stamford, CT 06905.)*

Database Manager

Since its creation in 1983, Mirage Concepts' Database Manager has maintained an excellent reputation as a program with the power and speed needed for a small business, as well as the flexibility and ease of use required to make it a hit in the home. The original Database Manager (see *RUN*, May 1984) retailed for $89.95, and although the program allowed you to print forms, lists, labels and reports, the Advanced Report Generator was an optional program costing $49.95. Currently, both programs have been combined onto one disk and the price has been set at a reasonable $99.95, representing a savings of $40.

The new Database Manager package even contains a data backup program. Lack of such a program was one of the only faults that many reviewers could find with the earlier version. It's also an indication that Mirage listens to users and will continue to make their programs among the best available.

If you're unfamiliar with Database Manager, let me quickly assure you that it is a full-featured program that allows you easily to create virtually any type of file and to search, sort, update, calculate, merge and print those files in a variety of ways to suit almost any purpose. Except for a few inconsistencies, the manual is a pleasure to use and leaves no questions unanswered. *(Mirage Concepts, 4055 W. Shaw, Suite 108, Fresno, CA 93711.)*

Recommendations

So what's the best database available for you and your C-64?

- If you want a top-of-the-line database system that does it all and then some, I'd go with Superbase, although Database Manager is certainly a close second.
- If you've got secrets you want to protect while still allowing other users to access your files, then The Consultant is your best bet.
- If you want a good database at a bargain-basement price, then run to the nearest store and grab a copy of Datamat 64.
- If you feel that you need a database program just to help you keep track of all the available database programs, you're not alone. R

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# FIELDS PER RECORD	20	20	99	20	200	20	50	20	10	80	127
# CHARACTERS PER FIELD	79	60	877	60	250	31	40	79	24	80	255
# CHARACTERS PER RECORD	254	254	7000	250	2000	230	253	254	132	255	1107
SEARCH											
MULTIPLE-FIELD	Y	Y	N	N	N	Y	Y	Y	Y	Y	Y
CONDITIONAL	Y	N	Y	N	Y	Y	Y	Y	N	Y	Y
WILDCARD	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
SORT											
MULTIPLE-FIELD	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
ALPHABETIC	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
NUMERIC	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
ASCENDING	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
DESCENDING	N	N	N	N	Y	Y	Y	N	N	N	Y
PRINT											
LABELS	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
REPORTS	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
MISCELLANEOUS											
TEMPLATES INCLUDED, #	N	Y,4	Y,6	N	N	N	N	N	Y,10	Y,1	N
FORMAT DESIGN (R/F)	R	R	F	R	F	R	F	R	R	F	F
CALCULATIONS (OPERATIONS)	Y(A)	N	Y(A)	N	Y(A)	Y(A)	Y(+)	Y(A)	Y(+)	Y(+)	Y(A)
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N/S = Not Specified. R = Rigid. F = Free-form. A = All major operations (+, −, *, /).

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TEDMON: The Plus/4's Machine Language Monitor

By JIM GRUBBS

This article shows you how to access TEDMON and introduces you to its commands.

When the Plus/4 comes out of the box, it is ready to do several things. You need only plug in the power supply and connect it to a TV set or monitor. Several pieces of built-in software put you in business almost immediately.

To the first-time user, the most mysterious piece of software in the Plus/4 is probably TEDMON, which gets its name from the Text Editor Device chip contained in the Plus/4. MON is short for monitor, a term that refers to a software package used when programming in machine language.

A monitor program gives you direct access to the computer's memory. This is helpful if you want to enter bytes of data into a specific memory location or retrieve those bytes from memory.

With TEDMON you can check the contents of any section of the Plus/4's memory and modify the data that is held there. Or, if you are an adept programmer, you can write entire machine language programs directly in memory without the aid of an assembler.

It's not my intention to make a machine language programmer out of you. I think, though, that you will have fun using TEDMON to discover some things about your new computer. This article leads you on a treasure hunt to see what you can find.

Looking at Memory

Activating TEDMON is almost as simple as turning on the computer. Once the power-up message appears on your screen, type MONITOR and press the return key. You will see the following:

```
    PC   SR   AC   XR   YR   SP
;  2007  00   01   00   00   F8
```

What you see are the contents of the memory registers that have been reserved for the processor chip in your computer. This is the same display you will get if you now type "R."

Everything your computer does comes through one or more of these registers at some time or another. For browsers, this isn't too important, except to make you realize just how simple things get when you think in terms of one machine language program instruction at a time.

The very first command you want to look at is the M, or Memory, command. Type M 0000, press the return key and look at your screen. The display, of which Figure 1 approximates a sample portion, consists of the contents of the first 96 memory locations in your Plus/4. The reverse-video section contains alphanumeric and graphics characters.

There may be some very funny-looking numbers here. What's an FA or a 0F? Remember, all you are doing here is snooping around, so don't let these strange numbers bother you.

What you have just run into are hexadecimal numbers. In the decimal system we use every day, we have ten different symbols, 0 through 9. In hexadecimal, we work with 16 different symbols. The first ten, 0 through 9, are the same and have the same value as they do in the decimal system. The letters A–F stand for the decimal numbers 10–15.

Learning to converse in hexadecimal is a requirement for doing any serious programming, but don't despair—most of what you are going to do won't depend on it.

In fact, Basic 3.5 includes a function called DEC. When you are in Basic, typing PRINT DEC("XX"), where XX is the hexadecimal number, will return the decimal value of that number! Unfortunately, this does not work in TEDMON.

Next to the displayed memory lo-

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```
>0000  0F  0A  00  00  00  00  00  22  :
>0008  22  00  00  FA  00  00  00  00  :  Reverse Video
>0010  00  00  00  04  00  20  19  16  :
```

Figure 1. *A sample of what your screen should display after you type M 0000 while using TEDMON.*

```
>818E  45  4E  C4  46  4F  D2  4E  45  :  ENDFORNE
>8196  58  D4  44  41  54  C1  49  4E  :  XTDATAIN
>819E  50  55  54  A3  49  4E  50  55  :  PUT#INPU
>81A6  D4  44  49  CD  52  45  41  C4  :  TDIMREAD
```

Figure 2. *By using the Memory (M) display command, you can locate your computer's Basic keyword list, part of which is shown above.*

cations is a block of reverse video. We will make use of this feature to go treasure hunting.

Type M 0000 FFFF and press the return key. Rows of numbers will start running by you fairly quickly. Keep your eyes focused on the numbers and letters in the reverse-video section. If you want to slow the display slightly, hold down the Commodore key. If you want to stop the display completely, press the run/stop key.

You are searching every memory location in your Plus/4, so it will take a few minutes to get through them all. If you want to do the search in a somewhat more controlled fashion, start by typing M 0000. When the display stops, simply type M again. Continue in this fashion as long as you wish.

Do you see anything interesting as the display scrolls by? In the reverse-video section, you should see the letters CBM appear several times. In fact, all of your Basic keywords will appear. Figure 2 is an example of some of the things you will find. If you're quick, you may even find some etched-in silicon names and initials! More on that in a moment.

The reverse-video section of the screen pretends the value stored in this memory location is an ASCII character. Then, when the memory in your computer contains the numeric equivalent of CBM, those characters will show up displayed in the reverse-video section.

The Plus/4 uses a unique memory arrangement that allows more user-available memory by being able to tell the difference between read-only memory (ROM) and random-access memory (RAM).

Use the M command to view hexadecimal location 7F8 by typing M 7F8. Normally, this location contains a 0, which means that for addresses 8000 (hexadecimal) and above, the ROM that contains the Basic language and the Kernal routines will be displayed by TEDMON.

By changing the value in this location to a hexadecimal 80, you can view the RAM at the same addresses. To make the change, simply display location 7F8 and then move the cursor over the value (in this case, 00). Type 80 right over the top of this value and press the return key.

You have just done the equivalent of a Basic Poke and changed the value stored in this location! If you are curious, try changing the value and type M 8000 FFFF. What you will find is a lot of garbage, since you don't have a program stored in this range. Before continuing, be sure to return location 7F8 to 0.

More Commands

This random hunting is fun, but there is a more controlled way to find particular items. For example, let's use the Hunt command to see if a guy named Fred happened to work on this computer.

By typing H for Hunt and specifying the beginning and ending addresses, you can look for the name Fred. If you are looking for an alphabetic string, you must preface the string with a single quote like this:

```
H 0000 FFFF 'FRED {return}
```

TEDMON will now search all the way from 0 to the top of memory, looking for a match. You will notice that several addresses will appear as it searches. You can ignore the first two; they are the addresses in which TEDMON itself stored the search string. The last one is the one you care about.

It turns out that "FRED" appears at BC20. Now try the M command again and see what you find. Type M BC20 and hit the return key. You'll see that not only Fred B., but also Terry R. and Mike I. have engraved their names forever in your computer!

At this point, you might want to try a little experiment. Exit TEDMON by typing X and pressing the return key. This will return you to Basic. Either load or type in a simple Basic program with some Print statements in it. I used the following:

```
10 PRINT "NOW IS THE TIME FOR ALL
   GOOD MEN TO COME TO THE AID
   OF THEIR COUNTRY"
20 PRINT "THE QUICK BROWN FOX
   JUMPED OVER THE LAZY DOG'S
   BACK 1234567890"
```

After you have done that, type MONITOR to reenter TEDMON. Try the Hunt command and see if you can track down your Print statements. In my case, I typed H 0000 FFFF 'NOW. Actually, you will find your whole program there, but the Basic commands have been abbreviated, or tokenized, and aren't easily recognizable.

Exit TEDMON again. (Type X and press the return key.) Try listing your program. It should still be there. Now type NEW and list the program. It should be gone. . . or so it would seem.

Type MONITOR again to reenter TEDMON. Try a memory display where you last found your program. Now you see that it's still there.

What happens is that when you issue the New command, the only things that change are the memory pointers. Memory is not erased. See for yourself how easy that is to prove with TEDMON!

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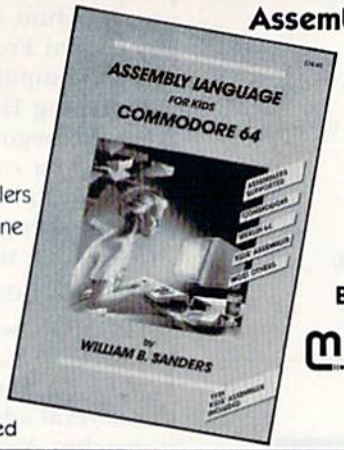

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Everything that comes preprogrammed in a computer is programmed in machine language. These programs exist on ROM chips. Using the TEDMON disassemble function, something closer to plain language can be made of those strange-looking hexadecimal numbers. Try typing D FFD0.

What should appear on the screen are a number of three-letter machine language instructions. LDA, JSR and JMP are some common ones. To the right of these instructions, a hexadecimal number may appear. Understanding the full meaning of this notation requires delving into machine language much further than we want to do right now.

Be content to know that if disassembled code shows something like JSR F043, it is saying, "jump to the subroutine that lives at location F043." It's a bit like the Gosub command in Basic.

We've looked at about half of TEDMON's commands. It is also possible to load a program from tape or disk directly from TEDMON. If the name of the program is "TEST," you could load it from disk using

```
L "TEST",08
```

From cassette, you would type

```
L "TEST",01
```

The Save command works the same way. That is,

```
S "TEST",08,0400,0BFF
```

saves everything from memory location 0400 to 0BFF into a program disk file called TEST.

The Verify command works just the way it does in Basic.

```
V "TEST",08
```

would verify the disk file against memory.

For creating programs, the assembler is a very powerful tool. There are also several additional commands that are helpful to programmers.

For now, it's time to tiptoe quietly away from TEDMON. This browsing didn't hurt a bit, and I hope it gave you some tools to better understand your computer. R

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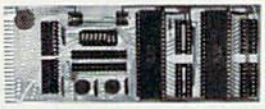

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Telecomm

RUN continues its series on telecommunications with a look at two popular general-interest on-line utilities.

The Source and Delphi

By MARGARET MORABITO

ED JUDICE

The first part of this article covers The Source, one of the oldest public on-line utilities. You'll then be introduced to and learn about the younger Delphi, which is making great strides and quickly becoming a prime contender in the growing group of general-interest on-line services.

The Source

The Source is one of the most well-known on-line information utilities in this country. Founded in 1979, The Source Telecomputing Corporation (STC) was taken over by The Reader's Digest Association in 1980 and is partly owned by Control Data Corporation.

The Source prides itself in providing the general public with self-help information for use in personal and business affairs. With a current membership of 60,000 and about 2000 new subscribers a month, The Source, like many on-line utilities today, is experiencing rapid growth as more and more people acquire personal computers at home and in the office.

The Source tends to be more business-oriented than some of the other general on-line utilities; businesses make up 60% of its subscribers, with the balance consisting of the general public. The average client is in his or her late 30s, with at least a college education and a high family income. The constantly growing membership has prompted The Source to revise and add new services.

Expanded Business Services

Of the eight main menu categories (see Table 1), the business offerings have been most expanded in recent months. In January, the Business and Investing section added a new service that will provide up-to-the-minute commodities prices, news and commentary via satellite from the Commodity World News in Chicago.

Members can now receive continuous updates on prices from six domestic exchanges and three overseas

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unications

exchanges; 200 news items per day, covering weather, worldwide developments affecting commodities and White House news; and correspondent news commentaries about the happenings on the floor of the commodities exchange.

A second investment service, just begun in late March, is INVESTEXT (The Business Intelligence Database), through which you can gain access to 38 international investment banking firms. INVESTEXT offers full-text research reports from 27 U.S. and 11 foreign investment firms. Anyone with investment and business connections will appreciate these newest offerings.

Of course, The Source also offers many of the more popular general-interest services for communications and consumer transactions, such as electronic mail, first-class U.S. mail delivery from ECOM, CompuStore, games and travel planning.

One feature of The Source that personal computer owners will find fascinating is MicroSearch, offered in the Personal Computing category. Through MicroSearch, you gain access to thousands of article abstracts from over 100 computer industry publications. These give you quick reference material on software, hardware, peripherals, new product releases and just about anything dealing with personal computing from over 3000 manufacturers.

The Source's membership fee reflects the growing tendency toward lower prices throughout the computer industry. Last year, The Source cut its membership fee in half. Now, $49 will give you access to the services on The Source, including a monthly newsletter with the latest Source news, updated command guides, The Source Manual and free customer support. The Customer Support service, at 800-336-3330, is always available and helpful.

If you have a major credit card, you can join The Source. First, call 800-336-3366. You will immediately be given your identification number and private password over the phone. Later, you'll receive the documentation, a personal identification card from The Source and your local network phone number. You can also join by phoning the same number and requesting that a membership agreement be mailed to you. You simply fill out the agreement and mail it back to The Source.

The hourly on-line rates are $7.75 for evenings and weekends and $20.75 for business hours. If you have a 1200-baud modem, you must pay an hourly surcharge. There's also a $10 monthly minimum charge, as well as charges for any of your own personal or business files that you may store in The Source. A higher hourly fee is charged for certain value-added services.

Logging-On

Logging-on to The Source is not difficult, but it takes some getting used to if you're accustomed to the easy prompts of using Tymnet. The Source uses Uninet and Telenet, both of which are significantly different from Tymnet. The main difference with these networks is that their prompts are not very descriptive, so you must know beforehand exactly how to respond to the system.

What follows is a brief rundown of logging-on to The Source, using Telenet with the 1650 Auto-Modem and its accompanying terminal program, TERM64.

The Auto-Modem is an easy-to-use, low-cost (about $60) auto-dialing modem, which is manufactured by Commodore for the C-64 and the VIC-20; it can also be used on the new Commodore 128 personal computer. The Auto-Modem comes with a good-quality dumb terminal, but you'll probably want to purchase a smart terminal to take full advantage of what the many on-line services offer.

Without a smart terminal, you won't be able to get free programs over your modem, nor will you be able to send your own files to others. The Auto-Modem is quite versatile and works with most smart terminal programs that are being sold for the C-64 nowadays. Having auto-dial and auto-answer capabilities, this modem is more than worth its price.

With your Auto-Modem properly connected and your system all powered up, load and run TERM64. The screen clears, displaying a Terminal Ready prompt, beneath which is the

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word "Disconnected," and under *that* is another Terminal Ready prompt. This display signals that the phone lines are clear and awaiting your call. Press f6 for instructions for setting the two switches on the Auto-Modem. Move T–D to D for data and move O–A to O for originate. Now you'll be prompted to type in the Telenet phone number for your location.

Type in the digits of the phone number without any parentheses, spaces or dashes; if the number happens to be long distance, type 1 before it. Press the return key when finished and wait.

As the modem dials your number, each digit will appear on the screen, one by one. When a connection is made, the red light on the left side of the Auto-Modem will shine, and the screen will display the Terminal Ready prompt, indicating that you have successfully connected with the Telenet network.

You won't see any prompts, but you should press the return key twice. Then, at the Terminal = prompt, press the return key one more time. At the @ prompt, type C 30149. This number is given to you in The Source sign-on booklet or over the phone, and it is for Commodore computer systems.

After you have entered the system number and pressed the return key, you'll be informed of your connection to The Source. Then, you will see an arrow prompt. If you don't know the log-on procedure beforehand, you'll have quite a hard time guessing what this arrow means. You should type ID, followed by a single space, and then your Source identification number. Press the return key and, at the next arrow, type your password followed by Return.

After using the simple, clearly labeled Tymnet phone network for other on-line utilities, I found Telenet more of a mystery to handle at first. However, once you become familiar with the Telenet procedure, you won't have any difficulty.

How to Navigate

The Source offers menu selections, which have recently been revised for easier usage. Many of the menu selections now have their own command words, within parentheses, after the selection. The Source designed the system this way so that newcomers could learn the appropriate commands with continued usage and then start using the faster commands rather than the slow menus.

You can always find a list of commands while on-line by typing "Help" at any command prompt. Even with this new design, however, navigating through The Source's command system can be difficult for a new member.

This is not the kind of service for light browsing. If you don't know the commands, you can get caught in unwanted territory. I recommend you study the excellent command guide that The Source gives you before going on-line. This will save you much aggravation.

By the way, you should quickly learn to turn off Chat mode. I was cornered by a persistent chatterer on my first sojourn into The Source, and I couldn't escape because I knew neither the command to start chatting back nor the command to quit Chat mode. I ended up wasting a lot of valuable time, and the interruption was unwelcome. For more information, write The Source, 1616 Anderson Road, McLean, VA 22102.

Delphi

When the people behind Delphi claim their on-line service is the "friendliest, easiest-to-use system ever," they're telling the truth. When you first log-on to Delphi, you feel as though *you* are in control, not some mainframe computer. For example, when logging-on, you can tell Delphi the number of characters that will fit on your screen, thereby avoiding the hard-to-read, broken 80-column display lines sent by many other services.

Delphi does provide a handbook, but you really don't need it to use the system. You can easily log-on using Tymnet and go for a tour through Delphi, taking your time and being helped along the way. If you want to break out of any location within any service, you just press CTRL Z.

Anyone interested in a vast amount of research information will appreciate Delphi. Not only does it give you its own 20,000-entry encyclopedia; it also provides a gateway to Dialog, the most sophisticated research library on-line. Dialog alone holds 200 separate databases for serious research. Initially targeted at the home user, Delphi has added new services that are now attracting the business user.

For those of you who want more versatility in your communications, Delphi is worth examining. It not only offers you the standard services, like electronic mail and U.S. mail delivery, but it also gives you access to subscribers of other on-line services through electronic mail. If you have business associates and friends who use The Source and CompuServe, you can easily keep in touch with them through Delphi's own electronic mail service.

Delphi has another unique service called GlobaLink, which provides the expertise of professional translators who take incoming electronic text files and translate them into foreign languages, such as German, Italian and French. The translated text files can then be sent anywhere in the world.

People wanting entertainment possibilities will find plenty in Delphi. Over 30 games are currently on-line.

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Table 1. *The Source's eight main menu categories.*

Bulletin Boards: Add Your Own Message; Read Posted Messages; Member Lists; Conference Schedule.
Conference: Who (lists users); Page a User; Join a Group; Name Nickname.
Delphi-Oracle: Advice from Oracle; Personal Advisory; Questions for Oracle.
Financial Services: Banking; Business Program Listing; Home Program Library; NAICO Net (brokerage); Security Objective Services; News-A-Tron Market Reports; Financial Newswire.
Games: Adventures; Board Games; Delphi Casino; Kiddie Korner; Logic Games; Sports Games; VT52 Terminal; VT100 Terminal; Test Library (new games).
Help: Comments on the help aids in Delphi.
Exit: How to exit Delphi.
Infomania: Authors; Bookshelf; Collaborative Novel; Members' Choice; Newsletter; Peoplenet; Poll.
Library: Autonet/Autobase; Healthnet; Kussmaul Encyclopedia; Librarian; Newsletters; Research Library (Dialog); Violette Wine Reports; Dialog Help; Delphi Information.
Mail: Batch Mail; Catalog of Mail Files; ECOM; GlobaLink Translation; Electronic Mail; Scan for New Messages; Telex/Easylink; Writer's Corner; Charge ECOMs.
News-Weather-Sports: Accu-Weather Forecasts; Movie Reviews; News Wire Service; Financial Newswire; Sportswire; Latest National News; Violette Wine Reports.
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Scheduler: Appointment Calendar; Diary.
Special Interests: American Sexology; Apple SIG; Business SIG; Cafe Bozart; Cain; Computer Kids; Epson User's Group; Eyecare SIG; Friendship Circle; Games SIG; Hearing Impaired; Healthnet; High School Network; Medical SIG; Mensa SIG; PAN Music SIG; Racing SIG; Space Research; Theological Forum; Texas Instruments SIG; User Advisory Panel; Writers and Editors Network; General Information.
Travel: Travel Library; Bulletin Boards; Itinerary Planning; Interactive Services; Groups; Office Services; Agency Menus.
Writer's Corner: Append; Catalog; Common; Copy; Create; Delete; Download; Edit; Home; List; Publish; Purge; Rename; Typeset; Upload.
Using Delphi: Advice from Delphi; Feedback; Guided Tour; Mail to Service; Manuals; Network Information; Premium Services; Newsletter; Rates and Prices; Credit Policy; Peoplenet; Settings; Usage History.

Table 2. *The services available on Delphi.*

Consumer transactional services are also on the menu, including electronic shopping and banking. (See Table 2 for all of Delphi's offerings.)

To subscribe to Delphi, call 800-544-4005. You'll be mailed a Delphi membership registration form, which will give you your password and a code number that you'll need to complete your registration. You will be asked to make up your own Delphi name, which will be used while on-line. As with most on-line services, you'll need a major credit card for billing purposes.

The subscription fee is $49 and covers a handbook, regular updates, a newsletter, a password and two free hours on-line. There's also a Delphi Starter Kit, available in computer stores for $29. It gives you one free hour and a command card; with this, you phone in your membership information or mail in the membership agreement form.

Hourly rates are $6 for evenings and weekends and $16 for office hours. There is no monthly minimum charge and no surcharge for using a 1200-baud modem. You must pay extra for certain value-added services and for storing your personal files on Delphi.

You log onto Delphi using the Tymnet network. After entering the Tymnet phone number and being connected, you should expect the following prompts.

Please Type Terminal Identifier	A
Please Log On	Delphi + Return
Connected	Return
User Name	User Name + Return
Password	Password + Return
Now on Delphi...	

For more information, write to Delphi, General Videotex Corporation, 3 Blackstone St., Cambridge, MA 02139.

The Source and Delphi both offer vast opportunities for both professional and personal users. Each utility provides services in three major areas of telecommunications: research information, communications and transactional services.

Anyone who wants to join a general-interest utility should do some research into the offerings, costs, ease of handling and special services offered. *RUN*'s May and June issues contain articles on two other well-known on-line utilities: CompuServe and the Dow Jones News/Retrieval. Another good source of information is the *Omni Online Database Directory*, compiled by Edelhart and Davies and published by MacMillan, 1983.

RUN's coverage of the major on-line services will continue next month with a look at two new services devoted entirely to entertainment and personal communication—People/Link and PlayNet. R

Address all author correspondence to Margaret Morabito, c/o RUN *editorial, 80 Pine St., Peterborough, NH 03458.*

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This is the second installment of a three-part article presenting the author's Basic 4.5, which gives you the power of all the Basic 4.0 commands, plus more. This month focuses on the added disk commands.

Basic 4.5

A Bigger and Better Basic

By ROBERT ROCKEFELLER

This month I will deal in more detail with the added disk commands of Basic 4.5. Basic 4.0 and 4.5 use a sophisticated parsing technique that allows the parameters following a disk command to be in any order whatsoever. This is quite a departure from Basic 2.0, where, for example, the Open command requires an exact syntax:

```
OPEN logical file#, device#, secondary
  address, "filename"
```

Deviation from this format causes a Syntax error. In contrast, all of the following command strings would be valid for the DOPEN command.

```
DOPEN #5 ,"TEST"
DOPEN (A$) ONU9, D0, W, #5
DOPEN "REL", #6, L100
```

The examples giving Basic 2.0 equivalents of 4.0 commands assume that a command channel to the disk has been opened with OPEN 15,device#, 15. Keeping this in mind, the new disk commands are as follows.

APPEND

APPEND reopens a sequential file that has been closed and allows you to append data to the end of the file. There have reportedly been problems with this command, so if you use it, always validate the disk (use COLLECT) afterward. APPEND can be followed by four parameters in any order:

1. The logical filenumber <#, then a number or any legal Basic numeric expression>.

2. The filename <a string or a string expression in brackets>.

3. Optional drive number <D, followed by a number or numeric expression>. The default is drive 0. Note that the 1541 is only a single drive, so it is not possible to reference drive 1.

4. Optional device number <U, followed by a number or numeric expression>. U may optionally be preceded by ON, instead of a comma. The default is unit 8.

Example:

APPEND #1, "SEQ", U9—open file# 1 to the file "SEQ" on disk unit 9, drive 0. Data written to the file will be appended to the end of "SEQ". (The Basic 2.0 equivalent is OPEN1,9,2,"0:SEQ,A").

BACKUP

BACKUP has no application for owners of 1541 drives. It can only be used by owners of dual drives, like the MSD Super Disk. Used to create exact copies of disks, BACKUP can be followed by three parameters:

1. Source drive number <D, followed by expression for 0 or 1>.

2. Destination drive <D, followed by expression for 1 or 0>. The destination drive number may be preceded by TO, instead of a comma.

3. An optional device number <U or ON U followed by expression for 4–31>.

Example:

BACKUP D0 to D1—makes an exact copy of the disk in drive 0 to drive 1 on unit 8. (The Basic 2.0 equivalent is PRINT# 15,"D1 = 0").

CATALOG and DIRECTORY

Either one displays the directory of a disk on the screen or printer. CATALOG may be followed by three parameters:

1. Optional filename. As described on pages 11–12 of the *1541 User's Manual*, wildcards may be inserted in the filename so that only a subset of the directory is listed. The filename may be a literal string enclosed in quotes or a string variable or expression in brackets.

2. Optional drive number.

3. Optional device number.

Examples:

CATALOG—displays entire directory of drive 0 on device 8.

CATALOG "pr*"—displays only filenames that start with "pr".

CATALOG "t??"—displays only filenames that are three letters long and start with "t".

CATALOG "*=p" on u9—displays only program files of the disk in drive 0 on device 8. (The Basic 2.0 equivalent is LOAD"$0" : LIST).

COLLECT

This command validates the disk and causes the disk drive to perform house cleaning. It should be executed regularly. COLLECT may be followed by two optional parameters:

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1. <D, followed by expression for 0 or 1>.

2. <U, followed by expression for 4–31>.

Examples:

COLLECT—validates drive 0 of unit 8.

COLLECT D1 ON U9—validates drive 1 of unit 9. (The Basic 2.0 equivalent is PRINT# 15, "V0").

CONCAT

CONCAT concatenates two sequential files so that the resulting single file contains all the data from the original two. CONCAT may be followed by four parameters:

1. Source filename. May be a string or a string expression in quotes.

2. Destination filename. The source file will be appended to the destination file. The destination filename may be preceded by TO instead of a comma.

3. Optional source drive number.

4. Optional destination drive number. For owners of dual drives only.

Examples:

CONCAT "SEQ1" TO "SEQ"—appends "SEQ1" to "SEQ" on drive 0 of unit 8.

CONCAT D0, "SEQ2" TO D1, "SEQ3"—appends "SEQ2" on drive 0 to "SEQ3" on drive 1.

(The Basic 2.0 equivalents are PRINT# 15, "C0:SEQ = 0:SEQ,0:SEQ1" and PRINT# 15, "C1:SEQ3 = 1:SEQ3,0:SEQ2").

COPY

COPY allows files to be copied from one disk to another if you have a dual drive. If you have a 1541, COPY allows a file to be reproduced on the same disk. You may want to do this if you are going to concatenate two files and wish to retain original copies of each. The new file must be given a different name from the source file, of course. COPY may be followed by four parameters, two of which are optional:

1. Source drive number <D followed by 0 or 1>.

2. Destination drive number. May be preceded by TO.

3. Optional source filename. String or string expression in brackets.

4. Optional destination filename. This must be a unique filename.

Examples:

COPY D0 TO D1—Copies all the files on the disk in drive 0 to the disk in drive 1 on unit 8. This requires a dual drive. Unlike BACKUP, COPY does not reformat the destination disk. Instead, all files except relative files are reproduced on the destination disk. If there is not enough room on the destination disk, a Disk Full error will be flagged.

COPY D0,"TEXT" TO D0, "TEXTCOPY"—creates a file called "TEXTCOPY," containing the exact data of "TEXT" on the disk in drive 0 of unit 8.

(The Basic 2.0 equivalents are PRINT# 15, "C1 = 0" and PRINT# 15, "C0:TEXTCOPY = 0:TEXT").

DCLOSE

DCLOSE performs the same function as CLOSE, but it has several optional forms. DCLOSE may be followed by two optional parameters:

1. <# followed by numeric expression>.

2. <U, followed by numeric expression evaluating to 4–31>.

Examples:

DCLOSE—closes all currently open files.

DCLOSE #1—closes only logical file number 1.

DCLOSE U8—closes all currently open files to device 8.

DLOAD

DLOAD loads a program to the start of Basic memory. It is like LOAD, but the syntax is different. DLOAD may be followed by three parameters:

1. Filename. This must be a string or a string expression in brackets.

2. Optional drive number <D followed by 0 or 1>.

3. Optional device number <U followed by a number 4–31>.

Examples:

DLOAD "BASIC-PROG"—loads "BASIC-PROG" from the default drive and device numbers.

DLOAD "BASIC*", D0, U9—Loads "BASIC*" from drive 0 of unit 9.

(The Basic 2.0 equivalents are LOAD "0:BASIC-PROG", 8 and LOAD "0:BASIC*", 9).

DOPEN

This command is similar to OPEN, except that only a subset of the functions of OPEN may be performed, and the syntax is different. With

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DOPEN, any type of file may be opened for reading, but only relative and sequential files may be opened for writing. There may be up to five parameters in the command string:

1. <# then numeric expression>. This represents the logical file number. The secondary address is automatically allocated by the DOPEN command.

2. A filename. This must be a string or a string expression in brackets. If the filename is preceded by the @ character, the file will be opened with replace.

3. Optional drive number <D followed by 0 or 1>.

4. Optional device number <U followed by 4–31>.

5. Optional file-type selector. This parameter should be included only for writing files. Files that read from the disk do not require a file-type selector. This may be L and a numeric expression for 1–254, or W by itself. Both parameters may not occur in the same command string. L is required only when opening new relative files; it is not required to reopen a previously opened relative file that has been closed. W signifies that a sequential file is to be opened for writing.

Examples:

DOPEN #1, "OLD FILE"—opens "OLD FILE" for reading. This file may be a sequential, relative, user or program file. It will be referenced through file number 1.

DOPEN #1, "NEW SEQ", W—opens a new sequential file for writing.

DOPEN #1, "NEW REL", L100—opens a new relative file. The record length will be 100 bytes long. Once a relative file has been opened, it may be read or written to at any time.

DOPEN #1, "@OLD SEQ", W—opens a new sequential file for writing; this will replace a file called "OLD SEQ".

(The Basic 2.0 equivalents are OPEN 1,8,2,"0:OLD FILE", OPEN 1,8,2,"0:NEW SEQ,S,W", OPEN 1,8,2,"0:NEW REL,L," + CHR$(100) and OPEN 1,8,2,"@0:OLD SEQ,S,W").

DS and DS$

DS and DS$ are not new disk commands. They are reserved variables, after the manner of TI, TI$ and ST in Basic 2.0. DS is a numeric variable containing the error number of the last disk access. This may range from DS = 0, meaning no error, to DS = 74, meaning drive not ready. DS$ contains the string that was received from the disk when the disk's error channel was queried.

The disk error channel is read every time DS is referenced, either in a direct Basic command, such as PRINT DS;DS$, or in a program.

Typical use is as follows:

```
1000 IF DS>19 THEN PRINT
DS$ : STOP : REM DISK ERROR
```

(The Basic 2.0 equivalent is 1000 INPUT #15,A,B$,C,D : IF A>19 THEN PRINT A;B$;C;D : STOP).

DSAVE

DSAVE saves a Basic program to disk. It is similar to SAVE, but less typing is required. DSAVE may be followed by three parameters:

1. The filename. As always, this must be a string or a string expression in brackets. If the filename is preceded by the @ character, the Save-with-Replace option is selected. Concerning the controversial Save-with-Replace option, let me say this: I think the secret to replacing files reliably involves two things—not letting your disks get too full, and val-

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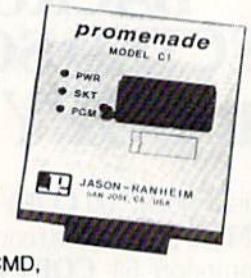

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idating the disk after every Save-with-Replace or Open-with-Replace and after every scratch. I used to lose files occasionally when I failed to perform those functions.

2. Optional drive number <D followed by 0 or 1>.

3. Optional device number <U followed by 4–31>.

Examples:

DSAVE "BAS.PROG"—saves a Basic program on the default drive and device.

DSAVE "@BAS.PROG" ONU9—saves Basic program on device 9, drive 0, replacing any program named "BAS.PROG". (Basic 2.0 equivalents are SAVE "0:BAS.PROG",8 and SAVE "@0:BAS.PROG",9).

HEADER

HEADER is used to format a new disk so that it will be usable by the disk drive. After executing the HEADER command, a prompt will appear (except in program mode) asking, "are you sure?" If you are, type Y. HEADER may be followed by up to four parameters in any order:

1. Disk name. This is a string or a string expression in brackets.

2. Drive number. This is compulsory <D followed by 0 or 1>.

3. Optional identifier <I plus a two-character identifier>. This must be different for each disk. This is what the DOS looks at when it wishes to determine if a different disk has been inserted. If the identifier of two disks is the same, and one disk is inserted after the other, the DOS will not read the BAM (block allocation map) of the second disk into disk memory; it will read and write files according to the BAM of the first disk.

The BAM tells the DOS which blocks of the disk are used by files and which are available. If the first disk had certain blocks free and the second disk is using these same blocks for file storage, it is possible that the allocated blocks of the second disk will be overwritten, corrupting what might be a valuable program or data.

If the identifier is omitted, the disk will not be reformatted; only the directory will be erased. The identifier would remain the same.

4. Optional device number <U followed by 4–31>.

Examples:

HEADER D0,"NEW DISK",IZX—formats the disk in drive 0 of unit 8, naming it "NEW DISK" and an identifier of ZX.

HEADER "NEW DISK1",D0—erases the directory of the disk in drive 0 of unit 8, renaming it "NEW DISK1". The identifier remains the same. (The Basic 2.0 equivalents are PRINT# 15,"N0: NEW DISK,ZX" and PRINT# 15, "N0:NEW DISK1").

RECORD

This command is designed to be used in conjunction with relative files. RECORD positions the disk's internal record pointer to the desired record, which then may be read or written to. This is the only Basic 4.0 disk command that has an invariable syntax. It is as follows: RECORD # logical file# , record# [,optional byte within record]. If no byte position within the record is specified, byte 1 is assumed.

Examples:

RECORD#1, 1000—positions the record pointer to byte 1 of record 1000. (Assuming that a command channel has been opened to the disk using secondary address 15, the Basic 2.0 equivalent is

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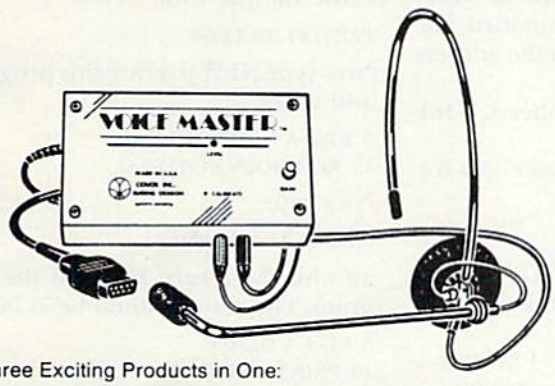

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PRINT# 15,"P" CHR$(5) CHR$((1000/256 – INT(1000/256)*256) CHR$(1000/256) CHR$(1))).

RENAME

RENAME is used, as its name suggests, to rename disk files. It may be followed by four parameters:

1. The name of the file you wish to rename. This must be a string or a string expression in brackets.

2. The new filename. This may be preceded by TO instead of a comma.

3. Optional drive number <D followed by 0 or 1>.

4. Optional device number <U followed by 4–31>.

Examples:

RENAME "OLD NAME" TO "NEW NAME".

RENAME D1,"OLD NAME", "NEW NAME".

(Basic 2.0 equivalents are PRINT# 15,"R0:NEW NAME = 0: OLD NAME" and PRINT# 15,"R1: NEW NAME = 1:OLD NAME"). NAME = 1:OLD NAME").

SCRATCH

This command erases one or more files from the disk. As in CATALOG, DOPEN, DLOAD and APPEND, pattern matching may be used. After scratching a file, DS will show 1, and the number of files actually deleted will occupy the position usually listing a track number.

For instance, if two files have been scratched, DS$ will show 01, FILES SCRATCHED,02,00. (Similar to HEADER, there is a safety feature—the screen displays "are you sure?" before a file is actually deleted.) SCRATCH may be followed by three parameters:

1. A filename you wish to erase. It must be a string or a string expression in brackets.

2. Optional drive number <D followed by 0 or 1>.

3. Optional device number <U followed by 4–31>.

Example:

SCRATCH "FILENAME". (The Basic 2.0 equivalent is PRINT# 15,"S0:FILENAME").

That covers all of the Basic 4.0 disk commands. Although Basic 4.0 was designed primarily to save typing and to improve the readability of Basic program listings, you can no doubt see that it also makes it possible to run many PET/CBM programs on your C-64.

Now we'll continue with the disk commands that Basic 4.5 adds to 4.0.

DCLEAR

This command initializes the disk, causing the drive to read the BAM and the directory of the current disk. This should be performed to prevent disk damage when two disks having the same identifier are inserted, one after the other. To be safe, execute DCLEAR every time you insert a new disk. Two optional parameters are allowed:

1. Optional device number <U followed by 4–31>.

2. Optional drive number <D followed by 0 or 1>.

Example:

DCLEAR. (The Basic 2.0 equivalent is PRINT# 15,"I0").

BLOAD

This command is used to load a program—machine language or otherwise—to either a specified location or to the address from which it was saved. It may be followed by four parameters:

1. A filename. This must be a string in quotes or a string expression in parentheses.

2. Optional load address. P followed by the address at which the program will be loaded. If this is omitted, the program will be loaded at the address from which it was saved.

3. Optional device number <U followed by 4–31>.

4. Optional drive number <D followed by 0 or 1>.

Examples:

BLOAD "M.L.PROG"—loads the program to the address from which it was saved.

BLOAD "DATA", P$C000—loads data to address $C000 or 49152.

BSAVE

This is used to save a portion of memory to disk. It may be followed by four parameters:

1. A filename. A literal string in quotes or a string expression in parentheses.

2. A save between a starting and ending address. This is of the format P <starting address>TO P<ending address>. The TO in the middle is compulsory.

3. An optional drive number <D followed by 0 or 1>.

4. An optional device number <U followed by 4–31>.

Example:

BSAVE "M.L.PROG",P$C000 TO P$D000—saves the memory from $C000 to $CFFF to drive 0 of device 8.

MERGE

This command is used to merge two Basic programs together. One must be on disk, and the other resident in memory. MERGE may be followed by four parameters:

1. A filename. This must be a literal string in quotes or a string expression in parentheses.

2. A logical file number <# followed by 1–255>.

3. An optional drive number <D followed by 0 or 1>.

4. An optional device number <U followed by 4–31>.

For a MERGE example, enter the following program in memory after entering NEW:

```
10 PRINT "A DEMO"
20 PRINT "DOES NOTHING"
30 PRINT "END"
```

To create a file that can be merged or executed (with EXEC), open a sequential file and list the program to disk:

```
DOPEN "X.DEMO", W, #1 :CMD1 :LIST
```

Close the file with:

```
PRINT#1 :DCLOSE
```

Now type NEW to erase this program, and enter:

```
5 REM A DEMO
15 REM DOES NOTHING
```

Now type

```
MERGE #1, "X.DEMO"
```

and hit the return key. List the program. The result should be as below.

```
5 REM A DEMO
10 PRINT "A DEMO"
15 REM DOES NOTHING
20 PRINT "DOES NOTHING"
30 PRINT "END"
```

Normally, MERGE will not be used in this manner, but to merge commonly used subroutines with your programs. For instance, say you have a subroutine that inputs numbers from the user. You could number this program in increments of 1, starting at a high line number, say 60000–60020. When this program is merged, it will exist as a separate entity within the program resident in memory. It is possible (and desirable) to have many useful subroutines existing as ASCII sequential files on disk. I rec-

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ommend you number each with a different line range.

EXEC

To create EXEC files, use the same method as in creating MERGE files. EXEC and MERGE also use identical syntax. If you typed in the example used above in MERGE, then try EXEC #1,"X.DEMO" to see EXEC in action.

EXEC works by reading a line of Basic from the disk, then executing this line just as if it had been typed in at the keyboard. MERGE works the same way; the only difference between them is that EXEC discards the line number while MERGE retains it. Within limits, any legal Basic program can be used to create an EXEC file. The limits are as follows.

1. Only a legal Direct mode command should be in an EXEC file. By Direct mode, I mean the mode the computer is in when a program is not running. The only exceptions to this are the INPUT and GET commands. INPUT, INPUT#, GET or GET# can be used in Direct mode if a programming trick is used. The trick is this:

```
POKE58,0                : INPUTA$
```

The Poke statement fools Basic into thinking that a program is running. You must leave a few spaces between the POKE58,0 and the Input statement, since this is where the data for A$ will be stored. If you don't leave a few spaces, the Input command will be overwritten, resulting in a Syntax error.

2. For...Next loops are allowed, but both must be on the same line. Example 1, below, is legal, but example 2 will cause a Next-Without-For error.

Example 1:

```
10 FOR LOOP = 1 TO 10 : POKE850,0 :
   NEXT LOOP
```

Example 2:

```
10 FOR LOOP = 1 TO 10 : POKE850,0
20 NEXT LOOP
```

3. The Read, Data and Restore commands are useless because Direct-mode data statements are not allowed.

4. The On, Goto, Gosub and Return commands are not usable in an EXEC file unless you intend to transfer control to a program in memory.

5. Basic 4.5 statements that open or close files should not be used. This rules out nesting EXEC statements.

AFFIX

Use AFFIX when it is desired to append a program on disk to a program in memory. This is a little different from MERGE. Try the example below. First type NEW and hit the return key to clear memory, then type in the following program.

```
10 REM A DEMO
20 REM A DEMO
```

Save this with DSAVE "AFFIX DEMO". Type NEW then hit the return key. Enter the following:

```
100 REM
110 REM
```

Now enter AFFIX "AFFIX DEMO". When the List command is executed, you will see this:

```
100 REM
110 REM
10 REM A DEMO
20 REM A DEMO
```

AFFIX works by setting the start-of-Basic pointer to point to the end of a program in memory, then executing DLOAD. To make effective use of AFFIX will require some kind of renumbering program; there are several in the public domain.

SEE

This command is used to list a sequential file on disk to the screen. It allows viewing EXEC/MERGE files just in case you forget what's what. SEE may be followed by four parameters:

1. A filename. A literal string in quotes or a string expression in brackets.

2. A logical filenumber <# followed by 1–255>.

3. An optional drive number <D followed by 0 or 1>.

4. An optional device number <U followed by 4–31>.

Example:

```
SEE #1, "X.DEMO"
```

At the end of this article are the loaders for the disk commands. Within limits, you may pick and choose among the commands you wish to enter. For instance, if you need BLOAD, but not EXEC, you can type in the loader for BLOAD and forget about the loader for EXEC.

You must previously have typed in the "OVERHEAD" loader program. (See Listing 1 in the June installment.) Also, before you type in any of the disk commands, you must type in the "Disk Parser" and "Disk Miscellaneous" loader programs (Listings 1 and 2 in this installment). These contain code used in common by all the disk commands.

For those of you who don't want to type in the listings, I'll offer copies at the end of this series. R

Address all author correspondence to Robert Rockefeller, RR #4, Langton, Ontario, Canada N0E 1G0.

Listing 1. *Disk Parser; must be loaded along with Listing 2 before you load any of the Disk Command loaders.*

```
10 REM DISK PARSER LOADER FOR BASIC 4.5
15 REM THIS MUST BE LOADED BEFORE ANY DISK
   COMMANDS CAN BE LOADED
20 :
30 FOR LOOP=34927 TO 35677
40 READ BYTE : POKE LOOP,BYTE
50 NEXT LOOP
60 :
34927 DATA 160,0,169,0,153,215,151,200,192,
      20
34937 DATA 144,248,169,8,141,215,151,32,121
      ,0
34947 DATA 208,1,96,201,145,208,3,76,207,13
      6
34957 DATA 201,85,208,3,76,217,136,201,35,2
      08
34967 DATA 3,76,211,137,201,80,208,3,76,246
34977 DATA 137,201,87,208,3,76,77,137,201,7
      6
34987 DATA 208,3,76,88,137,201,73,208,3,76
34997 DATA 225,137,201,34,208,3,76,113,137,
      201
35007 DATA 40,208,3,76,113,137,201,68,208,3
35017 DATA 76,231,136,76,8,175,32,115,0,201
35027 DATA 85,240,3,76,8,175,32,155,183,142
35037 DATA 215,151,162,8,32,55,137,76,36,13
      7
35047 DATA 32,155,183,224,2,144,3,76,72,178
35057 DATA 173,219,151,41,16,208,7,142,216,
      151
35067 DATA 162,16,208,5,142,216,151,162,32,
      32
35077 DATA 55,137,76,23,137,32,121,0,201,16
      4
35087 DATA 208,19,32,115,0,76,183,136,32,12
      1
35097 DATA 0,201,164,208,6,32,115,0,76,197
```

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Listing 1 continued.

```
35107 DATA 136,32,121,0,240,13,201,145,208,
      3
35117 DATA 76,207,136,32,253,174,76,134,136
      ,96
35127 DATA 160,0,44,160,1,138,57,219,151,24
      0
35137 DATA 3,76,8,175,138,25,219,151,153,21
      9
35147 DATA 151,96,162,64,32,55,137,32,115,0
35157 DATA 76,36,137,32,155,183,224,255,144
      ,3
35167 DATA 76,8,175,224,0,240,249,142,226,1
      51
35177 DATA 162,1,32,55,137,76,36,137,32,158
35187 DATA 173,32,163,182,32,244,180,160,0,
      170
35197 DATA 173,219,151,41,2,240,2,160,3,138
35207 DATA 153,221,151,165,34,153,222,151,1
      65,35
35217 DATA 153,223,151,132,187,160,0,177,34
      ,201
35227 DATA 64,208,29,224,18,176,20,166,187,
      254
35237 DATA 222,151,208,3,254,223,151,222,22
      1,151
35247 DATA 162,128,32,55,137,208,9,162,22,7
      6
35257 DATA 55,164,224,17,176,247,162,2,173,
      219
35267 DATA 151,41,2,208,5,32,55,137,208,3
35277 DATA 32,58,137,76,10,137,32,155,183,1
      42
35287 DATA 218,151,162,4,32,55,137,76,36,13
      7
35297 DATA 160,0,32,115,0,208,1,96,192,2
35307 DATA 176,6,153,227,151,200,208,240,76
      ,36
35317 DATA 137,32,115,0,32,147,130,165,20,1
      41
35327 DATA 229,151,165,21,141,230,151,162,4
      ,32
35337 DATA 58,137,32,121,0,201,164,240,3,76
35347 DATA 36,137,32,115,0,201,80,240,3,76
35357 DATA 8,175,32,115,0,32,147,130,165,20
35367 DATA 141,231,151,165,21,141,232,151,7
      6,36
35377 DATA 137,36,128,133,0,135,128,133,130
      ,131
35387 DATA 0,128,133,44,65,0,78,128,133,132
35397 DATA 0,86,128,0,68,129,61,128,0,67
35407 DATA 129,134,61,128,133,0,67,129,134,
      61
35417 DATA 129,134,44,128,133,0,82,128,134,
      61
35427 DATA 128,133,0,83,128,133,0,73,128,0
35437 DATA 135,128,133,0,128,133,0,136,132,
      187
35447 DATA 162,0,164,187,200,185,50,138,48,
      12
35457 DATA 157,128,3,240,3,232,208,242,142,
      127
35467 DATA 3,96,132,187,201,128,208,8,173,2
      16
35477 DATA 151,9,48,32,89,139,201,129,208,6
35487 DATA 173,217,151,76,150,138,201,130,2
      08,26
35497 DATA 173,219,151,41,1,240,201,32,87,1
      39
35507 DATA 169,76,32,89,139,32,87,139,173,2
      26
35517 DATA 151,32,89,139,169,0,201,131,208,
      23
35527 DATA 173,219,151,41,64,240,171,32,87,
      139
35537 DATA 169,83,32,89,139,32,87,139,169,8
      7
35547 DATA 32,89,139,201,132,208,20,173,227
      ,151
35557 DATA 240,146,32,87,139,173,227,151,32
      ,89
35567 DATA 139,173,228,151,32,89,139,201,13
      3,208
35577 DATA 15,173,219,151,41,2,240,27,32,84
35587 DATA 139,160,0,32,47,139,201,134,208,
      15
35597 DATA 173,220,151,41,2,240,8,32,84,139
35607 DATA 160,3,32,47,139,201,135,208,12,1
      73
35617 DATA 219,151,41,128,240,5,169,64,32,8
      9
35627 DATA 139,76,121,138,32,68,139,160,255
      ,200
35637 DATA 196,151,176,8,177,34,157,128,3,2
      32
35647 DATA 208,243,169,0,96,185,222,151,133
      ,34
35657 DATA 185,223,151,133,35,185,221,151,1
      33,151
35667 DATA 96,169,58,44,169,44,157,128,3,23
      2
35677 DATA 96
```

Listing 2. *Disk Miscellaneous loader.*

```
10 REM LOADER FOR DISK MISCELLANEOUS
15 REM THIS MUST BE LOADED BEFORE ANY DISK
   COMMANDS CAN BE LOADED
20 :
30 FOR LOOP=35983 TO 36075
40 READ BYTE : POKE LOOP,BYTE
50 NEXT LOOP
60 :
70 FOR LOOP=36375 TO 36390
80 READ BYTE : POKE LOOP,BYTE
90 NEXT LOOP
100 :
110 FOR LOOP=36532 TO 36626
120 READ BYTE : POKE LOOP,BYTE
130 NEXT LOOP
140 :
35983 DATA 162,5,76,55,164,169,0,141,233,15
      1
35993 DATA 133,19,96,169,229,160,6,45,219,1
      51
36003 DATA 240,8,169,0,141,233,151,76,8,175
36013 DATA 152,45,220,151,208,242,96,169,2,
      44
36023 DATA 169,4,44,169,16,44,169,32,45,219
36033 DATA 151,240,225,96,169,2,44,169,4,45
36043 DATA 220,151,240,214,96,173,127,3,162
      ,128
36053 DATA 160,3,76,189,255,169,98,164,152,
      217
36063 DATA 109,2,240,4,136,16,248,96,24,105
36073 DATA 1,208,240
36375 DATA 32,111,136,169,231,32,158,140,16
      0,20
36385 DATA 32,116,138,76,245,142
36532 DATA 65,82,69,32,89,79,85,32,83,85
36542 DATA 82,69,32,40,32,89,47,78,32,41
36552 DATA 32,63,32,0,165,58,201,255,208,33
36562 DATA 169,180,160,142,32,30,171,169,0,
      133
36572 DATA 204,32,228,255,168,240,250,32,21
      0,255
36582 DATA 164,207,208,252,136,132,204,201,
      89,240
36592 DATA 2,56,96,24,96,173,215,151,32,177
36602 DATA 255,169,111,32,147,255,162,0,236
      ,127
36612 DATA 3,176,9,189,128,3,32,168,255,232
36622 DATA 208,242,76,174,255
```


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Listing 3. *EXEC and MERGE loader.*

```
1Ø REM LOADER FOR EXEC, MERGE
15 REM DOPEN LOADER MUST BE LOADED FIRST
2Ø :
3Ø FOR LOOP=358Ø1 TO 35946
4Ø READ BYTE : POKE LOOP,BYTE
5Ø NEXT LOOP
6Ø :
358Ø1 DATA 32,43,141,162,128,142,233,151,16
      9,225
35811 DATA 16Ø,6,32,16Ø,14Ø,174,218,151,134
      ,19
35821 DATA 32,198,255,32,74,14Ø,32,74,14Ø,7
      6
35831 DATA 4,14Ø,173,214,151,133,152,174,21
      8,151
35841 DATA 32,198,255,16Ø,Ø,44,233,151,48,1
      7
35851 DATA 112,24,32,148,14Ø,32,2Ø4,255,173
      ,218
35861 DATA 151,32,195,255,76,116,164,32,74,
      14Ø
35871 DATA 176,236,2Ø1,32,2Ø8,247,32,74,14Ø
      ,2Ø1
35881 DATA 13,24Ø,14,153,Ø,2,2ØØ,192,8Ø,144
35891 DATA 241,32,148,14Ø,76,113,165,32,2Ø4
      ,255
359Ø1 DATA 165,152,141,214,151,152,17Ø,32,2
      Ø2,17Ø
35911 DATA 76,134,164,32,2Ø7,255,36,144,16,
      6
35921 DATA 32,148,14Ø,76,143,14Ø,8Ø,7,162,1
35931 DATA 142,233,151,56,96,24,96,32,43,14
      1
35941 DATA 162,64,76,222,139,32
```

Listing 4. *CATALOG loader.*

```
1Ø REM LOADER FOR CATALOG
2Ø :
3Ø FOR LOOP=3627Ø TO 36374
4Ø READ BYTE : POKE LOOP,BYTE
5Ø NEXT LOOP
6Ø :
3627Ø DATA 32,111,136,32,156,14Ø,16Ø,Ø,32,1
      16
3628Ø DATA 138,32,2Ø8,14Ø,16Ø,96,169,127,17
      4,215
3629Ø DATA 151,32,186,255,32,192,255,162,12
      7,32
363ØØ DATA 198,255,32,Ø,142,32,Ø,142,32,Ø
3631Ø DATA 142,32,Ø,142,165,197,2Ø1,6Ø,24Ø,
      25Ø
3632Ø DATA 2Ø1,63,2Ø8,3,32,11,142,32,Ø,142
3633Ø DATA 17Ø,32,Ø,142,32,2Ø5,189,32,Ø,142
3634Ø DATA 2Ø8,5,32,215,17Ø,2Ø8,217,32,71,1
      71
3635Ø DATA 2Ø8,241,32,18,225,168,32,183,255
      ,41
3636Ø DATA 192,24Ø,1Ø,32,2Ø4,255,169,127,32
      ,195
3637Ø DATA 255,1Ø4,1Ø4,152,96
```

Listing 5. *BSAVE and DSAVE loader.*

```
1Ø REM LOADER FOR BSAVE, DSAVE
2Ø :
3Ø FOR LOOP=35678 TO 35731
4Ø READ BYTE : POKE LOOP,BYTE
5Ø NEXT LOOP
6Ø :
7Ø FOR LOOP=36Ø76 TO 361Ø1
8Ø READ BYTE : POKE LOOP,BYTE
9Ø NEXT LOOP
1ØØ :
35678 DATA 32,111,136,32,18Ø,14Ø,32,2ØØ,14Ø
      ,169
35688 DATA 1Ø1,16Ø,2,32,16Ø,14Ø,16Ø,59,32,1
      16
35698 DATA 138,169,Ø,174,215,151,168,32,186
      ,255
357Ø8 DATA 32,2Ø8,14Ø,173,229,151,133,172,1
      73,23Ø
35718 DATA 151,133,173,174,231,151,172,232,
      151,169
35728 DATA 172,76,95,225
36Ø76 DATA 32,111,136,32,18Ø,14Ø,169,1Ø1,16
      Ø,6
36Ø86 DATA 32,16Ø,14Ø,162,3,181,43,157,229,
      151
36Ø96 DATA 2Ø2,16,248,76,11Ø,139
```

Listing 6. *DLOAD loader.*

```
1Ø REM LOADER FOR DLOAD
2Ø :
3Ø FOR LOOP=361Ø2 TO 36138
4Ø READ BYTE : POKE LOOP,BYTE
5Ø NEXT LOOP
6Ø :
361Ø2 DATA 32,111,136,32,18Ø,14Ø,32,156,14Ø
      ,16Ø
36112 DATA 63,32,116,138,169,Ø,133,1Ø,168,1
      74
36122 DATA 215,151,32,186,255,32,2Ø8,14Ø,16
      9,Ø
36132 DATA 166,43,164,44,76,117,225
```

Listing 7. *Loader for COPY, RENAME, SCRATCH and DCLEAR.*

```
1Ø REM LOADER FOR COPY, RENAME, SCRATCH, DC
   LEAR
15 REM LOADER CONTAINING HEADER MUST BE LOA
   DED FIRST
2Ø :
3Ø FOR LOOP=36454 TO 36531
4Ø READ BYTE : POKE LOOP,BYTE
5Ø NEXT LOOP
6Ø :
36454 DATA 32,111,136,169,2,45,219,151,24Ø,
      3
36464 DATA 32,197,14Ø,169,197,16Ø,4,32,16Ø,
      14Ø
36474 DATA 16Ø,28,76,33,142,32,111,136,32,1
      8Ø
36484 DATA 14Ø,32,197,14Ø,169,229,16Ø,4,32,
      16Ø
36494 DATA 14Ø,16Ø,45,76,33,142,32,111,136,
      32
365Ø4 DATA 18Ø,14Ø,32,156,14Ø,32,2Ø4,142,17
      6,176
36514 DATA 16Ø,52,76,33,142,32,111,136,169,
      231
36524 DATA 32,158,14Ø,16Ø,56,76,33,142
```

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Listing 8. *Loader for DOPEN, APPEND and SEE.*

```
10 REM LOADER FOR DOPEN, APPEND, SEE
20 :
30 FOR LOOP=36139 TO 36270
40 READ BYTE : POKE LOOP,BYTE
50 NEXT LOOP
60 :
36139 DATA 32,111,136,32,180,140,32,183,140
      ,162
36149 DATA 96,169,1,45,219,151,208,1,162,33
36159 DATA 138,160,6,32,160,140,160,4,32,11
      6
36169 DATA 138,32,208,140,32,218,140,168,17
      3,218
36179 DATA 151,174,215,151,32,186,255,76,19
      3,225
36189 DATA 32,111,136,32,180,140,32,183,140
      ,169
36199 DATA 225,160,6,32,160,140,160,10,76,7
      1
36209 DATA 141,32,43,141,169,225,160,6,32,1
      60
36219 DATA 140,174,218,151,32,198,255,32,44
      ,168
36229 DATA 32,18,225,168,32,183,255,208,23,
      152
36239 DATA 201,13,240,12,201,160,176,8,201,
      32
36249 DATA 144,231,201,128,176,227,32,71,17
      1,76
36259 DATA 130,141,32,204,255,173,218,151,7
      6,195
36269 DATA 255,32
```

Listing 9. *Loader for CONCAT, HEADER and BACKUP.*

```
10 REM LOADER FOR CONCAT, HEADER, BACKUP
20 :
30 FOR LOOP=36391 TO 36454
40 READ BYTE : POKE LOOP,BYTE
50 NEXT LOOP
60 :
36391 DATA 32,111,136,32,180,140,32,197,140
      ,169
36401 DATA 197,160,4,32,160,140,160,35,76,3
      3
36411 DATA 142,32,111,136,32,180,140,32,186
      ,140
36421 DATA 32,156,140,32,204,142,176,5,160,
      15
36431 DATA 76,33,142,96,32,111,136,32,186,1
      40
36441 DATA 32,189,140,169,199,32,158,140,16
      0,23
36451 DATA 76,33,142,32
```

Listing 10. *DCLOSE loader.*

```
10 REM LOADER FOR DCLOSE
20 :
30 FOR LOOP=36627 TO 36689
40 READ BYTE : POKE LOOP,BYTE
50 NEXT LOOP
60 :
36627 DATA 208,14,164,152,240,9,185,88,2,32
36637 DATA 195,255,76,21,143,96,32,111,136,
      169
36647 DATA 243,160,6,32,160,140,169,4,45,21
      9
36657 DATA 151,240,6,173,218,151,76,195,255
      ,164
36667 DATA 152,200,136,240,17,185,98,2,205,
      215
36677 DATA 151,208,245,185,88,2,32,195,255,
      76
36687 DATA 58,143,96
```

Listing 11. *RECORD loader.*

```
10 REM LOADER FOR RECORD
20 :
30 FOR LOOP=36690 TO 36779
40 READ BYTE : POKE LOOP,BYTE
50 NEXT LOOP
60 :
36690 DATA 169,35,32,255,174,169,1,141,132,
      3
36700 DATA 32,158,183,142,218,151,32,253,17
      4,32
36710 DATA 147,130,165,20,141,130,3,165,21,
      141
36720 DATA 131,3,32,121,0,240,9,32,253,174
36730 DATA 32,158,183,142,132,3,164,152,173
      ,218
36740 DATA 151,136,16,5,162,3,76,55,164,217
36750 DATA 89,2,208,243,185,99,2,141,215,15
      1
36760 DATA 185,109,2,141,129,3,169,5,141,12
      7
36770 DATA 3,169,80,141,128,3,76,245,142,16
      2
```

Listing 12. *BLOAD and AFFIX loader.*

```
10 REM LOADER FOR BLOAD, AFFIX
20 :
30 FOR LOOP=35732 TO 35800
40 READ BYTE : POKE LOOP,BYTE
50 NEXT LOOP
60 :
70 FOR LOOP=35946 TO 35982
80 READ BYTE : POKE LOOP,BYTE
90 NEXT LOOP
100 :
35732 DATA 32,111,136,32,180,140,169,229,16
      0,2
35742 DATA 32,160,140,160,63,32,116,138,160
      ,1
35752 DATA 169,0,133,10,174,230,151,240,2,1
      60
35762 DATA 0,174,215,151,32,186,255,32,208,
      140
35772 DATA 169,0,174,229,151,172,230,151,32
      ,213
35782 DATA 255,144,3,76,249,224,32,183,255,
      41
35792 DATA 191,240,5,162,29,76,55,164,96
35946 DATA 32,111,136,32,180,140,32,156,140
      ,165
35956 DATA 45,56,233,2,141,229,151,165,46,2
      33
35966 DATA 0,141,230,151,32,161,139,134,45,
      132
35976 DATA 46,32,51,165,76,96,166
```


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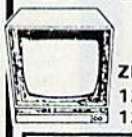

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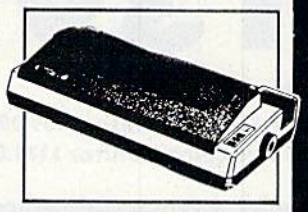

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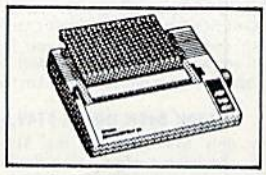

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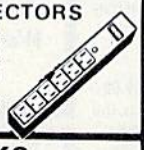

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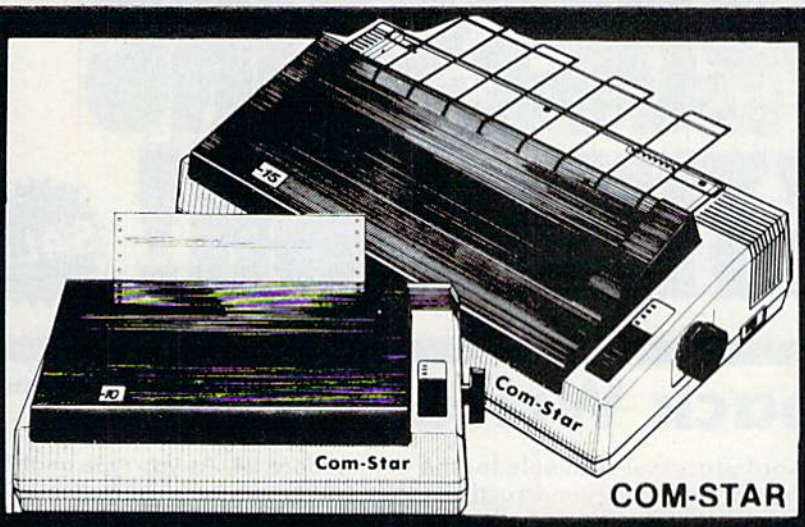

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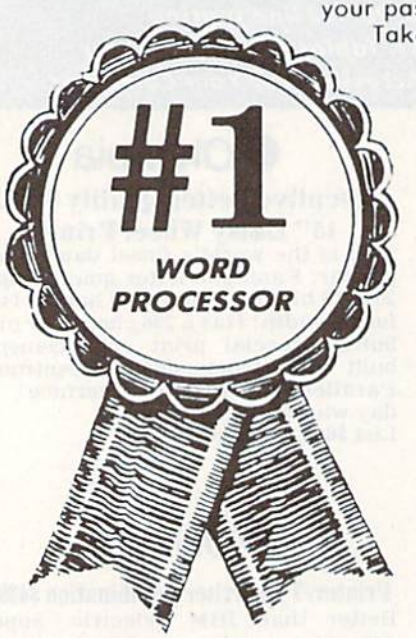

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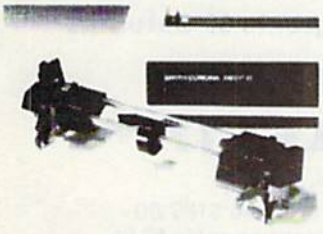

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Electrical Needs: 120V/60Hz
Internal Char. Coding: ASCII&ISO
Print Buffer Size: 132 Bytes (1 line)
No. of Char. in Char. Set: 96 ASCII& International
Graphics Capability: Standard 60, 72 Dots Per Inch Horizontal, 72 Dots Per Inch Vertical
Pitch: 10, 12, 16.7, 5, 6, 8.3
Printing Method: Impact Dot Matrix
Char. Matrix Size: (Standard) 9H x 8V, (Elongate) 10H x 8V
Printing Features: Bi-directional, Short line seeking
Printing Speed: 80 CPS

PAPER

Type: Plain
Forms Type: Fanfold, Cut Sheet
Max Paper Width: 11"
Feeding Method: Friction Feed Std.; Tractor Feed Included

RIBBON

Type: Cassette — Fabric inked ribbon
Life: 1 million characters

CHARACTER MODE

Character Font: 9 x 8 Standard, 10 x 8 Elongated, No. 8 pin to be used for underline
Character Set: 96 ASCII, 11 x 7 International Char.
Pin Graph Mode: The incoming bit pattern corresponds to the 8 pins in the print head
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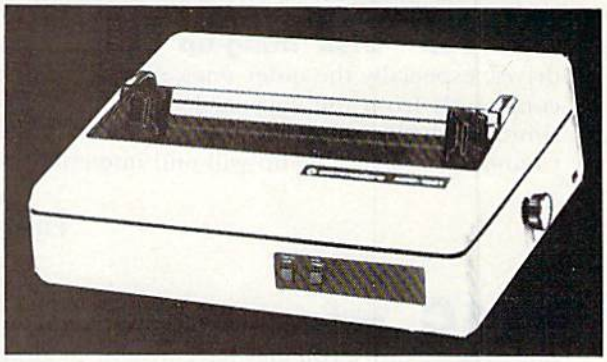

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From p. 10.

want, you can attach the new transformer to the top of the old power supply; it's not too fancy, but it's definitely functional.

John Long
Clarkston, GA

$21A Disk archives—A compulsory part of anyone's disk library is the file of backup disks. For my own backup file, I used brand-new disks, appropriately named and write-protected and sealed in zip-lock sandwich bags to guard against dust and moisture. These are then put in a plastic disk box and stored in a linen cupboard, far away from magnetic fields of any sort.

Jim Lynch
Antigua, West Indies

$21B Disk hang-up fix—Sometimes disk drives, especially the older ones, seem to disregard your commands from the keyboard. When this happens, try simultaneously pressing the stop and restore keys. Chances are, the hang-up will end immediately.

Eric Haver
Pittsburgh, PA

$21C 2040/4040 disk drives—If you use one of these units, you may have trouble loading software written for the 1541, even though the disk formats are compatible. It sometimes helps if you put the 1541 disk in drive 0 and put another formatted disk in drive 1. If the program still doesn't load, it's because the manufacturer used a protection scheme that depends on the frailties of the 1541 drive.

Bruce Jaeger
St. Paul, MN

$21D Disk-save command quirks—If you type

```
SAVE"PROGRAM",8
```

you will get "PROGRAM" PRG in the disk directory. If you type

```
SAVE"PROGRAM,S",8
```

the directory will show "PROGRAM" SEQ, and the program won't load unless you enter LOAD"PROGRAM,S". If you save it as "PROGRAM,U", it will similarly show up as "PROGRAM" USR in the directory, and must be loaded as "PROGRAM,U".

You can use these quirks in several ways. If, for instance, you save a program whose name ends in ",S", you give it a modest amount of security from being loaded by others. Only those in the know would think of trying to load what appears to be a SEQ file. Or, if you make it a habit to end machine language program names with ",U", the USR in the directory will be your clue that they must be loaded with ,8,1. The clue is a good one, since Radio Shack and some other computers reserve the USR designation for machine language files.

Eddie Lyons
Bronxville, NY

$21E GET# improved—Here's an incredible C-64 trick that works the same as the GET# statement, but is about five times faster. The editors tried it on a directory-reading program that contained a lot of GET# statements, and execution time was cut in half.

There's a routine in the operating system that works like CMD, but in the opposite direction—it defines a certain file as the input channel, rather than the output channel. To call the routine from Basic, Poke the file-number into location 781, then execute a SYS 65478. Once that's done, you can use the normal GET statement to read a character from the file. When you're through reading from the file, you must clear the input channel with SYS 65484.

The trick speeds things up because Basic is relieved from constantly switching its input channel between the keyboard and the file. Although we've only tested it on disk, it should work with cassette files, too.

Tim Gerchmez
Bellevue, WA

$21F Closing files—The well-known SYS65511, often said to close all files, really doesn't do that. It causes the computer to forget its opened files, but does *not* signal the peripherals to close them. While some may call this a minor difference in semantics, it can be disastrous when disk files are involved. The following one-liner is the easiest and most effective way I've found to close all open files at once, regardless of what files they are or of when and where they were opened.

```
X=PEEK(152):FORJ=1TOX:CLOSEPEEK(601):NEXT
```

Location 152 contains the number of currently open files. The ten-byte queue starting at 601 contains their file numbers and works similarly to the keyboard buffer. As each file is closed, its entry is removed, and the rest are moved down one byte. If you enter the one-liner exactly as shown, you'll successfully close all files.

By the way, POKE 152,0 yields the same results as SYS65511. In fact, that is exactly what SYS65511 does.

Charles Lavin
Coral Gables, FL

$220 Disk ID changers—A disk's two-character ID is recorded once in the directory and once on each disk sector. If you have inadvertently given two disks the same ID, you can use the following routine to change the directory, which will avoid most of the problems of duplicate IDs. Use spaces where they are shown in the

Print# statements, and don't forget the semicolon at the end of line 50.

```
10 OPEN 15,8,15,"I0" : OPEN 2,8,2,"#"
20 INPUT "NEW ID";ID$
30 PRINT#15,"U1:2 0 18 0"
40 PRINT#15,"B-P:2 162"
50 PRINT#2,ID$;
60 PRINT#15,"B-P:2 0"
70 PRINT#15,"U2:2 0 18 0"
80 PRINT#15,"I0"
90 CLOSE2 : CLOSE15
```

By adding these lines, the program can be changed to restore the disk's original ID. Note the new line 20.

```
20 PRINT#15,"M-R"CHR$(18)CHR$(0)CHR$(2)
25 GET#15,A$,B$ : ID$ = A$ + B$
```

Mark Niggemann
Ames, IA

$221 Write-protect detector—This routine detects if your disk has its write-protect notch covered. It reads bit 4 of a port at $1C00 on the disk controller; if the bit is set, the write-protect notch is open.

```
10 OPEN 15,8,15
20 PRINT#15, "M-R"CHR$(0)CHR$(28)
30 GET#15,A$ : A = ASC(A$ + CHR$(0)) AND 16
40 IF A = 0 THEN PRINT "WRITE PROTECTED"
50 CLOSE 15
```

Mark Niggemann
Ames, IA

$222 Outside reading—*IEEE Spectrum*, the monthly publication of the Institute of Electrical and Electronics Engineers, is a semi-technical journal of interest to all sorts of electrical engineers. Its March 1985 issue contained a superb ten-page article on the design history of the Commodore 64. It includes, among other things, the real explanation of "sparkle" on the early 64s and tells why the 1541 disk drive is so slow. If you know an IEEE member, ask to see that copy.

L.F.S.

$223 Wavy video—If your power supply is physically close to your monitor, it can cause a slow, side-to-side waving in the video display.

Sechzig Hertz
Storung, Germany

$224 Hex conversion aid—Radio Shack's #65-990 Programmer's Hexadecimal Calculator has been a wonderful addition to my computer room. It converts hex to decimal and vice versa, more smoothly and with less effort than any unit I've seen. It includes a clock and calendar, so it's useful even when sitting on the desk. At $24.95, it's a worthwhile tool for any programmer.

Oberon King
Staten Island, NY

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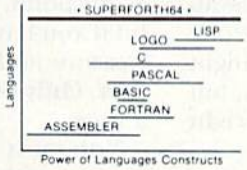

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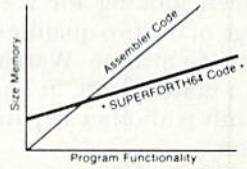

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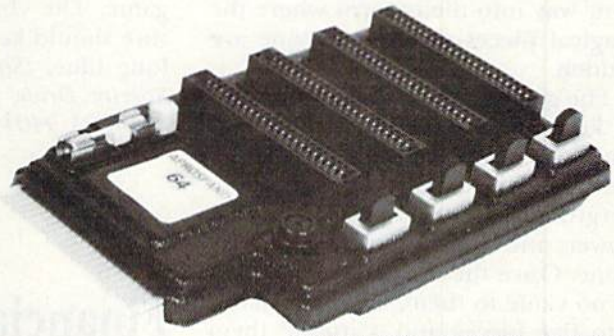

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From p. 14.

Gemstone Warrior

B

Find the Caverns And Recover the Magical Gemstone

For the past several years, defenders of arcade excitement and fans of adventure involvement have been looking for a successful marriage of the two qualities into one package. Gemstone Warrior might not be a match made in heaven, but it certainly is another step in the right direction.

The script of the game is similar to the most tried-and-true fantasy fables. A battle of good against evil is by now standard operating procedure for many adventures, but Gemstone Warrior isn't a simple example of the strong surviving. It requires cunning and quick thinking for you to stay out of trouble and to find your way into the caverns where the magical pieces of the gemstone are hidden.

The gemstone originally was a tool to keep the evil forces at bay and maintain tranquility throughout the land. But the villains (who live underground) became jealous of that power and rose up to snatch the stone. Once they realized that it was of no value to them, they smashed it into five pieces and scattered them around the maze of tunnels.

As the heroic warrior, you must battle ghosts, skeletons, gas plants, amoebas and demons as you work your way toward the maze.

Your wealth is measured according to how many bodies you leave in your wake and how many chests you are able to uncover. More important than the wealth are the other objects that you collect, which hold the key to remaining healthy, healing your wounds, rising from the dead, and such special effects as the ability to become invisible.

Graphics are quite good, though sometimes, at a quick glance, one item in the warrior's inventory might look a lot like another.

The speed and recognition factors are the game's biggest limitations. Even at the beginner's level, monsters come upon you at a pace that leaves you very little time to decide which of the inventory items you should use.

The pause key, normally used only to take breaks during a game, becomes a lifesaver in Gemstone Warrior. It gives you time to decide exactly what action to take against your enemies when you resume the game.

A joystick is optional in the game—I found it more natural to use than the keyboard. You can save a game at any point, which is extremely helpful if you have accumulated a sizable treasure and would rather not start over. Only one game can be saved at a time.

You must map out each area that you've explored so that you don't cover the same ground twice. Each game begins in a different location, and you are awarded points for the least amount of time it takes you to recover the gem.

Gemstone Warrior is a game that you can play over and over again, as the scenario changes with each new game. The challenge of this adventure should keep you occupied for a long time. *(Strategic Simulations, 883 Stierlin Drive, Bldg. A-200, Mountain View, CA 94043. C-64/$34.95 disk.)*

Rick Teverbaugh
Anderson, IN

Financial Advisor

B

Here's Some Help For those Major Financial Decisions

Put away your pencil and calculator and let the Plus/4's Financial Advisor take care of your complex figuring. This program will do the mathematics behind all of your financial decision-making for any one of five different activities: periodic-deposit accounts, periodic withdrawals, installment loans, stocks and bonds.

If you own a business or are actively involved in the investment field, this program is one you could use. If, however, you will make only one or two major purchases (such as a home or a car) every five years, you probably won't need the Financial Advisor. A quick call to your bank or car dealer will probably suffice.

This cartridge-based program is ready to use on powering up, and it won't conflict with the internal software of the Plus/4. You can jump into any of the built-in programs at any time.

The Financial Advisor is menu- and command-driven. From each of the five activities, you have several options with which you can customize your particular problem. This is quite an advantage, as you can get an accurate answer, not just an approximation.

Your job is to provide any data that you do know; the program will then calculate the unknown for you. When you first start to use the Financial Advisor, you should be very familiar with the commands and submenus so that you can fully utilize all the features of the program. The Help function, however, does allow you to view all of these commands, along with their definitions, if the need arises.

Good documentation is a necessity with a multilevel program such as this, and you will not be disappointed with the 35-page manual that comes with the Financial Advisor. It takes you step by step through an explanation of the menus and commands available and provides a reference chart of commands, as well as shortcuts for menu selection on the function keys.

The manual also leads you through five hypothetical decision-making sessions, each highlighting one of the strategies available from the main menu. This learn-by-doing method of instruction is excellent.

This program provides a Calculator mode that you can access at any time without disturbing the set-up of your specific financial activity. If you must do some quick figuring to arrive at a value that is needed in a problem, you simply switch into the calculator and do your arithmetic. You can then move back to your problem, enter the needed value, and continue on.

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This is a nice feature, which you will probably rely on frequently as you use the program more and more.

Unfortunately, the program does not allow you to store your financial scenarios on disk, and I feel this is a drawback. You can print out your screen displays, but it would be much more helpful to have disk storage as well.

If you have a need for this much financial figuring power, the price and quality of the Financial Advisor make it a good choice. *(Commodore Business Machines, 1200 Wilson Drive, West Chester, PA 19380. Plus/4/$29 cartridge.)*

Margaret Morabito
***RUN* staff**

Adventure Construction Set

B

Change Your Favorite Adventure or Custom-Design Your Own

Do you find that many adventure games are interesting at first, but ultimately drive you crazy with endless labyrinths, unsolvable puzzles and unbeatable foes? Did you ever wish you could change an adventure, or perhaps create one of your own from scratch, but felt you lacked the programming skill?

With Adventure Construction Set, you can produce your own graphics adventures in the tradition of Temple of Apshai or Ali Baba and the Forty Thieves. Rather than an extensive knowledge of Basic or assembly language, all you need is your favorite joystick and a great imagination.

The program is actually three construction sets in one, allowing you to set your adventures in the fantasy world of dungeons and dragons, the cloak-and-dagger world of spies, or the science-fiction world of spaceships and aliens. Each set provides you with an abundant supply of creatures, props, sound effects and spells with which you can begin building your adventure.

Except for the music and sound effects, virtually everything provided in the basic sets can be modified. If, for example, you find an enemy to be too aggressive or powerful, simply call up his profile screen and alter any of his traits to even the odds. Also, if you simply don't like the looks of a character or object, you can completely redraw it using the program's graphics editor. You can even design custom objects and creatures from scratch if you need something not provided in the construction set.

It is unlikely, however, that you will need to create anything on your own, since Adventure Construction Set provides almost every conceivable type of creature, weapon, door, terrain, armor, treasure and space that you will need.

In an adventure game, spaces are one of the most useful props available. They can be used as invisible barriers; they can invoke spells of your choosing; they can be designed to bar passage to all who are carrying or not carrying a certain magical item; they can even hide items from the view of a casual adventurer.

The adventures that can be created with the program begin with a world map, which can contain up to 16 regions. Each region is composed of up to 15 rooms. A single region can also contain up to 16 different creatures and over 500 objects.

Although Adventure Construction Set does simplify the creation process considerably with its joystick-controlled menus and time-saving options (such as "Let Adventure Construction Set Finish Your Adventure"), building a first-rate adventure will still require a lot of planning and hard work. Also, before you can construct an adventure, you must create your own adventure disk. This can take up to 20 minutes and requires several disk swaps. To copy your newly created adventure involves roughly the same amount of drive time.

If you have any doubt, however, that the program is worthwhile, simply give Rivers of Light a try. This adventure, included on the disk and created by Adventure Construction Set, is the story of a search for eternal life in ancient Egypt. It's an enjoyable adventure, full of magic, challenging enemies and intriguing puzzles. It should convince you. *(Electronic Arts, 2755 Campus Drive, San Mateo, CA 94403. C-64/$50 disk.)*

Bob Guerra
Charlestown, MA

Team-Mate

A

Win the Productivity Game with this Integrated Package

Tri Micro's existing business programs work so well that the need for any significant improvements would seem unlikely. However, Tri Micro has created a fully integrated single-disk system, called Team-Mate, that just might top them all.

Team-Mate allows programs for word processing, spreadsheet design, databases and business graphics to share a common data format and disk. It quickly produces the kind of text and graphics displays that would take hours of labor with ordinary integrated software packages.

Team-Mate's main menu offers two choices: Trilogy, which is a combination word processor, spreadsheet and database program, and Graph Plus, which is a business graphics program.

Trilogy allows you to design personalized letters and files with as much creativity as your imagination will allow. I found the word processor to be much improved over Tri Micro's The Write File. What sets it apart from most others is the option to add data to your text from either a database or spreadsheet program, as well as to incorporate graphics displays into your printouts.

The spreadsheet program in Trilogy contains 850 cells for numbers, text, formulas and file commands. Entering data into a spreadsheet cell is quite simple, even for inexperienced users. The Text mode is especially useful, as it allows you to label a cell that contains numeric data. This permits rapid access to the cell by simply calling up the cell name.

An especially innovative feature of the spreadsheet is a windowing

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command that splits the screen and permits you to view the word processing text and the spreadsheet simultaneously.

File Manager, the database program in Trilogy, is also cleverly integrated with the word processor. You can use the database to save records to disk, and locate those records by sorting them. You can access and edit your records with a few simple commands that will update and resave them.

The most useful feature of File Manager is its ability to merge individual database fields, or entire records, into the text of the word processor. This simplifies the printing of mailing lists and form letters that might require information from your database.

Graph Plus, Team-Mate's business graphics program, is fully integrated with the word processing program. The hardcopies you produce with Team-Mate can contain pie charts, bar charts and line graphs. There are two screen windows in Graph Plus: a graphics window and a data-editing window. There is a full set of special commands used by the editing window for labeling your charts and graphs. You can also design your own graphics displays.

The commands in the editing window permit you to manually or automatically scale your graphics with your step values. Spreadsheet data can be automatically read into your graphs, saving you the time and effort of entering spreadsheet data manually. Such a graphic representation of data greatly complements a spreadsheet.

Team-Mate's integrated design has resulted in a high-performance program that Commodore users will discover to be one of the best available. Tri Micro has created a new set of standards for software integration that other manufacturers will surely want to match. *(Tri Micro, 14072 Stratton Way, Santa Ana, CA 92705. C-64/ $49.95 disk.)*

Tim Walsh
***RUN* staff**

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The World's Greatest Baseball Game

C

This Sports-Simulation Game Offers Plenty of Strategy and Action

The newest kind of sports-simulation game capitalizes on the C-64's calculating abilities and its amazing sound and graphics reproduction. It attempts to combine the statistical realism of board games with the excitement and action of video games.

The World's Greatest Baseball Game is that kind of game. Like its name, its goals are ambitious. According to the instruction manual, it "uses actual players' statistics and your own game-playing ability to determine the outcome of each game."

The game comes on a two-sided disk. One side permits you to maneuver the on-screen players. The second version has players that are controlled by the computer, and your only function is to manage your team.

You can view the complete rosters of the teams with which you have chosen to play. Each player's vital statistics are displayed, as well as a suggested starting lineup and pitcher. You are free to rearrange the batting order or lineup of either team.

Your defensive and offensive options are limited, and, except for those rare occasions when you'll want to use a relief pitcher or pinch-hitter, playing the statistical version of the game entails little more than pressing one key to release a pitch and another to reset the game for the next pitch. Each pitch results in one complete play.

The player-controlled game requires you to work a lot harder. You can either play against the computer or another person. Unlike the statistical game, which uses only the keyboard, this game requires a joystick.

In an effort to give you as much control over the on-screen action as possible, the game demands exten-

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sive joystick jockeying. You use the joystick and fire-button to do all of the following: pitch the ball, as well as determine its direction and velocity; return the ball to the pitcher; hit the ball; steal a base; move any of the fielders; and throw the ball from one fielder to another.

I found play-action very difficult to master, and the on-screen graphics only mediocre, as the figures neither move nor look much like real baseball players.

One of the great lures of this sports-simulation game is that it permits you to use real major-league stars. In doing so, you'd expect them to perform as they would in real life. This, of course, cannot happen consistently in the player-controlled version of the game, since your ability to maneuver the joystick determines how each player will perform.

Another blow to The World's Greatest Baseball Game's realism is its presentation of every pitcher and batter as right-handed. Didn't the game's creators realize the importance of things such as lefty-righty matchups? In their aim for realism, these kinds of things should have been taken into consideration.

Perhaps this game's problems stem from its attempt to do too much; as a result, it doesn't do enough. The statistical game might prove to be boring to play if you're not particularly interested in all the intricacies of the strategy; and the player-controlled game, in attempting to provide you with some fast action, becomes very complicated. I'm not sure that either version of the game is capable of accurately reflecting the outcome of on-screen player matchups.

Epyx should be admired for going for a grand slam when creating this game. You'll find some strategy and action here, but unfortunately, in trying too hard to accurately capture these two very different aspects of the game of baseball, the program seems to fall short in both categories. *(Epyx, Inc., 1043 Kiel Court, Sunnyvale, CA 94089. C-64/$29.95 disk.)*

Scott Wasser
Shavertown, PA

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C

JIM STRASMA

Do you have a problem or question about your Commodore computer? Commodore Clinic can help. Just send your question (limit one per entry) on a postcard to:

Jim Strasma
Commodore Clinic
1238 Richland Ave.
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Queries are answered only through this column, but, due to the volume of mail, only those questions that appeal to the majority of our readers will be published. Please do not enclose a self-addressed stamped envelope, since we cannot provide personal responses or answer questions before publication.

REPAIRS

Q: My Commodore 64 seems to lock up about five minutes after I turn it on. If I turn it off for a few minutes, it will work for a few minutes before the problem appears again. Do you know what could be causing this problem?

John Allison
Rockville, MO

A: Heat. I receive letters like yours several times a week, and, in most cases, the culprit appears to be an overheating power supply. As a general rule, if a 64 fails anywhere from five minutes to a few hours after being turned on, the problem is heat-related, and the power supply should be checked first.

If the red power light on the top of the keyboard dims or goes out, the power supply is probably at fault. But even if the light is on normally, the power supply could still be inadequate. The way to be sure is to borrow a different power supply and try it. If the problem goes away, your power supply will have to be fixed or replaced.

Since this is such a common problem, let me make a couple of suggestions. First, be sure your power supply is plugged in properly; on some 64s, it's possible to force its connector in the wrong way. On most units, the dimple in the side of the connector should face up when plugging in.

Second, keep your power supply in an open area. It needs ventilation, because it is in a sealed case and generates a lot of heat.

Third, try to minimize the number of add-ons you plug into a 64 using the standard power supply, and be sure their connectors are on properly.

Fourth, if your power supply fails, try to replace it with one of the repairable or oversized power supplies now being offered by various companies.

Q: I'm having a problem with joystick port 2 in my 64. I get no response from the joystick on it, even though the joystick works in port 1. Problems running programs are also evident. This just happened recently. What is the cause, and have you any tips on preventing it from happening again?

Barry Gray
El Paso, TX

A: Both joyports are controlled by the 6526 CIA chip at U1 on your 64's circuit board. Most likely, it has been blown by plugging in the joystick while the computer was turned on. (We all do that, but the chip isn't buffered, so sometimes it doesn't work.)

You can probably fix the problem by replacing U1. You'll find it soldered in place, but add a socket when replacing it, so you'll never have to unsolder it again. Radio Shack has a good cheap desoldering iron, but since 6526 chips are hard to locate, you may still prefer to leave the repair to your dealer.

To avoid future occurrences, plug in your joystick with the computer off. You might want to buy two joysticks and leave them in place all the time.

Q: I have a 1525 printer that doesn't pull labels through. Commodore sent me instructions on adjusting the printer to let labels move through, and I tried three times to adjust it, with no luck. Could you give me better instructions on adjusting the printer or, better yet, the name and address of a company whose labels will run on a 1525?

John Gehrke
Brooklyn, NY

A: The 1525 isn't noted for its paper-pulling ability, but, before giving up, take your instructions to a Commodore dealer (such as Meizner Business Systems in your area), and let them try to make the adjustment. You might also try the new transparent plastic labels offered by Quill Corp. (100 S. Schelter, Lincolnshire, IL) and others. They are thinner and more flexible than paper labels.

If anyone else would like the Com-

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modore instructions, they are labeled "Adjustment for feeding of double labels in 1525 printer." If you can't get them from Commodore, send me a #10 self-addressed stamped envelope and 50 cents for copying, and I'll send you a copy.

PROGRAMMING

Q: Some programs appear to use lengthy variables (for example, DELTA = 1). I thought variables could only be two characters. Does the computer disregard all after the first two?

Paul Arneth
Sandy Hook, CT

A: That's correct. PET Basic variables may be any practical length, but only the first two characters are significant. One other limitation is that no part of a variable name may read as a Basic keyword. The value of using long names is that they can be more descriptive. In the example you cite, Delta is very descriptive of the function of that variable in a flight simulator, whereas the equivalent DE = 1 would require a Remark statement for clarity each time it is used.

Q: I would like to sell, as a plug-in cartridge, a program that I have written. How can I get it mass-produced? Should I have the program copyrighted? If so, how?

Curtis Finke
Evansville, IN

A: Several companies will gladly sell you EPROM burners to convert your program into ROM form. Two with which I am familiar are the Prom Queen from Gloucester Computers (1 Blackburn Center, Gloucester, MA), and the Promenade from Jason Ranheim (580 Parrott, San Jose, CA). To complete the process, you will then need cartridge shells. These are available from at least two companies: Eastern House Software (3239 Linda, Winston-Salem, NC) and Richvale Telecommunications (10610 Bayview, Richmond Hill, Ontario, Canada). These companies or others like them may also be willing to burn the needed ROMs for you, saving you the need to have an EPROM burner.

Recent court decisions suggest ROM-based programs can now be copyrighted, so long as they claim to be so. Therefore, be sure to include a copyright notice, such as "Copyright 1985 Curtis Finke, all rights reserved" both in the code stored in the ROM and on the outside of the ROM and cartridge. That should be enough to copyright your program. However, you can gain some advantages in a lawsuit to enforce your copyright if the copyright has been registered at the U.S. Copyright Office in Washington, D.C. The cost is small, but contact the copyright office for current details.

Q: I would like to know how I could make a figure appear on the screen, say, a small man, and make it walk across the screen, controlled by joysticks. I would also like to be able to make a ladder and have the figure climb it. And one more thing: I would like to make him shoot by pushing the fire-button, and have the shots affect certain objects on the screen rather than others.

Could you send a short program that would illustrate such an action? Even a recommendation for a book would be deeply appreciated.

Mike Martin
Wilmington, DE

A: You need to learn about sprites, also known as movable object blocks. They are one of the most powerful features of the 64, and can be used to do everything you ask, but not in a program short enough to print here.

I've reviewed some books that might help you—*Sprite Graphics for the Commodore 64*, from Prentice-Hall/Micro Text (Englewood Cliffs, NJ), *The Graphics Book for the Commodore 64*, from Abacus Software (Grand Rapids, MI) and *Graphics for the Commodore 64 Computer*, from Spectrum Books/Prentice-Hall (Englewood Cliffs, NJ).

Also, consider using a sprite-making program, such as Sprite Master, from Access Software (Salt Lake City, UT), or Spwriter, from the October 1984 issue of *RUN*. Such programs take much of the drudgery out of using sprites.

Q: I connected a reset switch to my 64. However, it wipes out all memory, programs and data, and it returns to the start-up screen, as though I'd just turned the power switch off and on. Can you help?

Bob Watson
Houston, TX

A: Although the start-up screen appears and nothing can easily be listed, all Basic memory locations, except a few pointers, remain intact after using a reset button. The trick is restoring those pointers. If you have a machine language monitor in memory, that will be a fairly easy process; simply use the SYS command to access it. It will be where it was before the reset. From the monitor, you can restore a VIC or 64 Basic program by changing locations $2D–$2E to point to the first location after the three $00 bytes that mark the end of Basic programs. With a bit of investigation, you may also be able to restore your variable pointers.

Q: How can I reset pointers to salvage a program I spent 12 hours on? I have a machine language monitor, so I can see the program in memory. If I try to list it, it starts out all right, but later looks like garbage. I tried to reenter each line that looked all right, but when I got to certain spots, the screen just "freaked out," turned black and made little shapes in the corner. What is going on, and can I salvage some of this program by resetting something?

Gil Doubrava
San Antonio, TX

A: Using the machine language monitor, you might want to try resetting link pointers to each line that lists incorrectly. (In Basic, the first two bytes of each line make up a pointer to the address of the next line; low byte first.) You may also uncover, within a troublesome line, an altered byte that can be changed

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to correct the program, again from within the monitor. However, it sounds like your program is beyond such help. You might find it takes longer to repair than to retype.

If this is the only program that fails, I expect the problem is that it includes a faulty Poke statement, and that you ran it before saving a copy to tape or disk. When writing a program, I save my work every twenty minutes, using a different filename each time. When I finish, I save programs one more time before running them. That way, I almost never lose a program.

HARDWARE

Q: I am looking for a colored replacement ribbon for my 801 printer. Where can I purchase one?

Steve Mikolajewski
Saginaw, MI

A: Though I haven't tested them, such ribbons are advertised by Pixellite Computer Products, authors of the excellent and popular Print Shop program, sold by Broderbund. Pixellite is located at 2000 Center St., Suite 100–1345, Berkeley, CA 94704 (415-527-6400). They offer red, green, blue, purple and brown ribbons for the 801, at $14 each, and for other popular printers at prices ranging from $7 to $13.

Q: I own a VIC and my friend owns an Atari 800. We both have a cassette recorder. Do you know how I can load his programs?

Rich Pasela
Strongsville, OH

A: Sorry, but you can't. Though both the VIC and Atari use the same cassettes, their data storage formats are quite different and incompatible.

Q: Please tell me if it is a good idea to get a modem and what I can do with one.

Sean Bergman
Veradale, WA

A: The key factor in deciding whether or not to get a modem is whether or not you can afford its benefits. CompuServe, for example, is a veritable cornucopia of information, but, where I live, using it costs me $20 an hour, so I tend to check in quickly once a week when the long-distance rates are lowest.

A friend in a larger town 30 miles away calls CompuServe at the same number I do, but for him it's a local call. Many towns, including his, also have active telephone bulletin board systems that people can call for free in their local dialing area.

As for what you can do with a modem, I'll cite one recent example. The day Commodore's new C-128 computer was announced, complete details about it were available to anyone interested, via CompuServe, within a half hour after the news conference that announced it. Although most weeks the news isn't as exciting as that, regular users of information networks and bulletin board systems tend to hear about news in the industry before most others.

One other important advantage offered by a modem is that it allows you to exchange files with users of other brands of computers, something you normally can't do via cassette or disk.

For more information on what you can do with a modem, be sure to follow *RUN*'s series on telecommunications, which began in the May issue.

SOFTWARE

Q: I own a Cardco Write Now! word processor and think it is great, but could you explain why I get double or triple spaces in between words when there are only single spaces on my television screen?

Joe Rambaldi
Belleville, NJ

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Q: **I am looking for software that may be useful in college algebra, physics and trigonometry. I am particularly looking for programs that will analyze problems, showing complete solutions, rather than just the answers.**

Henry Dove
Box 396
Atchison, KS 66002

A: I've included your address, because Commodore programs suitable for use in college are embarrassingly scarce. The only college-level program I can recommend is CBS Software's Quadratic Equations, from their "Success with Math" series. It is an excellent program and does what you ask.

One other program worth mentioning for college use is Commodore's Sky Travel, which is a fully functional planetarium. I consider it a must for astronomy classes at any grade level. It is so well done that such classes can justify buying a 64 just to use it.

Q: **I want to purchase some foreign language software written and marketed in West Germany. Can you tell me if the software will run directly on my equipment here in the States without any electrical modification?**

Brooks Haderlie
Columbus, OH

A: Yes, it will work just fine here. I've received disks and cassettes from all over the world and have had no trouble using any of them on U.S. equipment.

Q: **Where can I buy Plus Graph for my Plus/4? When a local company tried to call Tri Micro, the phone had been disconnected.**

Judy Maxwell
Louisville, KY

A: I've just this week received a press release from Tri Micro, listing a new address and phone number. Try contacting them at: International Tri Micro, 14072 Stratton Way, Santa Ana, CA 92705 (714-832-6707).

Any Plus/4 owners with questions about the "3+1" application ROM built into the Plus/4 may also want to contact Tri Micro, since they developed it for Commodore.

Q: **What is public domain software and how do people get hold of it?**

Steave Trelut
Greeley, CO

A: Public domain programs are software donated by programmers for the use of other computerists. The programmers are not interested in marketing their software commercially. It's free, except for a nominal charge for the media on which the program is stored, as well as packaging and shipping costs. There are thousands of such programs, including some of the best-known utilities, such as Micromon.

The easiest way to get such software is through a Commodore user's group. Most now have dozens, if not hundreds, of disks. The Toronto, Ontario, PET User's Group is special in this regard. It is the largest user's group in the world, with a correspondingly huge library that is nonetheless reasonably well organized and documented. It accepts associate memberships from anywhere and ships disks of public domain programs all around the world.

If you need a public domain program mentioned in this column and can't get it more cheaply elsewhere, I have it and will send it anywhere on disk for $15, U.S. currency. R

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Commodore's Service Network

Local service is now available to Commodore computer owners through the creation of a national network of service centers. Commodore has provided RUN *with a current list of service centers, but more are being added almost daily. In the next three issues, we will be publishing the list of service centers categorized by state for easy reference. A call to the toll-free Commodore support hot line (800-247-9000) will give you the most up-to-date information about service and dealer locations.*

Attention, dealers: If we haven't included your name, send in the name of your store, along with the address and telephone number, to RUN, *80 Pine St., Peterborough, NH 03458. We'll update the list in subsequent issues.*

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Model City Electronics
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209-941-8631

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Victorville, CA 92392
619-245-3622

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916-920-1107

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Fullerton, CA 92631
714-933-6993

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Costa Mesa, CA 92626
714-641-0181

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National City, CA 92050
619-477-3106

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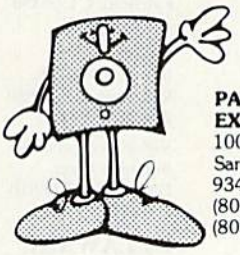

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813-977-1280

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217-787-4855

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Chicago, IL 60660
312-338-6000

Computer Clinic
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Manhattan, IL 60442
815-478-4995

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Palos Heights, IL 60463
312-448-2775

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Peoria, IL 61615
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Dunlap, IL 61525
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Dubuque, IA 52001
319-557-8653

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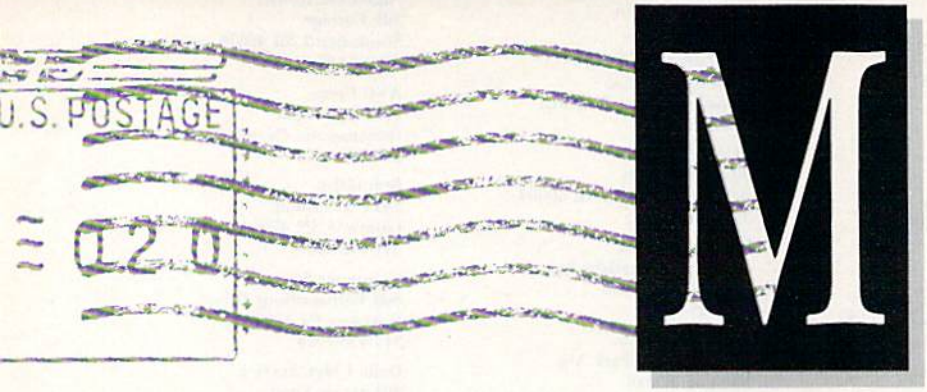

RUN's Magical 13th Issue

Thanks to wizard Lou Sander for the incredible "lucky 13th" Special Issue of *RUN*! This has got to be one of the most valuable compendiums of truly useful tips to (yet) be accumulated and published for the C-64. Lou Sander would have been proud of the "fight" at the newsstand for the last copy of the magazine. Furthermore, the computer store was out of both the Special Issue and the regular issue, which sold out in one day!

Needless to say. . . I won the battle at the newsstand. I have sent in my subscription, so I won't have to fight the crowds again.

A note of thanks to Lou for also indexing all 512 tricks. I have used the index many times to relocate tricks for my friends who weren't lucky enough to get their very own copies.

David Kemmer
Oronoco, MN

Let me congratulate you on your Special Issue and its year's worth of digital prestidigitation—it was terrific!

Dominick Cascio
Forest Hills, NY

Magic is my favorite part of *RUN*. The 1985 Special Issue was amazing and well worth the wait for delivery.

David Stumme
Bellport, NY

I found your Special Issue well worth the money. Why, the wall chart alone was worth the $3.95. Keep up the good work.

J.H. Langston
Newport News, VA

Okimate 10 Is Okay!

Regarding comments published on the Okimate 10 printer in your March Mail RUN. . . I, too, have found this to be a very good printer, particularly when used with good thermal paper. It prints better on thermal paper than on thermal transfer paper. The solid areas are indeed solid, much more so than that of most dot-matrix printers.

However, good-quality thermal paper can be *very* hard to find. The type I am using, after great efforts in searching, is the IBM PC Compact Printer Paper, part no. 1503926. It comes in packs of 250 8½ × 11 fanfold pages.

Sam Wang
Clemson, SC

For more information on the Okimate 10, see p. 115 of last month's issue.

Editors

Graph Maker 64

Your April 1985 issue contained a program called Graph Maker 64, by Doug Smoak. I would like to compliment you and Mr. Smoak for making available a most useful program for anyone who has need to utilize graphs for business or personal use. The end result is most professional, and you certainly can't beat the price.

For those who wish it, Mr. Smoak can furnish a two-line addition to the program, allowing you to leave a vertical space between the graphed columns. This greatly assists visibility on a black-and-white printout.

Edmund J. Korber
Ebensburg, PA

A Plus/4 Enthusiast

I am the proud owner of a nifty-swifty, handy-dandy Plus/4. I am also proud to say that I was one of the first people in my city to own one, and, for the price, I wouldn't own anything else.

I have enjoyed "Spotlight on Productivity," your informative and comprehensive series on the Plus/4's built-in programs (*RUN*, December 1984, February, April and May 1985). You mentioned you were going to run an article on TEDMON, the Plus/4's built-in machine language monitor. If so, I hope it will be written in the same easy-to-understand English as your previous Plus/4 articles.

I was excited to see in your March issue that you had taken the time to convert some programs from C-64 to Plus/4 (specifically the business programs). I hope you will continue to do this for readers in future issues.

Scott C. Burg
Phoenix, AZ

See p. 76 in this issue for our article on TEDMON. We appreciate the many letters we've received from Plus/4 owners about this series, and we will continue coverage of the Plus/4 on a monthly basis, with articles by various authors. We will also continue to run Plus/4 program listings.

Editors

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The Mail RUN

Commodore Service Improving

In regard to your letter "Where's Commodore's Service?" (*RUN*, March 1985), I have a happier story. My C-64 and 1541 developed annoying losses of data when I was running data programs that required continual use of the drive. Additionally, my power supply was getting hot enough to use as a hot plate! Only a fan directed at the power supply and disk drive could cool things down enough for me to safely get through new data entries.

One evening, as I sat at the keyboard huddled underneath a blanket in an attempt to stay warm while the fan blasted at me and the drive during data entries, I thought the entire scene was rather hilarious.

I brought up my word processing program and drafted a letter to Commodore suggesting they find some way to cool down their drives and explaining the rather unorthodox situation I was experiencing between my fan and blanket and Commodore equipment.

Within a week, I received a letter from Commodore. I was told a new power supply was being shipped free of charge and was invited to send in my disk drive for examination and free repair if necessary—my only charge being shipping expenses one way. The power supply arrived soon after, and the system has worked perfectly since then, with no need to send in the drive. I thought Commodore was pretty terrific and wrote them to that effect.

A suggestion to other users: Read your local newspaper's classified advertising about computers. I have found several independent computer stores that will service Commodore equipment. Even more importantly, Commodore has recently announced the establishment of a national service network with nearly 1300 outlets. This should take the heat off Commodore and clearly demonstrate that they are indeed supporting their customers.

Linda Darnton
Gaylord, MI

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Communications Software for Commodore 64 with FREE Rockney Disk Utilities!!!

If you are serious about terminal programs and communications, you need this package. Very simply, this is the "professional model." It's the only communications software for C-64 that is recommended by the "World Leader in Information Services." Response has been absolutely tremendous. Thank you all!! Order now and we will enclose a FREE COPY of our hot-selling Rockney Disk Utilities (a $24.95 value).

You Get:

- On-line or Off-line printing of local and host files.
- Down-loading and up-loading of sequential files the size of the disk.
- XMODEM protocol for error-free transmission of BASIC programs, machine language programs, and sequential files.
- Both ASCII and PET ASCII character sets. ASCII character set can be user defined.
- Fully adjustable communications parameters for parity, data bits, stop bits, echo, and speed.
- Full implementation of flow control. X-on/X-off characters can be user defined.
- Spool file to record entire session on disk.
- Special security masking of sensitive data and passwords.
- Accurate system clock to record connect time.
- Program is 100% machine language with error-free 1200 baud operation.
- Multi-colored displays with all colors user defined.
- Full support for up to four 1541 disk drives, all Commodore printers, and the 1520 plotter. (Yes, you can print on-line with the 1520!)
- Autodial feature for the Commodore 1650 and 1660 Automodems and Hayes Smartmodem.
- Full implementation of the ASCII control codes.
- Key defined MACROS, allow user to define commands, so repetitious tasks can be done with single key-strokes.
- Full DOS support. All DOS commands can be done from within the program, including Display BAM.
- The program is not copy-protected, but it is copyrighted. No banging of the disk drives! You may make as many copies as you like for your own use.

ROCKNEY WORK STATION comes with a complete users guide containing many tips and examples of use.

Please send me Rockney Work Station and my free copy of Rockney Disk Utilities.
$49.95 on disk

☐ Check ☐ Money Order Maryland residents, please add 5% Sales Tax.

ROCKNEY SOFTWARE
16528 Baederwood La, P.O. Box 5795, Derwood, MD 20855

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C-64 Only

Stock-Graph draws great color graphs of weekly stock prices and moving averages. You may choose your own moving average. A SUPER EXPANDER or SIMONS' BASIC is required to draw graphs.

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The best of public domain software for the Commodore 64.

There are programs for a fun time, music, high resolution pictures, a variety of games, educational programs, and many useful utilities and applications. The programs in the 64-GOLD library have been tested and work—try some today.

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- ☐ Complete set of 64 disks with printed file descriptions. $259

Check boxes of the items you want and return to 64 GOLD. CA residents please add state sales tax.

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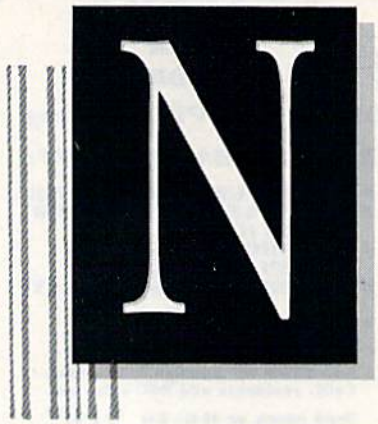

Compiled by SUSAN TANONA

Productivity Trio

Softsync, Inc. (162 Madison Ave., New York, NY 10016) has released Trio, an integrated package for the Commodore 64.

The package contains a word processor, spreadsheet and database program, all of which are designed to work together. Trio is available on disk for $69.95.

Check Reader Service number 400.

■

At the Races

Thoroughbred & Harness Racing Handicapping is a horse-racing analysis package for the C-64 and VIC-20. Three programs are included: Thoroughbred Racing Analysis, Harness Racing Analysis, and Bet Return Analysis.

Available on tape or disk, the package retails for $29.95. Software Exchange, 2681 Peterboro Road, PO Box 5382, W. Bloomfield, MI 48033.

Check Reader Service number 401.

■

Wishbringer

Infocom (55 Wheeler St., Cambridge, MA 02138) has released Wishbringer, an interactive fiction game that is geared toward the introductory-level player.

You are a mail clerk in a small town. You set off to deliver a mysterious envelope to the Olde Magick Shoppe and find that you must do battle with Evil One and her Boot Patrol. Wishbringer is on disk for the C-64. Retail price is $34.95.

Check Reader Service number 402.

■

C Power Compiler

Pro-Line Software (755 The Queensway East, Unit 8, Mississauga, Ontario, Canada L4Y 4C5) has released C Power, a compiler that uses the C language.

C Power compiles directly to 6510 machine code, thus avoiding the need for any intermediate step. It is available on disk for the C-64 and retails for $99.95.

Check Reader Service number 403.

■

Easy-Link

Easy-Link is a serial interface from Progressive Peripherals & Software (2186 South Holly, Denver, CO 80222).

The device is 100% transparent, completely bi-directional and comes with its own power supply. Retail price is $99.95.

Check Reader Service number 404.

■

Teacher's Helper

Genesis 2 is a lesson-authoring system that allows teachers or parents to create computer exercises in a question-and-answer format. These exercises can be printed out and saved on tape or disk for future use.

The program retails for $20. Greenwood Software, 1214 Washington, The Dalles, OR 97058.

Check Reader Service number 405.

■

Wurble

Sher-Tek Systems (PO Box 6808, Station J, Ottawa, Ontario, Canada K2A 3Z4) has released Wurble, a game for the C-64.

Designed for ages ten and older, the game encourages the use of spelling and vocabulary skills, as you compete to form words on the computer's screen. Retail price is $14.85.

Check Reader Service number 406.

■

Jogger's Log

Jogger is a runner's log that allows you to record and update your goals and progress as a runner. You can print out high-resolution graphics plots of your weekly, monthly and annual statistics.

It is available on disk for the C-64. Parsons Software, 1920 Briar Meadow, Arlington, TX 76014. The retail price is $29.

Check Reader Service number 407.

■

Trivia Flight

Mark of the Falcon (3621 Goodell Lane, Fort Collins, CO 80526) has

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released Trivia Flight, a game for the C-64.

The package contains three disks and offers more than 4000 trivia questions. Additional question disks will be released every two months. Retail price is $26.95.

Check Reader Service number 408.

C-64 Disassembler

Schnedler Systems (1501 N. Ivanhoe St., Arlington, VA 22205) has released Symbol Master, a symbolic disassembler for the C-64.

This package aims to pick up where simple disassemblers leave off, in allowing you to see the overall structure of a program. Available on disk, retail price is $49.95.

Check Reader Service number 409.

Program with Chipwits

Chipwits is a game that aims to introduce the basic concepts of computer programming, using 16 robots that can be programmed to move, see, smell and grab onto objects.

Available on disk for the C-64, Chipwits retails for about $34. Epyx, Inc., 1043 Keil Court, Sunnyvale, CA 94089.

Check Reader Service number 410.

Copy-Protected Disks

Glenco Engineering, Inc. (3920 Ridge Ave., Arlington Heights, IL 60004) has released Safeguard 64 disks for the C-64.

The disks are designed to prevent unauthorized duplication of programs, through the use of a magnetic mark that is on each disk. Retail price is between $1 and $5.50 each.

Check Reader Service number 411.

Crusade in Europe

Crusade in Europe is the first release in the Command Series for the C-64, from MicroProse Software

(10616 Beaver Dam Road, Hunt Valley, MD 21030).

This is a simulation of the American and British struggle against Germany, from the D-Day invasion to the Battle of the Bulge. Available on disk, retail price is $39.95.

Check Reader Service number 414.

Best Business Management

Business Electronics Software & Technology (PO Box 852, McMinnville, OR 97128) has introduced a set of business-management programs for the C-64.

They are B.E.S.T. Accounts Receivable, B.E.S.T. Accounts Payable, B.E.S.T. Inventory and B.E.S.T. General Ledger.

Check Reader Service number 412.

Mach 5

Access Software (925 East 900 South, Salt Lake City, UT 84105) has released Mach 5, a disk speed-up enhancement package for the C-64.

It loads disk-based programs at a faster rate of speed, adds 4K of memory to Basic, and is 100% transparent. Included on the cartridge is a disk-organizer program. Retail price is $34.95.

Check Reader Service number 413.

Build a Book About You

Build a Book About You is a package that allows children between the ages of two and 12 to design, print out and bind their own storybook. Included in the package are a disk containing four stories, two illustrated page sets, and two hard-bound covers.

Retail price is $39.95. Scarborough Systems, 25 North Broadway, Tarrytown, NY 10591.

Check Reader Service number 415.

Virtuoso

TCO Software Co. (PO Box 81504, Fairbanks, AK 99708) has released Virtuoso, a music program for the Commodore 64.

It allows you to write and play long pieces of music in up to three voices. A second version, Virtuoso+, will print out your musical compositions. Both are available on disk. Virtuoso retails for $39.95, Virtuoso+ for $45.

Check Reader Service number 416.

One on One in World War II

Computer Ambush is a World War II strategy game for the C-64, from Strategic Simulations (883 Stierlin Road, Bldg. A-200, Mountain View, CA 94043).

You will experience the challenge of one-on-one combat in a small French town. Available on disk, retail price is $59.95.

Check Reader Service number 417.

Pascal for the Pro

Kyan Software (1850 Union St. #183, San Francisco, CA 94123) has released Advanced Kyan Pascal.

The package offers such extensions as enhanced graphics, string handling and random-access files. The compiler runs approximately 30 times faster than Basic. Available on disk for the C-64, retail price is $69.95.

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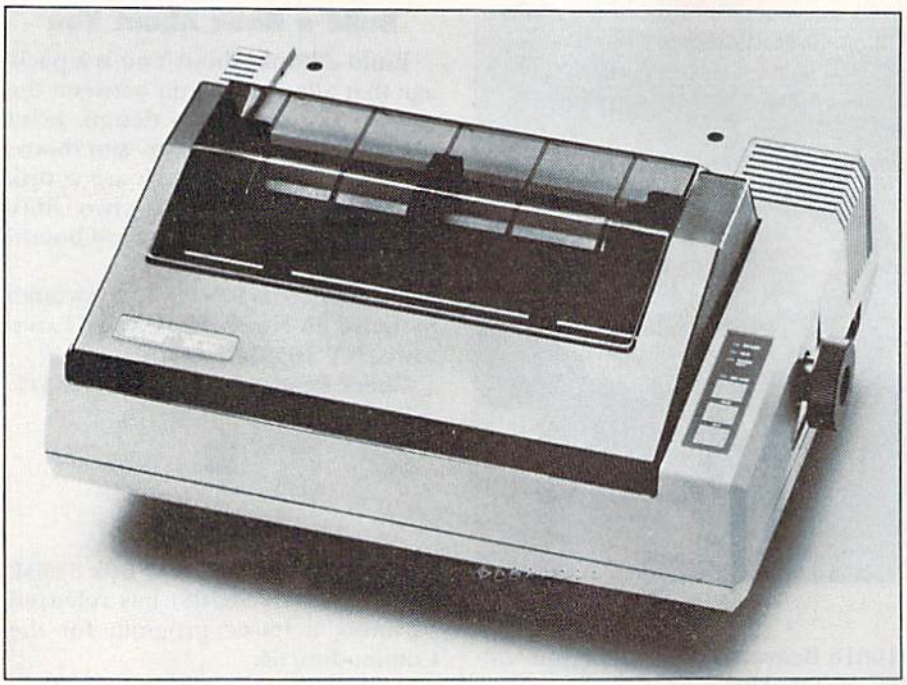

Commodore-Compatible Printer

The SG-10C is a dot-matrix printer with an option for near letter-quality print, from Star Micronics (200 Park Ave., New York, NY 10166).

It has a built-in Commodore interface, and offers a print speed of 120 cps in the Draft mode, and 30 cps in the Near-letter-quality mode. Retail price is $299.

Check Reader Service number 419.

Self-Booting Software

ABL-64 is an automatic loader cartridge for the C-64. The device will reload and run a program in the event of a power failure, resuming where the program left off before the failure.

Retail price is $39.95. Input Systems, 15600 Palmetto Lake Drive, Miami, FL 33157.

Check Reader Service number 420.

Team-Mate

Tri Micro (14072 Stratton Way, Santa Ana, CA 92705) has released Team-Mate, an integrated package for the C-64.

You can move freely among the word processor, database and spreadsheet programs contained on the disk. A business graphics program is also included. See review in this month's Software Gallery. Retail price is $49.95.

Check Reader Service number 421.

Parallel Printer Interface

The ApriCord CD is a printer interface that supports the printing capabilities of the entire line of Commodore computers. The device allows parallel graphics printers to emulate Commodore printers.

Retail price is $69.95. Apricorn, 7050 Convoy Court, San Diego, CA 92111.

Check Reader Service number 422.

Real Estate Investor

Jance Associates (PO Box 234, East Texas, PA 18046) has released Real Estate Investor for the C-64.

The program is designed to aid in the buying of a home or other real estate, and explores such areas as mortgage payments, depreciation and the possible consequences of your purchase. Available on tape or disk, retail price is $35.

Check Reader Service number 425.

A Master of Print

The Printmaster/+G parallel printer interface is compatible with the C-64, the Plus/4 and the C-128, and offers emulation of the Commodore printers. Full graphics and graphics characters are supported.

Retail price is $119.95. Omnitronix, PO Box 43, Mercer Island, WA 98040.

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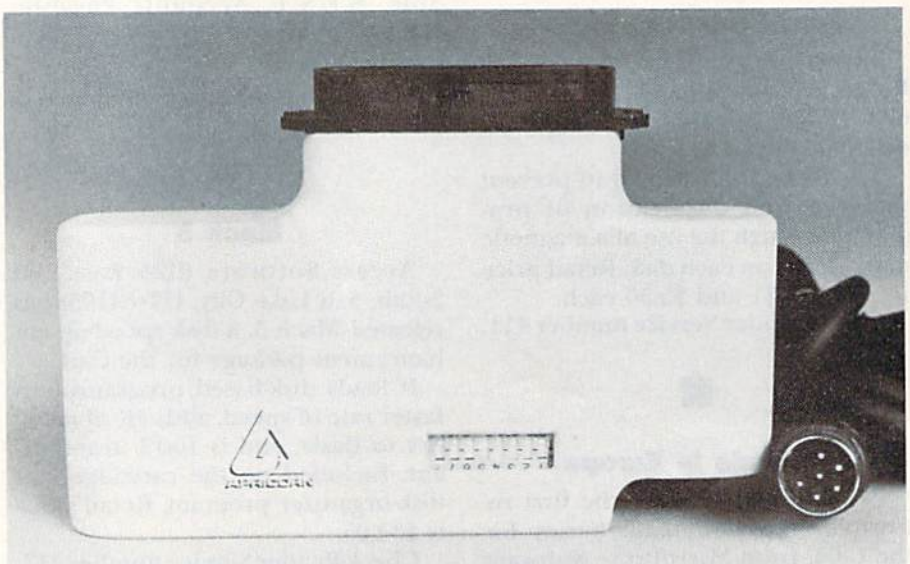

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RUN AMOK

Item: The telephone number for Police-Net, published in Alan Bragg's letter in the June Mail RUN, has been changed. The new number is 713-873-0403.

Item: The following line changes or insertions should be made in the listings for Datafile Update (May 1985, p. 100):

In Datafile (Listing 1), change line 23: `23 MEM=3ØØØØ:RETURN`

In DFReport (Listing 2), insert new line 538, change line 575, insert new line 888 and change the former line number 888 to 889:

```
538 AØ=Ø:PRINT"{SHFT CLR} {CTRL 9}{11 SPACE
    s}PRINT OPTIONS MENU{8 SPACEs}"

575 IFK=2ANDFL=1THENGOSUB842:GOSUB888:GOTO5
    7Ø

888 IFZ<>1THENRETURN
889 AØ=AØ+VAL(REC$(K%(I),VAL(ML$(NC,1)))):R
    ETURN
```

In Datafile (Listing 1), line 164 must be changed as follows in order to use DFPrint (see the article Datafile Fast Print, p. 30 in this issue):

```
164 FORI=1TOX:PRINT"{CRSR DN} SAVING POINTE
    RS";I;"{2 CRSR UPs}":PRINT#5,I:NEXTI
```

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How to type listings from RUN

Typing in listings can be difficult enough without having to worry about strange graphics characters, charts or tables. That's why we decided to make it easy to enter listings from *RUN* by translating everything we thought might be confusing in any program.

When you see something between the curly brackets, all you have to do is press the keys indicated. For example:

{SHIFT L}—means hold down the shift key and press the L key at the same time.
{COMD J}—means hold down the Commodore key (it is on the lower left side of the keyboard) and press the J key at the same time.
{SHIFT CLR}—hold down the shift key and press the CLR/HOME key.
{HOME}—press the CLR/HOME key without shifting.
{CTRL 6}—hold down the control key and press the 6 key.
{FUNCT 2}—function 2 (in this case, you hold down the shift key and press the function 1 key).
{CRSR UP}{CRSR DN}{CRSR LF}{CRSR RT}—these are the four cursor directions.
{UP ARROW}—means the arrow key (the one with the pi sign under it).
{LB.}—the British pound sign (£).
{PI}—the pi sign key (π); (shift and press the up arrow key).

Our translating program does not designate single spaces between characters. Within quotations, these spaces are often critical to the screen display. Be sure to read the listings closely and include these single spaces as you type in your program.

In some instances, when a large number of characters or spaces are repeated in a listing, we will represent them this way: {22 spaces} or {17 CRSR LFs}.

Print vs Print#

RUN readers should be aware of difficulties that may arise when entering listings that contain the PRINT and PRINT# commands.

These two commands may look very similar, but they are different. If, for example, you use a question mark (?) to abbreviate PRINT in a line such as 10 PRINT#4,A$, then you're telling the Commodore computer that you're trying to print the variable #4, which is not a legal variable name.

The command PRINT#4 actually means "print to file number 4." You can abbreviate PRINT# by hitting the P key and the shift and R keys at the same time and then entering the file number. But *do not* abbreviate PRINT# with a question mark.

If you think of PRINT as one command and PRINT# as an entirely different command, then you should have no problems.

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August

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